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The Impact of Monetary Policy Stance, Financial Conditions, and the GFC on Investment-Cash Flow Sensitivity

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Abstract

This paper investigates the significance of internal finance in determining firms' fixed capital investments. We estimate an investment model which allows us to test whether the marginal impact of cash flows on investment varies with the central bank's monetary policy stance, financial conditions at the macro level and the Global Financial Crisis (GFC). Using a comprehensive panel data set of Turkish small and medium-sized enterprises (SMEs) in the manufacturing sector, we find that investment-cash flow sensitivity is positive and statistically significant. This result implies that Turkish firms are financially constrained by internal finance. Results suggest that the monetary policy stance, represented by various indicators for robustness, significantly affects firms' financing constraints. In particular, investment-cash flow sensitivity declines during expansionary monetary policy periods. However, the argument does not hold for financially less constrained firms which can access external finance relatively easily. Having examined the response of firms' financing constraints to changes in financial conditions, we find that the investment-cash flow sensitivity declines when financial conditions are relatively supportive. Finally, firms need cash flow more for investing in the GFC compared to other years. The finding is consistent with relatively less availability of external funds in crisis periods.

JEL classification: C33, D92, E22.

Keywords: investment-cash flow sensitivity, financing constraints, monetary policy stance, financial conditions index

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Non-Technical Summary

The internal and external finance are not perfect substitutes since asymmetric information between firms and their lenders creates a risk premium for the latter. Internal finance is not expected to significantly affect fixed investment of firms that are not financially constrained or that can easily access to credit. On the other hand, it can determine fixed investment of financially constrained firms which have weak or no access to external finance. Monetary policy stance affects external finance premium by altering firms' net worth and/or banks' credit supply. In addition to that, macro-financial conditions matter in terms of firms' financing constraints. Especially, rise in the volatility of capital flows to emerging markets following the Global Financial Crisis (GFC) brought financial conditions to the forefront.

Previous studies regarding firms' financing constraints have several shortcomings. First, they focus mostly on listed firms. However, listed firms and non-listed firms significantly differ in terms of access to external finance. Second, empirical literature regarding the impact of monetary policy stance on firms' financing constraints, which is quite limited, generally focus on advanced economies. There is not enough firm level evidence for developing countries such as Turkey. Third, the impact of macro-financial conditions on firms' financing constraints, which has drawn attention with financial stability concerns after the GFC, has not been thoroughly investigated. Finally, there is not enough evidence addressing the impact of the GFC on financing constraints of Turkish manufacturing firms. The aim of this study is to contribute to the empirical literature by responding to those shortcomings.

The main findings can be summarized as follows. First, internal finance is a constraint over Turkish SMEs' investment on tangible assets. The strength of their balance sheets matters in terms of their investment decisions. Second, we observe that expansionary monetary policy significantly relaxes firms' financing constraints. While the finding is valid for financially more constrained firms, we do not have conclusive evidence regarding the financially less constrained firms. Third, macro-financial conditions matter in terms of the restrictiveness of financing constraints. Since the availability of funds in an open economy is not determined only by the domestic monetary policy, we take the interaction of broader macro-financial conditions with the cash flow sensitivity of investment into account. We provide evidence that supportive financial conditions relax firms' financing constraints. In line with the expectations, our findings indicate that cash flow sensitivity of investment is significantly greater during the global crisis period compared to other years without the crisis.

One of the implications that emerge from these findings is that policies ensuring SMEs' access to external finance is necessary. That would require measures to reduce asymmetric information between the SMEs and their lenders.

1. Introduction

The effects of financing constraints on the corporate investment are well documented in the empirical literature since the pioneering study of Fazzari, Hubbard, and Petersen (1988). When there are frictions in financial markets, different financing alternatives are no longer substitutable for each other in terms of firms' financing decisions. Firms' financing choices over the internal and external financing alternatives are driven by the relative costs[1]of those two alternatives. The most salient kind of friction in financial markets is the asymmetric information problem that occurs between the firms and several other kinds of parties such as banks, creditors, and shareholders. Monitoring and screening costs led by asymmetric information induces a premium over the external finance making it more costly than internal finance. Departing from the perfect financial markets assumption makes the financing structure of the firm relevant to its real decisions such as investing on tangible assets.

The link between strength of a firm's balance sheet and its fixed investment is established by estimating the cash flow sensitivity of investment. A firm's cash flow is regarded as an indicator for its net worth. When incorporated into an investment model, its coefficient estimate represents the responsiveness of investments to the variations in the net worth of the firm. If the financial markets function perfectly so that there are no extra costs between external and internal financing options originating from the asymmetric information problem, cash flow variable or internal finance is not expected to affect a firm's fixed investment significantly.

There is a substantial empirical literature following Fazzari et al. (1988) which estimates cash flow sensitivity of investment for financially constrained and unconstrained firms. However, the empirical literature so far has some limitations. First, it predominantly focuses on the listed firms, although the financing constraints on listed and unlisted firms significantly differ. Second, the previous studies regarding the impact of monetary policy stance on firms' financing constraints, which are also quite limited, generally focus on advanced economies (See Haase (2016) for US, Masuda (2015) for Japan, and Angelopoulou and Gibson (2009) for the UK). Third, they do not account for the broader financial conditions that reflect both monetary policy stance and domestic and international credit environment. While the indices of macro-financial conditions have become popular after the GFC, the empirical literature investigating their impact on cash flow sensitivity of investment remains scant. Finally, the effects of the GFC on the relation between corporate investment and financing constraints have not been examined thoroughly so far.

[1]We focus on the costs resulting from asymmetric information problem. There are also other costs on external finance such as transaction costs.

In this study, we investigate whether the cash flow sensitivity of investment significantly differs from each other for financially constrained and unconstrained firms. Apart from the previous empirical literature, we focus on unlisted SMEs operating in a small open developing country, Turkey. Then, we examine the interaction between the monetary policy stance and financing constraints on the firms' investment. We discuss if this interaction differs among firms which are classified according to the level of financing constraints. From a broader perspective, we look for evidence regarding the significance of financial conditions in a country in determining the cash flow sensitivity of firms' fixed capital investment. Finally, we investigate the influences of Global Financial Crisis (GFC) on the cash flow sensitivity of investment taking into account that access to external finance becomes harder in crisis periods.

Our empirical strategy is based on the Euler equation model of investment that includes a cash-flow variable as a proxy for frictions in financial markets. Using firm level data, we estimate the baseline specification and several extensions using dynamic panel GMM method. We examine the period between 2005 and 2014 which includes years with substantial growth rates in Turkish economy (such as 2005 with 9.0 per cent, 2010 with 8.5 per cent and 2011 with 11.1 per cent) as well as the GFC. It is also worth noting that our data set is one of the most comprehensive data sets that represent a large portion of the manufacturing sector in Turkey.

Our main findings indicate that monetary policy stance does affect the financing constraints on a firm's investments. This result holds for financially more constrained firms, which are those having lower exports to total sales ratio, lower bank credits to total liabilities ratio, and those that have less real assets compared to the corresponding industry averages. However, it does not hold for financially less constrained firms which can access external finance easily. After the GFC, the role of financial conditions in the economy became more pronounced since the monetary policy was conducted with macro-prudential policies aiming to maintain financial stability. Our results suggest that the tightness of financial conditions matters for the cash flow sensitivity of investment. In fact, investment decisions of Turkish firms are constrained less in terms of the strength of their balance sheets when financial conditions are relatively supportive. The results also indicate that financing constraints of Turkish SMEs amplify during the GFC.

The rest of the paper is organized as follows. Section 2 provides a brief literature review on the effects of firms' financing constraints on investment. Section 3 presents the model and the data. Section 4 provides the estimation results and Section 5 concludes.

2. Literature Review

The pioneering theory of capital structure literature, the irrelevance theory of Modigliani and Miller (1958), claims that the capital structure of a firm and its real decisions such as investment and production are independent of each other. A firm's choice on internal financing over debt and equity finance does not matter in terms of its net value. The theory has been the benchmark of capital structure literature for a long time. As its rigid assumptions such as no taxes, no transaction costs, no bankruptcy costs and the existence of information symmetry between firm's management and its investors are criticized, new explanations for the capital structure of firms emerged. Among alternative theories, the trade off, and the pecking order theories of capital structure are the most popular ones. In this paper, we focus on the pecking order theory of capital structure in explaining the firm's constrainedness in terms of the internal finance.(See Kraus and Litzenberger for the trade off theory, Baker and Wurgler (2002) for market timing theory and Ross (1977) for signaling theory of capital structure.)

One of the most critical departures from the irrelevance theory is the rejection of the assumption that capital markets are perfect. When the capital markets are imperfect, the debt instruments are no longer substitutable among themselves. Following this approach, Myers and Majluf (1984) formalize the pecking order theory of corporate finance which asserts that firms rely on their internal funds, debt, and equity in hierarchical way to finance their operations. The reason behind this financing hierarchy lies in the additional costs originating from the asymmetric information between firm's management, and its creditors and investors. The firm's management has more information on the quality of the firm's projects than its investors and creditors. In such a case, investors demand a premium to compensate the risk that the asymmetric information problem creates. Thus, the internal finance, and external finance are no longer substitutable to each other as the former has a cost advantage over the latter (See also Townsend (1979)).

From an empirical point of view, Fazzari et al. (1988) tests the significance of the financing constraints on firms' fixed investment by relying on the pecking order theory of capital structure. If internal and external finance are perfect substitutes, then cash flow is not expected to be binding on firms real decisions, as they can turn to external finance options such as issuing debt instruments or equities without any additional costs. In this framework, the cash flow sensitivity of investment matters. It indicates the responsiveness of a firm's fixed capital investment with respect to changes in its cash flow. To test the significance of financing constraints on corporate investment, Fazzari et al. (1988) splits their sample into two parts according to a criteria for *financial constrainedness*. The firms paying lower

dividends to their shareholders are defined as financially constrained.[2] At the end, if there is significant difference between the cash flow sensitivity of both financially constrained and not constrained firms, then it is concluded that financing constraints on corporate investment exist. Although there is a large empirical literature reporting positive relationship between cash flow sensitivity and financial constrainedness, there are also several studies which report the opposite. Using the same data set of Fazzari et al. (1988), Kaplan and Zingales (1997) questions whether cash flow sensitivity is a good measure of financial competitiveness. Contrary to the findings of the former, they report a negative relationship between the cash flow sensitivity and financial constraints. They base their findings on three arguments, namely the measurement errors in Tobins q, the effect of outliers, and the sample selection problems. This debate continues with further studies such as Fazzari, Hubbard, and Petersen (2000), Kaplan and Zingales (2000). Both studies claim that their opponents theoretical models fail to explain the relation between internal finance and investment, and their critiques are not well grounded. In order to provide an explanation to these controversial findings, Cleary, Povel, and Raith (2007) examines the theoretical relation between internal finance and investments. They claim that a U-shaped relationship exists between the two variables. Consistent with the common explanation, investment level monotonically increases with the rising internal funds. On the contrary, investment level declines to a particular level as the internal funds diminishes. After this particular level, it recovers even if the internal funds goes to negative side. They explain this movement with the income generated by previous investment that it is used for financing new investment.

