Market Undervaluation and Inter-Company Borrowings*

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Abstract

The traditional finance literature suggests that equity market undervaluation leads managers to use financial debt, especially short-term debt. We hypothesize that an undervalued firm is likely to obtain better borrowing conditions from economically linked firms as they have superior information on the firm and have nonsalvageable interest in helping the firm to recover from transitory valuation loss. We find that inter-company borrowings serve as an important bridge financing when firms are temporarily undervalued. The effect is stronger among micro firms: a one standard deviation increase in stock undervaluation leads a typical micro firm to increase/decrease the use of inter-company borrowings/traditional financial debts equal to 0.81% of total assets. Furthermore, we find that such substitution effect is higher among firms with higher external finance dependence, but is lower among firms with higher informational and financial constraint.

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The economic literature has reached a consensus that equity market misvaluation plays an important role in corporate financing decisions. Managers with private information about the real state of the firm are able to identify valuation errors and design financial strategy to exploit these situations (e.g, Graham and Harvey (2001), Bancel and Mittoo (2004), Jensen (2005), Baker et al., (2007), Polk and Sapienza (2009)). More importantly, market timing activities affect firms' capital structure in a significant and long-lasting way (e.g., Baker and Wurgler (2002), Korajczyk and Levy (2003)). [2] Research on debt financing has been focusing on investigating the role of market conditions in affecting firm credit access. For instance, Barry et al. (2008) examine whether the consideration of timing interest rates play a part in debt issuance. Schultz (2003), Butler et al. (2006), Greenwood et al. (2010) investigate whether timing debt characteristics creates value for shareholders. More recently Fama and French (2012), Harford et al. (2014) analyze if credit market misvaluation impacts financing decisions of firms. Despite all, the effect of stock market valuation waves on firm's choice of various financing sources has not received much consideration in the literature.

In this paper, we examine inter-company borrowing[3] versus financial debt choice under equity market undervaluation. We contend that firms are more likely to rely on inter-company borrowings when equity market undervalues their performance. Our rational lies in a simple argument that suppliers and other business partners of a firm have an advantage over financial institutions in acquiring information about the financial health and the product market of the firm or/and have incentives to help the firm when the equity market undervaluation is transitory. We suggest that the information channel is likely the mechanism underlying the increased use of inter-company borrowings subsequent to undervaluation in small firms and that implicit equity stake is probably

[2] Although subsequent studies raise questions about the significance and persistence of equity market timing given the existence of non-trivial transaction costs (e.g., Alti (2006), Flannery and Rangan (2006)), a general consensus has been reached on managers' commitment to timing equity issuance.

[3] Inter-company borrowings in this paper refer to contractual obligations provided by non-financial institutions. These are obligations including but not limited to firm's delayed payment to suppliers and the inter-company borrowings from other economically linked firms.

the main channel that affects big firm to choose inter-company borrowings in undervaluation times.

Traditional finance literature suggests that trade credit is less desirable than financial credit due to the typically high implicit interest cost. To make payment to the seller, the buyer can choose to borrow from a financial institution or pay later. In the latter case, the buyer will need to pay a higher interest rate defined in advance by the trade credit terms. Smith (1987) establishes that trade credit terms serve as important screening devices that elicit information about buyer default risk. This suggests that firms only choose to delay payments when third-party financing is not available.

Yet, existing evidence shows that most suppliers do not always set up discount terms and often adopt pure net terms due to the reason that suppliers have an implicit financial stake in their customers and are able to liquidate assets more efficiently (Ng et al. (1999) and Giannetti et al. (2011)). Ng et al. (1999) find that suppliers tend to allow customers – especially those who have established long-term financial stake - to take the discount even in the presence of discount terms. Moreover, trade credit can serve as a subsidy that solves negative externalities for suppliers, i.e., lost final sales (Daripa and Nilsen (2011)).

Indeed, although Smith (1987) derives that the buyer´s choice of trade credit sends a negative signal to the seller, she also notes that in the presence of a non-trivial financial stake, the seller still has incentives to "distinguish between buyers who require temporary assistance … and those likely to default and who are not expected to generate sufficient future quasi-rents to justify continued extension of credit." In high information asymmetry times, financial market is likely to systematically undervalue a buyer´s performance[4]. The seller who has a financial stake and

[4] Myers and Majluf (1984) suggests that undervaluation, also referred to as the renowned "lemon" problem, can arise due to information frictions. Recent studies show that the "lemon" problem also exist in credit market. Cai et al. (2007) contend that underpricing in the corporate bond market represents a solution to information problems. In support of their proposition, they find evidence that underpricing in bond IPOs and seasoned offerings is higher among firms with higher asymmetric information. Ellul and Pagano (2006) propose an alternative explanation for bond underpricing, blending investors' aftermarket illiquidity concerns with information asymmetry after the IPOs.

information advantage[5] over a third-party financing institution will have incentive to increase the extension of credit if the seller believes that this is a temporary situation. We expect that the phenomenon accentuates for small businesses who have been less analyzed by financial institutions and financial analysts. For big firms, it is less likely that suppliers are better informed than external market. However, as these firms have large market power, they will still be able to obtain extra credits from their suppliers. For example, Giannetti et al. (2011), Murfin and Njoroge (2015) find that in the oligopolistic supplier market where supplier firm's business is largely dependent on their customers, issuing trade credit is a mechanism to mitigate business shocks induced by the failure of a main customer. In fact, even if both customers and suppliers are constrained, provision of trade credit can alleviate an underlying moral hazard problem (Burkart and Ellingsen (2004)). Furthermore, in comparison with banks, trade credit providers are less inclined to enforce late payment penalties against their trading partners (Fitzpatrick and Lien (2013)). All these aspects, taken together, explain why firms would have incentives to use inter-company credits under market undervaluation periods.

Our empirical results indicate that non-financial intermediaries play an important part in alleviating equity market undervaluation and that inter-company borrowings serves as bridge financing during undervalued times. We employ an undervaluation measure that screens out the contaminating effect of investment options and the constrained regression approach that compares the credits supplied by financial institutions and alternative lenders (e.g., suppliers) as a function of undervaluation levels. We find that there is a positive association between undervaluation and inter-company borrowings. The effect is widespread and is more prominent among micro stocks. On average, a microcap firm increases the use of inter-company borrowings and trade credit (measured by account payable) by 0.81% and 0.26% of total assets respectively if the firm subjects to a one standard deviation increase in stock undervaluation. Furthermore, we find that smaller

[5] The continuous interaction generates valuable "soft information," which mitigates information asymmetries between a firm and its stakeholders when the firm is temporarily undervalued due to information frictions. Additionally, monitoring of credit quality can occur as a by-product of selling when a manufacturer's sales representatives visit the borrower regularly (Mian and Smith (1992)).

firms circumvent the potential loss resulting from market undervaluation by substituting inter-company borrowings for short-maturity financial debt, a common financing source of small firms, while larger firms substitute inter-company borrowings for long-maturity financial debt. The effect is enhanced among small firms with high dependence on external finance. However, small firms, when informationally and financially constrained, use less inter-company borrowings compared with their small unconstrained counterparts. It is consistent with the view that the extension of inter-company credit is used as a screening device to elicit information (e.g., Smith (1987), Biais and Gollier (1997), Atanasova (2012), Aktas et al. (2012)). Lastly, we find that the increased use of inter-company borrowings for a firm that is temporarily undervalued by the market leads to a more pronounced stock price reversal, consistent with the view that the extension of inter-company borrowings send a favorable signal and help outside investors to readjust their expectation.

Our research brings new evidence to the finance literature. Notably, our paper points to firm's attempt to alleviate undervaluation by turning to transitional funds, i.e., inter-company borrowings, while waiting for the market to recover. Previous studies on trade credit (e.g., Garcia-Appendini and Montoriol-Garriga (2013) and Casey and O'Toole (2014)) emphasize the role of trade credit in providing additional liquidity to firm who are suffering from temporary liquidity shocks[6]. Our paper extends this literature by providing an alternative explanation for the dynamics of trade credit usage. In particular, we explain the increased use of trade credit from the perspective of equity market undervaluation. We show that the use of trade credit further help to re-stabilize stock market valuation.

Our work is also related to recent work of Warusawitharana and Whited (2015), Harford et al. (2014) and Warr et al. (2012) who demonstrate that capital market misvaluation affects firm's

[6] This line of literature shows that liquid firms extended a large amount of trade credit to other firms during the 2007-2008 financial crisis. Casey and O'Toole (2014) find that when bank credit is scarce and firms are credit-rationed, SMEs are more likely to use trade credit than are unconstrained firms. Casey and O'Toole (2014) also find evidence that firms use alternative sources of finance, such as inter-company loans, market financing, or government grants.

investment and financing decisions[7]. By examining firm´s access to alternative sources of credits, our research complement and extend these studies that analyze the use of overall credits.

The remainder of this paper is organized as follows. Section 1 develops the hypotheses, discusses the empirical approach, defines the variables of interest and describes the data. After defining the variables of interest and describing the data, section 2 conducts the empirical tests investigating whether and how market undervaluation affects a firm's debt allocation between financial debts and inter-company borrowings. In Section 3, we explore the implications of firm heterogeneity in the effect of undervaluation. Section 4 exploit whether ex post, the market corrects for the ex-ante undervaluation subsequent to firm's use of inter-company borrowings. Section 5 concludes.

1. Hypotheses Development and Empirical Specification

1.1 Hypotheses Development

Undervaluation has several theoretical explanations, all pointing to the situation where stakeholders disagree on the value of the firm. Financial investors (F), including stock market investors and financial market participants, believe that the price of the stocks reflect the true value of a firm, whereas managers (M) estimate a higher value. Managers (insiders) estimate to have superior information about the prospect of the firm compared to financial investors (outsiders) and that the financial investors undervalue their firm.

Under the above setting, the market timing theory concludes that to finance the firm's activities, managers will not issue equity while anticipating investors to correct their expectations. As

[7] Estimating the parameters of a dynamic investment mode, Warusawitharana and Whited (2015) show that equity market misvaluation induces larger changes in financial policies of firms than investment policies. Harford et al. (2014) investigates how firms take borrowing and investment decisions in misvalued credit market. Using the ex post accuracy of credit ratings, they find that firms make use of rating inaccuracies to employ more debt and increase investment. Warr et al. (2012) show that equity mispricing and its impact on the cost of equity affect significantly the adjustment speed towards target capital structure. A firm would postpone equity issuance when the firm's stock is temporarily underpriced relative to its fundamental value even if it needs to reduce a leverage surplus.

indicated by Baker and Wurgler (2002), there are two versions of equity market timing. The first is the dynamic form of Myers and Majluf (1984) which models rational managers and investors, with adverse selection cost varying across firms over time. The second version considers irrational investors (or managers) and models time-varying mispricing, or time-varying perception of mispricing (see La Porta et al. (1997), Frankel and Lee (1998) and Shleifer (2000)). We do not distinguish one version from another. Indeed, in the two models, undervaluation in the stock market is explained by information asymmetry between investors (F) and managers (M). More specifically, the undervaluation of a firm (denoted by UN_i) is modeled as a function of the information difference between managers and the financial investors. The use of the information can be rational or irrational but both versions conclude that managers raise debt if the firm is undervalued, i.e., when $UN_i > 0$.

These traditional approaches only consider the choice between equity and financial debt. We introduce an alternative financing option, that is, "inter-company borrowings", which are obligations of firms, including but not limited to, firm's delayed payment to suppliers (trade credit) and borrowings from other economically linked firms. Our question is whether managers prefer to raise financial debt (either short-term or long-term) or to use inter-company borrowings when a company is temporarily undervalued by financial investors. To model this, besides stockholders (outsiders), banks (outsiders) and managers (insiders), we introduce the third type of stakeholders, i.e., the economically linked companies who could be sellers of goods or providers of services.

In a classical approach, Smith (1987) considers that the third party holds less information about the prospect of the firm than financial markets do. In particular, banks frequently monitor financial performance of firms, therefore they are able to collect comprehensive information and analyze the information accurately. As a result, the interest rate, r, charged by banks will be lower than the implicit interest rate, θ^*, charged by suppliers. To the extent that it is true, a firm will take cash discount if it has access to a financial market at an interest rate lower than θ^*. Conversely, firms will prefer trade credit if the bank refuses to lend more or if the implicit interest rate of trade credit is lower than the interest rate charged by banks.

However, directly comparing the implicit interest rate of trade credit and the interest rate of bank credit is not an easy task. From buyer's perspective, the use of trade credit may only imply that the buyer accepts to pay higher price for the sake of obtaining insurance about the quality of goods or services provided by the seller. The use or the extension of trade credit could be a positive signal on the buyer in this setting, as it sends the message to the outsiders that the situation of the buyer is better than that expected by outsiders.

Indeed, a strand of research (eg, Biais and Gollier (1997), Aktas et al. (2012)) show that economically linked firms can have superior information about the firm. The first rational is that these firms have better knowledge of the market product in which the firm/buyer is operating compared to the outsiders. Therefore, the managers of these firms can derive more accurate expectations and inferences about the prospect of the firm's market. The second rational is that managers of the economically linked companies are in direct contact with the buyers and thus have a better view of the true value of the firm. These explanations are especially true for SMEs (See Ferrando and Mulier (2013), Garcia-Appendini and Montoriol-Garriga (2013) and Casey and O'Toole (2014)).

