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Summary of Sufi's Papers

Part I

Sufi, 2009, Bank Lines of Credit, RFS 22, p. 1057v
Note: Sufi has posted the coding on his website so this part should be fairly easy.
Hint: Variables 'Traded over the counter' and 'Not in an S&P index' can be constructed using Compustat variables 'exchg' and 'spmim', respectively. The first part of this assignment is to replicate *Table 1, Table 3, and Figure 1* (as well as other tables that you think are very important).

I.1 Introduction

This paper empirically examines the factors that determine whether firms use bank lines of credit or cash in corporate liquidity management. The author finds that bank lines of credit, also known as revolving credit facilities, are a viable liquidity substitute only for firms that maintain high cash flow. The central question of the analysis is: What governs the use of cash versus bank lines of credit in corporate liquidity management? The author attempted to answer this question using a unique data set with two sets of variables collected directly from annual 10-K SEC filings.

1. For the universe of public firms in S&P's Compustat from 1996 through 2003, the data set contains information on whether a firm has access to a line of credit.
2. For a random sample of 300 firms from this universe (1908 firm-year observations), the data set contains information on the size of the line of credit, the portion of the line of credit drawn, and the unused availability.
3. The data set for the random sample contains information on whether firms are in compliance with or in violation of financial covenants associated with the line of credit. This data set is one of the first to contain detailed information on the use of lines of credit by a large sample of public firms. The author use this data set to explore why firms rely on cash versus lines of credit for liquidity.

The author uses this data set to explore why firms rely on cash versus lines of credit for liquidity. In the first set of results, he finds evidence that maintenance of high cash-flow levels is a key characteristic that governs firms' use of lines of credit relative to cash. Firms with high levels of cash flow rely on lines of credit, whereas firms with low levels of cash flow rely on cash.

More important meaning of this paper is that the author exploress the cash-flow sensitivity of cash using a measure of constraints that relies on access to lines of credit. Theoretical research on credit lines suggests that line of credit access as a measure of financial constraints adds valuable information to traditional measures used in the literature. He defines as ‘‘unconstrained’’ firms that have two key characteristics. First, they have a line of credit in every year in which they are in the sample. Second, they maintain cash flows scaled by book assets above the median firm throughout the sample.

Overall, the paper suggests that banks provide credit lines that are contingent on maintenance of cash flow. Reductions in cash flow lead to covenant violations, which in turn lead to a restriction in the availability of a line of credit. Lines of credit are therefore a poor liquidity substitute for firms that have low existing or expected cash flows. For these firms, cash is a more reliable source of liquidity. These firms rely more heavily on cash and save more cash out of cash flow.

I.2. Data and Methodology

Beginning with a *Compustat* universe that contains non-financial U.S.-based firms with at least four consecutive years between 1996 and 2003 of positive data on total assets (*item 6*), and four consecutive years of non-missing data on total liabilities (*item 181*), total sales (*item 12*), a measure of EBITDA (*item 13*), share price (*item 199*), shares outstanding (*item 25*), preferred stock (*item 10),* deferred taxes (*item 35*), and convertible debt *(item 79*).

These data limitations are governed by the necessity of these variables in constructing basic financial characteristics of the firm. I also require firms to have four consecutive years of book leverage ratios between 0 and 1.

The reproduction generates a sample of ***3817*** firms from 1996 through 2003 (***24,533*** firm-year observations). Then I restricted the sample to firms with at least four consecutive years of data as the author mentions the particularly interest in how line of credit use evolves for a given firm over time. This sample, which is referred to as the ‘‘full’’ sample, forms the basis for the text searching program described below, which provides information on whether firms have a line of credit.

To select the random sample of 300 firms, as the author did, manually collecting detailed data on used and unused lines of credit from annual 10-K SEC filings. It is important to emphasize that there is no search program used to collect line of credit data for the random sample; they are collected manually Any balance of the backup line of credit that does not support outstanding commercial paper is recorded as an unused part of the line of credit. This is consistent with the actual reporting done by firms. It is important to note that borrowers with a commercial paper backup line of credit draw down the portion of the line that does not backup outstanding commercial paper. Only 5% of firms in my sample have a commercial paper program, and all results are robust to the complete exclusion of these firms.

Not that an advantage of the random sample data collection is that it allows me to assess directly the errors in the search program used for the full sample. In other words, by comparing the line of credit collection from manual inspection with the search program in the random sample, it is available for us to be able to assess the number of Type I and Type II errors associated with the search program.

