Macroeconomic Uncertainty and Firm Leverage

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Abstract

In this paper we investigate the link between the optimal level of nonfinancial firms' leverage and macroeconomic uncertainty. Using the model of firm's value maximization, we show that as macroeconomic uncertainty increases, captured by an increase in the variability of industrial production or inflation, firms decrease their optimal levels of borrowing. We test this prediction on a panel of non–financial US firms drawn from COMPUSTAT quarterly database covering the period 1991-2001, and find that as macroeconomic uncertainty increases, firms decrease their levels of leverage. Our results are robust with respect to the inclusion of macroeconomic factors such as interest rate, and index of leading indicators.

Keywords: leverage, uncertainty, non–financial firms, panel data.

JEL classification C23, D8, D92, G32.

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1 Introduction

"WASHINGTON, March 12 (Reuters) — Newell Rubbermaid Inc. (NYSE:NWL — News), a household and business products maker, on Wednesday filed with the Securities and Exchange Commission (News – Websites) to periodically sell up to $1 billion in debt securities ... company said the net proceeds of the sale would be used for general corporate purposes. These could include additions to working capital, repayment of existing debt and acquisitions, according to the shelf registration filing. Under such a filing, a company may sell securities from time to time in one or more offerings, with amounts, prices and terms determined at the time of sale."[1] As all these changes in debt affect the leverage level, it is interesting to investigate the driving factors leading to this variation. For this purpose it is crucial to study the indicators that influence the "underwriters" advice with respect to the best timing for issuing debt. The importance of this research is further justified by the amount of issued debt taking place nowadays. For example on March 12, 2003 Reuters informed about twelve more different debt issues, including Moore North America ($400 mln), Citigroup ($1.5 bln), Bank of America ($295 mln), Shaw Group ($253 mln), Comcast ($1.5 bln), Eli Lilly ($500 mln), Hanson Australia Funding ($600 mln), Unisys Corp ($300 mln).[2]

The most common purposes for borrowing are capital investment and existing debt repayment. However, some corporations change the amount of debt they issue just before the official announcement. For instance, both Citigroup and Comcast originally planned to sell $1.0 billion notes each. It is important to understand why firms change their decisions about initial offerings.

Determinants of capital structure always attracted a lot of research attention.

[1] Citation: Yahoo! Bond Center: Latest Bond Market News, 12 March 2003, http://biz.yahoo.com/n/z/z0400.html?htime=1047576818

[2] Ibid.

In the middle of the last century, Modigliani and Miller (1958) showed that under perfect capital market assumption financial and real variables are irrelevant. However, recent theoretical developments are opposite to this fact. For instance, there is wide literature on the relationship between liquid asset holdings and firms' investment decisions.[3]. Furthermore, leverage depends on such firm–specific characteristics as cash–holdings, total assets, and investment–to–capital ratio[4] Unfortunately, little work has been done on estimating the interaction of macroeconomic level variables and capital structure indicators. Baum et al. (2001) find relationship between macroeconomic uncertainty and cross–sectional distribution of cash–to–asset ratios for US non–financial firms. One may conclude that macroeconomic uncertainty is an important factor of macroeconomic environment. Following this idea, we want to contribute to the literature on corporate debt by investigation of the link between macroeconomic uncertainty and optimal level of leverage.[5]

In this paper, we show that firms may alter their debt level in presence of macroeconomic uncertainty. In order to achieve this goal a dynamic stochastic partial equilibrium model of the firm's value optimization is developed. The model is based upon a testable hypothesis of association between optimal level of debt and uncertainty. According to the theoretical predictions, an increase in money growth uncertainty or inflation uncertainty leads to a decrease in leverage. In times of greater macroeconomic uncertainty companies issue less debt.

To ascertain the impact of macroeconomic uncertainty on the optimal level of leverage we utilize a panel of non–financial firms obtained from the quarterly COMPUSTAT database over 1991–2001 period. After some screening procedures it includes above 30,000 manufacturing firm–year observations, with 700 firms per quar-

[3]See Gilchrist and Himmelbert (1998); Fazzari et al. (1988), for example

[4]See Shuetrim et al. (1993), Auerbach (1983), Weill (2001).