The recent empirical literature following Fazzari et al. (1988) framework examines the cash flow sensitivity of investment from different perspectives. Using data of European unlisted SMEs, Mulier, Schoors, and Merlevede (2016) investigates whether the cash flow sensitivity of investment differs with respect to the level of financial constrainedness. Tsai, Chen, Lin, and Hung (2014) analyzes the effect of banking system reform on cash flow sensitivity of investment for Chinese listed firms. Using firm level corporate governance data of 14 developing countries, Francis, Hasan, Song, and Waisman (2013) examines the relation of corporate governance and cash flow sensitivity of investment. To assess the effects of public subsidies on firms investment-cash flow sensitivity, Colombo, Croce, and Guerini (2013) use data from unlisted Italian firms. Using US firm data for the period 1980-2008, Attig, Cleary, Ghoul, and Guedhami (2012) examines the relevance of institutional investment horizon to the investment-cash flow sensitivity. Yet, the impact of monetary policy stance on the cash

[2] Guariglia (1999) summarizes the criteria to describe financially constrained firms used in the literature as: dividend payment ratio, size, age, availability of credit grade and affiliation with banks or holding companies.

flow sensitivity of investment has not been thoroughly investigated.

There is limited research related to the effects of monetary policy stance on firms financing constraints. Angelopoulou and Gibson (2009) investigates whether the cash flow sensitivity of investment for UK firms differs with respect to the monetary policy stance. They develop a monetary policy indicator for the UK using a narrative approach. The interaction of cash flow sensitivity with a monetary policy indicator reveals that the cash flow sensitivity of financially constrained firms increases during the periods of tight monetary policy. Their findings are in line with the expectations of firm balance sheet channel of monetary policy transmission. Masuda (2015) provides supporting evidence that the liquidity constraints of firms increases as the monetary policy becomes tight. To estimate a q investment model for Japanese manufacturing firms, he uses the liquidity ratio (the ratio of liquid assets to total assets) instead of cash flow to represent the firms' net value. His findings suggest that liquidity constraints increase with tight monetary policies and quantitative easing policies alleviate the liquidity constraints on firms. In addition, he reports that tight monetary policies increase the liquidity constraints of firms as the firm size decreases. Recently, Haase (2016) examines the phenomena using data from listed US firms for the period 1971-2008. He uses the asset size as a criterion to classify firms according to financial constrainedness. He employs two indicators for the exogenous monetary policy shocks. One is the Romer series, and the other is the residuals from a VAR model which includes variables such as FED funds rate, real GDP, inflation rate and PPI. His results suggest that the fixed investment of constrained firms is affected by monetary policy shocks more than that of unconstrained firms. The literature so far has two main limitations. First, the previous research concentrates on listed firms, although the financial constraints on listed and unlisted firms differ significantly. Second, the empirical research predominantly focuses on advanced countries such as the UK, US, and Japan. However, small open developing countries, such as Turkey, draw more attention since their external financing structure is different from that of advanced countries. While bank financing is dominant in Turkey, market financing is almost negligible. In addition, trade credits are important external finance instruments, especially for Turkish SMEs.

In an era of highly integrated financial markets, global shocks increasingly become a more significant factor for domestic financial conditions, especially in small open economies. The availability of global liquidity and the course of capital flows into emerging markets determine the availability of funds within a country. The liquidity, stimulated by the enormous amount of quantitative easing in advanced economies after the GFC, headed towards the emerging markets to have relatively higher yields. Central banks in emerging markets have taken measures, namely macroprudential policies, to stabilize the capital flows that cause

fluctuations in exchange rates and distort the pricing behavior.[3]

Macroprudential policies targeting the sustainability of financial stability, and monetary policy targeting the price stability can work either in similar directions or in opposite directions. For instance, expansionary monetary policy can be applied with policies aiming to decrease the credit growth. Another example may be a high inflationary country that performs tight monetary policy. That country can simultaneously limit credit growth because of the availability of funds originating from the surge in capital inflows. As a result, we need to consider not only the domestic monetary policy but also the broader financial conditions for a complete treatment. We account for Turkey's increased connectedness to global financial markets compared to the last decades and its exposure to the volatile capital flows which become significant especially after the GFC. Taking these into consideration, we investigate the impacts of both monetary policy stance and the broader financial conditions on firm's financing constraints.

Studies examining the relation between financing constraints and corporate investment of Turkish firms mostly focus on listed firms. Umutlu (2010) investigates the effects of leverage on firm's investment using a balanced panel of 92 listed nonfinancial Turkish firms over the period 1993-2002. Estimating the Tobin's q investment model, he finds that cash flow sensitivity of investment is not significant. Ozmen, Sahinoz, and Yalcin (2012) estimates a similar investment model for 168 listed Turkish firms for the period 1998-2009. Using difference GMM method, cash flow sensitivity is reported to be insignificant for large firms while significant for small and middle sized firms. They find that, Tobin's q positively and significantly affects the corporate investment. These studies, however, concentrate on the listed firms while majority of Turkish manufacturing firms are unlisted SMEs.

Several other studies use the CBRT's company accounts as the comprehensive firm data set that we also use. Analyzing the credit market imperfections and business cycle asymmetries, Gunay and Kilinc (2015) provides evidence on the financial constrainedness of Turkish nonfinancial firms. They use sectorally aggregated data from CBRT company accounts for the 1989-2006 period. Koç and Şahin (2015) investigates the balance sheet channel with fixed effects panel data methods using the same data source while spanning the period 1991-2008. Yesiltas (2009) investigates the financing constraints and investment decisions of Turkish manufacturing firms for the period 1991-2003. Estimating the investment model using data of 4559 manufacturing firms, she finds that internal finance significantly affects firm's investment. Kaplan, Ozmen, and Yalcin (2006) focuses on 1990-2004 period with a larger data set consisting of 6098 manufacturing firms. System GMM estimations indicate that cash flow

[3]Macroprudential policies are those aim to maintain the financial stability. The interest on these policies increased after the GFC. See Galati and Moessner (2013) for a review on macro prudential policies.

sensitivity is significant for large firms while it is insignificant for middle sized firms.

The previous studies using either listed firms' data or the CBRT's comprehensive data set have some limitations. First, they do not account for the interaction of financial constraints with monetary policy stance and financial conditions. Second, they do not control for the trade credit which is an important financing instrument for Turkish SMEs. Third, there has not been an analysis so far regarding the degree of financial constrainedness of Turkish SMEs with respect to their asset size, exporting behaviour, and bank finance dependency. And finally, although the GFC has affected Turkish non-financial firms negatively, previous research does not cover the period after the financial crisis. This study differs from the previous studies by covering a more recent period that includes the GFC, by using a more comprehensive data set provided by the CBRT, by controlling for the trade credit which is an important financing instrument for Turkish SMEs, and by considering the impact of monetary and financial conditions on the investment-cash flow sensitivity.

3. Empirical Analysis

3.1. The Model

Following Fazzari et al. (1988), the general model for estimating the cash flow sensitivity of firms' fixed capital investment can be written as:

$$(I/K)_{it} = f(\mathbf{X}/K)_{it} + g(CF/K)_{it} + \vartheta_{it} \tag{1}$$

where I is the amount of end of the year gross investment made to purchase tangible fixed assets by the firm i at time t. K is the beginning of the year stock of gross fixed tangible assets, or gross fixed capital stock[4], of the firm i at time t. CF represents the end of the year cash flow of a firm i at time t. $\mathbf{X}$ is the matrix of control variables representing the firm characteristics. ϑ_{it} stands for the composite error term. It is a combination of firm specific effects, λ_i, sector specific effects, μ_s, year specific effects, φ_t, and idiosyncratic error term, ϵ_{it}. Q-type investment models typically include the Tobin's q (Tobin (1969)) in matrix $\mathbf{X}$ in order to control for a firm's investment opportunities and its future profitability. In the absence of Tobin's q, another variable, sales, is used as a control variable. If the capital markets are perfectly functioning, so that internal and external financing instruments are perfect substitutes, it is expected that cash flow does not have any significant effect on a

[4]For several other studies using gross capital stock in estimating cash flow sensitivity of investment, see Colombo et al. (2013), Chen and Chen (2012), Lyandres (2007), Deshmukh and Vogt (2005) and Goergen and Renneboog (2001).

firm's fixed capital investment.

There are three common models, namely the Euler equation model, q-type model and sales accelerator model, that are used in the empirical literature to examine the impact of financing constraints on corporate investment. We cannot employ a q-type investment model in our analysis because the majority of firms in our data set are unlisted. Since we do not have information on the firms' market values, we cannot calculate the Tobin's q. Among the other two models, we use the Euler equation model because it explicitly considers the dynamic structure of investment behaviour and incorporates adjustment costs while investment level reaches the optimal capital stock (Bond and Meghir, 1994). Its main advantage over the alternatives is that it does not require profitability measures since it explicitly accounts for growth opportunities by using marginal product of capital.[5]

The baseline specification used in estimation is formulated as follows:

$$(I/K)_{it} = \alpha_0 + \alpha_1(CF/K)_{it} + \alpha_2(S/K)_{it} + \alpha_3(I/K)^2_{it-1} + \vartheta_{it} \tag{2}$$

where S is the amount of gross sales made by the firm i at time t. The nonlinear term is embedded to the model to control the non-linear dynamics of investment behavior. Here we assume that the adjustment costs associated with the physical capital investment are convex. Thus, the adjustment costs increase faster than the capital stock accumulation. As a result, large amount of physical capital investment becomes more costly and gradual increase in the investment level appears to be a favorable alternative.