In order to reproduce Table 2, which contains all the essential variables, I clarify these statistics with the Compustat reference for quarterly data

Item #			
2	Sale (Net)	SALEQ	MM$
5	Depreciation and Amortization	DPQ	MM$
8	Income Before Extraordinary Items	IBQ	MM$
10	Income Before Extraordinary Items – Adjusted for Common Stock Equivalents	IBADJQ	MM$
14	Price – Close – 3rd Month of Quarter	PRCCQ	$&¢
21	Operating Income Before Depreciation	OIBDPQ	MM$
22	Interest Expense	XINTQ	MM$
36	Cash and Short-Term Investments	CHEQ	MM$
40	Current Assets – Total	ACTQ	MM$
42	Property, Plant, and Equipment – Total (Net)	PPEGTQ	MM$
44	Assets – Total/Liabilities and Stockholders' Equity – Total	LSEQ	MM$
45	Debt in Current Liabilities	DLCQ	MM$
49	Current Liabilities – Total	LCTQ	MM$
51	Long-Term Debt – Total	DLTTQ	MM$
52	Deferred Taxes and Investment Tax Credit (Balance Sheet)	TXDITCQ	MM$
54	Liabilities – Total	LTQ	MM$
61	Common Shares Outstanding	CSHOQ	MM
69	Net Income (Loss)	NIQ	MM$
84	Sale of Common and Preferred Stock (Statement of Cash Flows)	SSTKY	MM$
86	Long-Term Debt – Issuance (Statement of Cash Flows)	DLTISY	MM$
92	Long-Term Debt – Reduction (Statement of Cash Flows)	DLTRY	MM$
93	Purchase of Common and Preferred Stock (Statement of Cash Flows)	PRSTKCY	MM$

I.3. Reproduction and Conclusions

Table 1 contains summary statistics for the full sample (left panel) and the random sample (right panel). Using the hand-collected data on line of credit balances in the random sample, as the

author did, I construct a variety of measures to assess the magnitude of lines of credit in corporate liquidity management. This table presents summary statistics for two samples of non-financial firms from 1996 through 2003. The left panel describes the full sample of ***3317*** firms (***21,504*** firm-year observations), and the right panel describes the random sample of 300 firms (***1837*** firm-year observations). Market-to-book, cash adjusted, is the market value of assets less cash divided by the book value of assets less cash balances. Net worth, cash adjusted, is the net worth less cash balances divided by book assets less cash

Table I

Full Sample				Random Sample			
Variable	Mean	Median	St.Dev	Variable	Mean	Median	St.Dev
Line of credit variables Has line of credit {0,1}	721	1.000	.299	*Line of credit variables* Has line of credit {0,1}	.702	1.000	.256
				Total line of credit/assets	.212	.187	.239
				Unused line of credit/assets	.301	.190	.198
				Used line of credit/assets	.101	.000	.168
				Total line/(total line + cash)	.308	.297	.222
				Unused line/(unused line + cash)	.248	.289	.174
				Violation of financial covenant {0,1}	0.159	-.---	0.410
Firm characteristics				*Firm characteristics*			
Book debt/assets	.310	.193	.232	Book debt/assets	.307	.184	.219
EBITDA/(assets - cash)	.041	.202	.411	EBITDA/(assets - cash)	.049	.213	.433
Tangible assets/(assets - cash)	.551	.408	.419	Tangible assets/(assets - cash)	.451	.367	.368
Net worth, cash adjusted	.519	.459	.180	Net worth, cash adjusted	.523	.474	.201
Assets - cash	3,401	1,829	26,109	Assets - cash	3,001	1,630	22,795
Market-to-book, cash adjusted	4.100	2.376	5.29	Market-to-book, cash adjusted	3.695	2.147	4.58
Industry sales volatility	.192	.113	.187	Industry sales volatility	.207	.141	.195
Cash-flow volatility	.108	.067	.129	Cash-flow volatility	.119	.073	.162
Not in an S&P index {0,1}	.602	1.000	.383	Not in an S&P index {0,1}	.666	1.000	.425
Traded over the counter {0,1}	.195	.000	.419	Traded over the counter {0,1}	.184	.000	.411
Firm age (years since IPO)	16	10	16	Firm age (years since IPO)	17	10	16

To conduct estimations to examine which firm characteristics influence the decision to utilize lines of credit as opposed to cash in corporate liquidity management, take the following operations into account for generating table 3:

1. There are two sets of dependent variables.
   (1) Examine a {0,1} indicator variable for whether the firm has a line of credit. For this dependent variable, I examine the effect of firm characteristics on the probability of having a line of credit using maximum likelihood probit estimation.
   (2) Examine the bank liquidity to total liquidity ratio, which varies from 0 to 1. For this dependent variable; examine the effect of firm characteristics on the ratio using linear (OLS) estimation.
2. examine the intensive margin for which I isolate the sample to only firms that have a line of credit. In all regressions, standard errors are clustered at the firm level and all regressions include year and 1-digit SIC industry indicator variables.
3. examine firm characteristics likely to be associated with firms facing a high cost of external relative to internal finance.