[5]One may suggest to investigate the effect of idiosyncratic uncertainty as a factor affecting leverage. The investigation of this effect is beyond the scope of the paper.

ter. We also consider a sample split, defining categories of durable–goods makers vs. non–durable goods makers. Our empirical strategy links the level of leverage and the macroeconomic uncertainty proxies using Arellano–Bond dynamic panel data approach (Arellano and Bond, 1991).

We can summarize our findings as follows. The data provide evidence for a negative association between the optimal level of debt and macroeconomic uncertainty, proxied by conditional variance of money growth and by conditional variance of inflation. Moreover, leverage levels of durable-goods makers are more sensitive to changes in monetary policy than those of non-durable goods makers. The result are shown to be robust to inclusion of such macroeconomic level variables as index of leading indicators and interest rate.

These results provide information for corporate structure decisions. Changes in macroeconomic uncertainty, partially caused by monetary policy, affect leverage, costs of obtaining external finance and investment dynamics thereafter. Moreover, monetary policy has an effect on discount rate of investment project. Therefore, the transmission mechanism of monetary policy is much more complicated than described in the models ignoring interaction of real, finance and uncertainty variables.

The remainder of the paper is constructed as follows. Section 2 presents a simple firm's value maximization model. Section 3 describes the data and discuss our results. Finally, Section 4 concludes and gives suggestions for further research.

2 A Q Model of Investment

2.1 Model Setup

The main theoretical model proposed in this paper is focused on the firm value optimization problem and represents a generalization of the standard Q models of investment by Gilchrist and Himmelberg (1998), Love (2003), Hubbard and Kashyap

(1992). The present value of the firm is set equal to the expected discounted stream of D_t, dividends paid to shareholders and β is the discount factor.

$$V_t(K_t) = \max_{\{I_{t+s}, B_{t+s}\}_{s=0}^{\infty}} D_t + E_t\left[\sum_{s=1}^{\infty} \beta^{t+s-1} D_{t+s}\right], \tag{1}$$

$$K_{t+1} = (1-\delta)K_t + I_t, \tag{2}$$

$$D_t = \Pi(K_t, \xi_t) - C(I_t, K_t) - I_t + B_{t+1} - (1+r_t)(1+\eta(B_t, K_t, \xi_t))B_t, \tag{3}$$

$$D_t \geq 0, \tag{4}$$

$$\lim_{T\to\infty}\left[\Pi_{j=t}^{T-1}\beta_j\right] B_T = 0, \forall t \tag{5}$$

The firm maximizes equation (1) subject to three constraints. The first is capital stock accounting identity $K_{t+1} = (1-\delta)K_t + I_t$, where K_t is beginning-of-the-period capital stock, I_t is the investment expenditures, and δ is the rate of capital depreciation. The second constraint defines firm dividends. $\Pi(K_t, \xi_t)$ denotes the maximized value of current profits taking as giving the beginning-of the-period capital stock, and a profitability shock ξ_t. $C(I_t, K_t)$ is real cost of adjusting I_t units of capital. We incorporate financial frictions assuming that risk-neutral share-holders require an external premium, $\eta(B_t, K_t, \xi_t)$, which depends on such firm-specific characteristics as debt and capital stock. As Gilchrist and Himmelberg (1998), we also assume $\partial\eta/\partial B_t > 0$ that highly indebted firms have to pay additional premium to compensate debt-holders for additional costs because of monitoring or hazard problems. Moreover, $\partial\eta/\partial K_t < 0$ that large firms have to pay lower risk premium. The gross interest rate is equal to $(1+r_t)(1+\eta(B_t, K_t, \xi_t))$, where r_t is the risk-free rate of return. Finally, B_t denotes financial liabilities of the firm.

Financial frictions are also introduced through non–negativity constraint for dividends, $D_t \geq 0$ and the corresponding Lagrange multiplier λ_t. The λ_t can be interpreted as the shadow cost of internally generated funds. The last equation is transversality condition, which prevents the firm from borrowing an infinite amount and paying it out as dividends.