The strict exogeneity assumption is generally not satisfied when the models including balance sheet variables are estimated with fixed or random effects methods. To address this concern, dynamic panel data methods are commonly applied in the empirical literature dealing with individual firm data in which explanatory variables are treated as either predetermined and/or endogenous. Following the common practice, we employ a dynamic specification which includes lags of dependent variable as follows:

$$(I/K)_{it} = \alpha_0 + \sum_{k=1}^{\rho} \beta_k (I/K)_{it-k} + \alpha_1(CF/K)_{it} + \alpha_2(S/K)_{it} + \alpha_3(I/K)^2_{it-1} + \vartheta_{it} \tag{3}$$

This dynamic model is estimated using the Arellano-Bover/Blundell-Bond system GMM approach (Arellano and Bover (1995); Blundell and Bond (1998)).

Several alternative models are employed to estimate the effects of monetary policy stance, financial conditions and the GFC on the financing constraints of Turkish manufacturing

[5]See Love (2001) and Schiantarelli (1995) for more detail.

SMEs. We first investigate the significance of financing constraints or internal finance in determining the fixed capital investment of firms. Cash flow to fixed capital stock ratio (CF/K) is the variable of our interest which is interpreted as the cash flow sensitivity of investment. The coefficient estimate of this variable is expected to be positive and significant if the firms are financially constrained. Then, we augment the model with an interaction term, $(CF/K)_{it} * EMP_t$, the product of cash flow sensitivity $(CF/K)_{it}$ and the expansionary monetary policy indicator EMP_t, which is a dummy variable taking the value 1 in the years that the monetary policy is expansionary. Equation (4) shows the specification to be estimated:

$$(I/K)_{it} = \alpha_0 + \sum_{k=1}^{\rho} \beta_k (I/K)_{it-k} + \alpha_1 (CF/K)_{it} + \alpha_2 (S/K)_{it} + \alpha_3 (I/K)^2_{it-1} + \gamma (CF/K)_{it} * EMP_t + \vartheta_{it} \quad (4)$$

The coefficient on the interaction term, γ, shows if firm's cash flow sensitivity of investment changes significantly among different policy stances. In order to get robust estimates, we use three alternative monetary policy indicators: (1) short term nominal interest rate, (2) the spread between short term nominal interest rate and the percentage change in real exchange rate and (3) the term structure of interest rates, namely slope of the yield curve.

We generally follow the short term nominal interest rates to decide about the Monetary policy stance of the Central Bank. To establish a relation between the CBRT's short term rates and monetary policy stance, we need a brief explanation on the change in bank's policy framework over the sample period.[6]

Before 2010, the borrowing rate of the Central Bank was considered as the effective policy rate because the excess liquidity in Turkish banking system made the Central Bank the net borrower of the system. After the GFC, banking system began to suffer from liquidity shortage which strengthened the position of Central Bank as the lender in the system. With the introduction of new monetary policy framework after 2010, CBRT began to provide liquidity to the banking system mainly through two channels which are one week repo and marginal funding. In this new policy framework, average weighted funding rate, which is calculated as the weighted average of the costs of these two main channels and other several funding instruments, is regarded as the effective policy rate.[7] Thus, we define the first indicator of monetary policy stance, the policy rate, as a series composed of the CBRT's

[6]For a detailed explanation on the relation between policy rate and monetary policy stance in Turkey, see Kara (2015).

[7]For more detail, see Kuçuk, Ozlu, Talaslı, Unalmış, and Yuksel (2016).

borrowing rate for the period before May 2010 and continued with the average weighted funding rate after that time. Then, we create the first expansionary monetary policy dummy variable, EMP_{1t}, which takes the value 1 if the average weighted funding rate declines in a given year with respect to the previous one.

Even if the countries have floating exchange rates, Central Banks are generally responsive to the excess volatility shocks in the foreign exchange markets. The second indicator considers the exchange rate movements in terms of monetary policy stance, following the study of Berument (2007). Using this approach, we define the second indicator of monetary policy stance, spread, as the difference between Central Bank's average weighted funding rate and the depreciation rate of real exchange rate.[8] This difference is calculated monthly and then yearly averages are computed. The monetary policy stance in a particular year is described as "expansionary" if the spread in that year declines with respect to the previous year. Second expansionary monetary policy dummy variable, EMP_{2t}, is composed accordingly. The money demand of individuals depends on both the policy rate and the relative value of local currency with respect to foreign currencies. Although floating exchange rate regime is applied in Turkey, the monetary and financial authorities monitor the foreign exchange market and even they intervene if serious volatilities are observed. So using this definition as an indicator of monetary policy stance is reasonable.

The third indicator is concerned with the term structure of interest rates in the financial markets and considers slope of the yield curve in representing the monetary policy stance. The link between short and long term interest rates may change in different time periods. We consider the change in this link as an indicator of the monetary policy stance. Yield curve represents the yields of financial instruments with respect to different maturity dates. We define slope of the yield curve, third policy indicator, as the difference between the yield of the government bond with longest maturity date[9] and yield of the Treasury bill with three months of maturity date.[10] Increasing slope of the yield curve means that the interest rate on long term financial instruments is larger than the interest rate on short term financial instruments since the investors have higher inflation expectations for the long term. The conventional way of conducting tight monetary policy is increasing the short term interest rates. This policy action increases the long term interest rates less than the short

[8] Berument (2007) notes that short term rates are higher than the currency depreciation rates in most of the time. If the interest rate is lower than the depreciation rate of real exchange rate, individuals prefer to hold foreign currency in order to preserve their wealth, resulting in currency substitution.

[9] The government bond with longest maturity changes in the sample period. The first 10-year Turkish government bond was released in January 2010. For 2010-2014, we use the yields of 10-year government bonds. For the period before, we use the yields of 5-year government bond which had the longest maturity.

[10] For other studies using term structure of interest rates as a monetary policy indicator see Svensson (1994), Estrella and Mishkin (1997) and from the central banker perspective see Başçı (2015).

term interest rates accounting the declining inflation expectations in the long term. So the Central Banks may consider the flatness of slope of the yield curve as a downturn in long term inflation expectations. In this context, we create a third expansionary monetary policy dummy, EMP_{3t}, which takes the value 1 if the slope of the yield curve increases in a year with respect to the previous year.

Beside the monetary policy, we investigate whether the broader financial conditions in an economy have significant effects on the firm's financing constraints. We consider that monetary policy stance alone does not provide a comprehensive treatment as there are several other determinants of financial conditions, some of which are affecting each other and interacting, influencing the real decisions of households and firms. Financial conditions index developed by Kara, Ozlu, and Unalmis (2015) comprises liquidity and credit conditions as well as the monetary policy actions in Turkey. The index includes several determinants of the financial conditions such as exchange rates, interest rates, risk premium, credit conditions and the slope of yield curve with weights assigned according to their predictive power. The positive innovations in the financial conditions index imply supportive financial conditions, and vice versa. Although it is a composition of domestic and international financing conditions, most of the movements of the index are explained by international factors such as global risk appetite, US monetary policy actions and foreign demand.

After 2010, CBRT changed its policy framework with an emphasis on the financial stability. While the principal mandate is still the price stability, macroprudential policies targeting the credit markets are also added to the policy toolbox. Not only the monetary authority, but also the government bodies such as the Banking Regulation and Supervision Agency took action in order to maintain financial stability by limiting credit growth in recent years. These developments require us to consider both monetary and credit conditions together to assess the external financial conditions for any firm. In the equation (5), we supply the baseline model, equation (3), with another interaction term, $(CF/K)_{it} * EFC_t$, the product of cash flow sensitivity, $(CF/K)_{it}$, and the expansionary financial conditions dummy variable, EFC_t, which takes the value 1 in the years that the financial conditions are looser. We construct this dummy variable in two different ways. First, if the financial conditions index is positive in a given year, then EFC_{1t} is one, otherwise it is zero. The second way considers the change in the financial conditions index from one year to another. If the financial conditions index increases in a given year compared to the previous, this given year is described as a year with supportive financial conditions and a value of 1 is assigned to the associated dummy variable, EFC_{2t}.

$$(I/K)_{it} = \alpha_0 + \sum_{k=1}^{\rho} \beta_k (I/K)_{it-k} + \alpha_1 (CF/K)_{it} + \alpha_2 (S/K)_{it} + \alpha_3 (I/K)^2_{it-1} + \theta (CF/K)_{it} * EFC_t + \vartheta_{it} \quad (5)$$

The coefficient, θ, shows the impact of loose financial conditions on cash flow sensitivity of firms with respect to the base which is tight financial conditions.

The third and the final purpose of the study is to investigate if the GFC has significant effects on the cash flow sensitivity of firms' fixed capital investment. The real GDP of Turkey has contracted 4.7 per cent in 2009 following the GFC. Representing the smallest unit of production, firms are expected to decrease their investment levels because of both unfavorable demand conditions and the lack of financing opportunities. We expect that the financing constraints, represented by the cash-flow sensitivities in our specifications, significantly change during the crisis period compared to other years in the sample. The deterioration in the credit mechanism makes the balance sheet strength essential. We incorporate the baseline model with an interaction term which is the product of crisis dummy and cash flow sensitivity of investment. The GFC dummy, GFC_t, takes the value one for 2008 and 2009, and takes the value zero for other years in under consideration.

$$(I/K)_{it} = \alpha_0 + \sum_{k=1}^{\rho} \beta_k (I/K)_{it-k} + \alpha_1 (CF/K)_{it} + \alpha_2 (S/K)_{it} + \alpha_3 (I/K)^2_{it-1} + \sigma (CF/K)_{it} * GFC_t + \vartheta_{it} \quad (6)$$

Our working hypotheses are as follows:

1. The financing constraints implied by the cash flow sensitivity matters for the fixed capital assets investment of Turkish SMEs in the manufacturing sector ($H_1 : \alpha_1 > 0$).
2. Expansionary monetary policy stance relaxes firms' credit constraints. ($H_1 : \gamma < 0$).
3. Supportive financial conditions relax firms' credit constraints. ($H_1 : \theta < 0$).
4. The financing constraints on corporate investment of Turkish SMEs increases significantly in the GFC period ($H_1 : \sigma = 0$).