4. asset tangibility is measured as tangible assets scaled by non-cash total assets. Third, firm size is measured as the natural logarithm of non-cash total assets. I also include net worth scaled by non-cash assets and the market-to-book ratio.
5. employ non-cash total assets as opposed to total assets to scale variables.
6. use two variables to measure business variability: *seasonality*, a measure of the variability of cash flow

Table III

Dependent v's	Firm has line of credit {0,1} Probit (marginal effects)		Total line/(totalline + cash) OLS		Unused line/(unusedline + cash) OLS	
Sample	Full (1)	Random (2)	Random (3)	With line of credit (4)	Random (5)	With line of credit (6)
[EBITDA/(assets - cash)]*t*-1	0.392**	-0.089*	0.104**	0.288	0.243*	0.229*
	(0.019)	(0.121)	(0.107)	(0.510)	(0.491)	(0.531)
[Tangible assets/(assets - cash)]*t*-1	0.212	0.612	0.775	0.195	0.174	0.201
	(0.052)	(0.193)	(0.203)	(0.083)	(0.079)	(0.091)
[Ln(assets - cash)]*t*-1	0.395**	0.069**	0.058**	0.008**	0.007**	0.007**
	(0.038)	(0.032)	(0.029)	(0.002)	(0.002)	(0.003)
[Net worth, cash adjusted]*t*-1	-0.003**	0.020	0.032	0.493**	0.521	0.489
	(0.003)	(0.259)	(0.199)	(0.249)	(0.288)	(0.233)
[Market-to-book, cash adjusted]*t*-1	-.010**	-0.051**	-0.034**	-0.071**	-0.066**	-0.078**
	(0.000)	(0.013)	(0.009)	(0.014)	(0.009)	(0.006)
[Industry sales volatility]*t*-1	-2.381**	-3.971**	-2.099**	-1.923	-2.022**	-1.959
	(0.451)	(0.756)	(0.598)	(0.451)	(0.441)	(0.500)
[Cash-flow volatility] *t*-1	-.321	-0.473	-0.232**	-0.036*	-0.041*	-0.035
	(0.032)	(0.144)	(0.156)	(0.411)	(0.398)	(0.401)
[Not in an S&P index {0, 1}]	0.051*	0.106	0.089	0.089	0.071	0.077
	(0.061)	(0.099)	(0.107)	(0.059)	(0.048)	(0.044)
[Traded over the counter{0, 1}]	-0.021	-0.039	-0.089	0.121**	0.154	0.129
	(0.031)	(0.145)	(0.023)	(0.057)	(0.042)	(0.59)
Ln[Firm age (years since IPO)]*t*-1	-0.092	-0.105	-0.054	-0.291*	-0.221	-0.238
	(0.001)	(0.048)	(0.046)	(0.004)	(0.000)	(0.001)
Number of observations	21504	1837	300	1837	300	1396
Number of firms	3317	300	300	242	300	242
$R2$	0.15	0.29	0.34	0.28	0.33	0.25

Table III presents coefficient estimates from regressions relating the use of a line of credit to various lagged firm characteristics. Columns 1 and 2 report the estimated marginal effects (or effect of going from 0 to 1 for indicator variables) of lagged firm characteristics on the probability of having a line of credit from maximum likelihood probability estimation using the full and random sample, respectively. Columns 3 through 6 report the coefficient estimates from an OLS estimation using the random sample; the estimation relates two different measures of the bank liquidity to total liquidity ratio to lagged firm characteristics. The estimation reported in columns 4 and 6 isolates the intensive margin of the bank liquidity to total liquidity ratio by focusing only on firms that have a line of credit. Regressions include year and 1-digit industry indicator variables; standard errors are clustered at the firm level. **,* statistically distinct from 0 at the 1 and 5% level, respectively.