Solving the optimization problem we derive Euler equation for investment:

$$\begin{aligned}&\frac{\partial C_t}{\partial I_t}+1= \\ &E_t\left[\beta\Theta_t\left(\frac{\partial \Pi_{t+1}}{\partial K_{t+1}}+(1-\delta)\left(\frac{\partial C_{t+1}}{\partial I_{t+1}}+1\right)-(1+r_{t+1})\frac{\partial \eta_{t+1}}{\partial K_{t+1}}B_{t+1}\right)\right]\end{aligned} \tag{6}$$

Expression $\beta\Theta_t$ may serve as a stochastic time-varying discount factor which is equal to β if we do not have financial constraints ($\lambda_{t+1}=\lambda_t$). Equation (6) relates optimal level of debt, B_{t+1}, with marginal profit of capital, $\partial\Pi(K_{t+1},\xi_{t+1})/\partial K_{t+1}$, marginal adjustment cost of investment, $\partial C(I_t,K_t)/\partial I_t$, expected marginal adjustment cost in period $t+1$, $\partial C(I_{t+1},K_{t+1})/\partial I_{t+1}$, and relative shadow cost of external financing in periods t and $t+1$, $\Theta_t=\frac{(1+\lambda_{t+1})}{(1+\lambda_t)}$.

From the first-order conditions for debt we receive:

$$E_t\left[\beta\Theta_t(1+r_{t+1})\left(1+\eta_{t+1}+\frac{\partial \eta_{t+1}}{\partial B_{t+1}}B_{t+1}\right)\right]=1 \tag{7}$$

In the steady state $\beta(1+r_{t+1})\Theta_t=\beta(1+r_{t+1})=1$, which implies that $\eta_{t+1}+\frac{\partial\eta_{t+1}}{\partial B_{t+1}}B_{t+1}=0$. Since we assume $\frac{\partial\eta_{t+1}}{\partial B_{t+1}}>0$, then B_t is guaranteed to be positive only if $\eta_{t+1}<0$. Gilchrist and Himmelberg (1998) suggest that the risk premium may be negative if η is considered as net of tax advantages or agency benefits.

Our parametrization approach follows roughly Love (2003) and Gilchrist and Himmelberg (1998). The level of financing constraint for a representative firm i, Θ_{it}, is a function of cash stock and debt

$$\Theta_{it}=a_{0i}+a_1\frac{Cash_{it}}{TA_{it}}+a_2\frac{B_{it}}{TA_{it}} \tag{8}$$

where $\frac{Cash_{it}}{TA_{it}}$ is cash–to–total assets ratio, $\frac{B_{it}}{TA_{it}}$ is debt level and a_{0i} is a firm-specific degree of financial constraints. Debt generates interest and principle obligations and increases probability of financial distress while availability of liquid assets decrease external finance constraint (see Hubbard et al., 1995; Almeida et al., 2003).

We utilize traditional adjustment cost function given by $C(I_t, K_t) = \frac{\alpha}{2}\left(\frac{I_t}{K_t} - \nu_i\right)^2 K_t$. Parameter ν_i might be interpreted as a firm-specific optimal level of investment. Then marginal adjustment cost of investment is given by:

$$\frac{\partial C_t}{\partial I_t} = \alpha\left(\frac{I_t}{K_t} - \nu_i\right) \tag{9}$$

In order to introduce macroeconomic uncertainty into the model, we parameterize expected adjustment cost $E_t C(I_{t+1}, K_{t+1}) = E_t\left\{\frac{\alpha}{2}\left(\frac{I_{t+1}}{K_{t+1}} - \nu_i + b\varepsilon_{t+1}\right)^2 K_{t+1}\right\} = E_t\left\{\frac{\alpha}{2}\left(\frac{I_{t+1}}{K_{t+1}} - \nu_i\right)^2\right\} K_{t+1} + b^2 E_t\left\{\varepsilon_{t+1}^2\right\} K_{t+1}$, where ε_{t+1} is a macroeconomic shock independent of $\frac{I_{t+1}}{K_{t+1}}$ and ν_i. $E_t\left\{\varepsilon_{t+1}^2\right\}$ could be written as $E_t\left\{\varepsilon_{t+1}^2\right\} = \tau_t$.Then expected marginal adjustment cost are

$$E_t\left\{\frac{\partial C_{t+1}}{\partial I_{t+1}}\right\} = \alpha\left(E_t\left\{\frac{I_{t+1}}{K_{t+1}}\right\} - \nu_i\right) + b^2\tau_t \tag{10}$$

Marginal profit of capital is parameterized using sales–based measure[6]

$$\frac{\partial \Pi}{\partial K} = \theta\frac{S}{K} \tag{11}$$

where S is the firm's sales, K is capital and $\theta = \frac{\alpha_k}{\mu}$, α_k is the capital share in the Cobb–Douglas production function specification and μ is markup (defined as $1/(1+\kappa^{-1})$, where κ is the firm–level price elasticity of demand).