When analyzing the determinants of investment at the corporate level, one should control for the level of debt a firm has. A firm having relatively high debt burden is expected to spend less for investment expenditures compared to a firm with relatively low debt burden. A negative relation between financial leverage and corporate investment is commonly reported

in the corporate finance literature.[11] The Turkish corporate finance literature is relatively limited regarding the empirical relationship between leverage and firm level investment. Umutlu (2010) investigates that relation for listed non-financial Turkish firms. He concludes that leverage negatively affects firm level investment only for firms having low q ratios. Ozmen et al. (2012) investigate the determinants of profitability, savings and investments for Turkish non-financial firms. Using the data of listed firms, they suggest that as the leverage ratio increases, the fixed investment also increases. They note that the relation is stronger for larger firms than SMEs. While there are different measures used to represent a firm's indebtedness, leverage, defined as the ratio of short and long term debt to the total liabilities, is the most common.

We control for an alternative financing instrument, which is trade credit, in the specifications. Firms usually make payments to their intermediate goods suppliers with a delay. These payments, although they are not bank credits, have several terms similar to traditional external financing instruments. Mateut (2005) states the terms of trade credits as the timing of payments, discounts for early settlements, the methods of payment, ownership of goods prior to payment, and interest or penalties for late payment. Trade credit is viewed as an alternative way of external financing for firms during periods of economic stagnation when the bank lending channel is weak. Firms that cannot reach the bank credit can extend their payments for the raw materials and intermediate goods to a certain maturity.

Since Turkey is a developing country with a negligible share of market finance in the external financing, firms dominantly use bank credits and trade credits. Ozlu and Yalçın (2012) report that the share of trade credits in corporate sectors external finance is higher in Turkey than many other countries.[12] They examine the trade credit channel of monetary transmission for Turkey before the GFC. It is documented that the share of bank loan in small firms' external finance declines during tight monetary policy periods. They justify this finding with the argument that small, and financially constrained firms, tend to use trade credits more when the financial conditions, represented by monetary policy stance, are tighter. For instance Carbo-Valverde, Rodriguez-Fernandez, and Udell (2016) addresses the access of small and medium-sized firms to finance in the context of commercial lending and the GFC, and provides supporting evidence that firms shift to trade credits from bank

[11] In order to have a better understanding on the empirical point of this relation, see Aivazian, Ge, and Qiu (2005) for capital investment of Canadian firms, Singh and Faircloth (2005) for R&D investment of US manufacturing firms, Ahn, Denis, and Denis (2006) for diversified firms with respect to their q ratios, Firth, Lin, and Wong (2008) for Chinese firms under a state-owned bank lending environment and Dang (2011) for UK firms in the presence of incentive problems.

[12] See Aydin, Kaplan, Kesriyeli, Ozmen, Yalcin, and Yigit (2006) for a more comprehensive descriptive analysis of corporate sector's financial structure in Turkey before 2005. They also state that the share of trade credits in firm's external financing is higher for Turkey.

credits when the external financing is tight.

All the specifications include time dummies in order to control the common effects which are year specific but firm invariant. They also include sector[13] fixed effects in order to control for different industry characteristics.

3.2. Data

The data used in this study is taken from the Company Accounts Statistics published annually by the CBRT. It contains the balance sheets, income statements and information on several characteristics of Turkish non-financial firms. Firms nationwide are requested to fill and return the last three years' balance sheets and income statements since 1992. The majority of the firms are private and unlisted. The database includes several firm characteristics such as location, date of establishment, legal status, sector and average monthly employment. Sectoral information of firms is presented according to NACE Rev.2 covering 18 main sectors. Among those main sectors we are interested in manufacturing sector in which there are mainly eleven sub-sectors. Table 6 in Appendix A provides sectoral composition of observations.

We concentrate on the small and middle sized enterprises (SMEs)[14] functioning in Turkish manufacturing industry. While there are several definitions for the small and middle sized enterprises[15], we define a firm as small and middle sized if it has an employment between 20 and 250. The company accounts data set is one of the most comprehensive sources containing the financial statements of real sector firms in Turkey. In terms of employment, it represents about 40 percent of the total employment in manufacturing industry for the years under consideration. Firms that have less than 250 employees comprise 84 percent of the firms in our database.

Because the Turkish legislations required firms to switch to inflation accounting beginning with the 2004 fiscal year, the revaluation of assets caused a significant jump in the series for that particular year. In order to avoid this break point, we limit the data set to the years between 2005 and 2014. Since the financial statements are all compiled in nominal terms,

[13]Main manufacturing sectors in NACE Rev.2 are manufacture of food and beverages, tobacco products, textiles, wearing appeal, leather and related products, coke and refined petroleum products, chemicals and basic chemical products, rubber and plastic products, basic metals, computer, electronics and optical products, electrical equipment, motor vehicles and other transport equipment, furniture and other manufacturing.

[14]Turkstat (2016) reports that in 2014 SMEs account for 99.8% of the total number of enterprises, 73.5% of employment, 54.1% of wages and salaries, 62.0% of turnover, 53.5% of value-added at factor costs and 55.0% of gross investment in tangible goods in Turkey.

[15]Turkstat defines SMEs as firms with number of employees less than 250. Eurostat separates it according to three criteria: Headcount, turnover or balance sheet total. The firm is micro, small or medium if its employment is less than 10, between 10 and 50 or between 50 and 250, respectively.

we deflate all nominal variables by manufacturing sector producer price index based the year 2003. We applied some other sample selection criteria in order to get robust results. First, we exclude state-owned enterprises and non-profit organizations from the sample. Almost all of the observations belong to limited liability and joint stock companies. Second, we limit the ratio of the two consecutive years' assets by 4 to avoid the effects of possible mergers and acquisitions. Third, we consider only the firms having observations at least 5 consecutive years to increase the continuity in time dimension. The final unbalanced panel data set includes 2925 firms and 15960 firm-year observations for the 2005-2014 period.

Inspection of aggregate statistics (see Appendix B) reveals that the link between the financial sector and firms has strengthened during the period 2005-2014 in Turkey. Both the debt ratios and asset prices rose between 2005 and 2014. During the sample period, total credits to corporations as a share of GDP has increased more than two folds. As the borrowing rates eased, the asset prices such as stock prices, real estate prices and bilateral exchange rates, have followed an upward trend. We have the opportunity to examine the credit constraints on the corporate investment in the last decade considering for the change in financial conditions in the sample period.

We first compute the dependent variable of the model which is the ratio of end of the year gross fixed capital investment to the beginning of the year gross capital stock. Because there is no capital stock variable readily provided in the data set, we compose it using the tangible fixed assets item available in the balance sheets. The gross fixed capital stock[16] in a given year is defined as the sum of sub-items under tangible fixed assets including land improvements, buildings, machinery, plant and equipment, motor vehicles, furniture and fixtures, other tangible fixed assets and assets in construction. The accumulated depreciation is not considered as a new investment so we did not include this sub-item in the variable definition. Because this variable represents the stocks, the flow variable, gross fixed capital investment is computed as the first difference of the gross fixed capital stocks.

The main explanatory variables are cash flow, sales, leverage ratio and trade credits of the firms in a given year. We define the cash flow as the end of the year EBITDA (earnings before interest, taxes, depreciation, and amortization) of the firm for any year. Although there are items in the balance sheet showing the cash level of the firms, as we need flow variables we refer to the income statements. The sales are the end of the year gross sales of the firms. Both cash flow and sales are divided by beginning of the year gross capital stock. Financial leverage, which is used as a financial control, is defined as the ratio of the sum of short and long term liabilities to the total assets. Trade credits which are the sum of short and long term trade credits are also defined as a ratio to the beginning of

[16]Throughout the paper, fixed capital stock and stocks of fixed tangible assets are used interchangeably.

the year total assets. Table 8 in Appendix C provides the summary statistics. To avoid the existence of outliers in the data set, we apply symmetric winsorization[17] at one percent to both dependent and independent variables. The mean and standard deviation of the dependent variable, investment-capital ratio, are 0.11 and 0.69, respectively. Corresponding figures for the main explanatory variable, cash flow-capital stock ratio, are 1.71 and 2.37. Both variables of interest have considerable levels of variation. The average age of a firm in the sample is almost 20 and a firm's average employment is around 100.

4. Estimation Results

4.1. The Cash Flow Sensitivity of Fixed Capital Investment

First, using the baseline Equation (3) we investigate if the Turkish manufacturing SMEs are financially constrained. In order to test this hypothesis, one should estimate the model for two separate samples divided according to a criteria for determining financial constrainedness and find out whether the cash flows sensitivities differ or not among those two samples. Fazzari et al. (1988) uses dividend payout ratio to classify the firms as financially constrained or not. Since our sample is composed of unlisted firms, we use another common measure in the literature which is the firm size. It is expected that as the firm size increases, the external finance premium for firms declines. Thus, for SMEs and large firms we estimate the cash flow sensitivity of investment which represents the relation between firm's investment on tangible assets and its financing constraints and then we compare the significance of cash flow sensitivity for two samples. A positive cash flow sensitivity estimate indicates that investment is constrained by internal finance. Throughout the study, SMEs are defined as firms with 20-250 employees while large firms are defined as firms with more than 250 employees.

To address the problems caused by the simultaneity, we estimate the models using the Generalized Method of Moments (GMM). The Difference-GMM method, introduced by Arellano and Bond (1991), suggests estimating the first differenced equation using the lagged levels of independent variables as instruments. Arellano and Bover (1995) and Blundell and Bond (1998) introduce the system GMM estimator by combining the first difference and level equations into a system estimation in order to handle the weak instruments problem originating from high persistence in the dependent variable. This framework also uses the differences as instruments for the levels, thereby increase the number of available instru-

[17] Dixon (1960) names the concept first referring to the statistician Charles Winsor (1895-1951). Together with trimming, it is one of the most common methods in order to deal with the effects of outliers.

Table 1: Investment Model Estimation, SMEs versus Large Firms

Dependent Variable: $(I/K)_{it}$	SMEs	Large Firms
$(I/K)_{it-1}$	-0.390*	-0.291**
	(0.230)	(0.143)
$(CF/K)_{it}$	0.215***	0.197
	(0.076)	(0.244)
$(TC/A)_{it}$	0.460***	0.630*
	(0.141)	(0.337)
$Leverage_{it}$	-0.375**	-0.151
	(0.158)	(0.309)
$(S/K)_{it}$	0.002	-0.004
	(0.004)	(0.015)
$(I/K)^2_{it-1}$	0.028*	0.023**
	(0.017)	(0.011)
Hansen p value	0.840	0.111
AR(1) p value	0.002	0.084
AR(2) p value	0.109	0.797
No of instruments	39	39
No of firms	2916	1299
No of observations	15642	7381

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

ments. The system GMM estimator[18] is more efficient than the difference GMM estimator when the instruments are weak.