Use of line of credit versus cash holdings across cash-flow distribution, then we can generate Figure 1, which is based on table 3

Figure I

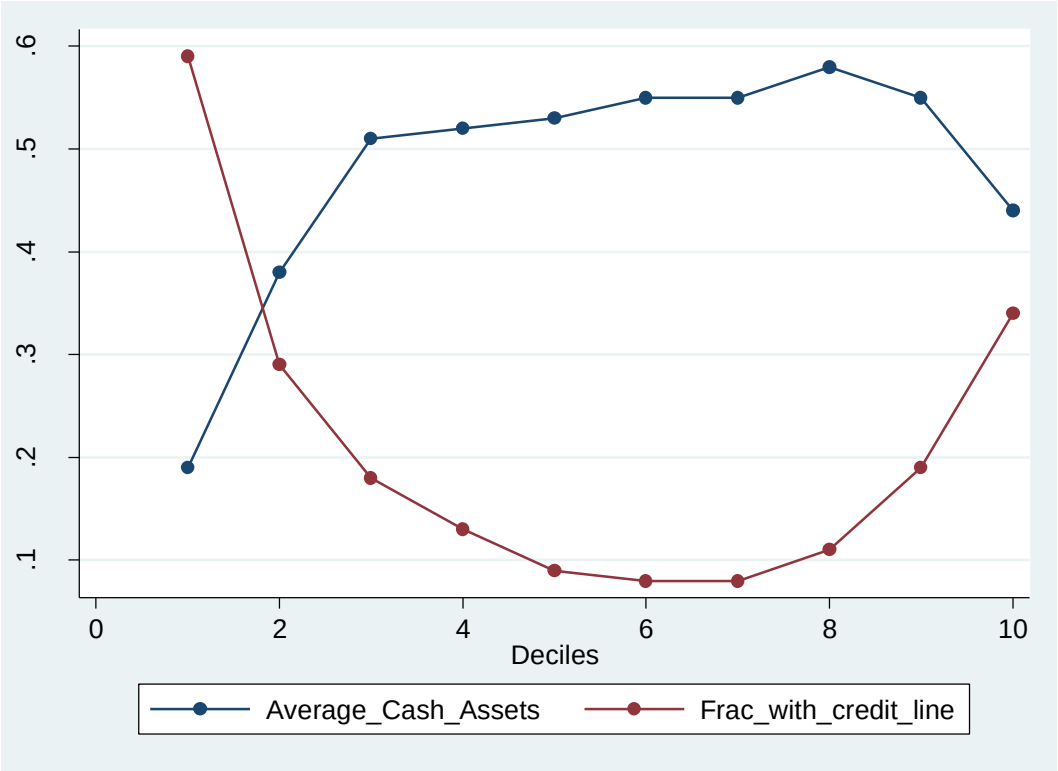

Figure 1 shows that they use cash instead. It maps both the fraction of firms that have a line of credit and the mean cash scaled by total assets across the cash-flow distribution. There is strong evidence of a negative correlation of line of credit use and cash holdings across the cash-flow distribution, especially at the low end. The figure maps the mean cash to total assets ratio and the fraction of firms that have a line of credit by lagged cash-flow decile. Going from left to right is going from firms in the lowest cash-flow decile to firms in the highest cash-flow decile. There is an opposite trend at the very high end of the cash-flow distribution in the 9th and 10th decile, where firms on average become less likely to use a line of credit and more likely to hold cash balances. This trend is driven by firms like Microsoft. They are much more likely to be in services industries, much less likely to use debt financing, and have much higher market-to-book ratios than firms in the high cash-flow deciles that use lines of credit. The opposite pattern at the high end of the cash-flow distribution is captured by the market-to-book and industry controls in the regression results, which is why they do not influence the positive effect of cash flow on line of credit utilization.

Figure 1 suggests that there is an explicit trade-off across the cash-flow distribution in firms' utilization of bank lines of credit versus cash in corporate liquidity management.

Part II

Roberts and Sufi, 2009, Control Rights and Capital Structure, JF 64, p. 1657
Note: The authors state that they use 11 covenant control variables in one place and 12 in others, but please assume that they use 11 such variables (based on footnote 10).
The second part of this assignment is to replicate Table II and Table III (as well as other tables that you think are very important).

II.1. Introduction

The primary contribution of this paper to the capital structure literature is to show that incentive conflicts in conjunction with the transfer of control rights have a first-order effect on financial policy, to quantify the relative magnitude of the effect of incongruent incentives on financial policy, and to show a precise mechanism (covenant violations and the resulting transfer of control rights) through which incentive conflicts impact financial policy.

Generally, this paper answers two important question: 1. To what extent do incentive conflicts and creditor rights impact corporate financial policies? 2. How do incentive conflicts and creditor rights impact corporate financial policies? The authors examined the response of corporate financial policies to covenant violations given their special characteristics: 1. Mitigating incentive conflict. 2. A channel to impact financial policy with misalignment. 3. The unbalanced occurrence of violations and bankruptcy. 4. Discreteness.