Finally, we linearize the product of β_t, Θ_t and A_t, where $A_t = \frac{\partial \Pi_{t+1}}{\partial K_{t+1}} + (1-\delta)\left(\frac{\partial C_{t+1}}{\partial I_{t+1}} + 1\right) - (1 + r_{t+1})\frac{\partial \eta_{t+1}}{\partial K_{t+1}} B_{t+1}$. We utilize first order Taylor approximation around means. Ignoring constant terms the approximation is equal to

[6] There is a discussion in Gilchrist and Himmelber (1998) suggesting that sales-based measure of marginal profit of capital is more desirable comparing to operating income measure.

$$\beta_t \Theta_t A_t = \overline{\beta}\gamma\Theta_t + \overline{\beta}A_t + \gamma\beta_t \qquad (12)$$

where $\overline{\beta}$ is the average discount factor, γ denotes the unconditional mean of A_t. We assume rational expectations, that allows to replace expectations with realized values plus firm-specific error term, e_t, orthogonal to information set available at the time when optimal investment and borrowing are chosen.[7]

$$\begin{aligned} \frac{B_{it+1}}{K_{it+1}} &= \beta_0 + \beta_1 \frac{B_{it}}{K_{it}} + \beta_2 \frac{Cash_{it}}{K_{it}} + \beta_3 \frac{S_{it}}{K_{it}} \\ &+ \beta_4 \frac{I_{it+1}}{K_{it+1}} + \beta_5 \frac{I_{it}}{K_{it}} + \beta_6 \tau_{t-1} + f_i + d_i + e_{it} \end{aligned} \qquad (13)$$

where the parameters are equal to[8]

$$\beta_1 = \frac{\overline{\beta}\gamma a_2}{d}, \beta_2 = \frac{\overline{\beta}\gamma a_1}{d}, \beta_3 = \frac{\overline{\beta}\theta}{d},$$
$$\beta_4 = \frac{\overline{\beta}(1-\delta)\alpha}{d}, \beta_5 = \frac{-\alpha}{d}, \beta_6 = \frac{\overline{\beta}(1-\delta)b^2}{d}$$

In our notation, $d = \left[\frac{\partial \eta_{t+1}}{\partial K_{t+1}}\right]^{-1} < 0$, f_i is a firm-specific fixed effect which is a function of a_{0i} and ν_i.[9] Moreover, we control for industry specific effect using industry dummies $d_{i,t}$.

Since COMPUSTAT gives end–of–period values for firms, we include lagged proxies for uncertainty in the regressions instead of contemporaneous proxies.[10] Thus,

[7]In order to reduce the potential effect of heteroscedasticity we scale debt and cash by the level of capital.

[8]We assume that in steady state $\overline{\beta}(1 + r_{t+1}) = 1$.

[9]Firm–specific effect is equal to $f_i = \left(1 - \overline{\beta}(1-\delta)\right)\alpha\nu_i + \overline{\beta}\gamma a_{0i}$.

[10]In our analysis we employ also lagged values of three-month Treasury Bill rate and detrended index of leading indicators as control variables.

we can say that recently–experienced volatility will affect firms' behavior. The main hypothesis of our paper is:

$$H_0 : \beta_6 < 0 \tag{14}$$

That is, macroeconomic uncertainty affects optimal level and this effect is negative. When firms anticipate "bad times" then they issue less debt.

Our model specification anticipates $\beta_3 < 0$, and $\beta_4 < 0$. Current optimal leverage level increases in response to decrease in liquid assets or sales. Moreover, we anticipate to receive persistence of leverage ratio, $\beta_2 > 0$.