Above all, it suggests that the implicit cost of inter-company borrowings can be lower than that of financial loans, especially if we deduct the cost of insurance. Indeed, the selling firms that have economic interest in maintaining business relationship with the buying firms sometimes lend to the buyer at an interest rate lower than the interest rate the seller pays to the banks. Hence, the specific characteristics of inter-company loans, including the proximity, the bargaining of the sale price, the economic interaction, the guarantee…etc., explain why the implicit costs of such loans can be lower "in fine" than those of financial credits for a buyer. Under these new approaches, inter-company borrowings are not necessarily a choice that comes after financial credit. Instead, these credits could be more appealing than financial loans in certain situations. For instance, when the buyer is temporarily undervalued. Indeed, considering the massive use of trade credit and other inter-company borrowings, the explanation could be that these credits are not the less interesting type of funding.

Formally, we consider three groups of agents:

1. Investors in financial markets and banks, known collectively as financial investors (F). These agents are considered as outsiders. They share the same set of information and interpret the information in the same way. One can also distinguish between these two sub-groups but our results should not alter.

2. Firm managers (M). We assume these agents as insiders and holding perfect information about the future cash flows of their firms.

3. Economically linked companies (LC). We assume that these agents hold a set of information that is closer to those of managers, meaning that they have nearly the same opinions about the perspectives of the firm and the firm's market. Moreover, they can have economic stakes in the buyers. We assume that other firms or institutions, not linked to the buyers, have no informational advantage. They are excluded from our analysis.

Suppose that k_F is the basic interest rate charged in financial markets. To simplify, we consider k_F as the financing cost of financial institutions (transaction costs included). Additionally, we consider that financial institutions and banks offer the lowest cost of financing.

Firm operations are financed with financial credit provided by financial institutions and/or by trade credit provided by linked companies.

The financing cost of the linked companies, k_{LC} is illustrated as,

$$k_{LC} = k_F + RP\,(Risk_{LC}|\emptyset_F) + TC_{LC}\,, \tag{1}$$

The financing cost of the trade credit, k_M^{LC} is

$$k_M^{LC} = k_F + RP\,(Risk_M|\emptyset_{LC}) + WA_M^{LC} + TC_M^{LC}\,, \tag{2}$$

The financing cost of a loan made by financial institutions to the firm/buyer, k_M^F is

$$k_M^F = k_F + RP\,(Risk_M|\emptyset_F) + TC_M^F\,, \tag{3}$$

where

k_F is the financing cost of financial institutions;

k_{LC} is the financing cost of the linked firm;

k_M^{LC} is the financing cost of trade credit extended by the linked company to the firm;

k_M^F is the financing cost of a loan made the financial institutions to the firm/buyer;

$RP\ (Risk_{LC}|\emptyset_F)$ is the risk premium associated with the risk of the linked firm, $Risk_{LC}$, perceived by financial institutions with respect to their information set $\emptyset_F$;

$RP\ (Risk_M|\emptyset_{LC})$ is the risk premium associated with the risk of the firm/buyer, $Risk_M$, perceived by the linked companies considering their information set, $\emptyset_{LC}$;

$RP\ (Risk_M|\emptyset_F)$ is the risk premium associated with the risk of the firm/buyer, $Risk_M$, perceived by financial institutions with respect to their information set $\emptyset_F$;

TC_{LC} is the transaction cost for the linked companies to acquire a financial credit;

TC_M^{LC} is the transaction cost for the firm/buyer to acquire a trade credit from linked companies;

TC_M^F is the transaction cost for the firm/buyer to acquire a financial credit;

WA_M^{LC} is the guarantee paid by the firm/buyer to the linked companies in order to have a good service or the promised product.

Consider the situation where a firm needs to choose between financial and trade credits. The difference in financing costs is,

$$k_M^{LC} - k_M^F = RP\ (Risk_M|\emptyset_{LC}) + WA_M^{LC} + TC_M^{LC} - RP\ (Risk_M|\emptyset_F) - TC_M^F \quad (4)$$

We can derive the financing choice of firms/buyers by comparing the levels of information that financial institutions (F) and economically linked companies (LC) hold. Below we discuss several possible situations.

First, in the absence of information asymmetry, we have

$$k_M^{LC} - k_M^F = WA_M^{LC} + TC_M^{LC} - TC_M^F \quad (5)$$

The cost of trade credit will be higher than the cost of financial debt, $k_M^F < k_M^{LC}$, due to the presence of the insurance cost, WA_M^{LC}, if we consider that the difference in the transaction costs is very small or even null. In this case, buyers accept to use trade credit for the insurance such that they want to ensure the quality of the products or of the services provided by suppliers;

Second, if the level of information of suppliers is lower than that of financial institutions, as supposed by Smith (1987), we have

$$RP\ (Risk_M|\emptyset_{LC}) > RP\ (Risk_M|\emptyset_F) \quad (6)$$

The difference between the cost of trade credit and that of financial credit is higher than in the first situation and the use of trade credit sends a bad signal in this case.

The third scenario is when banks deny credit to borrowers at the prevailing market interest rate. Known as credit rationing, this problem is widely recognized as caused by imperfect information in financial markets. During the credit rationing periods, trade credit is likely to be the only source of funds available to firms. The reason why linked companies accept to lend is that they have economic interests in the undervalued firm.

The last situation is our assumption where the level of information that suppliers hold is higher than that of financial institutions, $\emptyset_{LC} > \emptyset_F$, suggesting undervaluation of buyers by financial institutions. $\emptyset_M - \emptyset_F = \emptyset_{LC} - \emptyset_F > 0$) and $UN_i > 0$). In this case, the risk premium requested by the linked companies is lower than the risk premium requested by the financial institutions. The difference between the cost of trade credit and the cost of financial debt, $k_M^{LC} - k_M^F$, should decrease and the use of inter-company borrowings should increase.

To sum up,

$\emptyset_{LC} > \emptyset_F \Rightarrow UN_i > 0 \Rightarrow RP\ (Risk_M|\emptyset_{LC}) < RP\ (Risk_M|\emptyset_F) \Rightarrow k_M^{LC} - k_M^F \searrow \Rightarrow$ ICB $\nearrow$

Where FD are financial debts and ICB are inter-company borrowings.

We empirically examine the following specification,

$$dFD = f\ (-UN, Control\ Variables) \quad (7)$$

$$dICB = f\ (+UN, Control\ Variables) \quad (8)$$

dFD is the issuance of financial debts, dICB the use of inter-company borrowings, and UN the level of market undervaluation.

Our prediction is the following: if $UN > 0$, FD ↘ and ICB ↗.

That is, when a firm is undervalued due to the presence of information asymmetry between financial investors and managers, economically linked firms are likely to extend trade credits with favorable conditions. The reason is the managers of the economically liked firms hold better information about the prospect of the firm/buyer than the financial markets do and estimate that the undervaluation of the firm/buyer is only temporary.

1.2 Empirical Specification

Previously researchers test firm´s use of different financing sources by running separate regressions. However, firm's financing decisions are simultaneously determined, and there are cash flow constraints on the possible financing decisions to be taken. In this paper, we adopt the constrained linear regression approach in which we compare the use of credits supplied by financial institutions and alternative lenders such as firm suppliers in a simultaneous framework. In addition to the cash flow variables, we also control traditional financial structure determinants, i.e., firm size, growth option, no dividend payment, and financial debt surplus relative to industry peers. Especially, once firms' growth options are entered, the undervaluation effect should be further cleaned out. As such, the firm´s use of trade credit and bank debt is simultaneously modelled as a function of a firm´s current valuation (undervaluation) by the financial market, the cash flow constraint that the firm needs to realize at the current time, and a set of control variables.

We impose that financing from various sources should equal to the demand in a firm's investment, as illustrated in the following equation:

$$dFD_{i,t} + dICB_{i,t} = dA_{i,t} + D_{i,t} - Y_{i,t} - dS_{i,t} + DD_{i,t-1}, \quad (9)$$

dFD is calculated as the net issuance of financial debts (See Appendix B); *dICB* is measured as changes in total liabilities excluding changes in financial debts; dA, D, Y and dS represent investment in assets, dividends paid, earnings, and shares issued, all measured in fiscal year t. Also present in the cash flow constraint (9) is the long-term debt redemption ($DD1_{t-1}$, the current portion of long-term debt, measured as of the fiscal year *t-1*) which we identify as an exogenous shock to a firm's debt structure. Firms regularly refinance the maturing debts to maintain the on-going investment, which consequently affect their choice of incremental debts.

Based on the above constraints, we estimate the following equations for the split between financial debts ($dFD_{i,t}$) and inter-company liabilities ($dICB_{i,t}$). For the sake of simplicity, we ignore other control variables that are added later in our analyses.

$$dFD_{i,t} = a + b_1 UN_{i,t-1} + b_2 dA_{i,t} + b_3 Y_{i,t} + b_4 dS_{i,t} + b_5 D_{i,t} + b_6 DD1_{i,t-1} + e_{i,t}, \quad (10)$$

$$dICB_{i,t} = -a - b_1 UN_{i,t-1} + (1-b_2) dA_{i,t} - (1+b_3) Y_{i,t} - (1+b_4) dS_{i,t} + (1-b_5) D_{i,t} + (1-b_6) DD1_{i,t-1} - e_{i,t}. \quad (11)$$

Imposing the cash flow constraint implies that for firm i at year t, the external debt funds ($dFD_{i,t}$ + $dICB_{i,t}$) are equivalent to the demand of asset investment ($dA_{i,t}$), dividend distribution ($D_{i,t}$), and debt refinancing ($DD1_{i,t-1}$), minus the supply of internal funds ($Y_{i,t}$) and new shares issued ($dS_{i,t}$). As a result, the intercepts and the residuals in the $dFD_{i,t}$, and $dICB_{i,t}$ regressions must add up to zero; the sums of the coefficients of $dA_{i,t}$, $D_{i,t}$ and $DD1_{i,t-1}$ in the equations (10) and (11) must add

up to 1; and the slopes on $Y_{i,t}$, and $dS_{i,t}$ must add up to -1. For the extra variables (e.g., $Undervaluation_{i,t-1}$), the coefficients must add up to 0.[8]

The slopes for $UN_{i,t-1}$ provide estimates of how market undervaluation pushes the split of external borrowings away from the average. We expect the use of trade credit to increase and the use of financial loans decrease with firm undervaluation. In other words, we should observe positive signs for $UN_{i,t-1}$ in the $dICB_{i,t}$ regression and negative signs for $UN_{i,t-1}$ in the $dFD_{i,t}$ regression.

2. Empirical Analyses

2.1 Data

Our baseline sample is drawn from the CRSP/Compustat Merged database for a group of non-financial U.S. firms over the period from 1983 through 2014. Due to the fact that we compute the intrinsic value of a firm based on a three-year forecast horizon, our final sample covers the period 1983-2011. For a firm to be included in the sample, we require complete information on the regression variables (see Appendix A). We further discard observations with common equity superior to total assets at the beginning of fiscal year. Moreover, we winsorize positive earnings ($PosY_t$), dividends (D_t), and lagged value-to-price ratio (UN_{t-1}) at 99.5% of the annual distribution, and winsorize change in assets (dA_t), shares issued (dS_t), and negative earnings ($NegY_t$) at 0.5% of the annual distribution. Observations with negative book equity and with common equity value superior to total assets at the end of fiscal year *t-1* are eliminated.

In addition to the cash flow variables and the value-to-price ratio, we incorporate additional controls, including growth option (also known as fair valuation, measured as the lagged value-to-

[8] Due to round-off errors, the sum of the estimated coefficients in the complementary regressions may not perfectly comply with the requirements of the cash flow constraint.

book ratio, V/B_{t-1}), firm size (MC_t, the log value of market capitalization in June of calendar year t), no dividend payment (NoD_t, a dummy variable for firms that do not pay dividends during fiscal year t), and lagged financial debt surplus (TDS_{t-1}, the difference between the actual and the industry financial debt ratio[9], measured at the end of the fiscal year $t-1$)[10]. Once firms' growth options are entered, we should be able to find more robust evidence of the undervaluation effect.

[Insert Table I about here]

Table I contains descriptive statistics for our baseline sample. We conduct separate analyses for firms with different size scales. Firm size is estimated as the percentage of NYSE firms that have the same or smaller market capitalization. As in Fama and French (2012), micro, small and big firms are defined as firms whose market capitalizations in June of year t are below the 20th NYSE percentile, between the 20th and the 50th NYSE percentile, and above the 50th NYSE percentile. The average annual sample represents 2,442 firms: 1,106 micro firms, 565 small firms, and 771 big firms.

Inter-company obligation holds a great proportion of total external financing, especially for big caps. The typical big firm issues inter-company loans equivalent to 2.67% of total assets, representing 40% of their total external finance (financial debt plus inter-company borrowings plus common equity issues). Refinancing maturing debts for micro caps requires about 38% of their total external finance, a figure two times as high as for small caps. Further, consistent with the conventional wisdom that small firms are more likely to be undervalued compared to their large mature peers, the average value-to-price ratio is higher in micro firms.

[9] The industry debt ratio is calculated as the industry weighted average debt ratio based on the Fama French 48 industry classification, with each firm weighted by its total liabilities.

[10] Fama and French (2012) also include negative book equity ($NegB_{t-1}$, a dummy variable for firms with negative book equity value at the end of fiscal year $t-1$), giving financial constraints for firms reporting severe losses. As our sampling process eliminates firms with poor performance, we exclude this variable from our analyses.