II.2. Data and Methodology

The analysis is conducted on a novel data set the includes the universe of financial covenant violations reported on firms' annual and quarterly securities and exchange commission (SEC) filings. Below are the key features of the data:

1. From 1996 to 2005 (half decade long) by calendar year.
2. More than one-quarter violate a financial covenant at some point during our sample horizon (high incidence).
3. Condition on the presence of both period *t* and *t*-1 data for all of the variables considered in our analysis (continuity).
4. Winsorize all variables at the 5^{th} and 95th percentiles (outliers). Also consider Winsorize at the 1st and 99th percentiles.
5. Firms of ≥ 4 consecutive quarters (within-firm variation)
6. Non-financial, domestic, USA dollar only, both active and inactive currently.

The variables are defined in detailed as follows:

Total Sales = SALEQ (item 2)
Total Assets = LSEQ (item 44)
Book Debt = DLTTQ (item 51) + DLCQ (item 45)
Net Equity Issuance = (SSTKY (item 84) – PRSTKCY (item 93))/lagged LSEQ (item 44)
Net Debt Issuance = (book debt – lagged book debt)/lagged LSEQ (item 44)
Market Value of Equity = PRCCQ(item 14) ∗ CSHOQ (item 61)
Book Value of Equity = LSEQ(item 44) – (LTQ (item 54) + annual IBADJQ (item 10)) + TXDITCQ (item52)

Tangible Assets = PPEGTQ (item 42)
Net Worth = LSEQ (item 44) – LTQ (item 54)
Cash = CHEQ(item 36)
Net Working Capital = ACTQ (item 40) – LCTQ(item 49)
EBITDA = OIBDPQ(item 21)
Cash Flow = IBQ (item 8) + DPQ(item 5)
Net Income = NIQ (item 69)
Interest Expense = XINTQ (item 22)

Here are some other notes for cleaning and merging the data

1. collect the covenant violation data for the 10-Ks and 10-Qs separately.
2. the incidence of repeat covenant violations is quite high in the data
3. not collect violations of non-financial covenants, such as limits on capital expenditures or acquisitions
4. picking 5 to 10 violations and examining the 10-K or 10-Q filing that corresponds to the violation

II.3. Reproduction results and conclusions

After cleaning and merging the data with t he resulting file, *CSTATSEC_NSS_20091005.dta*, can be matched to Compustat using the
two variables *gvkey* and *datacqtr*. Using a perl script, we then download all of the 10-K/10-Q filings for observations in *CSTATSEC_NSS_20091005.dta*. I had the reproduction of 138, 886 observations of 10,532 firms

Table II Reproduced

	Mean	Median	SD
Capital structure variables			
Net debt issuance (basis points	41.19801	3.219059	333.51799
Net equity issuance (basis points)	37.53686	.9210203	109.08473
Book debt*t*/assets*t*	.091835	.3212097	.7979484
Covenant control variables			
Net worth*t*/assets*t*	.137693	.3210415	.9597323
Net working capital*t*/assets*t*	.051629	.1920970	.0756443
Cash*t*/assets*t*	.1912123	.0892128	.2418181
EBITDA*t*/assets*t*-1	1.10541	.4232103	2.739797
Cash flow*t*/assets*t*-1	-.2440027	.0890187	1.7.6141
Net income*t*/assets*t*-1	-.3337382	.0108645	1..486848
Interest expense*t*/assets*t*-1	.2258772	0.098216	1.367139
Other control variables			
Market-to-book ratio*t*	5.62e+6	7.89 e+6	2.16e+8
Tangible assets*t*/assets*t*	.6187712	0.202811	.4836999
Ln(assets*t*)	4.304768	4.872103	2.645922

And then I estimated the firm fixed effects regressions and first difference regressions of net debt issuance on covenant violation indicators and control variables. The specifications reported in columns (2)–(4) of Panel A include lagged natural logarithm of total assets, the lagged tangible assets to total assets ratio, the lagged market-to-book ratio, and a lagged "has S&P rating" indicator as control variables. In addition, the specification in column (2) of Panel A includes the 11 covenant control variables: the lagged book debt to assets ratio, the lagged net worth to assets ratio, the lagged cash to assets ratio, the lagged and current EBITDA to lagged assets ratio, the lagged and current cash flow to lagged assets ratio, the lagged and current net income to lagged assets ratio, and the lagged and current interest expense to lagged assets ratio. Column (3) of Panel A includes the covenant control variables in addition to four covenant control interaction variables: the lagged debt to assets ratio interacted with the lagged cash flow to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged EBITDA to lagged assets ratio, the lagged debt to assets ratio interacted with the lagged net worth to assets ratio, and the lagged EBITDA to lagged assets ratio interacted with the lagged interest expense to lagged assets ratio. Column (4) of Panel A includes all covenant control variables and covenant control interaction variables, these variables squared and to the third power, and five quantile indicator variables for each of the controls. Columns (1)–(4) of Panel B include the first differenced analogs to control variables in Panel A, with the exception of measures using debt, which are differences lagged two quarters instead of one-quarter to avoid spurious correlations. All specifications include calendar year-quarter indicator variables and fiscal quarter indicator variables. Standard errors are reported in parentheses and are clustered by firm.