2.2 Identifying Macroeconomic Uncertainty

The macroeconomic uncertainty identification approach resembles the one used by Baum et al. (2002). Firms' debt depends on anticipation of future profits and investments. The difficulty of the optimal amount of debt issuing evaluation increases with the level of macroeconomic uncertainty. In this paper we use two proxies for macroeconomic uncertainty. First, the conditional variance of money growth, which is a measure of from monetary policy makers side. This indicator is available at a higher (monthly) frequency than the one of the national income aggregates. Second, in order to capture the uncertainty emerging from the financial sector, we use the conditional variance of the CPI inflation. However, we use not lagged but weighted conditional variances of money growth (WCV_MON) or inflation (WCV_INFL), with weights 0.4, 0.3, 0.2, and 0.1 corresponding to $\sigma^2_{t-1}, \sigma^2_{t-2}, \sigma^2_{t-3}$ and σ^2_{t-4} respectively. Introduction of arithmetic lags proxies allows to capture the combined effects of contemporaneous and lagged levels of uncertainty.

We derive our proxies for macroeconomic uncertainty from monthly real monetary base (DRI series $FMBASE$) and from consumer price inflation (International Financial Statistics series $64XZF$). For each of these cases we build a generalized ARCH

(GARCH) model for the series, where the mean equation is an autoregression. The conditional variances derived from this GARCH model for each proxy are averaged to the quarterly frequency and then used.

Literature suggests also other candidates for macroeconomic uncertainty proxies such as moving standard deviation (see Ghosal and Loungani, 2000), standard deviation across 12 forecasting teams of the output growth and inflation rate in the next 12 month (see Driver and Moreton, 1991). However, pattern of our macroeconomic data suggests us to use GARCH (1,1) model.[11]

3 Empirical Implementation

3.1 Dataset

We work with the COMPUSTAT Quarterly database of U.S. firms. The initial databases include 173,505 firms' quarterly characteristics over 1991-2001. The firms are classified by two–digit Standard Industrial Classification (SIC). The main advantage of the dataset is that it contains detailed balance sheet information. However, the main limitation of the data is the significant weight on large companies.

We also apply a number of sample selection criteria to the original sample. First, we set all negative values for all variables in the sample as missing. Second, we set observations as missing if the values of ratio variables are lower than 1st percentile or higher than 99th percentile. We prefer to use the screened data to reduce the potential impact of outliers upon the parameter estimates. After the screening and using only manufacturing sector firms we receive on average 700 firms' quarterly characteristics.

In order to construct firm-specific variables we utilize COMPUSTAT data items Long-term debt ($data9$) and Total Assets ($data6$) for leverage ratio, Cash and Short–Term Investments ($data1$), Capital Expenditures ($data90$), Sales ($data12$) for Cash–

[11] This approach is also used by Driver and Urga (2002), Byrne and Davis (2002).

to–Asset ratio ($Cash/TA$), Investment–to-Asset ratio (I/K) and Sales–to-Asset ratio (S/K).

Table 1 presents descriptive statistics for firm specific variables. The median long-term debt as a percentage of total assets is 19% compared to the mean of 21%.

We subdivide the data of manufacturing–sector firms (two–digit SIC 20–39) into producers of durable goods and producers of non–durable goods on the basis of SIC firms' codes. A firm is considered DURABLE if its primary SIC is 24, 25, 32–39.[12] SIC classifications for NON–DURABLE industries are 20–23 or 26–31.[13] Besides the macroeconomic variables described in the previous subsection, we also use the rate of CPI inflation, three–month Treasury Bill rate and the detrended index of leading indicators as control variables.[14]

3.2 Empirical results

This paper focuses on the link between the leverage level of the firm and both firm–specific and macroeconomic variables. Based on the dynamic stochastic partial equilibrium model, we hypothesize that non-financial firms decrease the level of uncertainty increases.

The results of estimating Equation (13) are given in Tables 2–4 for all manufacturing firms, durable–goods makers and non–durable goods makers. Column (1) of Table 2 represents the Arellano–Bond one–step estimator with weighted conditional variance of inflation as a proxy for macroeconomic uncertainty. Columns (2)–(3) include estimates controlling for the effects of three–month Treasury Bill rate ($Interest_{t-1}$),

[12] These industries include lumber and wood products, furniture, stone, clay, and glass products, primary and fabricated metal products, industrial machinery, electronic equipment, transportation equipment, instruments, and miscellaneous manufacturing industries.