Our measure for market undervaluation (UN) in the main tests is firm's value-to-price ratio *UN*, calculated as firm's intrinsic value at the end of fiscal year t-1 divided by firm's stock price at the end of December of calendar year t-1. We employ a residual income model[11] to estimate a firm's intrinsic value. Taking into account the future cash flows of a firm, this measure allows us to filter out firm's growth options, thus allows us to tell the misvaluation component from the fair valuation component. We follow previous studies (e.g., Lee et al. (1999), Elliott et al. (2008), Warr et al. (2012), Dong et al. (2012)) to employ a three-year forecast horizon (See Appendix C for a detailed discussion). As noted by Lee et al. (1999), the value-to-price ratio is not necessarily equal to the theoretical cutoff of 1 even in the absence of misvaluation, due to the fact that the implied risk premium could have changed. Analogously, a value-to-price ratio of more than 1 does not necessarily indicate undervaluation. We use this measure to draw cross-sectional inferences about whether firms are underpriced, relative to their counterparts.

2.2 Undervaluation and the Allocation between Financial Debt and Inter-Company Borrowings

We start by testing how firms respond to equity market undervaluation by choosing inter-company borrowings over financial debts based on the size-undervaluation two-way sorted portfolios. To examine a firm's financing preferences, we calculate inter-company borrowings, net of financial debt issued ($dICB_t$ - dFD_t).

The portfolio formation procedure is as follows. For each year and each size group, we sort firms into deciles according to their previous-fiscal-year-end value-to-price ratio. Firms in the highest decile comprise the most undervalued portfolio, those in the lowest decile comprise the most overvalued portfolio, and the remaining firms comprise the benchmark group. For each portfolio constructed, we report the time-series means of the lagged value-to-price ratio (UN_{t-1}) and the use of inter-company borrowings over financial debts in Table II. The average difference

[11] Previous studies find that misvaluation measured by the residual income model generally outperforms other traditional market multiples (such as price-to-book, earnings-to-book, and dividend-to-book ratios) in predicting stock returns, security issuance/repurchase decisions, and merger/takeover activities.

in issuances and the associated t-statistics among the three portfolios are presented at the bottom of each panel.

[Insert Table II about here]

In support of our hypothesis that firms rely more on inter-company borrowings when their stocks are valued lower than their intrinsic value, we find that $dICB_t$ - dFD_t increases monotonically with UN_{t-1}. The most undervalued portfolio in the full sample issues 2.18% (t=9.25) more $dICB_t$ - dFD_t over financial debts than the most overvalued portfolio. Furthermore, when undervalued, smaller firms are more likely to use alternative credits than larger firms. The difference is more prominent among micro firms: $dICB_t$ - dFD_t between the most undervalued and the most overvalued portfolios touches 4.02%, statistically different from zero.

We next perform multivariate regression tests with extra control variables based on the baseline regression specification (equations (10) and (11)). We separate negative earnings (*NegY*) from positive earnings (*PosY*), allowing for the possibility that the allocation of liabilities between financial debts and $dICB_t$ - dFD_t varies with the sign of the income shocks. The inclusion of $V/B_{i,t-1}$ allows to filter out the effect of rational valuation from the effect of misvaluation. Dong et al. (2012) argues that $P/B_{i,t-1}$ could potentially extract part of the misvaluation effect. In unreported analyses, we find that including $P/B_{i,t-1}$ instead of $V/B_{i,t-1}$ yields quantitatively similar results.

$$dFD_{i,t} = a + b_1 UN_{i,t-1} + b_2 dA_{i,t} + b_{3a} NegY_{i,t} + b_{3b} PosY_{i,t} + b_4 dS_{i,t} + b_5 D_{i,t} + b_6 DD1_{i,t-1} + b_7 V/B_{i,t-1} + b_8 NoD_{i,t} + b_9 MC_{i,t} + b_{10} TDS_{i,t-1} + e_{i,t}, \quad (12)$$

$$dICB_{i,t} = - a - b_1 UN_{i,t-1} + (1-b_2) dA_{i,t} - (1+b_{3a}) NegY_{i,t} - (1+b_{3b}) PosY_{i,t} - (1+b_4) dS_{i,t} + (1-b_5) D_{i,t} (1- b_6) DD1_{i,t-1} - b_7 V/B_{i,t-1} - b_8 NoD_{i,t} - b_9 MC_{i,t} - b_{10} TDS_{i,t-1} - e_{i,t}. \quad (13)$$

We focus our attention on understanding whether at some point in time equity misvaluation of a firm relative to others affects the firm's decision to allocate different sources of debt funds. We

accordingly employ the Fama-Macbeth procedure to estimate the regression parameters. Specifically, we run a cross-sectional regression for each year *t* during the sample period. The reported parameter estimates are the averages of the annual regression coefficients and R^2 is the average value of the annual coefficients of determination. Standard errors are further adjusted using the Newey-West procedure. Note that since regressions are run for each year, the identified effects on undervaluation should be strictly cross-sectional and not likely to be contaminated by over-time fluctuations in market valuations as a consequence.

[Insert Table III about here]

The results, reported in Table III, lead to a similar conclusion that firms substitute inter-company borrowings for financial debts in the presence of equity market undervaluation. The estimated coefficients, (- b_1) in equation (13), for $UN_{i,t-1}$ are all positive in the $dICB_{i,t}$ regression, providing an indication that firms with low stock valuation would shift toward inter-company borrowings. The estimated coefficient of $UN_{i,t-1}$ for the overall sample suggests that a one standard deviation increase in $UN_{i,t-1}$ above the mean leads the typical firm to increase the use of inter-company borrowings equivalent to 0.49% of its total assets. A comparison of the economic significance among the different size groups suggests that undervaluation leans micro firms more towards favoring inter-company borrowings in comparison with bigger firms. The effect is significant: a one standard deviation increase in $UN_{i,t-1}$ implies an increase of inter-company borrowings to assets by 0.81%, 0.16% and 0.19% for micro, small, and big caps, respectively.

2.3 Undervaluation and the Use of Trade Credit

Trade credit has been recognized as an important substitute form of bank credit. Understanding the potential factors that drive the demand and supply of trade credit is especially important, given the high levels of trade credit on US firm's balance sheet[12]. Especially, researchers contend that

[12] Trade credit is the most important component of working capital for U.S. firms (Demirgüç -Kunt and Kaksimovic (2001)). The typical U.S. firm uses trade credit for as much as 40% of its working capital (Aktas et al. (2015)).

there is an increased demand and provision of trade credit when rationing exists in the credit market (e.g., Burkart and Ellingsen (2004), and Garcia-Appendini and Montoriol-Garriga (2013)). We conjecture that an alternative force, i.e. market undervaluation, could affect firm's decision to employ trade credit. For small firms, suppliers are better informed than external markets, therefore willing to provide more trade credits when their customers face unfavorable conditions for accessing external finance. For bigger firms, as they usually have bargaining power over their suppliers, they would turn to vendor financing when they feel undervalued and the financial debts too expensive. To examine this conjecture, this section provides a direct test of whether firms actively use loans from their suppliers, customers, and partner firms to hedge market undervaluation. In both cases, we should observe positive relationship between trade credit and market undervaluation.

To explore the role of trade credit, we further classify inter-company borrowings into accounts payable which denotes firm's delayed payment to suppliers, accounts receivable which denotes delayed payments by customers, and the remaining (miscellaneous) liabilities which include inter-firm lending, tax liabilities, etc.

Portfolio analysis results presented in Columns (2) and (3) of Table II imply significant difference in trade credit usage over financial debts between undervalued and overvalued firms. The substitution of financial credit with account payable for the most undervalued portfolio is 2.26% higher than that for the most overvalued portfolio. We do not find that firms manage to speed up customer payment in undervalued periods.

We next extend our analyses to a multivariate framework, based on a system of three equations for the allocation of financing among financial debts (*dFD*), the type of trade credit under investigation (*dTrade*), and the miscellaneous liabilities (*dMisL*), in which *dICB =dTrade + dMisL*. Fama-Macbeth estimation of the above specification can be found in Table IV. The trade credit investigated is accounts payable in column (1), accounts receivable in column (2), and the sum of accounts payable and accounts receivable in column (3). For brevity, estimates are only reported for $UN_{i,t-1}$.

[Insert Table IV about here]

In accordance with our expectation, we find that micro firms use more trade credits subsequent to equity market undervaluation. The estimated coefficients of $UN_{i,t-1}$ are positive and significant for micro firms in the *dTrade* regression. A one standard deviation increase in UN_{t-1} leads a micro firm to increase its use of accounts payable equal to 0.26% of its total assets (0.22 times the standard deviation of UN_{t-1}, 1.16). For big firms, the coefficients of *UN* are insignificant in *dTrade*. but strengthen in *dMisL*, suggesting that trade credit is perhaps not the major source of inter-company borrowings that big firms use to exploit market misvaluation.

Additional, our results (Table IV, Column (2)) point to the fact that customers delay their payment when the suppliers are currently valued low by the market. Notably, this result is only valid for micro-size firm, most probably due to weak market power. TThe delayed payment of customers during suppliers' undervalued periods can also be explained by the possibility that shocks to suppliers are accompanied with shocks to customers.

These results highlight the tendency of small firms to employ trade credit in response to negative valuation errors, indicating that the better information on the part of suppliers is the economic mechanism at work. The rational is intuitive as the underlying assumption that suppliers are better informed than external markets is more believable for small firms and less likely for large firms that are frequently covered by financial analysts.

2.4 Undervaluation and the Shift among Short-, Long-Term Financial Debt and Inter-Company Borrowings

Now that we find evidence in support of our hypothesis that the use of inter-company borrowings is likely determined by overall market misvaluation, we next analyze the dynamics between inter-company borrowings and financial debts with short and long maturities. The caveat is that access to external finance differs among firms. Smaller firms rely exclusively upon bank loans, thus they tend to have less access to long-maturity debt compared with larger firms. In this sense, the shift for smaller firms is more likely to occur between inter-company borrowings and short-term

financial debt. We further divide a firm's financial credit into short-term and long-term debts (*dFD =dSTD + dLTD*).

To provide a more complete picture of the maturity spectrum, we measure debt issuance with respect to various maturity cutoffs. In our main tests, we follow the conventional practice to report the results based on the three-year maturity cutoff[13]. The accounting identity for the net issuance of debt with various maturities is explained in Appendix B.

Adopting the constrained regression framework requires that the estimates for parameters in *dICB* should be the same as in Table III. Moreover, parameter estimates in the *dSTD* and the *dLTD* regressions reflect the coefficient split between long-term and short-term debts in the *dFD* regression.

[Insert Table V about here]

As indicated by Table V, smaller firms circumvent the potential loss resulting from market undervaluation by substituting inter-company borrowings for short-maturity financial debt, while larger firms substitute inter-company borrowings for long-maturity financial debt for the same purpose. For micro caps, the coefficient for UN_{t-1} is negative in the $dSTD_t$ regression but positive in the $dLTD_t$ regression. The opposite is true for big caps.

2.5 Alternative Specifications

We next discuss the robustness of our baseline findings by conducting alternative empirical specifications and various undervaluation measures in Table VI. Firm fixed effect estimator and firm-year fixed effects estimator are used in Columns (1) and (2). Columns (3) and (4) calculate robust and clustered standard errors. Credit market conditions are included in Columns (2) and (4).

[Insert Table VI about here]

[13] Results based on the one-year, two-year, and four-year debt maturity cutoffs are qualitatively similar.

Finance literature (e.g., Marsh (1982), Baker et al. (2003)) and field surveys (e.g., Graham and Harvey (2001)) document that credit market conditions are associated with firm's debt financing decisions[14]. Our findings on the lagged value-to-price ratio (Column (2) of Table V) remain robust after including short-term interest rate, the term structure of interest rate, the credit spread of interest rate and changes in firm's credit quality (Hadlock and Pierce's (2010) SA index), although controlling these extras marginally weakens the coefficients of market misvaluation. This result confirms our intuition that the effect of market undervaluation on debt allocation is mainly cross-sectional. The effect of undervaluation is also robust to firm fixed effect estimator.

Column (5) computes firm-specific error, in a way similar to that developed by Rhodes-Kropf, Robinson, and Viswanathan (2005). Instead of decomposing the log market-to-book ratio, we decompose the log book-to-market ratio into a firm-specific error, a time-series sector error, and a long-run book-to-value component.

$$b_{i,t} - m_{i,t} = v(\theta_{i,t}\,;\,\alpha_{j,t}) - m_{i,t} + v(\theta_{i,t}\,;\,\alpha_j) - v(\theta_{i,t}\,;\,\alpha_{j,t}) + b_{i,t} - v(\theta_{i,t}\,;\,\alpha_j) \qquad (14)$$

where $v(\theta_{i,t}\,;\,\cdot)$ expresses the fundamental value based on a vector of multiple α. $v(\theta_{i,t}\,;\,\alpha_{j,t})$ is the time-t fundamental value conditional on sector j's valuation; $v(\theta_{i,t}\,;\,\alpha_j)$ is sector j's time-invariant valuation.

Our estimation strategy for $v(\theta_{i,t}\,;\,\alpha_{j,t})$ and $v(\theta_{i,t}\,;\,\alpha_j)$ also follows Rhodes-Kropf et al. (2005) and run valuation regressions for each of the Fama French 12 industry. Specifically, we regress market equity (m) on book equity (b), positive net income (*PosNI*), the absolute value of negative net income (*NegNI*), and book leverage (*Lev*), all expressed in natural logs. Then, using the

[14] Marsh (1982) show that debt issuance decisions are related to general market conditions. Baker, Greenwood and Wurgler (2003) find evidence that timing long-term debt issuance prior to low future excess return accounts for a substantial amount of over-time variation in average debt maturities of firms. Barry et al. (2008) find that firms issue long-term debts when the current interest rates are low relative to the historical levels. More convincingly, survey evidence of Graham and Harvey (2001) indicates that managers issue short-term debt "when short-term interest rates are low compared to long-term rates", and "when waiting for long-term market interest rates to decline". Bancel and Mittoo (2004) find similar evidence for European managers.

obtained estimates and time-series average values of these estimates, we estimate the values for $v(\theta_{i,t}\,;\,\alpha_{j,t})$ and $v(\theta_{i,t}\,;\,\alpha_j)$, respectively.