Table III Reproduced

Panel A: Fixed Effects Dependent Variable: Net debt issuance*t*/assets*t*-1 (Basis Points)				
	(1)	(2)	(3)	(4)
Covenant violation*t*	5.2	1.2	4.5	4.9
	(4.1)	(6.8)	(10.6)	(9.5)
Covenant violation*t*-1	-91.2**	-70.5**	-63.4**	-42.9**
	(-10.2)	(8,8)	(8.7)	(8.1)
Covenant control None	None	Covenant	Covenant	Covenant Control,
Covenant Covenant		Control	Control,	control square, to be
control Control variables,			interaction	third power, quintile
variables			control	indicators
Number of firm-quarters	138, 886	138, 886	138, 886	138, 886
Number of firms	10,532	10,532	10,532	10,532
*R*2	0.038	0.132	0.169	0.092

Panel B: First Differences Dependent Variable: Net debt issuance*t*/assets*t*-1 (Basis Points)				
	(1)	(2)	(3)	(4)
Covenant violation*t*	7.0	-1.8	-1.1	0.98
	(8.9)	(7.5)	(7.4)	(7.2)
Covenant violation*t*-1	-60.1**	-79.3**	-69.4**	-30.9**
	(13.2)	(11,8)	(11.6)	(10.8)
Covenant control None	None	Covenant	Covenant	Covenant Control,
Covenant Covenant		Control	Control,	control square, to be
control Control variables,			interaction	third power, quintile
variables			control	indicators
Number of firm-quarters	119, 215	119, 215	119, 215	119, 215
Number of firms	8,739	8,739	8,739	8,739
*R*2	0.000	0.092	0.009	0.087

Column (1) in Panel A of Table III presents the estimation results from the baseline firm fixed effects specification with only fiscal quarter and calendar year-quarter indicator variables as controls The specification reported in column (2) adds the noninteraction covenant control variables. The specification reported in column (3) includes the four interaction terms, which have little impact on the adjusted-R2 or estimated covenant violation coefficient. Finally, column (4) presents the results for a kitchen sink specification including the following controls.

In Panel B, as the author did, I present estimates from the first difference analog to the fixed effects specification in equation (1). More precisely, the specifications reported in Panel B examine the change in net debt issuance for a given firm as a function of covenant violations, after controlling for changes in covenant control variables.

This study shows that incentive conflicts play an important role in shaping corporate financial policy, and financial covenant violations lead to large and persistent declines in net debt issuing activity by providing creditors with limited rights to influence financial policy via changes to the terms of the credit agreement. Covenant violations play a key role in determining the flow of credit to firms because of their ability to allocate control rights to creditors in a state-contingent manner.

III. References

1. Sufi, 2009, Bank Lines of Credit, RFS 22, p. 1057v Note
2. Roberts and Sufi, 2009, Control Rights and Capital Structure, JF 64, p. 1657