We use GMM-style instruments for the dependent variable and potentially endogenous variables such as cash flow to capital stock ratio, trade credits to assets ratio, sales to capital stocks ratio, leverage ratio and interaction terms. For the year fixed effects and sector controls, we employ IV-style instruments following Roodman (2009). We choose number of the instruments that satisfies the test statistics for each model.

Table 1 summarizes the estimation results for Equation (3). Results suggest that the cash flow sensitivity of fixed capital investment is positive and statistically significant for SMEs while it is not significant for large firms. These results imply that financing constraints are important in determining the fixed investment of small and middle sized manufacturing firms in Turkey. On the contrary, large firms are not financially constrained while making investment decisions. We observe that trade credits are significant in determining the corporate investment of Turkish SMEs. That is to say, keeping all other factors constant, an SME having more trade credits over its assets is expected to invest more on fixed assets, on average. Our results suggest that leverage ratio affects the investment on fixed assets significantly and negatively which is in line with the expectations. Results also indicate that

[18] *xtabond2* command written by Roodman (2009) is used for GMM estimations in STATA. Finite-sample correction derived by Windmeijer (2005) is applied to the standard errors of the two step estimations.

sales-to-capital stock ratio is not significant in determining the fixed capital investment.[19] The significant estimate of the squared term supports the non-linear dynamics of the fixed capital investment and the nature of adjustment costs that firms encounter when making the investment.

4.2. The Impact of Monetary Policy Stance

Table 2 presents the estimation results for Equation (4). This specification incorporates the interaction of cash flow sensitivity and expansionary monetary policy stance. Three different monetary policy indicators are interacted with cash-flow-capital stock ratio to see the robustness of results to different definitions. As we explained previously, we us the following monetary policy indicators: average weighted funding rate, the spread, and slope of the yield curve. We estimate negative and significant coefficient for the interaction term of the expansionary monetary policy and the investment-cash flow sensitivity. Results indicate that expansionary monetary policy relaxes the degree of financing constraints of Turkish manufacturing SMEs. Alternatively, during tight monetary policy periods SMEs are financially more constrained by the internal finance since access to external finance becomes harder.

For robustness, we provide further estimates regarding the impact of monetary policy stance on firms' financing constraints. Our strategy aims to control for financial constrainedness which can not be attributable to the demand side as the supply side data is not available. Here we divide the sample into two broad categories with respect to their degree of financial constrainedness following the empirical literature. Our criteria are as the following:

- Bank Credit Ratio: Empirical findings indicate that while financially strong firms rely more on bank credits for external financing, financially constrained firms rely more on trade credits. See Kuntchev, Ramalho, Rodriguez-Meza, and Yang (2013), Ferrando and Mulier (2013), Casey and O'Toole (2014), Carbo-Valverde et al. (2016) for related literature.
- Export Ratio: Export-oriented firms are less likely to be financially constrained. See Ganesh-Kumar, Sen, and Vaidya (2001), Bridges and Guariglia (2008), Guariglia and Mateut (2010), Wagner (2014), Muuls (2015) for the supporting literature.
- Asset Size: Smaller and younger firms having less collaterals and less experience in business are expected to be financially more constrained. For some other studies claim-

[19] Because our sample is composed of unlisted firms and we cannot calculate the Tobin's q, we control the firm's investment opportunities with its sales. In the absence of Tobin's q as a control variable, cash flow sensitivity is criticized to incorporate the investment opportunities. Using alternative controls for investment opportunities, D'Espallier and Guariglia (2015) states that investment cash flow sensitivity does not reflect the investment opportunities and the investment opportunities bias is overstated.

ing that firms access to finance declines as the asset size decreases, see Gilchrist and Himmelberg (1995), Erickson and Whited (2000), Almeida, Campello, and Weisbach (2004), Acharya, Almeida, and Campello (2007), Denis and Sibilkov (2010), Hovakimian (2011), Farrell, Unlu, and Yu (2014), He and Wintoki (2016).

Table 2: Investment Model Estimation, Expansionary Monetary Policy

Dependent Variable: $(I/K)_{it}$	EMP I	EMP II	EMP III
$(I/K)_{it-1}$	-0.235**	-0.492**	-0.603*
	(0.120)	(0.222)	(0.341)
$(CF/K)_{it}$	0.598***	0.514***	0.198***
	(0.064)	(0.062)	(0.071)
$(CF/K)_{it} * EMP_{1t}$	-0.145**		
	(0.063)		
$(CF/K)_{it} * EMP_{2t}$		-0.113*	
		(0.062)	
$(CF/K)_{it} * EMP_{3t}$			-0.349**
			(0.169)
$(TC/A)_{it}$	0.368***	0.345***	0.567***
	(0.102)	(0.124)	(0.197)
$Leverage_{it}$	-0.258*	-0.375*	-0.468***
	(0.149)	(0.195)	(0.144)
$(S/K)_{it}$	-0.005	-0.005	0.007
	(0.005)	(0.006)	(0.004)
$(I/K)^2_{it-1}$	0.017**	0.040**	0.042*
	(0.008)	(0.017)	(0.023)
Hansen p value	0.397	0.753	0.696
AR(1) p value	0.000	0.000	0.000
AR(2) p value	0.196	0.117	0.155
No of instruments	47	41	34
No of firms	2916	2916	2916
No of observations	15642	15642	15642

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We use industry means at four digit NACE classification to divide the sample into associated sub-samples. Financially more constrained firms are those firms having lower exports to total sales ratio, lower bank credits to total liabilities ratio and less real asset than their corresponding manufacturing industry averages, and vice versa.

Table 3 summarizes the findings regarding different sub-samples. We observe that cash flow sensitivity of investment significantly responds to changes in the monetary policy stance only for the firms which have lower-than-industry-average bank credit shares, are less export-oriented and have less-than-industry-average real assets. Alternatively, the financing constraints on financially more constrained firms relax during expansionary monetary policy periods. While the corresponding estimations for financially less constrained firms indicate that the financing constraints ease when the monetary policy is expansionary, the estimates

are not statistically significant. If a firm has a more-than-industry-average bank credit ratio, it is more export-oriented and it has more-than-industry-average real assets, it can access external finance easier. Which in turns makes the monetary policy stance insignificant for corporate investment decisions.

4.3. The Impact of Financial Conditions

The GFC made a remarkable effect on the monetary policy frameworks of both advanced and developing countries. The former conducted quantitative easing policies, which released a large amount of liquidity for the global economy, in order to revive the economic activity. The excess global liquidity increased the volatility of capital flows into emerging economies, such as Turkey. As a response, macroprodential tools designed to sustain financial stability are embedded to the policy sets of central banks including the CBRT. Not only the central banks but also government organizations, such as Banking Regulation and Supervision Agency in Turkey, contributed to the macroprudential measures together with the Central Bank's new policy framework.

Table 3: Estimations for More and Less Financially Constrained SMEs

	More Constrained Firms								
	Lower Bank Credit Ratio			Lower Export Ratio			Less Assets		
Dependent Variable: $(I/K)_{it-1}$	EMP I	EMP II	EMP III	EMP I	EMP II	EMP III	EMP I	EMP II	EMP III
$(I/K)_{it-1}$	-0.396*	-0.536*	-0.541**	-0.381*	-0.578**	-0.478*	-0.421*	-0.399*	-0.424*
	(0.193)	(0.291)	(0.256)	(0.229)	(0.278)	(0.288)	0.240)	(0.212)	(0.234)
$(CF/K)_{it}$	0.726***	0.742***	0.670***	0.580***	0.490***	0.586*	0.952***	0.683***	0.703***
	(0.147)	(0.130)	(0.258)	(0.081)	(0.088)	(0.318)	(0.235)	(0.133)	(0.263)
$(CF/K)_{it} * EMP_{jt}$	-0.338**	-0.494***	-0.284*	-0.181**	-0.167**	-0.259*	-0.424**	-0.299*	-0.199*
	(0.142)	(0.156)	(0.168)	(0.076)	(0.074)	(0.139)	(0.204)	(0.156)	(0.121)
$(TC/A)_{it}$	0.373*	1.777**	0.061	0.992*	0.418**	0.156	0.406*	0.36**	0.143
	(0.216)	(0.865)	(0.323)	(0.527)	(0.182)	(0.198)	(0.211)	(0.140)	(0.204)
$Leverage_{it}$	-0.090	-0.390	-0.261	-0.156	-0.082	-0.252	-0.114	-0.273	-0.063
	(0.220)	(0.465)	(0.684)	(0.222)	(0.247)	(0.365)	(0.200)	(0.342)	(0.319)
$(S/K)_{it}$	-0.004	-0.005	-0.005	-0.005	-0.001	0.015	-0.002	-0.001	-0.015
	(0.005)	(0.006)	(0.012)	(0.005)	(0.007)	(0.025)	(0.015)	(0.006)	(0.025)
$(I/K)^2_{it-1}$	0.026**	0.036	0.037**	0.027*	0.043**	0.033*	0.027*	0.034*	0.028*
	(0.013)	(0.022)	(0.017)	(0.016)	(0.021)	(0.020)	(0.017)	(0.018)	(0.016)
Hansen p value	0.304	0.946	0.958	0.346	0.603	0.688	0.138	0.125	0.682
AR(1) p value	0.008	0.006	0.008	0.001	0.002	0.006	0.003	0.003	0.004
AR(2) p value	0.779	0.322	0.207	0.140	0.146	0.327	0.403	0.303	0.167
No of instruments	39	37	52	46	42	50	55	38	55
No of firms	2111	2111	2111	2234	2234	2234	2523	2523	2523
No of observations	7413	7413	7413	9803	9803	9803	12619	12619	12619

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: *Continued from previous page*