Column (5) of Table VI shows a positive association of firm-specific error (the deviation from firm's intrinsic value to market pricing) with inter-company borrowings; a higher value of $v(\theta_{i,t}\,;\,\alpha_{j,t}) - m_{i,t}$ means a higher level of undervaluation, Firms have clear incentives to substitute inter-company borrowings for financial debts when their stocks are valued lower than their peers. In terms of industry-specific valuation error, column 6 indicates that a firm is more likely to allocate funds to short-maturity debts, when the industry to which the firm belongs is valued high. This finding corroborates the argument that the risk of rolling over maturing debts is low when the market is hot. This association is less prominent among micro caps who are concerned more about refinancing risk or are simply screened out of the credit market even in an upward turn. Finally, we find that firms finance long-term growth options (Column (7)) with financial debts, with smaller caps employing more short-term debts and bigger caps employing more long-term debts.

Another concern is that the residual income model uses inputs gathered after the debt financing choices are made even though the valuation is estimated before. To provide robustness, column (6) in Table VI use analyst forecast data from I/B/E/S to calculate ex ante misvaluation based on publicly available information. We follow Lee et al. (1999) to calculate the new book equity at year t as the book equity at year t-1 plus the earnings minus the dividend payout at year t ($B_t = B_{t-1} + EPS_t - DPS_t$). The intrinsic value of a firm is further computed using equation (14), in which EPS is the mean forecasted EPS in I/B/E/S. Using median forecasted EPS yields similar findings.

The estimated coefficients (column (8)) of the value-to-price ratio calculated are in the expected positive sign in the inter-company borrowings regression, except for micro caps. Note that although the choice of analyst forecast data is more appropriate in capturing the publicly available information, it leads to a sharp reduction of sample size, due to the scarce analyst coverage in the

1980s[15] and for smaller firms. Especially, the employment of the IBES sample decreases the size of the microcap sample dramatically from 1106 to 161 for the average annual sample.

To save place, other robustness tests are not reported. These include : 1) different measures of intrinsic value using forecast horizons beyond three years, 2) various estimation for cost of capital based on alternative asset pricing models (e.g., the Fama and French three-factor model and the Carhart four-factor model) and market premium measures (e.g., the market return measured by the S&P 500 index minus the risk free rate measured using the three-month T-bill rate, the 10-year and 20-year T-bond rates; or the market risk premium estimated over the past five years, from January 1945 to month *t-1*, with a constant rate of 12.5%), 3) using industry peers' weighted average P/B_{t-1} as a proxy for fair valuation/growth options, and 4) defining alternative cutoffs of debt maturity (one-year, two-year, and four-year), etc. We also run robustness tests controlling additional variables (e.g., industry dummy, extreme short-term debt user dummy variables, annual sales growth) and undoing variable winsorization. Above all, we find that adopting alternative these specifications leads to qualitatively similar results that firms substitute inter-company borrowings for financial debt when their stock is undervalued.

3. Dependence on External Finance, Information Asymmetry and Financial Constraint

The results in the previous section demonstrate that inter-company borrowings, as an important source of liquidity, provides a buffer against temporary unfavorable terms of accessing external capital. To further clarify the economic channel through which market undervaluation works in affecting credit choices of firms (financial vs. inter-company), the following section examines firm heterogeneity in credit allocation decisions conditional upon firm's dependence on external finance, information asymmetry, and financial constraints.

[15] Lee et al. (1999), D'Mello and Shroff (2000), Dong et al. (2006), Elliott et al. (2007) and Warr et al. (2012) also use the perfect foresight model to estimate intrinsic value in their main analyses and employ analyst data in robustness or complementary analyses.

3.1 External Finance Dependence

Firms heavily dependent on external capital will find it more binding to finance their desired investment with external funds subsequent to market undervaluation. If so, we should see a rise in the sensitivity of the demand for inter-company borrowings to market undervaluation with dependence on external finance. To test this prediction, we divide our sample into subsamples of firms with high and low external finance dependence and compare the effect of market undervaluation on the allocation to inter-company borrowings between the two firm groups. External finance dependence is measured by (i) financing cycles when the amount of external debt required is sufficiently large; (ii) adjusted KZ index constructed by Baker, Stein, and Wurgler (2003) based on the original work of Kaplan and Zingales (1997).

Previous researchers argue that corporate financing behaviors vary greatly with financing cycles. For example, Hovakimian (2001, 2004, 2006) show that the effects of traditional leverage determinants differ between passive firms; i.e., firms that do not issue or repurchase securities, and active firms; i.e., firms that make significant changes to their capital structure. Following Hovakimian et al. (2001), we define a debt refinancing period as the year in which the value of the total debt issued for financial purposes (*dSTD* plus *dLTD*) represents at least 5% of a firm's book assets; all other years are defined as non-refinancing periods[16]. Then we re-estimate the debt allocation equations for subsamples of debt refinancing and non-refinancing periods, separately. The estimated coefficients of the lagged value-to-price ratio for each subsample and the test of difference in the undervaluation effect among these two subsets are presented in the first three columns in Panel A of Table VII.

[Insert Table VII about here]

We show that the undervaluation effect on trade credit varies fundamentally according to firms' refinancing cycles. Offsetting the price impact induced by market undervaluation plays a larger

[16] Using alternative cutoffs to define debt refinancing periods (3% and 7% of total book or market assets) yield qualitatively similarly results.

part in determining a firm's use of inter-company borrowings during debt refinancing periods relative to non-refinancing periods. It is worthwhile to note that the average slope for UN_{t-1} in the $dICB_t$ regression for the overall sample is only significant for the refinancing periods. The test of difference confirms that the effect is stronger during refinancing periods (4.25 standard errors from zero). This difference is also economically important: a one standard deviation increase in UN_{t-1} leads the typical firm to shift toward inter-company borrowings by 0.62% of assets during refinancing periods but to shift away from inter-company borrowings only by 0.04% of assets during non-refinancing periods (Columns (1) and (2) in Panel B of Table VII).

In addition, we find that both small and big firms are likely to use inter-company borrowings as a buffer to offset the negative influence of market undervaluation during significant debt refinancing periods. For micro firms, the average difference of inter-company borrowings allocation between refinancing and non-refinancing periods in response to a one standard deviation increase in UN_{t-1} represents 0.73% (0.86% - 0.13%) of a micro firm's assets. For big firms, the estimate for UN_{t-1} in the $dICB_t$ regression is negative during non-refinancing periods, suggesting the exclusive role of market undervaluation in driving inter-company borrowing at the time when external finance dependence is high. This result also corroborates our intuition such that although inter-company is an expensive financing resource in normal times, it can only be desirable when firms are facing constraints in obtaining other financing sources.

To find further robustness, we next estimate firm-level equity dependence by computing the adjusted KZ index following Baker, Stein, and Wurgler (2003). Firms with a higher KZ index have a heavier reliance on external financing and are more likely to experience difficulties in financing their ongoing operations when credit condition deteriorates.

We rank and classify firms into two groups based on the adjusted KZ index using 70% cutoff point. Firms with higher needs for external capital are those with KZ indexes above the 70^{th} percentile and the rest of the sample is comprised of firms with lower needs for external capital. We next compare the impact of market undervaluation on the allocation among inter-company borrowing, long-term financial credit and short-term financial credit across the two subsamples,

as presented in Columns (4), (5), and (6) in Panel A of Table VII. In general, we find that high KZ firms (most constrained) reply more on inter-company borrowings subsequent to undervaluation than low KZ firms (least constrained) do, and the difference is more meaningful for bigcaps.

3.2 Information Asymmetry and Financial Constraint

Previous studies find that the improvement of information environment help to reduce the cost of equity (Duarte et al. (2008), Tang (2009), thus affects firm's financing behavior (Pan et al. (2015) in an important way. Measuring information asymmetry (IA) by analyst dispersion (standard deviation of analyst forecasts) and residual volatility in daily stock returns (See Krishnaswami et al. (1999)), we next investigate how information asymmetry drives the differences in the undervaluation effect on firms' choices between financial debts and inter-company borrowings. Specifically, we include the corresponding dummy (denoted by *High)* for high IA firms based on the 70% cutoff, along with its interaction with our undervaluation measure UN_{t-1} (denoted by $High \times UN_{t-1}$), allowing for different reactions of high and low IA firms in response to negative valuation shocks. For the sake of brevity, we only report the regression coefficients on UN_{t-1} and the interaction between $High_t$ and UN_{t-1}.

[Insert Table VIII about here]

The results in Panel A of Table VIII reveal that big firms encountering severe information frictions use inter-company loans to a larger extent at the time when their stocks are experiencing valuation shocks. The estimates for $High \times UN_{t-1}$ is positive and significant in $dICB_t$ whether information asymmetry is measured by analyst dispersion or residual volatility. The estimates for UN_{t-1} in bigcaps is insignificant, indicating that transparent bigcaps are less likely to employ inter-company borrowings in response to market undervaluation. For opaque microcaps, it is less likely that they turn to inter-company borrowings during undervaluation periods. By sharp contrast, screening out the effect of information asymmetry, the lagged value-to-price ratio shows even more accentuated coefficient compared to that reported in Table V.

Another concern is that the relevance of market undervaluation is contingent upon financial flexibilities of firms. In particular, the importance of financial flexibility/constraint in influencing firm's use of credits has long been documented by researchers (e.g., Wilson and Summers (2002), Giannetti et al. (2011), Aktas et al. (2015), Faulkender and Petersen (2006), Sufi (2007, 2009)). To address this concern, we examine how the association between stock undervaluation and the use of inter-company borrowings is mediated by financial constraints of firms.

Panel B of Table VIII presents the estimation results augmented by the financial constraint dummy and its interaction with UN_{t-1}. We use Hadlock and Pierce's (2010) SA index and White and Wu's (2006) WW index to construct the dummy for financial constraint (denoted by *High).* Firms ranked above the 70th percentile of the SA index or the WW index are considered as the most constrained. Regarding the interaction term $High \times UN_{t-1}$, the estimates show negative signs for smaller firms but positive signs for bigger firms. This result suggests that in the presence of financial constraint, undervalued smaller firms fail to requests more credits from their suppliers, while bigger firms have a higher chance of finding inter-company borrowings to pay their investment when valuation shocks strike. For example, when financial constraint is measured by the WW index, the estimated coefficient on $High \times UN_{t-1}$ is significantly positive (0.45) in the $dICB_t$ regression for bigcaps. Meanwhile, unconstrained micro firms seem to respond more readily to undervaluation in applying for inter-company borrowings. A one standard deviation increase in UN_{t-1} above the mean leads an unconstrained (measured by SA index) micro firm to increase its use of inter-company borrowings equivalent to 97 inter-company borrowings of its total assets, which is almost eight times as high as that of an unconstrained big firm (0.20×0.61=0.12).

4. Firm performance subsequent to inter-company credit extension

The above findings establish that firm's use of inter-company credits increase with negative valuation shocks. We interpret this result with the economic framework that suppliers receive more information about the customer's creditworthiness than intermediary credit providers do. That is, a firm's stakeholders agree to relax the existing limits of "credit" extension under the condition

that they believe that the negative shock in market valuation of the firm is short-lasting and that the firm's future performance will warrant such a relaxation. To verify whether this is the story behind the scene, this section investigates firm performance subsequent to inter-company credit extension and examine whether the increase of inter-company credit during firm's undervaluation periods plays an enhanced role in restoring firm performance.

We focus our analyses on firm's subsequent investment decisions and stock return, with investment decision measured using change in capital expenditure and stock return measured using one-year stock cumulative return. Our specification is to run Fama-Macbeth regression of change in capital expenditure ($dCapx_t$) and stock cumulative return ($Return_t$) on change in inter-company credit ($dICB_{t-1}$), the lagged value-to-price ratio (UN_{t-1}), $UN_{t-1}\times dICB_{t-1}$, and a set of control variables including firm profitability (the ratio of a firm's EBITDA to the book value of total assets, denoted by $Profit_{t-1}$), book leverage (the ratio of a firm's total debt outstanding to the book value of total assets, denoted by Lev_{t-1}), the value-to-book ratio (the ratio of a firm's fundamental value to the book value of total assets, denoted by V/B_{t-1}), size (the percentage of NYSE firms that have the same or smaller market capitalization, denoted by $Size_{t-1}$), and credit access (a dummy variable which takes a value of one if Standard and Poor's domestic long-term issuer rating is available and zero otherwise, denoted by $Access_{t-1}$). The dependent variable is measured during fiscal year t and all the explanatory variables are measured during fiscal year t-1.

[Insert Table IX about here]

Table IX reports the results on change in capital expenditure. Panel A of Table IX indicates that all else being equal, increase in past undervaluation is associated with a decrease in firm's contemporary investment, consistent with the conventional view that negative valuation errors impact negatively firm investment. We find that small firms cut down capital expenditures following an increase in the use of inter-company credit. The increase in inter-company credits is probably explained by constraints of accessing financial credits of these firms but the increase in inter-company credits does not fully meet the demand in financing their operations. Unlike the results with overall inter-company credit, the results with trade credit (i.e., account payable) in

Panel B of Table IX ($UN_{t-1}\times dAP_{t-1}$)indicate that although increase in trade credit does not affect firm's investment in a significant way, such an increase subsequent to stock market undervaluation does enhance the subsequent investment of small and bigcaps.