IV. Appendix - Stata Code

I.

```
. cd C:/Users/CQ/Desktop
. use "C:\Users\CQ\Desktop\SUFI_RFS_LINESOFCREDIT20070221DATA.dta",
clear
(LOC DATA FROM SUFI
, RFS, BANK LINES OF CREDIT IN CORPORATE FINANCE)

. summarize

    Variable |        Obs        Mean    Std. Dev.       Min
Max
-------------+--------------------------------------------------------
-
       gvkey |     28,447       30488    32506.99       1004
141469
       yeara |     28,447    1999.577    2.222229       1996
2003
randomsample |     28,447    .0670721    .2501512          0
1
      lineun |      1,908     144.037    536.7798          0
10400
        line |      1,908    51.34572    261.3921          0
4755
-------------+--------------------------------------------------------
-
     linetot |      1,908    195.3827     679.501          0
14671
lineofcred~s |      1,908    .7484277    .4340304          0
1
lineofcredit |     28,447    .8169227    .3867367          0
1
         def |      1,908    .0796646    .2708442          0
1
. describe

Contains data from
C:\Users\CQ\Desktop\SUFI_RFS_LINESOFCREDIT20070221DATA.dta
  obs:        28,447                          LOC DATA FROM SUFI, RFS,
BANK
                                                LINES OF CREDIT IN
CORPORATE
                                                FINANCE
```

```
 vars:             9                          27 Feb 2007 16:51
 size:       938,751
-------------------------------------------------------------------------------
              storage   display    value
variable name   type    format     label      variable label
-------------------------------------------------------------------------------
gvkey           long    %12.0g                Compustat firm
identifier
yeara           float   %8.0g                 Fiscal year
randomsample    float   %9.0g                 Random sample
lineun          float   %9.0g                 Unused line
line            float   %9.0g                 Used line
linetot         float   %9.0g                 Total line
lineofcredit_rs float   %9.0g                 Has line of credit,
random sample
lineofcredit    byte    %8.0g                 Has line of credit, full
sample
def             float   %9.0g                 Financial covenant
violation
-------------------------------------------------------------------------------
Sorted by: gvkey  yeara
. tab yeara;

Fiscal year |      Freq.     Percent        Cum.
------------+-----------------------------------
       1996 |      2,957       10.39       10.39
       1997 |      3,409       11.98       22.38
       1998 |      3,671       12.90       35.28
       1999 |      3,856       13.56       48.84
       2000 |      3,781       13.29       62.13
       2001 |      3,744       13.16       75.29
       2002 |      3,597       12.64       87.94
       2003 |      3,432       12.06      100.00
------------+-----------------------------------
      Total |     28,447      100.00

. *CREATING DATA SET FOR PUBLIC USE;
. preserve;

. keep gvkey yeara randomsample lineofcredit lineofcredit_rs line
lineun linetot def;

. sort gvkey yeara;

. label data "LOC DATA FROM SUFI, RFS, BANK LINES OF CREDIT IN
CORPORATE FINANCE";

. desc;

Contains data from SUFI_RFS_LINESOFCREDIT20070221FULLDATA.dta
  obs:        28,447                          LOC DATA FROM SUFI, RFS,
BANK
                                                LINES OF CREDIT IN
CORPORATE
```

```
                                                      FINANCE
 vars:             9                                27 Feb 2007 16:50
 size:     1,052,539 (99.8% of memory free)
-------------------------------------------------------------------------------
              storage  display     value
variable name   type   format      label      variable label
-------------------------------------------------------------------------------
gvkey           long   %12.0g                 Compustat firm
identifier
yeara           float  %8.0g                  Fiscal year
randomsample    float  %9.0g                  Random sample
lineun          float  %9.0g                  Unused line
line            float  %9.0g                  Used line
linetot         float  %9.0g                  Total line
lineofcredit_rs float  %9.0g                  Has line of credit,
random
                                                sample
lineofcredit    byte   %8.0g                  Has line of credit, full
sample
def             float  %9.0g                  Financial covenant
violation
-------------------------------------------------------------------------------
Sorted by:  gvkey  yeara
     Note:  dataset has changed since last saved

. sum;

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       gvkey |     28447       30488    32506.99       1004     141469
       yeara |     28447    1999.577    2.222229       1996       2003
randomsample |     28447    .0670721    .2501512          0          1
      lineun |      1908     144.037    536.7798          0      10400
        line |      1908    51.34572    261.3921          0       4755
-------------+--------------------------------------------------------
     linetot |      1908    195.3827     679.501          0      14671
lineofcred~s |      1908    .7484277    .4340304          0          1
lineofcredit |     28447    .8169227    .3867367          0          1
         def |      1908    .0796646    .2708442          0          1

. save SUFI_RFS_LINESOFCREDIT20070221DATA.dta, replace;
file SUFI_RFS_LINESOFCREDIT20070221DATA.dta saved

. restore;

. *TABLE 1: SUMMARY STATISTICS;
. tabstat
> lineofcredit
> bd
> cflcl1
> tanglcl1
> nwlcl1
> asslcl1
> mblcl1
```

```
>
> q_salesvar
> cfvar
>
> spind
> exch
> firmage
> , s(mean p50 sd n) col(stat) f(%7.3f) ;

… …
```