	Less Constrained Firms								
	Higher Bank Credit Ratio			Higher Export Ratio			More Assets		
Dependent Variable: $(I/K)_{it-1}$	EMP I	EMP II	EMP III	EMP I	EMP II	EMP III	EMP I	EMP II	EMP III
$(I/K)_{it-1}$	-0.375*	-0.359*	-0.303*	-0.436**	-0.479**	-0.339**	-0.329**	-0.549**	-0.826*
	(0.226)	(0.211)	(0.168)	(0.181)	(0.234)	(0.165)	0.161)	(0.245)	(0.460)
$(CF/K)_{it}$	0.405***	0.485***	0.212*	0.299***	0.316**	0.394***	0.435**	0.228**	0.967**
	(0.081)	(0.105)	(0.113)	(0.078)	(0.161)	(0.109)	(0.177)	(0.091)	(0.484)
$(CF/K)_{it} * EMP_{jt}$	-0.053	-0.091	-0.008	-0.003	0.088	-0.014	-0.027	-0.065	-0.420
	(0.081)	(0.099)	(0.060)	(0.103)	(0.188)	(0.047)	(0.201)	(0.064)	(0.264)
$(TC/A)_{it}$	0.657***	0.533***	0.567***	0.422**	0.385**	0.527*	0.520**	1.225*	0.479
	(0.180)	(0.183)	(0.213)	(0.207)	(0.188)	(0.280)	(0.259)	(0.642)	(0.597)
$Leverage_{it}$	-0.371*	-0.127	-0.426*	-0.273	-0.470*	-0.312*	-0.753**	-0.582	-0.814
	(0.212)	(0.233)	(0.239)	(0.277)	(0.262)	(0.181)	(0.370)	(0.581)	(1.138)
$(S/K)_{it}$	-0.003	0.0015	-0.001	-0.001	-0.004	-0.007	-0.008	0.002	-0.025
	(0.005)	(0.005)	(0.007)	(0.004)	(0.009)	(0.005)	(0.007)	(0.005)	(0.023)
$(I/K)^2_{it-1}$	0.028*	0.034**	0.032**	0.034**	0.030*	0.024**	0.031**	0.042**	0.061*
	(0.016)	(0.017)	(0.015)	(0.016)	(0.017)	(0.011)	(0.014)	(0.018)	(0.034)
Hansen p value	0.577	0.640	0.106	0.904	0.795	0.752	0.537	0.567	0.318
AR(1) p value	0.003	0.000	0.011	0.019	0.028	0.010	0.009	0.019	0.012
AR(2) p value	0.112	0.493	0.140	0.241	0.227	0.242	0.673	0.591	0.224
No of instruments	50	42	50	53	39	39	57	43	47
No of firms	2194	2194	2194	1510	1510	1510	878	878	878
No of observations	8291	8291	8291	5900	5900	5900	3081	3081	3081

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

From a broader perspective, monetary policy stance alone may not be adequate in representing the availability of credits or the degree of firm's access to finance. Considering the increase of financial depth in the last decade, the degree of connectedness in international financial system and the policy framework in the post GFC era, the financial conditions for an entire economy provide a more comprehensive treatment. Although the financial conditions have gained more importance after the GFC, the literature regarding to the effects of economy-wide financial conditions on the cash-flow sensitivity of investment has remained relatively limited. More recently, Balfoussia and Gibson (2016) estimates a q model of investment using a sample of 2400 listed Euro area firms for the period 1980-2013. They use a financial conditions index for the Euro area, which is based on supply side conditions in the economy and includes variables representing monetary policy stance. They provide empirical evidence that tighter financial conditions negatively affect the firm-level investment. They also report that smaller and more leveraged firms are relatively more affected as they tend to be relatively more financially constrained. Differently, we are interested in the financing constraints on corporate investment of unlisted SMEs in this study. Although these firms constitute the vast majority of production and employment in the economy, there is not enough research on their financing constraints in different monetary and financial conditions. Using Equation (5), we estimate the interaction of the cash flow sensitivity of investment and the financial conditions indicator.

The financial conditions index is responsive to both domestic and international macroeconomic variables. However, most of the movements in the index are driven by foreign conditions (Kara et al. (2015)). Since Turkey is a developing open economy with considerably high funding needs, economic activities such as consumption, investment and production are sensitive to the availability of global funds. Equation (5) includes the interaction of investment-cash flow sensitivity and supportive financial conditions. The interpretation for the coefficient of the interaction term is quite straightforward. A negative and significant coefficient estimate implies that financing constraints are relatively less binding on investment when the financial conditions are not tight.

The findings summarized in Table 4 suggest that when the financial conditions are expansionary, cash flow sensitivity of investment declines in line with the expectations.[20] The period under investigation includes the GFC and years which follow the contraction of economies around the world. The side effects of unconventional monetary policy actions conducted in advanced countries diversified the policy tools of Central Bankers in developing countries in which the capital flows affected the economies negatively. Macroprudential

[20] Appendix E presents the cross-correlations between interaction terms. In addition, the course of the normalized indicators for monetary and financial conditions is shown in Figure 1 graphically.

Table 4: Investment Model Estimation, Expansionary Financial Conditions

Dependent Variable: $(I/K)_{it}$	EFC I	EFC II
$(I/K)_{it-1}$	-0.220*	-0.512**
	(0.122)	(0.230)
$(CF/K)_{it}$	0.487***	0.510***
	(0.063)	(0.060)
$(CF/K)_{it} * EFC_{1t}$	-0.081**	
	(0.041)	
$(CF/K)_{it} * EFC_{2t}$		-0.115*
		(0.061)
$(TC/A)_{it}$	0.360***	0.340***
	(0.108)	(0.127)
$Leverage_{it}$	-0.297**	-0.384*
	(0.149)	(0.201)
$(S/K)_{it}$	-0.004	-0.004
	(0.005)	(0.005)
$(I/K)^2_{it-1}$	0.018*	0.041**
	(0.010)	(0.018)
Hansen p value	0.417	0.782
AR(1) p value	0.000	0.000
AR(2) p value	0.136	0.105
No of instruments	41	41
No of firms	2916	2916
No of observations	15642	15642

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

tools together with conventional monetary policy tools are used in order to stabilize and control the credit growth in the presence of excess global liquidity. In addition, the variables such as US monetary policy, global risk appetite and foreign demand make contribution to the financial conditions index. These variables are important in terms of both signalling to financial markets about the current state of financial conditions and forming expectations regarding future developments.

4.4. The Impact of Global Financial Crisis

Households and firms adjust their consumption and investment decisions during crisis periods when uncertainty is high. Financially constrained firms, such as the majority of SMEs[21], are expected to suffer more in periods of economic turbulence compared to the firms which are financially unconstrained. Financial crisis affects firms' opportunities to access external finance by at least two different channels. First, the propagation of the financial crisis to real economy causes the total demand for goods and services to decline, which in turn decreases the firms' sales and profits. The ongoing debt payments together

[21] Kurul and Tiryaki (2016) report that the probability of accessing finance for Turkish firms increases with the firm size.

with insubstantial demand conditions entail the firms' balance sheets to weaken. As a result, the value of the firms' collateral assets declines. Second, from the credit supply perspective, banks and other financial institutions become more reluctant to lend money to firms in order to avoid the adverse selection problems that tend to become more prevalent in contraction periods.[22] Thus, firms' access to external finance becomes more limited. The growing need for internal finance strengthens financing constraints.

Table 5: Investment Model Estimation, Impact of the Global Financial Crisis

Dependent Variable: $(I/K)_{it}$	GFC
$(I/K)_{it-1}$	-0.510*
	(0.306)
$(CF/K)_{it}$	0.168**
	(0.073)
$(CF/K)_{it} * GFC_t$	0.379**
	(0.155)
$(TC/A)_{it}$	0.576***
	(0.153)
$Leverage_{it}$	-0.352*
	(0.205)
$(S/K)_{it}$	0.010
	(0.007)
$(I/K)^2_{it-1}$	0.037*
	(0.022)
Hansen p value	0.689
AR(1) p value	0.001
AR(2) p value	0.123
No of instruments	50
No of firms	2916
No of observations	15642

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The literature generally provides studies that examine the effects of GFC on the aggregate investment levels of economies. However, the research on the firm-level investment is relatively limited. Khramov (2012) investigates the asymmetric effects of GFC on the investment-cash flow sensitivity of listed US firms. Although the investment-cash flow sensitivity of firms increases during the crisis period, change in the investment-cash flow sensitivity varies with the level of collateral assets that firms have. Joeng (2015) provides evidence for the listed Korean firms that corporate investment declines during the crisis and the decline is more severe for SMEs than the larger firms.[23] Using the data of listed US firms, Drobetz, Haller, Meier, and Tarhan (2017) investigate the effects of liquidity crisis on the cash flow sensitivity of firm investment. Their results show that while the impact of the crisis on

[22] Mishkin, Crockett, Dooley, and Ahluwalia (2003) define financial crisis as the disruptions to financial markets in which adverse selection and moral hazard problems become much worse.

[23] See also Kahle and Stulz (2013) for the impact of GFC on firm investment in terms of bank lending.

financially healthy firms is negligible, its impact on financially weak firms is strong.

Table 5 provides the estimation results of Equation (6). The results are consistent with the literature summarized above. Credit constraints on firms increase during crisis as the bank and firm balance sheets are negatively affected. The decline in the availability of external funds strengthen the internal financing which is represented by investment-cash flow sensitivity. A positive and significant estimate for the coefficient of crisis interaction indicates that financing constraints on firm-level investment is greater in the crisis period compared to other years in the sample. That is to say, GFC induced significant liquidity constraints for the unlisted Turkish SMEs by limiting their access to external finance during the period .

5. Conclusion

We examine the significance of internal finance in determining the fixed investment of Turkish SMEs in the manufacturing sector. Unlike the previous literature, we use a comprehensive data set composed of unlisted Turkish small and medium-sized firms. The listed and unlisted firms are expected to differ in terms of access to external finance. Listed firms are generally large and independently audited, so their creditworthiness is expected to be higher with respect to unlisted SMEs.

Conclusions from this study can be summarized as follows. First, the internal finance is a constraint over a firm's investment on tangible assets. The existence of asymmetric information problem between a firm's management and its creditors creates a risk premium which increases the cost of external finance. As access to external finance becomes more costly relative to internal funding, a firm's dependence on the strength of its balance sheet becomes more emphasized. As a result, a firm's decision on fixed investments tends to be related to how financially weak or strong it is.

Second, expansionary monetary policy significantly relaxes a firm's financing constraints. As the monetary policy stance changes from contractionary to expansionary, we find significant difference in the relation between the internal finance and investment levels. Results also show that the impact of monetary policy stance on the cash flow sensitivity of investment differs among financially more constrained and less constrained firms. For financially more constrained firms, the expansionary monetary policy significantly decreases firms' financing constraints. However, we do not have conclusive evidence regarding the impact of monetary policy stance on the financing constraints of financially less constrained firms which can access external finance relatively easily.