[Insert Table X about here]

The results of the model in which the dependent variable is cumulative stock return, reported in Table X, reveal a similar pattern. On the one hand, there is evidence of stock price reversal subsequent to undervaluation, in accordance with the short-lasting misvaluation argument. The lagged price-to-value ratio UN_{t-1} is positively associated with stock cumulative return $Return_t$ and the estimated coefficients of UN_{t-1} are significantly different from zero, regardless of the size group. The interaction term $UN_{t-1}\times dICB_{t-1}$ shows positive signs, suggesting that increase in inter-company credit and trade credit following undervaluation further promotes the reversal in stock price. However, the improvement in stock price reversal is only significant in smaller firms.

Overall, our findings in Tables IX and X support the view that inter-company credit, especially trade credit, plays a potentially important part in boosting ex post performance of firms. Customers use more trade credit relative to traditional credit earn higher subsequent stock returns, in favor of supplier's holding superior information about their customers' prospects. Our results also corroborate Mateut et al. (2006) and Guariglia and Mateut (2006) who underline the role of the non-formal financial channel in the transmission of monetary policy and find that implicit borrowing helps firms absorb shocks in credit supply. After all, the reported reversal in stock price suggests the validity of our undervaluation measure in a sense that the market corrects the ex-ante undervaluation ex-post.

5. Concluding Remarks

Firms can be temporarily mispriced relative to their intrinsic value, due to the fact that the supply of capital is not perfectly competitive and elastic. To exploit the windows of opportunity generated by the valuation errors, firms issue overvalued securities and repurchase undervalued ones. In this

paper, our main question is whether stock market undervaluation leads to the substitution of financial credits by inter-company borrowings.

We conjecture that a firm has an incentive to switch away from financial credits to inter-company borrowings when the firm's stock is undervalued. In this situation, when the market is undervalued, rather than taking on expensive and risky financial debts, firms tend to delay payments to their suppliers and borrow more from their partners who know their prospects better.

Employing an undervaluation measure and an econometric technique that allows us to explicitly test for the role of the undervaluation in the choice of financial credit versus inter-company credit, we find evidence that market undervaluation inclines firms to allocate more credits to inter-company borrowings over financial liabilities. This finding remains robust after using alternative estimation methods, including credit market conditions, considering alternative misvaluation measure, and specifying ex ante publicly available information at the time of issuance. Furthermore, we find that the effect of undervaluation on the inter-company versus financial credit choice varies with firm size, external finance dependence, financial flexibility, and information asymmetry. Specifically, we find that although smaller firms tend to employ more inter-company credit when their stocks are undervalued, they fail to do so when they are constrained, informationally or/and financially. Conversely, big firms experiencing high informational and financial constraint are able to obtain inter-company credits to a larger extent, probably because big firms hold a high economic stake. Lastly, we show that the use of trade credit in undervalued times enhances firm value. This result reveals that trade credit plays a potential role in correcting stock pricing errors, consistent with the argument that trade credit allows firms to redeploy underutilized corporate resources to higher-valued use.

Appendix A. Variable Definitions

Variables	Abbreviation	Measurement
Lagged Value-to-Price ratio	UN_{t-1}	The intrinsic value measured at the end of fiscal year t-1, divided by CRSP closing price at the end of calendar year t-1. Intrinsic value is estimated in the framework of the residual income model, assuming perfect foresight of managers.
Lagged Value-to-Book ratio	V/B_{t-1}	The intrinsic value measured at the end of fiscal year t-1, divided by book equity at the end of fiscal year t-1.
Change in Assets	dA_t	Change in total assets during fiscal year t.
Shares Issued	dS_t	Change in common equity plus dividends, minus earnings, during fiscal year t.
Change in Total Liabilities	dL_t	Change in total liabilities during fiscal year t.
Change in Operating Liability	$dICB_t$	Change in total liabilities minus change in total debts, during fiscal year t. Total debt is debt in current liabilities plus debt in total long-term liabilities.
Change in Account Payable	dAP_t	Change in account payable, during fiscal year t.
Change in Account Receivable	dAR_t	Change in account receivable, during fiscal year t.
Change in Trade Credit	$dTrade_t$	Change in account payable and account receivable, during fiscal year t.
Change in Financial Debt	dFD_t	Change in total financial debt (long-term debt plus short-term debt in current liabilities) during fiscal year t.
Change in Short-term Debt	$dSTD_t$	Net short-term debt issuance, during fiscal year t. See Appendix B for a detailed discussion.
Change in Long-term Debt	$dLTD_t$	Net long-term debt issuance, during fiscal year t. See Appendix B for a detailed discussion.
Long-term Debt Redemption	$DD1_{t-1}$	Long-term debt due in one year at the end of fiscal year t-1.
Dividends	D_t	Dividend per share at ex-date at the end of fiscal year t, multiplied by common shares outstanding at the end of calendar year t.
Earnings	Y_t	Income before extraordinary items available for common stockholders, plus extraordinary items and discontinued operations, during fiscal year t.
Negative Earnings	$NegY_t$	Earnings during fiscal year t if Y_t is negative.
Positive Earnings	$PosY_t$	Earnings during fiscal year t if Y_t is positive.
No Dividends	NoD_t	A dummy variable that takes the value of one if a firm does not pay dividends during fiscal year t, and 0 otherwise.
Market Capitalization	MC_t	The log of the common shares outstanding multiplied by the CRSP closing price in June of calendar year t.
Lagged Financial Debt Surplus	TDS_{t-1}	The financial debt ratio of a firm minus its industry peers' weighted average debt ratio in fiscal year t-1, with each firm weighted by its total liabilities. Debt ratio is the financial debt amount of a firm divided by the total liabilities of the firm. Industry peers are defined using Fama and French 48 Industry.

* dA_t, dS_t, dL_t, $dICB_t$, dAP_t, dAR_t, $dTrade_t$, dFD_t, $dSTD_t$, $dLTD_t$, $DD1_{t-1}$, D_t, Y_t, $NegY_t$ and $PosY_t$ are scaled by total assets at the end of fiscal year t and multiplied by 100.

Appendix B. Net Issuance of Short- and Long-term debt

We assume that in year t+1 the current portion of long-term debt in year t is completely refinanced and debts with maturities of n years (n=2, 3, 4, 5) change the accounting identity to debts maturing in n-1 years. That is, long-term debt due in the 1st year is paid off in the upcoming year and debt due in the 2nd year turns to debt due in 1 year on the firm's balance sheet, and so on. The accounting identities for the net issuance of debt with various maturities are written as:

$$dSTD_t = dDLC_t - dDD1_t \quad \text{(B.1)}$$

$$dDD1_t = DD1_t - DD2_{t-1} \quad \text{(B.2)}$$

$$dDD2_t = DD2_t - DD3_{t-1} \quad \text{(B.3)}$$

$$dDD3_t = DD3_t - DD4_{t-1} \quad \text{(B.4)}$$

$$dDD4_t = DD4_t - DD5_{t-1} \quad \text{(B.5)}$$

$$dDD5+_t = DD5_t + DD6+_t - DD6+_{t-1} \quad \text{(B.6)}$$

$dSTD_t$ represents net change in short-term debt during fiscal year t excluding the current portion of long-term debt. $dDD1_t$, $dDD2_t$, $dDD3_t$, $dDD4_t$, and $dDD5+_t$ represent net changes in long-term debts which mature in one, two, three, four, and beyond five years. *DLC* is the Compustat data item for financial debt in current liabilities. *DD1*, *DD2*, *DD3*, *DD4*, and *DD5* are long-term debts payable in one, two, three, four, and five years. *DD6+* is long-term debt maturing in more than 6 years, constructed as *DLTT* (long-term debt maturing beyond one year) minus the sum of *DD2*, *DD3*, *DD4*, and *DD5*.

Net issuance of debts with maturities inferior or superior to x (x=1, 2, 3, 4) years can be easily constructed by adding up the related items. For instance, for the three-year maturity cutoff, the net change in short-term debt ($dSTD^3$) is the sum of *dSTD*, *dDD1*, *dDD2*, and *dDD3* and the net change in long-term debt ($dLTD^3$) is the sum of *dDD4* and *dDD5+*.

Appendix C. The Calculation of Firm Intrinsic Value

The original version of the model calculates a firm's intrinsic value based on an infinite horizon framework in which intrinsic value is expressed as the book value of the firm at time t, plus the discounted future expected earnings in excess of the expected return on book equity. To simplify the estimation, we follow previous studies to employ a three-year forecast horizon, [17] which yields:

$$\widehat{V}_t = B_t + \frac{E_t[(ROE_{t+1} - r_e) \times B_t]}{(1+r_e)} + \frac{E_t[(ROE_{t+2} - r_e) \times B_{t+1}]}{(1+r_e)^2} + TV, \quad \text{(C.1)}$$

$$\text{TV} = \frac{E_t[(ROE_{t+3} - r_e) \times B_{t+2}]}{(1+r_e)^2 \times r_e}, \quad \text{(C.2)}$$

where $\widehat{V}_t$ denotes the estimated intrinsic value of the firm's stock at time *t*; *B* is the time t book equity per share; $E_t(.)$ is the expectation operator conditional on the information set at time *t*; ROE_{t+i} is the return on equity at time $t+i$; r_e is the cost of equity conditional on information available at time *t*; and *TV* is the terminal value, estimated by treating the time $t+3$ abnormal earnings as a perpetuity.

Future book equity B_{t+i} is computed based on the accounting principle of "clean surplus" as,

$$B_{t+i} = B_{t+i-1} + EPS_{t+i-1} \times (1 - k), \quad \text{(C.3)}$$

where *EPS* is the earnings per share from the previous period, and *k* is the payout rate (dividends divided by the income before extraordinary items) at time *t*. If earnings are negative, *k* is estimated as 6% of total assets (*k*= dividends / (0.06×Total Assets). Computations with *k* less than 0 or over

[17] We acknowledge that our implementation of the three-year forecast horizon may underestimate firms with growth options to be exercised over the long run. However, as the market timing behavior of firms is supposed to be short-lasting, we believe the value-to-price ratio computed under the three-year horizon is able to capture misvaluation to a large extent. Moreover, we obtain qualitatively similar results from the estimates of intrinsic value using the four-, five-, six-, and ten-year forecast horizons in unreported robustness analyses. Previous researchers, e.g., Lee et al. (1999), also demonstrate that the choice of a forecast horizon beyond three years does not affect the quality of the estimates for firm's intrinsic value.

1 are removed. Any negative B_t is eliminated. We further require the terminal value to be non-negative.

Return on equity is calculated as,

$$ROE_{t+i} = \frac{EPS_{t+i}}{(B_{t+i-1}+B_{t+i-2})/2}, \quad \text{(C.4)}$$

The annualized cost of equity, r_e, is predicted using the CAPM model based with monthly return data from CRSP. We estimate the month-t beta for each stock using a 60-month rolling window, with at least 24 months of returns. As in Dong et al. (2012), the market risk premium is the annualized excess return of the CRSP value-weighted index over the annualized one-month T-bill rate[18] over the past three decades. To reduce the effect of outliers, we further restrict values of r_e to be within the range of 5%–25%.[19]

[18] Lee et al. (1999) documents that the estimates of V_t based on the short-term T-bill rates outperform the long-term T-bond rates because the former has a faster speed of mean reversion.

[19] Most researchers find robust results whichever cost of capital model is used (D'Mello and Shroff (2000)), while others report that estimates using these models are noisier than those provided by the single factor CAPM model (Elliott et al. (2008). We find that adopting alternative cost of capital models with various market premium measures leads to similar results.

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Table I

Summary Statistics

This table presents summary statistics (mean value and standard deviation (Std Dev)) for shares issued (dS_t), change in inter-company liabilities ($dICB_t$), net financial debt issued (dFD_t), net short- and long-term debt issuance ($dSTD_t$ and $dLTD_t$)), long-term debt redemption ($DD1_{t-1}$), change in assets (dA_t), negative earnings ($dNegY_t$), positive earnings ($dPosY_t$), dividends (D_t), no dividends dummy (NoD_t), market capitalization (MC_t), the lagged financial debt surplus relative to industry peers (TDS_{t-1}), the lagged price-to-book ratio (P/B_{t-1}), the lagged value-to-price ratio (i.e., the undervaluation measure UN_{t-1}), and the lagged value-to-book ratio (dV/B_{t-1}). Short- and long-term debts are defined as debts maturing in less and more than three years, respectively. The sample is drawn from the CRSP and Compustat Merged database for non-financial U.S. firms over the period from 1983 through 2014, on a fiscal year basis. For a firm to be included in the sample, we require complete information on the regression variables. Observations with negative book equity and common equity value superior to total assets at the end of fiscal year t-1 are excluded. In addition to the overall sample, statistics are also separately presented for micro, small, and big firms whose market capitalizations in June of year t are below the 20th NYSE percentile, between the 20th and the 50th NYSE percentile, and above the 50th NYSE percentile, respectively. The average annual sample represents 2, 442 firms, including 1,106 micro firms, 565 small firms, and 771 big firms.