[13] These industries include food, tobacco, textiles, apparel, paper products, printing and publishing, chemicals, petroleum and coal products, rubber and plastics, and leather products makers.

[14] Detrended index of leading indicators is computed from DRI-McGraw Hill Basic Economics series DLEAD.

and index of leading indicators ($Leading_{t-1}$). The model is estimated using an orthogonal transformation instrumented by all available moment restrictions starting from $(t-2)$.[15] Columns (4)–(5) include results with weighted conditional variance of money growth as a proxy for macroeconomic uncertainty. All regressions include constant and industry dummies. Moreover, robust standard errors were used. On the basis of Sargan test we cannot say that the models are misspecified.

The results indicate that there is a negative and significant relationship between leverage and macroeconomic uncertainty. The coefficient by uncertainty variable takes values from -0.013 to -0.016 for inflation proxy and -0.058 for money growth proxy respectively.

We receive interesting contrast for durable good makers and non–durable goods makers in Tables 3 and 4. Durable goods makers exhibit negative significant effects when macroeconomic uncertainty is proxied by weighted conditional variance of money growth, with larger in absolute value coefficients than those for all firms. As these companies have larger inventories of work in progress and have longer production cycle they are more sensitive to volatility in monetary policy, including money growth. At the same time, they are marginally affected by uncertainty from inflation side, while non–durable goods makers mostly affected by this type of uncertainty only.

In summary, we find support for model predictions expressed in expression (15). The firms decrease their borrowing in more uncertain times. The results vary between durable good makers and non–durable manufacturers. When macroeconomic environment becomes more uncertain companies become more cautious and borrow less. This conclusion corresponds to results described in Bloom et al., 2001.

[15]The orthogonal transformation uses

$$x*_{it} = \left(x_{it} - \frac{x_{i(t+1)} + ... + x_{iT}}{T-t}\right)\left(\frac{T-t}{T-t+1}\right)^{1/2}$$

where the transformed variable does not depend on its lagged values.

4 Conclusions

In the paper we investigate the relationship between leverage of manufacturing firms and macroeconomic uncertainty using Quarterly COMPUSTAT data. Based on the theoretical predictions developed using famous Q-model of investment, we anticipate that firms decrease the level of debt when macroeconomic uncertainty increases. In order to test empirically our model we employ dynamic panel data methodology.

There are significant differences in results for durable good makers and non–durable goods manufacturers. The former exhibit larger sensitivity to macroeconomic uncertainty from monetary policy makers side, while the latter reacted to changes in inflation volatility.

Results are shown to be robust to inclusion of such macroeconomic level variables as interest rate, and index of leading indicators.

From the policy perspective, we suggest that macroeconomic uncertainty has an effect on balance sheet structure, which affects the dynamics of investment. Recent studies (see Bernanke and Gertler, 1989) show that balance sheets shocks may affect the amplitude of investment cycle in a simple neoclasical model. Moreover, in many countries monetary policy tends to be characterized by runs of successive monetary instruments movements in the same direction, with only rare reversals during which the monetary instrument moves in the opposite direction to recent changes. For instance the Federal Reserve is particularly averse to interest rate reversals. In the US, it is approximately ten times more likely that a rise in the interest rate will be followed by another rise, rather than a fall, in the interest rate. One may suggest to rationalize the lack of reversals in central bank policy.

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Appendix 1: Construction of leverage, macroeconomic and firm specific measures

The following variables are used in the quarterly empirical study.

From the COMPUSTAT database:

DATA1: Cash and Short–Term Investments

DATA6: Total Assets

DATA9: Long-Term Debt

DATA12: Sales

DATA90: Capital Expenditures

From International Financial Statistics:

64XZF: consumer price inflation

From the DRI-McGraw Hill Basic Economics database:

DLEAD: index of leading indicators

FMBASE: real monetary base

Table 1: Descriptive Statistics

All firms	μ	σ^2	$p25$	$p50$	$p75$
$\frac{B_t}{TA_t}$	0.2140	0.0258	0.0872	0.1896	0.3083
$\frac{I_t}{TA_t}$	0.0372	0.0357	0.0131	0.0269	0.0495
$\frac{Cash_t}{TA_t}$	0.0747	0.0097	0.0117	0.0329	0.0969
$\frac{S_t}{TA_t}$	0.3064	0.0211	0.2117	0.2832	0.3721
Durable					
$\frac{B_t}{TA_t}$	0.2047	0.0252	0.0792	0.1771	0.2969
$\frac{I_t}{TA_t}$	0.0360	0.0355	0.0126	0.0258	0.0472
$\frac{Cash_t}{TA_t}$	0.0797	0.0102	0.0136	0.0376	0.1054
$\frac{S_t}{TA_t}$	0.0205	0.0211	0.2177	0.2881	0.3734
Non–Durable					
$\frac{B_t}{TA_t}$	0.2268	0.0264	0.1017	0.2059	0.3215
$\frac{I_t}{TA_t}$	0.0387	0.0359	0.0139	0.0285	0.0524
$\frac{Cash_t}{TA_t}$	0.0676	0.0090	0.0098	0.0275	0.0873
$\frac{S_t}{TA_t}$	0.2995	0.0217	0.2023	0.2763	0.3693

Note: p25, p50 and p75 represent the quartiles of the distribution, while σ^2 and μ represent its variance and mean respectively.

Table 2: Determinants of Leverage: All Firms

Variable	(1)	(2)	(3)	(4)	(5)
WCV_INFL_{t-1}	-0.0167***	-0.0154**	-0.0160***		-0.0133**
	[0.0050]	[0.0051]	[0.0050]		[0.0053]
WCV_MON_{t-1}				-0.0584***	-0.0392**
				[0.0168]	[0.0175]
$\frac{B}{K}_{t-1}$	0.8338***	0.8347***	0.8328***	0.8311***	0.8344***
	[0.0159]	[0.0159]	[0.0162]	[0.0162]	[0.0159]
$\frac{CASH}{K}_t$	-0.0726***	-0.0723***	-0.0725***	-0.0734***	-0.0727***
	[0.0100]	[0.0100]	[0.0100]	[0.0101]	[0.0100]
$\frac{S}{K}_t$	-0.0863***	-0.0864***	-0.0857***	-0.0856***	-0.0860***
	[0.0089]	[0.0089]	[0.0089]	[0.0089]	[0.0088]
$\frac{I}{K}_t$	-0.0278*	-0.0280*	-0.0261	-0.0274*	-0.0288*
	[0.0163]	[0.0163]	[0.0162]	[0.0162]	[0.0163]
$\frac{I}{K}_{t+1}$	-0.0241*	-0.0246*	-0.0246*	-0.0184	-0.0205
	[0.0137]	[0.0137]	[0.0137]	[0.0138]	[0.0139]
$INTEREST_{t-1}$		0.0005			
		[0.0004]			
$LEADING_{t-1}$			0.0004	0.0005**	
			[0.0002]	[0.0002]	
LM (1)	-13.38***	-13.39***	-13.40***	-13.40***	-13.39***
LM (2)	0.74	0.74	0.74	0.70	0.72
Sargan (p)	0.464	0.445	0.489	0.398	0.423

Note: Sample size is 24106 observations. Every equation includes constant and industry dummy variables. Asymptotic robust standard errors are reported in the brackets. Estimation by GMM using DPD package for GiveWin, one–step results. "Sargan" is a Sargan–Hansen test of overidentifying restrictions (p–value reported). "LM (k) is the test for k-th order autocorrelation. Instruments are B/K_{t-2} to B/K_{t-6}, $CASH/K_{t-2}$ to $CASH/K_{t-6}$, I/K_{t-2} to I/K_{t-6}, and S/K_{t-2} to S/K_{t-6}.