Third, macro-financial conditions matter in terms of the restrictiveness of financing con-

straints. As the availability of funds for an open economy is not determined only by the domestic monetary policy, we also take into account the interaction of broader macro-financial conditions with the cash flow sensitivity of investment. Results indicate that when the financial conditions are more supportive in a given year, the cash flow sensitivity of investment is lower compared to other years having tight financial conditions.

Since access to external finance becomes harder due to tight credit demand and supply conditions during crisis periods, firms' financing constraints are expected to amplify. In line with the expectations, our last conclusion shows that the cash flow sensitivity of investment is significantly greater in the global crisis period compared to other years without the crisis.

Based on the empirical results, we make some policy recommendations regarding the financing constraints of the SMEs. Since SMEs' internal financing is a determinant of their investment, some measures can be taken to ensure that these firms access to external finance. Despite the fact that expansionary monetary and financial conditions relax the financing constraints of SMEs, we do not have evidence regarding their effects on the economy as a whole. Therefore, a selective approach can be preferred in order to facilitate SMEs' access to external financing. In essence, that would require measures to reduce asymmetric information between the SMEs and their creditors. Finally, given that financial conditions as well as monetary policy are influential on firms' financing constraints, monetary and macroprudential policies need to be considered in coordination.

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Appendix A. Number of Observations by Sector and Year

Table 6: Number of Observation by Manufacturing Sub-sector and Year

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
All Manufacturing	1384	1576	1625	1776	1969	1806	1718	1452	1295	1041	15642
Food and Beverages	234	259	244	285	312	301	292	254	213	174	2568
Tobacco Products	3	3	3	3	3	2	3	4	1	3	28
Textiles, Wearing Appeal, Leather, etc.	289	352	361	393	438	385	351	275	252	198	3294
Coke and Refined Petroleum Products	8	7	7	7	6	9	12	9	7	8	80
Chemicals and Basic Chemical Products	89	96	113	123	129	118	109	92	85	66	1020
Rubber and Plastic Products	189	233	239	266	290	256	259	227	207	170	2336
Basic Metals	162	185	193	204	234	223	230	201	181	151	1964
Computer, Electronics and Optical Products	13	12	16	18	19	16	16	8	6	5	129
Electrical Equipment	57	67	71	68	73	63	59	52	44	40	594
Furniture	42	38	39	48	51	51	43	37	35	26	410
Motor Vehicles and Other Transport Equipment	80	83	86	89	112	98	88	71	65	52	824
Other Manufacturing	218	241	253	272	302	284	256	222	199	148	2395

Source: Sectoral Balance Sheets Database, CBRT.
Sectoral classification is based on NACE Rev2.

Appendix B. Aggregate Level Financial Statistics

Table 7: Debt, Asset Prices and Borrowing Rates for the Period 2005-2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total Credit to Corporations (% of GDP)[1]	22.6	27.5	29.9	35.7	35.3	40.1	44.4	44.8	52.4	56.2
Total Credit to Corporations (Billions of USD)[1]	112.4	153.0	225.2	230.1	235.1	299.5	327.0	393.6	440.7	492.3
Domestic Credit Provided by Financial Sector (% of GDP))	43.9	44.0	47.2	52.2	61.7	68.0	66.7	67.1	72.9	75.3
Gross Fixed Capital Formation (Annual Growth Rate)[2]	19.6	15.4	5.5	-2.7	-20.5	22.5	23.8	2.7	13.8	5.1
Industrial Production Index (2010=100)[3]	88.6	94.8	102.6	100.3	87.9	100.3	110.3	112.8	117.7	121.4
Borsa Istanbul Stock Exchange (Total, Index, 2010=100)	60.3	59.3	84.1	40.7	80.0	100.0	77.7	118.5	102.7	129.9
Borsa Istanbul Stock Exchange (Industry, Index, 2010=100)	59.3	58.8	77.3	37.7	72.2	100.0	91.9	123.1	118.8	149.9
Real Estate Prices (Index, 2010=100)						103.6	115.3	128.6	146.4	170.0
TRY/USD Exchange Rate (Index, 2010=100)[4]	89.4	95.0	86.7	86.6	103.1	100.0	111.5	119.5	126.7	145.6
Debt to Surplus Ratio (Non Financial Corp.)[5]						2.0	1.9	2.0	2.1	2.2
Average Funding Rate of CBRT (Percent)[6]	14.8	15.6	17.2	16.3	9.6	7.1	6.3	7.5	5.8	8.9
Borrowing Rates for Corporations (Percent)[7]	20.5	18.8	18.7	18.7	14.1	8.9	10.8	14.1	10.8	13.5
Borrowing Rates for Consumers (Percent)[8]	20.9	21.0	21.0	20.6	17.8	12.5	13.9	15.6	11.8	14.2

Sources: CBRT, TURKSTAT, IMF, OECD, BIS, The World Bank and Bloomberg.

[1] Total credit to nonfinancial corporations from all sectors at market value, end of the year observation.

[2] OECD defines it as the acquisition (including purchases of new or second-hand assets) and creation of assets by producers for their own use, minus disposals of produced fixed assets.

[3] Only manufacturing industry.

[4] Turkish Liras per U.S. Dollar, year average.

[5] OECD defines is as the ratio of debt outstanding to the annual flow of gross operating surplus of non financial corporations.

[6] Weighted average cost of the CBRT's funding instruments.

[7] Weighted average interest rates for banks' trade loans in Turkish Liras, annual average of weekly rates.

[8] Weighted average interest rates for banks' consumer loans (sum of personal, vehicle and housing credits) in Turkish Liras, annual average of weekly rates.

Appendix C. Descriptive Statistics

Table 8: Descriptive Statistics

	(1) Mean	(2) Median	(3) Std.Dev	(4) Min	(5) Max
Gross Investment on Fixed Tangible Assets	0.05	-0.01	5.64	-234.43	205.49
Gross Fixed Tangible Assets Stock	12.03	4.14	51.38	0.00	2608.33
Assets	18.83	9.87	31.76	0.05	1051.53
Cash Flow	15.69	5.13	75.23	-9.71	3116.39
Trade Credits	2.96	1.32	5.71	0.00	148.02
Sales	22.60	10.67	46.32	0.00	2380.39
Leverage Ratio	0.59	0.60	0.27	0.00	10.86
Investment/Capital Stock	0.11	0.00	0.69	-0.80	16.01
Cash Flow/Capital Stock	1.71	1.30	2.37	-1.17	38.24
Trade Credits/Assets	0.21	0.15	0.19	0.00	1.56
Sales/Capital Stock	6.37	2.54	28.86	0.00	1052.94
Firms' Age	19.84	18.00	9.72	0.00	50.00
Number of Employees	101.00	86.00	65.00	20.00	250.00
Interaction Terms					
$(\text{CF/K})_{it} * EMP_{1t}$	0.54	0.13	1.80	-2.04	34.91
$(\text{CF/K})_{it} * EMP_{2t}$	0.46	0.09	1.60	-2.04	34.91
$(\text{CF/K})_{it} * EMP_{3t}$	0.34	0.00	1.38	-2.04	34.91
$(\text{CF/K})_{it} * EFC_{1t}$	0.44	0.06	1.54	-2.04	34.91
$(\text{CF/K})_{it} * EFC_{2t}$	0.42	0.00	1.59	-2.04	34.91
$(\text{CF/K})_{it} * GFC_t$	0.19	0.00	1.11	-2.04	34.91

Source: Sectoral Balance Sheets, CBRT.
The estimation sample taken into consideration. Gross investment on fixed tangible assets, gross fixed tangible assets stock, assets, cash flow, trade credits and sales are real figures which are in millions of Turkish Liras. Investment and gross investment on fixed tangible assets are used interchangeably, as the capital stock and gross fixed tangible assets stock are. For the variables defined as ratios, numerators are end-of-the-year figures while denominators are beginning-of-the-year figures. Interaction terms are the product of cash flow and associated dummy variables for monetary policy stance, financial conditions and the GFC, respectively.

Appendix D. Robustness Checks

We apply several robustness checks that test the sensitivity of results against variable and sample selection. Summarizing the findings from robustness checks, we observe that the results of the study are robust to alternative variable and sample selections. Table 9-Table 12 present the results of robustness checks. There are six columns in each tables. First three columns present the results for the specifications with interaction of cash flow sensitivity and monetary policy stance. Here EMP_{jt} stands for the dummy variable representing expansionary monetary policy for $j = 1, 2, 3$. Dummy variables are constructed according to average

weighted funding rate, spread and slope of the yield curve, respectively. The fourth and fifth columns present the results for the specifications with interaction of cash flow sensitivity and the financial conditions. EFC_{kt} stands for the dummy variable representing loose financial conditions for $k = 1, 2$. Dummy variables are created with respect to the financial conditions index provided by Kara et al. (2015) and the yearly change of this index, respectively. The last column is devoted for the specification with interaction of cash flow sensitivity and GFC. The dummy variable for crisis takes the value 1 for 2008 and 2009, and takes the value 0 for other years in the sample.

First, we investigate how the results differ when we define the main explanatory variable, cash flow, in a different way. We define the cash flow as annual net profit of the firm for any given year instead of its EBITDA. Table 9 presents the results using this alternative definition.

The second and third robustness tests consider the net fixed tangible assets instead of the gross fixed tangible assets. Both of the two variables are employed in the empirical literature on the relation between firm's fixed investment and its financing constraints. Net fixed investment is defined by two alternative methods. First, the accumulated depreciations for the fixed tangible assets, available in the balance sheet, are added to the gross fixed tangible assets for each year. This definition can be criticized by relying on the *accounting depreciation* that may not coincide with the *economic depreciation*. For instance, Turkish accounting legislations allow firms to reserve almost half of their value for some particular assets annually as depreciation. This calls for the second method for computing the net fixed tangible assets which is common in the empirical literature. The Perpetual Inventory Method (PIM) is applied assuming that the annual depreciation for fixed tangible assets is 5 percent. In order to span a wider horizon, the beginning year of the fixed tangible stock series is chosen as 1995. Because we consider firms having at least five consecutive years of balance sheet data for 1995-2014 period, the number of observations declines to less than one third of the original sample. Table 10 and Table 11 present the results for the second and third robustness checks, respectively.

The fourth, and the last, robustness test investigates how the results are sensitive to the change in the degree of winsorization. Winsorization which is employed in order to avoid outliers is applied to the 2 percent of both tails of the sample distribution instead of 1 percent. Table 12 presents the results for the fourth robustness check.