	No. Firms	Stats	dS_t (%)	$dICB_t$ (%)	dFD_t (%)	$dSTD_t$ (%)	$dLTD_t$ (%)	$DD1_{t-1}$ (%)	dA_t (%)	$NegY_t$ (%)	$PosY_t$ (%)	D_t (%)	NoD_t	MC_t	TDS_{t-1}	P/B_{t-1}	UN_{t-1}	V/B_{t-1}
All	2442	Mean	2.02	1.85	2.94	0.29	2.65	1.89	5.56	-3.37	5.06	1.06	0.56	5.39	-0.07	2.28	0.91	1.39
		Std Dev	9.36	8.21	19.05	9.54	9.51	4.24	21.76	11.22	5.30	2.12	0.50	2.27	0.25	2.59	0.94	1.47
Micro	1106	Mean	2.68	1.05	2.75	0.78	1.97	2.45	1.65	-5.74	3.89	0.53	0.77	3.43	-0.08	1.83	1.08	1.28
		Std Dev	9.80	9.58	23.28	12.25	11.03	5.48	25.14	14.40	5.12	1.74	0.42	1.23	0.28	2.21	1.16	1.53
Small	565	Mean	2.55	2.31	2.85	-0.29	3.14	1.34	8.42	-2.23	5.35	1.07	0.52	5.77	-0.08	2.42	0.78	1.33
		Std Dev	9.88	7.36	16.28	7.44	8.84	2.96	19.31	8.21	5.24	2.24	0.50	0.72	0.26	2.61	0.74	1.30
Big	771	Mean	0.70	2.67	3.30	0.02	3.28	1.48	9.08	-0.79	6.51	1.82	0.27	7.92	-0.05	2.83	0.76	1.61
		Std Dev	8.10	6.37	12.92	5.63	7.29	2.57	16.74	6.02	5.21	2.28	0.45	1.33	0.21	2.94	0.61	1.48

Table II

Univariate Test: How does Undervaluation Affect Firms' Fund Allocation Decision between Financial and Inter-Company Credits?

This table compares the use of inter-company borrowings relative to financial debts across different stock valuation levels. Time-series mean values of the lagged value-to-price ratio (UN_{t-1}), inter-company borrowings net of financial debt ($dICB_t$ - dFD_t), account payable net of financial debt (dAP_t - dFD_t), account receivable net of financial debt (dAR_t - dFD_t), and trade credit (the sum of account payable and account receivable) net of financial debt ($dTrade_t$ - dFD_t) are reported for three portfolios constructed based on the 10%-90% value-to-price cutoffs. The differences in issuances among the portfolios are presented at the bottom of the table, with the associated t-statistics reported in parentheses. ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

				(1)	(2)	(3)	(4)
		Obs.	UN_{t-1}	$dICB_t$ - dFD_t	dAP_t - dFD_t	dAR_t - dFD_t	$dTrade_t$ - dFD_t
All	1-Undervalued	7046	2.73	0.08	-1.46	-0.95	-0.42
	2-Benchmark	5674	0.78	-1.12	-2.42	-1.87	-1.40
	3-Overvalued	7038	0.13	-2.10	-3.72	-3.21	-2.71
	Difference 1 - 3			2.18***	2.26***	2.26***	2.29***
	(t-statistic)			(9.25)	(11.32)	(10.77)	(9.47)
	Difference 1 - 2			1.19***	0.96***	0.91***	0.98***
	(t-statistic)			(7.85)	(7.24)	(6.82)	(6.66)
Micro	1-Undervalued	3197	3.59	0.32	-0.98	-0.26	0.15
	2-Benchmark	2569	0.89	-1.70	-2.40	-1.95	-1.69
	3-Overvalued	3193	0.10	-3.70	-4.26	-4.62	-4.66
	Difference 1 - 3			4.02***	3.28***	4.36***	4.82***
	(t-statistic)			(9.96)	(9.82)	(12.33)	(11.33)
	Difference 1 - 2			2.01***	1.41***	1.69***	1.84***
	(t-statistic)			(7.56)	(6.20)	(7.42)	(7.10)
Small	1-Undervalued	1626	2.20	0.36	-1.18	-0.91	-0.12
	2-Benchmark	1314	0.68	-0.70	-2.29	-1.51	-0.86
	3-Overvalued	1623	0.13	-0.23	-2.40	-1.52	-0.50
	Difference 1 - 3			0.59	1.22***	0.61	0.38
	(t-statistic)			(1.27)	(3.01)	(1.48)	(0.83)
	Difference 1 - 2			1.06***	1.10***	0.59**	0.75***
	(t-statistic)			(3.53)	(4.09)	(2.19)	(2.62)
Big	1-Undervalued	2223	1.88	-0.47	-2.35	-2.04	-1.47
	2-Benchmark	1790	0.70	-0.58	-2.54	-2.00	-1.38
	3-Overvalued	2222	0.18	-1.17	-3.90	-2.42	-1.52
	Difference 1 - 3			0.70**	1.55***	0.38	0.05
	(t-statistic)			(2.19)	(5.46)	(1.30)	(0.18)
	Difference 1 - 2			0.11	0.19	0.04	0.09
	(t-statistic)			(0.60)	(1.14)	(0.24)	(0.50)

Table III

Baseline Regression Results: How does Undervaluation Affect Firms' Fund Allocation Decision between Financial and Inter-Company Credits?

This table presents the Fama-Macbeth regression results for the effect of stock undervaluation on the split of financing between financial and inter-company credits, as illustrated in equations (12) and (13). Newey-West (1987) variance estimator is used to report heteroscedasticity and autocorrelation robust t-statistics (in parentheses). ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

			Intercept	UN_{t-1}	dA_t	$NegY_t$	$PosY_t$	dS_t	D_t	$DD1_{t-1}$	V/B_{t-1}	NoD_t	MC_t	TDS_{t-1}	R^2
	All	Coef	-1.29***	0.52***	0.41***	-0.42***	-0.23***	-0.36***	0.32***	0.15***	0.02	0.02	0.09***	1.91***	0.54
		t-Stat	(-3.26)	(4.68)	(29.04)	(-30.83)	(-7.19)	(-20.44)	(12.79)	(13.14)	(0.35)	(0.21)	(3.23)	(6.12)	
	Micro	Coef	-2.24***	0.70***	0.45***	-0.47***	-0.27***	-0.40***	0.49***	0.16***	-0.03	0.32**	0.26***	3.02***	0.57
		t-Stat	(-4.89)	(4.56)	(21.36)	(-23.69)	(-6.29)	(-16.56)	(13.09)	(12.83)	(-0.36)	(2.68)	(7.56)	(8.70)	
$dICB_t$	Small	Coef	-0.10	0.21*	0.36***	-0.36***	-0.21***	-0.31***	0.19***	0.12***	0.33**	-0.21	-0.03	1.01***	0.49
		t-Stat	(-0.16)	(1.98)	(21.33)	(-16.00)	(-6.69)	(-15.57)	(4.04)	(5.05)	(2.06)	(-1.58)	(-0.37)	(2.92)	
	Big	Coef	-0.85**	0.31***	0.36***	-0.37***	-0.19***	-0.26***	0.17***	0.11***	0.14*	-0.19	0.08**	0.30	0.53
		t-Stat	(-2.18)	(2.90)	(25.78)	(-14.57)	(-6.55)	(-13.03)	(6.56)	(7.54)	(1.88)	(-1.28)	(2.20)	(1.10)	
	All	Coef	1.29***	-0.52***	0.59***	-0.58***	-0.77***	-0.64***	0.68***	0.85***	-0.02	-0.02	-0.09***	-1.91***	0.70
		t-Stat	(3.26)	(-4.68)	(41.05)	(-42.24)	(-23.70)	(-37.03)	(27.67)	(73.63)	(-0.35)	(-0.21)	(-3.23)	(-6.12)	
	Micro	Coef	2.24***	-0.70***	0.55***	-0.53***	-0.73***	-0.60***	0.51***	0.84***	0.03	-0.32**	-0.26***	-3.02***	0.67
		t-Stat	(4.89)	(-4.56)	(26.01)	(-26.87)	(-16.85)	(-24.38)	(13.88)	(66.17)	(0.36)	(-2.68)	(-7.56)	(-8.70)	
dFD_t	Small	Coef	0.10	-0.21*	0.64***	-0.64***	-0.79***	-0.69***	0.81***	0.88***	-0.33**	0.21	0.03	-1.01***	0.74
		t-Stat	(0.16)	(-1.98)	(37.26)	(-29.01)	(-25.29)	(-35.47)	(17.24)	(37.35)	(-2.06)	(1.58)	(0.37)	(-2.92)	
	Big	Coef	0.85**	-0.31***	0.64***	-0.63***	-0.81***	-0.74***	0.83***	0.89***	-0.14*	0.19	-0.08**	-0.30	0.76
		t-Stat	(2.18)	(-2.90)	(45.90)	(-24.40)	(-28.10)	(-37.74)	(32.10)	(61.40)	(-1.88)	(1.28)	(-2.20)	(-1.10)	

Table IV

Stock Undervaluation and the Use of Trade Credit

This table presents the effect of stock undervaluation on firms' choice between financial and different sources of inter-company credits, with undervaluation estimated using the value-to-price ratio (UN_{t-1}). We estimate a system of three equations for the split among financial debts (dFD_t), trade credit ($dTrade_t$,), accounts payable in column (1), accounts receivable in column (2), and accounts payable plus accounts receivable in column (3)) and the remaining liabilities ($dMisL_t$).

$$dFD_{i,t} = a + b_1 UN_{i,t-1} + b_2 dA_{i,t} + b_{3a} NegY_{i,t} + b_{3b} PosY_{i,t} + b_4 dS_{i,t} + b_5 D_{i,t} + b_6 DD1_{i,t-1} + b_7 V/B_{i,t-1} + b_8 NoD_{i,t} + b_9 MC_{i,t} + b_{10} TDS_{i,t-1} + e_{i,t},$$

$$dTrade_{i,t} = c + d_1 UN_{i,t-1} + d_2 dA_{i,t} + d_{3a} NegY_{i,t} + d_{3b} PosY_{i,t} + d_4 dS_{i,t} + d_5 D_{i,t} + d_6 DD1_{i,t-1} + d_7 V/B_{i,t-1} + d_8 NoD_{i,t} + d_9 MC_{i,t} + d_{10} TDS_{i,t-1} + e_{i,t},$$

$$dMisL_{i,t} = -(a+c) - (b_1 + d_1) UN_{i,t-1} + (1-b_2 - d_2) dA_{i,t} - (1+b_{3a} + d_{3a}) NegY_{i,t} (1+b_{3b}+d_{3b}) PosY_{i,t} - (1+b_4+d_4) dS_{i,t} + (1-b_5-d_5) D_{i,t} + (1-b_6-d_6) DD1_{i,t-1} - (b_7 + d_7) V/B_{i,t-1} - (b_8 + d_8) NoD_{i,t} - (b_9+d_9) MC_{i,t} - (b_{10} + d_{10}) TDS_{t-1} - (e_t + \xi_t).$$

Parameters are estimated using the Fama-Macbeth procedure. Newey-West (1987) variance estimator is used to report heteroscedasticity and autocorrelation robust t-statistics (in parentheses). For brevity, results are only reported for UN_{t-1}. ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

			(1)	(2)	(3)
			dAP_t	dAR_t	$dAP_t + dAR_t$
$dTrade_t$	All	Coef	0.14***	0.08	0.18**
		t-Stat	(4.98)	(1.16)	(2.56)
	Micro	Coef	0.22***	0.18*	0.36***
		t-Stat	(4.15)	(1.95)	(2.90)
	Small	Coef	0.07	-0.20	-0.18
		t-Stat	(0.82)	(-1.29)	(-0.76)
	Big	Coef	0.05	-0.05	-0.00
		t-Stat	(1.06)	(-0.52)	(-0.03)
$dMisL_t$	All	Coef	0.32***	0.40***	0.29**
		t-Stat	(5.06)	(3.14)	(2.43)
	Micro	Coef	0.41***	0.45**	0.28*
		t-Stat	(5.42)	(2.74)	(1.85)
	Small	Coef	0.10	0.47**	0.34
		t-Stat	(0.78)	(2.49)	(1.36)
	Big	Coef	0.24**	0.32***	0.29**
		t-Stat	(2.36)	(3.00)	(2.32)
dFD_t	All	Coef	-0.46***	-0.48***	-0.46***
		t-Stat	(-5.38)	(-5.59)	(-5.47)
	Micro	Coef	-0.63***	-0.63***	-0.64***
		t-Stat	(-5.50)	(-5.16)	(-5.39)
	Small	Coef	-0.17	-0.28***	-0.16
		t-Stat	(-1.63)	(-2.95)	(-1.58)
	Big	Coef	-0.29**	-0.27**	-0.29***
		t-Stat	(-2.72)	(-2.68)	(-2.86)

Table V

Misvaluation and the Allocation of Debt Financing between Short-Term Debt, Long-Term Debt, and Inter-Company Borrowings

This table presents the Fama-Macbeth regression results for the split of financing among short-, long-term debt and inter-company borrowings. A system of three equations is estimated, as illustrated below.

$dSTD^{x}_{i,t} = a + b_1 UN_{i,t-1} + b_2 dA_{i,t} + b_{3a} NegY_{i,t} + b_{3b} PosY_{i,t} + b_4 dS_{i,t} + b_5 D_{i,t} + b_6 DD1_{i,t-1} + b_7 V/B_{i,t-1} + b_8 NoD_{i,t} + b_9 MC_{i,t} + b_{10} TDS_{i,t-1} + e_{i,t}$,

$dLTD^{x}_{i,t} = c + d_1 UN_{i,t-1} + d_2 dA_{i,t} + d_{3a} NegY_{i,t} + d_{3b} PosY_{i,t} + d_4 dS_{i,t} + d_5 D_{i,t} + d_6 DD1_{i,t-} + d_7 V/B_{i,t-1} + d_8 NoD_{i,t} + d_9 MC_{i,t} + d_{10} TDS_{i,t-1} + e_{i,t}$,

$dICB_{i,t} = -(a+c) - (b_{1+} d_1) UN_{i,t-1} + (1-b_{2-} d_2) dA_{i,t} - (1+b_{3a+} d_{3a}) NegY_{i,t} - (1+b_{3b}+d_{3b}) PosY_{i,t} - (1+b_{4+} d_4) dS_{i,t} + (1-b_5-d_5) D_{i,t} + (1-b_6-d_6) DD1_{i,t-1} - (b_{7+} d_7) V/B_{i,t-1} - (b_{8+} d_8) NoD_{i,t} - (b_{9+} d_9) MC_{i,t} - (b_{10+} d_{10}) TDS_{t-1} - (e_t + \xi_t)$.