Table 3: Determinants of Leverage: Durable Goods–Makers

Variable	(1)	(2)	(3)	(4)	(5)
WCV_INFL_{t-1}	-0.0112*	-0.0117*			-0.0092
	[0.0063]	[0.0063]			[0.0069]
WCV_MON_{t-1}			-0.0708***	-0.0765***	-0.0613***
			[0.0215]	[0.0216]	[0.0226]
$\frac{B}{K}_{t-1}$	0.8129***	0.8108***	0.8189***	0.8164***	0.8211***
	[0.0227]	[0.0231]	[0.0216]	[0.0221]	[0.0216]
$\frac{CASH}{K}_t$	-0.0833***	-0.0833***	-0.0776***	-0.0777***	-0.0770***
	[0.0141]	[0.0142]	[0.0140]	[0.0141]	[0.0140]
$\frac{S}{K}_t$	-0.1061***	-0.1051***	-0.1056***	-0.1046***	-0.1053***
	[0.0126]	[0.0126]	[0.0126]	[0.0126]	[0.0126]
$\frac{I}{K}_t$	-0.0648***	-0.0630***	-0.0680***	-0.0658***	-0.0674***
	[0.0233]	[0.0232]	[0.0244]	[0.0242]	[0.0244]
$\frac{I}{K}_{t+1}$	-0.0269**	-0.0377**	-0.0246*	-0.0277	-0.0286
	[0.0187]	[0.0188]	[0.0191]	[0.0191]	[0.0192]
$LEADING_{t-1}$		0.0006*		0.0006*	
		[0.0003]		[0.0003]	
LM (1)	-9.783**	-9.795**	-9.85**	-9.86**	-9.86***
LM (2)	0.50	0.50	0.78	0.78	0.79
Sargan (p)	0.345	0.347	0.278	0.284	0.317

Note: Sample size is 14176 observations. Every equation includes constant and industry dummy variables. Asymptotic robust standard errors are reported in the brackets. Estimation by GMM using DPD package for GiveWin, one–step results. "Sargan" is a Sargan–Hansen test of overidentifying restrictions (p–value reported). "LM (k) is the test for k-th order autocorrelation. Instruments are B/K_{t-2} to B/K_{t-4}, $CASH/K_{t-2}$ to $CASH/K_{t-4}$, I/K_{t-2} to I/K_{t-4}, and S/K_{t-2} to S/K_{t-4}.

Table 4: Determinants of Leverage: Nondurable Goods–Makers

Variable	(1)	(2)	(3)	(4)	(5)
WCV_INFL_{t-1}	-0.0204***	-0.0200***			-0.0202***
	[0.0078]	[0.0077]			[0.0082]
WCV_MON_{t-1}			-0.0253	-0.0281	-0.0027
			[0.0261]	[0.0262]	[0.0226]
$\frac{B}{K}_{t-1}$	0.8730***	0.8729***	0.8718***	0.8718***	0.8729***
	[0.0207]	[0.0208]	[0.0207]	[0.0208]	[0.0206]
$\frac{CASH}{K}_t$	-0.0659***	-0.0657***	-0.0679***	-0.0675***	-0.0659***
	[0.0130]	[0.0130]	[0.0129]	[0.0129]	[0.0129]
$\frac{S}{K}_t$	-0.0620***	-0.0617***	-0.0630***	-0.0625***	-0.0620***
	[0.0112]	[0.0112]	[0.0112]	[0.0113]	[0.0112]
$\frac{I}{K}_t$	0.0268	0.0281	0.0248	0.0266	0.0267
	[0.0187]	[0.0188]	[0.0186]	[0.0187]	[0.0187]
$\frac{I}{K}_{t+1}$	-0.0087	-0.0090	-0.0048	-0.0050	-0.0085
	[0.0192]	[0.0193]	[0.0191]	[0.0193]	[0.0195]
$LEADING_{t-1}$		0.0002		0.0003	
		[0.0003]		[0.0003]	
LM (1)	-10.51**	-10.51**	-10.52**	-10.53**	-10.50***
LM (2)	-0.01	-0.01	-0.04	-0.04	-0.01
Sargan (p)	0.333	0.376	0.376	0.335	0.315

Note: Sample size is 9930 observations. Every equation includes constant and industry dummy variables. Asymptotic robust standard errors are reported in the brackets. Estimation by GMM using DPD package for GiveWin, one–step results. "Sargan" is a Sargan–Hansen test of overidentifying restrictions (p–value reported). "LM (k) is the test for k-th order autocorrelation. Instruments are B/K_{t-2} to B/K_{t-3}, $CASH/K_{t-3}$ to $CASH/K_{t-3}$, I/K_{t-2} to I/K_{t-3}, and S/K_{t-2} to S/K_{t-3}.