Table 9: Estimations with Alternative Cash Flow Definition

$(I/K)_{it}$	EMP I	EMP II	EMP III	EFC I	EFC II	GFC
$(I/K)_{it-1}$	-0.058	-0.276*	-0.333*	-0.507**	-0.509**	-0.562*
	(0.148)	(0.165)	(0.192)	(0.256)	(0.256)	(0.333)
$(CF/K)_{it}$	0.649*	0.696***	1.670**	0.939***	0.932***	0.316**
	(0.371)	(0.144)	(0.848)	(0.225)	(0.281)	(0.131)
$(CF/K)_{it} * EMP_{jt}$	-0.559*	-0.159**	-0.897**			
	(0.337)	(0.077)	(0.432)			
$(CF/K)_{it} * EFC_{kt}$				-0.461**	-0.448**	
				(0.223)	(0.241)	
$(CF/K)_{it} * GFC_t$						0.871**
						(0.376)
$(TC/A)_{it}$	0.711***	0.356**	0.261*	0.397**	0.402**	0.758***
	(0.135)	(0.148)	(0.154)	(0.168)	(0.166)	(0.158)
$Leverage_{it}$	-0.360	-0.101	0.055	-0.101	-0.143	-0.314*
	(0.232)	(0.181)	(0.338)	(0.157)	(0.158)	(0.171)
$(S/K)_{it}$	0.011**	-0.005	0.020	-0.000	0.000	0.003
	(0.005)	(0.007)	(0.029)	(0.005)	(0.004)	(0.004)
$(I/K)^2_{it-1}$	0.004	0.028*	0.023*	0.041**	0.044**	0.040
	(0.011)	(0.016)	(0.013)	(0.020)	(0.021)	(0.025)
Hansen p value	0.769	0.192	0.231	0.139	0.243	0.200
AR(1) p value	0.000	0.006	0.014	0.041	0.009	0.040
AR(2) p value	0.387	0.861	0.124	0.231	0.276	0.128
No of instruments	42	51	46	47	47	45
No of firms	2920	2920	2920	2920	2920	2920
No of observations	15804	15804	15804	15804	15804	15804

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Estimations with Net Fixed Tangible Assets I

$(I/K)_{it}$	EMP I	EMP II	EMP III	EFC I	EFC II	GFC
$(I/K)_{it-1}$	0.216	-0.310**	-0.899*	0.061	-0.545*	-0.292*
	(0.196)	(0.129)	(0.519)	(0.108)	(0.317)	(0.168)
$(CF/K)_{it}$	0.161***	0.070**	0.434**	0.070**	0.061*	0.066*
	(0.056)	(0.029)	(0.214)	(0.031)	(0.034)	(0.037)
$(CF/K)_{it} * EMP_{jt}$	-0.060*	-0.050**	-0.170*			
	(0.035)	(0.023)	(0.102)			
$(CF/K)_{it} * EFC_{kt}$				-0.099*	-0.035*	
				(0.055)	(0.018)	
$(CF/K)_{it} * GFC_t$						0.070**
						(0.031)
$(TC/A)_{it}$	1.568***	0.667**	0.774**	1.659***	1.068***	0.929***
	(0.285)	(0.320)	(0.350)	(0.264)	(0.285)	(0.327)
$Leverage_{it}$	-1.361***	-0.931*	-0.619	-0.901**	-0.320	-1.024***
	(0.508)	(0.472)	(0.739)	(0.414)	(0.432)	(0.384)
$(S/K)_{it}$	0.002	0.003	-0.002	0.003**	0.009***	0.002
	(0.002)	(0.002)	(0.011)	(0.002)	(0.003)	(0.005)
$(I/K)^2_{it-1}$	-0.013	0.014**	0.044*	-0.003	0.027*	0.014*
	(0.009)	(0.006)	(0.024)	(0.005)	(0.015)	(0.008)
Hansen p value	0.187	0.623	0.243	0.160	0.845	0.423
AR(1) p value	0.000	0.000	0.003	0.000	0.000	0.000
AR(2) p value	0.926	0.151	0.120	0.436	0.132	0.448
No of instruments	46	43	56	43	49	44
No of firms	2912	2912	2912	2912	2912	2912
No of observations	15637	15637	15637	15637	15637	15637

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Estimations with Net Fixed Tangible Assets II

$(I/K)_{it}$	EMP I	EMP II	EMP III	EFC I	EFC II	GFC
$(I/K)_{it-1}$	-0.509*	-0.642*	0.038	-0.276	-0.454*	-0.458*
	(0.303)	(0.371)	(0.217)	(0.356)	(0.275)	(0.269)
$(CF/K)_{it}$	0.957***	0.913***	0.147***	0.869***	0.671***	0.132
	(0.321)	(0.2676)	(0.057)	(0.336)	(0.160)	(0.054)
$(CF/K)_{it} * EMP_{jt}$	-0.708**	-0.611*	-0.289*			
	(0.352)	(0.321)	(0.148)			
$(CF/K)_{it} * EFC_{kt}$				-0.405*	-0.291*	
				(0.216)	(0.150)	
$(CF/K)_{it} * GFC_t$						0.315*
						(0.162)
$(TC/A)_{it}$	0.543*	0.555*	0.890*	0.782*	0.316	0.664**
	(0.299)	(0.307)	(0.282)	(0.427)	(0.232)	(0.283)
$Leverage_{it}$	-0.101	-0.141	-0.596**	0.027	-0.203	-0.519*
	(0.453)	(0.383)	(0.291)	(0.402)	(0.301)	(0.286)
$(S/K)_{it}$	0.010***	0.012**	0.005	0.007	0.003	0.015***
	(0.003)	(0.005)	(0.008)	(0.006)	(0.005)	(0.003)
$(I/K)^2_{it-1}$	0.040	0.061*	-0.004	0.021	0.32	0.051*
	(0.025)	(0.034)	(0.018)	(0.030)	(0.021)	(0.027)
Hansen p value	0.580	0.362	0.804	0.615	0.455	0.907
AR(1) p value	0.007	0.006	0.000	0.001	0.008	0.008
AR(2) p value	0.866	0.586	0.161	0.296	0.199	0.671
No of instruments	43	44	39	43	57	49
No of firms	873	873	873	873	873	873
No of observations	5095	5095	5095	5095	5095	5095

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Estimations with Winsorization level p=0.02

$(I/K)_{it}$	EMP I	EMP II	EMP III	EFC I	EFC II	GFC
$(I/K)_{it-1}$	-0.332*	-0.333**	0.307	-0.361*	-0.539*	-0.130
	(0.199)	(0.166)	(0.255)	(0.195)	(0.320)	(0.143)
$(CF/K)_{it}$	0.616***	0.693***	0.370***	0.558***	0.537***	0.244***
	(0.120)	(0.114)	(0.126)	(0.082)	(0.087)	(0.035)
$(CF/K)_{it} * EMP_{jt}$	-0.177**	-0.223***	-0.111*			
	(0.082)	(0.081)	(0.059)			
$(CF/K)_{it} * EFC_{kt}$				-0.109*	-0.109*	
				(0.063)	(0.057)	
$(CF/K)_{it} * GFC_t$						0.159**
						(0.073)
$(TC/A)_{it}$	0.341***	0.203**	0.483***	0.260***	0.202*	0.403***
	(0.103)	(0.096)	(0.121)	(0.100)	(0.122)	(0.086)
$Leverage_{it}$	-0.181	-0.027	-0.199*	-0.022	-0.026	-0.131
	(0.225)	(0.157)	(0.103)	(0.182)	(0.275)	(0.106)
$(S/K)_{it}$	0.000	0.005	0.002	0.003	0.009	0.009**
	(0.003)	(0.007)	(0.005)	(0.006)	(0.005)	(0.004)
$(I/K)^2_{it-1}$	0.054*	0.055**	-0.063	0.071*	0.096*	0.021
	(0.032)	(0.027)	(0.044)	(0.040)	(0.055)	(0.023)
Hansen p value	0.197	0.725	0.267	0.648	0.280	0.150
AR(1) p value	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) p value	0.186	0.142	0.602	0.116	0.105	0.102
No of instruments	43	52	48	38	41	56
No of firms	2916	2916	2916	2916	2916	2916
No of observations	15642	15642	15642	15642	15642	15642

Robust standard errors in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix E. Correlations Between Interaction Terms

Table 13: Cross-Correlation Table (Obs=15642)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) $(CF/K)_{it} * EMP_{1t}$	1.000					
(2) $(CF/K)_{it} * EMP_{2t}$	0.520	1.000				
(3) $(CF/K)_{it} * EMP_{3t}$	0.646	0.365	1.000			
(4) $(CF/K)_{it} * EFC_{1t}$	0.387	0.866	0.284	1.000		
(5) $(CF/K)_{it} * EFC_{2t}$	0.505	0.986	0.373	0.850	1.000	
(6) $(CF/K)_{it} * GFC_t$	0.581	0.197	0.785	-0.049	0.203	1.000

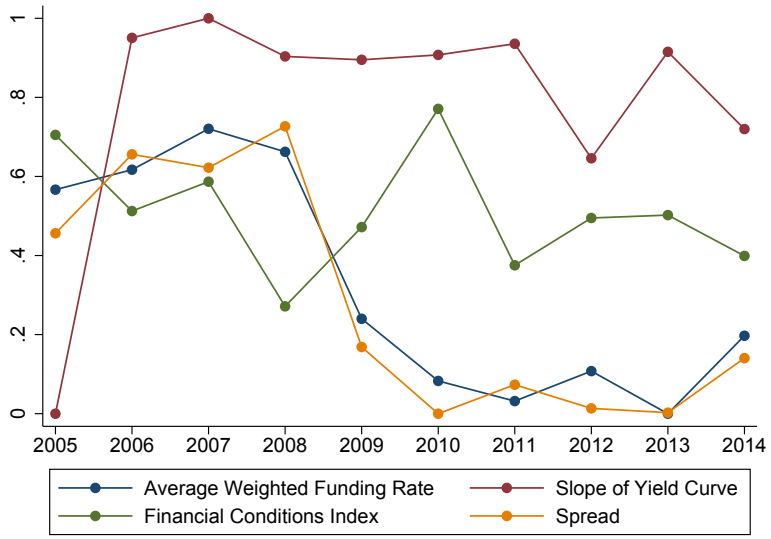

Fig. 1. Normalized Indicators for Monetary Policy Stance and Financial Conditions

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