Newey-West (1987) variance estimator is used to report heteroscedasticity and autocorrelation robust t-statistics (in parentheses). ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

			Intercept	UN_{t-1}	dA_t	$NegY_t$	$PosY_t$	dS_t	D_t	$DD1_{t-1}$	V/B_{t-1}	NoD_t	MC_t	TDS_{t-1}	R^2
	All	Coef	-1.29***	0.52***	0.41***	-0.42***	-0.23***	-0.36***	0.32***	0.15***	0.02	0.02	0.09***	1.91***	0.54
		t-Stat	(-3.26)	(4.68)	(29.04)	(-30.83)	(-7.19)	(-20.44)	(12.79)	(13.14)	(0.35)	(0.21)	(3.23)	(6.12)	
	Micro	Coef	-2.24***	0.70***	0.45***	-0.47***	-0.27***	-0.40***	0.49***	0.16***	-0.03	0.32**	0.26***	3.02***	0.56
$dICB_t$		t-Stat	(-4.89)	(4.56)	(21.36)	(-23.69)	(-6.29)	(-16.56)	(13.09)	(12.83)	(-0.36)	(2.68)	(7.56)	(8.70)	
	Small	Coef	-0.10	0.21*	0.36***	-0.36***	-0.21***	-0.31***	0.19***	0.12***	0.33**	-0.21	-0.03	1.01***	0.49
		t-Stat	(-0.16)	(1.98)	(21.33)	(-16.00)	(-6.69)	(-15.57)	(4.04)	(5.05)	(2.06)	(-1.58)	(-0.37)	(2.92)	
	Big	Coef	-0.85**	0.31***	0.36***	-0.37***	-0.19***	-0.26***	0.17***	0.11***	0.14*	-0.19	0.08**	0.30	0.53
		t-Stat	(-2.18)	(2.90)	(25.78)	(-14.57)	(-6.55)	(-13.03)	(6.56)	(7.54)	(1.88)	(-1.28)	(2.20)	(1.10)	
	All	Coef	-0.29	-0.55**	0.30***	-0.32***	-0.36***	-0.33***	0.39***	0.57***	0.00	0.02	-0.20***	-4.84***	0.29
		t-Stat	(-0.82)	(-2.40)	(20.89)	(-20.79)	(-10.98)	(-21.92)	(10.22)	(23.56)	(0.02)	(0.23)	(-6.63)	(-16.06)	
	Micro	Coef	1.29***	-0.94***	0.34***	-0.35***	-0.44***	-0.37***	0.35***	0.62***	0.10	-0.01	-0.50***	-5.16***	0.35
$dSTD_t$		t-Stat	(2.93)	(-2.77)	(26.60)	(-30.17)	(-12.38)	(-29.37)	(10.47)	(19.94)	(0.59)	(-0.09)	(-8.18)	(-15.59)	
	Small	Coef	-0.51	-0.17	0.25***	-0.33***	-0.25***	-0.27***	0.31***	0.46***	-0.09	0.00	-0.25	-4.49***	0.25
		t-Stat	(-0.50)	(-1.29)	(20.39)	(-8.77)	(-10.61)	(-17.32)	(8.22)	(13.67)	(-0.90)	(0.03)	(-1.62)	(-9.14)	
	Big	Coef	-3.54***	0.08	0.22***	-0.22***	-0.23***	-0.24***	0.30***	0.50***	-0.24***	-0.26***	0.25***	-4.28***	0.25
		t-Stat	(-9.93)	(0.54)	(19.72)	(-11.26)	(-12.29)	(-12.98)	(7.61)	(15.27)	(-3.09)	(-2.88)	(7.26)	(-13.51)	
	All	Coef	1.58***	0.03	0.29***	-0.25***	-0.41***	-0.32***	0.29***	0.28***	-0.02	-0.04	0.11***	2.93***	0.27
		t-Stat	(6.10)	(0.17)	(19.97)	(-12.18)	(-24.98)	(-19.72)	(9.81)	(12.39)	(-0.17)	(-0.29)	(3.99)	(7.09)	
	Micro	Coef	0.94***	0.24	0.21***	-0.18***	-0.28***	-0.22***	0.17***	0.22***	-0.07	-0.31**	0.23***	2.14***	0.20
$dLTD_t$		t-Stat	(2.94)	(1.04)	(13.97)	(-11.45)	(-16.56)	(-13.17)	(11.51)	(7.37)	(-0.38)	(-2.15)	(4.49)	(5.32)	
	Small	Coef	0.61	-0.03	0.38***	-0.32***	-0.54***	-0.42***	0.50***	0.42***	-0.24	0.21	0.29**	3.48***	0.38
		t-Stat	(0.81)	(-0.22)	(20.02)	(-9.26)	(-24.36)	(-20.33)	(12.83)	(12.30)	(-1.28)	(1.04)	(2.39)	(5.39)	
	Big	Coef	4.39***	-0.39**	0.42***	-0.40***	-0.58***	-0.51***	0.53***	0.39***	0.10	0.46**	-0.33***	3.98***	0.45
		t-Stat	(12.56)	(-2.45)	(28.83)	(-11.47)	(-25.71)	(-21.14)	(19.37)	(11.10)	(0.91)	(2.59)	(-7.43)	(9.95)	

Table VI

Alternative Specifications

This table reports the coefficient estimates for UN_{t-1} using alternative estimation methods and various misvaluation measures. For brevity, regression coefficients are only reported for UN_{t-1} or firm-specific error ($v_{i,t} - m_{i,t}$), time-series sector error ($v_i - v_{i,t}$), and long-run book-to-value ($b_i - v_{i,t}$). ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

			Estimation Methods				Misvaluation Measures			
			Fixed Effect		Cluster-Robust		RKRV (2005)			Analyst
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			UN_{t-1}	UN_{t-1}	UN_{t-1}	UN_{t-1}	$v_{i,t} - m_{i,t}$	$v_i - v_{i,t}$	$b_{i,t} - v_i$	UN_{t-1}
$dICB_t$	All	Coef	0.45^{***}	0.48^{***}	0.40^{***}	0.37^{***}	0.44^{***}	0.31^{***}	1.40^{***}	0.23^{***}
		t-Stat	(12.77)	(13.23)	(5.83)	(10.25)	(8.78)	(2.58)	(18.83)	(4.73)
	Micro	Coef	0.47^{***}	0.48^{***}	0.48^{***}	0.45^{***}	0.47^{***}	0.30	1.43^{***}	0.21
		t-Stat	(8.97)	(9.28)	(5.57)	(9.59)	(5.61)	(1.26)	(11.22)	(1.63)
	Small	Coef	0.44^{***}	0.45^{***}	0.20^{**}	0.14	0.32^{***}	0.32	1.19^{***}	0.24^{**}
		t-Stat	(4.62)	(4.84)	(2.14)	(1.41)	(2.99)	(1.24)	(7.95)	(2.22)
	Big	Coef	0.51^{***}	0.47^{***}	0.38^{***}	0.27^{***}	0.62^{***}	0.09	1.27^{***}	0.26^{***}
		t-Stat	(6.87)	(6.53)	(2.92)	(3.57)	(8.10)	(0.58)	(11.37)	(3.65)
$dSTD_t$	All	Coef	-0.40^{***}	-0.38^{***}	-0.39^{***}	-0.33^{***}	-0.37^{***}	-0.83^{***}	-0.52^{***}	-0.20^{***}
		t-Stat	(-7.07)	(-6.50)	(-4.51)	(-4.73)	(-4.62)	(-4.25)	(-4.36)	(-3.06)
	Micro	Coef	-0.48^{***}	-0.45^{***}	-0.55^{***}	-0.52^{***}	-0.51^{***}	-0.58	-1.02^{***}	-0.26
		t-Stat	(-5.13)	(-4.91)	(-4.44)	(-5.37)	(-3.37)	(-1.33)	(-4.37)	(-1.37)
	Small	Coef	-0.35^{***}	-0.40^{***}	-0.32^{**}	-0.22^{*}	-0.31^{**}	-1.71^{***}	0.13	-0.43^{***}
		t-Stat	(-2.70)	(-3.12)	(-2.39)	(-1.68)	(-2.05)	(-4.65)	(0.63)	(-2.72)
	Big	Coef	-0.17^{*}	-0.22^{***}	-0.05	0.03	-0.26^{***}	-0.61^{***}	-0.40^{***}	-0.09
		t-Stat	(-1.94)	(-2.61)	(-0.52)	(0.42)	(-2.76)	(-3.39)	(-2.97)	(-1.06)
$dLTD_t$	All	Coef	-0.05	-0.09	-0.01	-0.03	-0.07	0.52^{***}	-0.87^{***}	-0.04
		t-Stat	(-0.91)	(-1.59)	(-0.22)	(-0.46)	(-0.81)	(2.62)	(-7.19)	0.21
	Micro	Coef	0.01	-0.02	0.07	0.07	0.04	0.28	-0.42^{*}	0.05
		t-Stat	(0.14)	(-0.27)	(0.92)	(0.76)	(0.29)	(0.65)	(-1.84)	(0.25)
	Small	Coef	-0.08	-0.05	0.12	0.08	-0.01	1.38^{***}	-1.32^{***}	0.19
		t-Stat	(-0.60)	(-0.35)	(1.04)	(0.57)	(-0.07)	(3.50)	(-5.82)	(1.11)
	Big	Coef	-0.34^{***}	-0.25^{***}	-0.33^{**}	-0.31^{***}	-0.37^{***}	0.53^{***}	-0.87^{***}	-0.17^{*}
		t-Stat	(-3.43)	(-2.58)	(-2.06)	(-3.55)	(-3.54)	(2.62)	(-5.79)	(-1.86)
Interest Rate			No	Yes	No	Yes	No	No	No	No
Term Structure			No	Yes	No	Yes	No	No	No	No
Credit Spread			No	Yes	No	Yes	No	No	No	No
Credit Quality			No	Yes	No	Yes	No	No	No	No
Firm Fixed Effect			Yes	Yes	No	No	Yes	Yes	Yes	Yes
Year Fixed Effect			Yes	No	No	No	Yes	Yes	Yes	Yes
Clustering			No	No	Yes	Yes	No	No	No	No

Table VII

Dependence on External Finance

This table contrasts the misvaluation effect conditional on firm's dependence on external finance. Panel A presents the regression results and the associated tests of the differences for subgroups of firms at debt refinancing and non-refinancing periods, respectively, and subgroups of firms with high and low Kaplan-Zingales Index based on the 30%-70% cutoffs. Panel B illustrates the corresponding magnitude effects of UN_{t-1}. For brevity, results are only reported for UN_{t-1}. ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

Panel A: Regression Results and Tests of Difference

			Panel A: Regression Results and Tests of Difference					
			Refinancing	Non-Refinancing	Test of Difference	High KZ	Low KZ	Test of Difference
			(1)	(2)	(3)	(4)	(5)	(6)
$dICB_t$	All	Coef	0.64^{***}	0.04	0.60^{***}	0.73^{***}	0.35^{***}	0.38^{***}
		t-Stat	(4.29)	(1.59)	(4.25)	(4.87)	(4.07)	(3.69)
	Micro	Coef	0.73^{***}	0.11^{***}	0.62^{***}	0.77^{***}	0.64^{***}	0.13
		t-Stat	(3.65)	(4.16)	(3.30)	(4.35)	(4.80)	(1.00)
	Small	Coef	0.47^{**}	0.07^{*}	0.39^{**}	0.25	0.27^{**}	-0.02
		t-Stat	(2.40)	(1.94)	(2.00)	(1.26)	(2.53)	(-0.13)
	Big	Coef	0.75^{***}	-0.14^{**}	0.90^{***}	0.84^{***}	0.16	0.67^{**}
		t-Stat	(4.09)	(-2.35)	(4.56)	(3.49)	(1.35)	(2.65)
$dSTD_t$	All	Coef	-1.03^{*}	-0.10	-0.93^{*}	-0.83	-0.24^{***}	-0.59
		t-Stat	(-1.94)	(-1.55)	(-1.81)	(-1.66)	(-3.19)	(-1.29)
	Micro	Coef	-1.58^{**}	-0.19^{***}	-1.38^{*}	-1.28^{*}	-0.54^{***}	-0.75
		t-Stat	(-2.12)	(-3.38)	(-1.92)	(-1.97)	(-4.08)	(-1.16)
	Small	Coef	-0.38	-0.07	-0.31	0.21	-0.55^{***}	0.76^{*}
		t-Stat	(-1.26)	(-0.47)	(-0.88)	(0.59)	(-5.06)	(1.97)
	Big	Coef	-0.03	0.11	-0.14	0.19	0.15	0.05
		t-Stat	(-0.11)	(1.06)	(-0.47)	(0.88)	(1.04)	(0.25)
$dLTD_t$	All	Coef	0.39	0.06	0.33	0.11	-0.10^{**}	0.21
		t-Stat	(0.91)	(1.16)	(0.79)	(0.25)	(-2.12)	(0.48)
	Micro	Coef	0.85	0.09^{*}	0.76	0.51	-0.10	0.61
		t-Stat	(1.36)	(1.97)	(1.24)	(0.94)	(-0.98)	(1.02)
	Small	Coef	-0.09	0.00	-0.08	-0.46	0.27^{**}	-0.73^{*}
		t-Stat	(-0.27)	(-0.02)	(-0.22)	(-1.16)	(2.51)	(-1.73)
	Big	Coef	-0.72^{**}	0.03	-0.76^{**}	-1.03^{***}	-0.31	-0.72^{***}
		t-Stat	(-2.09)	(0.37)	(-2.26)	(-4.07)	(-1.60)	(-3.02)

Table VII - Continued

		Panel B: Magnitude Effects			
		Refinancing	Non-Refinancing	High KZ	Low KZ
		(1)	(2)	(3)	(4)
$dICB_t$	All	0.62	0.04	0.80	0.29
	Micro	0.86	0.13	0.98	0.69
	Small	0.36	0.05	0.23	0.17
	Big	0.46	-0.08	0.65	0.09
$dSTD_t$	All	-1.00	-0.09	-0.90	-0.20
	Micro	-1.86	-0.22	-1.63	-0.58
	Small	-0.29	-0.05	0.19	-0.34
	Big	-0.02	0.06	0.15	0.09
$dLTD_t$	All	0.38	0.05	0.12	-0.08
	Micro	1.00	0.10	0.65	-0.11
	Small	-0.07	0.00	-0.41	0.17
	Big	-0.44	0.02	-0.79	-0.18

Table VIII

Information Asymmetry and Financial Constraint

This table checks whether and how information asymmetry and financial constraint drive the differences in the misvaluation effect on firms' choices between financial debts and inter-company borrowings. Equations (24), (25), and (26) are estimated, along with the high information asymmetry/high financial constraint dummy and its interaction with UN_{t-1}. Information asymmetry is either measured by analyst dispersion or residual volatility in daily stock returns. Financial constraint is estimated using Hadlock and Pierce's (2010) SA index or Whited and Wu's (2006) WW index. Dummies are constructed based on the 30%-70% cutoffs. For brevity, results are only reported for UN_{t-1}, and the interaction term. ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

			Panel A: Information Asymmetry				Panel B: Financial Constraint			
			UN_{t-1}	$High_t \times UN_{t-1}$	UN_{t-1}	$High_t \times UN_{t-1}$	UN_{t-1}	$High_t \times UN_{t-}$	UN_{t-1}	$High_t \times UN_{t-1}$
			Analyst Dispersion		Residual Volatility		SA index		WW index	
$dICB_t$	All	Coef	0.44^{**}	0.07	0.48^{***}	0.04	0.56^{***}	-0.16	0.53^{***}	-0.02
		t-Stat	(2.51)	(0.32)	(3.64)	(0.40)	(4.31)	(-1.43)	(4.37)	(-0.20)
	Micro	Coef	1.26^{***}	0.05	0.70^{***}	-0.02	0.84^{***}	-0.23^{*}	0.78^{***}	-0.14
		t-Stat	(4.74)	(0.09)	(4.91)	(-0.24)	(4.40)	(-1.85)	(4.90)	(-1.25)
	Small	Coef	0.32^{*}	-0.32	0.31	-0.19	0.17	0.41^{*}	0.13	0.05
		t-Stat	(1.74)	(-1.02)	(1.58)	(-0.59)	(1.41)	(1.85)	(1.03)	(0.40)
	Big	Coef	0.17	0.38^{**}	0.18	0.41^{***}	0.20^{*}	0.39	0.24^{*}	0.45^{**}
		t-Stat	(0.98)	(2.13)	(1.70)	(4.30)	(2.01)	(1.66)	(1.84)	(2.48)
$dSTD_t$	All	Coef	-0.26^{***}	-0.22	-0.28^{**}	-0.40	-0.41^{***}	-0.35	-0.41^{***}	-0.18
		t-Stat	(-2.81)	(-1.29)	(-2.30)	(-1.40)	(-3.52)	(-0.57)	(-3.09)	(-0.57)
	Micro	Coef	-1.20^{***}	-0.39	-0.66^{***}	-0.50	-0.86^{***}	-0.33	-0.78^{***}	-0.39
		t-Stat	(-5.43)	(-1.09)	(-4.08)	(-1.19)	(-4.39)	(-0.48)	(-5.05)	(-0.70)
	Small	Coef	-0.37^{*}	-0.02	-0.14	-0.26	-0.08	-0.34	-0.11	-0.03
		t-Stat	(-1.97)	(-0.06)	(-0.68)	(-0.79)	(-0.40)	(-1.04)	(-0.51)	(-0.06)
	Big	Coef	0.27^{*}	-0.32^{*}	0.33^{**}	-0.49^{**}	0.21	-0.25	0.05	0.25
		t-Stat	(1.93)	(-1.72)	(2.03)	(-2.60)	(1.44)	(-1.03)	(0.30)	(1.31)
$dLTD_t$	All	Coef	-0.18	0.15	-0.20^{*}	0.37	-0.15	0.51	-0.12^{**}	0.20
		t-Stat	(-1.09)	(0.56)	(-2.00)	(1.33)	(-1.62)	(0.91)	(-2.28)	(0.61)
	Micro	Coef	-0.06	0.35	-0.04	0.51	0.02	0.56	-0.01	0.52
		t-Stat	(-0.19)	(0.63)	(-0.36)	(1.31)	(0.16)	(0.84)	(-0.06)	(0.87)
	Small	Coef	0.04	0.33	-0.17	0.45^{**}	-0.09	-0.07	-0.02	-0.02
		t-Stat	(0.19)	(1.01)	(-0.87)	(2.11)	(-0.45)	(-0.18)	(-0.09)	(-0.05)
	Big	Coef	-0.44^{**}	-0.07	-0.52^{**}	0.08	-0.41^{**}	-0.14	-0.30	-0.70^{***}
		t-Stat	(-2.15)	(-0.23)	(-2.52)	(0.39)	(-2.26)	(-0.45)	(-1.36)	(-2.95)

Table IX

Inter-Company Borrowings and Capital Expenditure

This table presents the Fama-Macbeth estimates from regressions of capital expenditures on changes in inter-company borrowings, the interaction between changes in inter-company borrowings and stock undervaluation, and a set of control variables. In Panel A, inter-company borrowing is changes in total liabilities minus change in total debts, in fiscal year t-1. In panel B, the inter-company credit under investigation is changes in account payable during fiscal year t-1. Newey-West (1987) variance estimator is used to report heteroscedasticity and autocorrelation robust t-statistics (in parentheses). ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

			Panel A: Increase in All Inter-Company Borrowings									
			Intercept	UN_{t-1}	$dICB_{t-1}$	$UN_{t-1}\times dICB_{t-1}$	$Profit_{t-1}$	Lev_{t-1}	V/B_{t-1}	$Size_{t-1}$	$Access_{t-1}$	R^2
$dCapx_t$	All	Coef	1.40^{***}	-0.64^{***}	-0.01^{*}	-0.03	0.67^{***}	-2.24^{***}	0.47^{***}	-0.01^{***}	0.48^{***}	0.02
		t-Stat	5.48	-5.01	-1.73	-0.39	3.97	-4.89	6.54	-4.76	4.45	
	Micro	Coef	1.35^{***}	-0.52^{***}	0.00	0.03	0.51^{***}	-2.25^{***}	0.48^{***}	-0.08^{***}	0.95^{***}	0.02
		t-Stat	4.24	-3.18	0.09	0.34	3.63	-3.24	6.37	-6.02	3.63	
	Small	Coef	4.06^{***}	-0.93^{***}	-0.03^{**}	0.08	2.17^{***}	-2.56^{***}	0.50^{***}	-0.08^{***}	0.56^{***}	0.05
		t-Stat	8.41	-5.99	-2.63	0.60	4.94	-4.37	4.47	-9.13	4.51	
	Big	Coef	4.70^{***}	-1.03^{***}	0.01	-0.04	5.86^{***}	-0.98^{*}	0.29^{***}	-0.05^{***}	0.21^{*}	0.05
		t-Stat	4.24	-3.49	1.09	-0.24	3.76	-1.90	3.21	-3.92	1.76	
			Panel B: Increase in Trade Credit									
			Intercept	UN_{t-1}	dAP_{t-1}	$UN_{t-1}\times dAP_{t-1}$	$Profit_{t-1}$	Lev_{t-1}	V/B_{t-1}	$Size_{t-1}$	$Access_{t-1}$	R^2
$dCapx_t$	All	Coef	1.37^{***}	-0.69^{***}	0.00	0.15^{***}	0.65^{***}	-2.14^{***}	0.47^{***}	-0.01^{***}	0.48^{***}	0.01
		t-Stat	5.28	-5.28	-0.33	2.93	3.85	-4.57	6.41	-4.52	4.45	
	Micro	Coef	1.36^{***}	-0.56^{***}	0.00	0.07	0.47^{***}	-2.26^{***}	0.49^{***}	-0.08^{***}	1.01^{***}	0.02
		t-Stat	4.19	-3.96	0.20	1.49	3.28	-3.29	6.81	-6.57	4.35	
	Small	Coef	4.01^{***}	-0.99^{***}	-0.02	0.33^{***}	2.19^{***}	-2.48^{***}	0.51^{***}	-0.08^{***}	0.54^{***}	0.04
		t-Stat	8.60	-6.10	-1.51	3.15	4.85	-4.32	4.56	-9.23	4.28	
	Big	Coef	4.66^{***}	-1.10^{***}	0.02	0.28^{**}	5.94^{***}	-0.88^{*}	0.30^{***}	-0.05^{***}	0.20	0.05
		t-Stat	4.17	-3.72	1.52	2.35	3.83	-1.83	3.11	-3.86	1.68	

Table X

Inter-Company Borrowings and Stock Price Reversal

This table presents the Fama-Macbeth estimates from regressions of one-year stock cumulative return on changes in inter-company borrowings, the interaction between changes in inter-company borrowings and stock undervaluation, and a set of control variables. In Panel A, inter-company borrowing is changes in total liabilities minus change in total debts, in fiscal year t-1. In panel B, the inter-company credit under investigation is changes in account payable during fiscal year t-1. Newey-West (1987) variance estimator is used to report heteroscedasticity and autocorrelation robust t-statistics (in parentheses). ***, **, and * show that the coefficient is significant at the 1%, 5%, and 10% level, respectively.

			Panel A: Increase in All Inter-Company Borrowings									
			Intercept	UN_{t-1}	$dICB_{t-1}$	$UN_{t-1}\times dICB_{t-1}$	$Profit_{t-1}$	Lev_{t-1}	V/B_{t-1}	$Size_{t-1}$	$Access_{t-1}$	R^2
$Cumulative\ Return_t$	All	Coef	0.05	0.15^{***}	0.00	0.03^{*}	0.04^{*}	-0.13	0.04^{***}	0.00^{*}	0.04^{**}	0.09
		t-Stat	0.94	7.94	-0.84	1.96	1.91	-1.64	2.98	-1.94	2.57	
	Micro	Coef	0.10	0.16^{***}	0.00	0.07^{***}	0.04^{*}	-0.20^{**}	0.02^{*}	-0.01^{***}	0.05	0.11
		t-Stat	1.57	6.74	-0.45	3.31	1.78	-2.09	1.76	-5.76	1.10	
	Small	Coef	0.48^{***}	0.20^{***}	0.00	0.04^{***}	-0.17^{**}	-0.10^{**}	0.03^{**}	-0.01^{***}	0.01	0.20
		t-Stat	6.22	9.67	0.05	2.88	-2.72	-2.37	2.48	-10.66	0.55	
	Big	Coef	0.48^{***}	0.11^{***}	0.00	0.02	0.06	-0.10	0.04^{**}	-0.01^{***}	0.01	0.12
		t-Stat	4.01	3.92	1.00	1.18	0.69	-1.30	2.54	-4.83	0.59	
			Panel B: Increase in Trade Credit									
			Intercept	UN_{t-1}	dAP_{t-1}	$UN_{t-1}\times dAP_{t-1}$	$Profit_{t-1}$	Lev_{t-1}	V/B_{t-1}	$Size_{t-1}$	$Access_{t-1}$	R^2
$Cumulative\ Return_t$	All	Coef	0.05	0.14^{***}	0.00	0.04^{***}	0.04^{*}	-0.14^{*}	0.04^{***}	-0.01^{*}	0.04^{**}	0.11
		t-Stat	0.96	7.76	0.57	3.92	1.89	-1.86	3.20	-1.94	2.52	
	Micro	Coef	0.10	0.16^{***}	0.00	0.04^{**}	0.04	-0.23^{**}	0.03^{*}	-0.01^{***}	0.06^{*}	0.20
		t-Stat	1.62	6.51	1.12	2.30	1.58	-2.52	1.89	-6.69	1.91	
	Small	Coef	0.49^{***}	0.20^{***}	0.00	0.00	-0.15^{**}	-0.10^{**}	0.03^{**}	-0.01^{***}	0.00	0.12
		t-Stat	6.34	9.54	-0.82	0.16	-2.38	-2.65	2.72	-10.58	0.32	
	Big	Coef	0.48^{***}	0.11^{***}	0.00	0.02	0.06	-0.10	0.04^{**}	-0.01^{***}	0.01	0.09
		t-Stat	3.96	3.98	-1.21	1.28	0.69	-1.27	2.58	-4.75	0.51	