Following the code by professor Amir Sufi, I leave out the rest of the code

II.

```
. use "C:\Users\CQ\Desktop\6c0cd5eea327842a.dta"
. generate Book_debt=dlttq+dlcq
(83,086 missing values generated)
. gen lag_lseq=lseq[n-1]
n ambiguous abbreviation
r(111);
. gen lag_lseq=lseq[_n-1]
(60,485 missing values generated)
. gen Total_sale=saleq
(44,646 missing values generated)
. gen Total_assets=lseq
(60,485 missing values generated)
. gen Net_EI=(sstky-prstkcy)/lag_lseq
(146,919 missing values generated)
. gen Net_DI=(Book_debt-Book_debt[_n-1])/lag_lseq
(105,389 missing values generated)
. gen MV_E=prccq*cshoq
(80,132 missing values generated)
. gen BV_E=lseq-(ltq+ibadjq*4+txditcq)
(114,036 missing values generated)
. gen Tangible_assets=ppegtq
(188,078 missing values generated)
. gen Net_worth=lseq-ltq
(60,833 missing values generated)
. gen Cash=cheq
(61,741 missing values generated)
. gen Net_WC=actq-lctq
(127,667 missing values generated)
. gen EBITDA=oibdpq
(96,175 missing values generated)
. gen Cash_F=ibq+dpq
(100,720 missing values generated)
. gen Net_income=niq
(44,005 missing values generated)
. gen Interest_exp=xintq
(145,295 missing values generated)
. ssc install winsor
checking winsor consistency and verifying not already installed...
installing into c:\ado\plus\...
installation complete.
```

```
. winsor Book_debt, p9(0.05)
option generate() required
r(198);
. winsor Book_debt, gen (Book_debtw) p(0.05)
. winsor Book_debt, gen ( Total_salew) p(0.05)
. winsor Book_debt, gen ( Total_assetsw) p(0.05)
. winsor Book_debt, gen ( Net_EIw ) p(0.05)
. winsor Book_debt, gen ( Net_DIw ) p(0.05)
. winsor Book_debt, gen ( MV_Ew ) p(0.05)
. winsor Book_debt, gen ( BV_Ew) p(0.05)
. winsor Book_debt, gen ( Tangible_assetsw ) p(0.05)
. winsor Book_debt, gen ( Net_worthw ) p(0.05)
. winsor Book_debt, gen ( Cashw ) p(0.05)
. winsor Book_debt, gen ( Net_WCw ) p(0.05)
. winsor Book_debt, gen ( EBITDAw ) p(0.05)
. winsor Book_debt, gen ( Cash_Fw ) p(0.05)
. winsor Book_debt, gen ( Net_incomew ) p(0.05)
.winsor Book_debt, gen ( Interest_expw ) p(0.05)
. save "C:\Users\CQ\Desktop\Compustat1996to2005.dta", replace
file C:\Users\CQ\Desktop\Compustat1996to2005.dta saved
. drop if mi( Book_debtw )
(61,000 observations deleted)
. drop if mi( Total_salew )
(0 observations deleted)
. drop if mi( Total_assetsw )
(0 observations deleted)
. drop if mi( Net_EIw )
(0 observations deleted)
. drop if mi( Net_DIw )
(0 observations deleted)
. drop if mi( MV_Ew )
(0 observations deleted)
. drop if mi( BV_Ew )
(0 observations deleted)
. drop if mi( Tangible_assetsw )
(0 observations deleted)
. drop if mi( Net_worthw )
(0 observations deleted)
. drop if mi(n Cashw )
. sort gvkey
. quietly by gvkey:  gen dup = cond(_N==1,0,_n)
. tabulate dup

        dup |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |        160        0.04        0.04
          1 |     17,210        4.05        4.09
          2 |     17,210        4.05        8.14
          3 |     17,022        4.01       12.15
          4 |     16,751        3.94       16.09
          5 |     16,201        3.81       19.91
          6 |     15,953        3.76       23.67
          7 |     15,735        3.70       27.37
          8 |     15,384        3.62       30.99
          9 |     14,778        3.48       34.47
         10 |     14,438        3.40       37.87
```

```
          11 |      14,060        3.31       41.18
          12 |      13,559        3.19       44.38
          13 |      12,970        3.05       47.43
          14 |      12,638        2.98       50.40
          15 |      12,273        2.89       53.29
          16 |      11,797        2.78       56.07
          17 |      11,292        2.66       58.73
          18 |      10,985        2.59       61.32
          19 |      10,661        2.51       63.83
          20 |      10,224        2.41       66.24
          21 |       9,781        2.30       68.54
          22 |       9,515        2.24       70.78
          23 |       9,238        2.18       72.95
          24 |       8,932        2.10       75.06
          25 |       8,521        2.01       77.06
          26 |       8,309        1.96       79.02
          27 |       8,116        1.91       80.93
          28 |       7,836        1.85       82.78
          29 |       7,297        1.72       84.49
          30 |       7,130        1.68       86.17
          31 |       6,958        1.64       87.81
          32 |       6,742        1.59       89.40
          33 |       6,162        1.45       90.85
          34 |       6,036        1.42       92.27
          35 |       5,905        1.39       93.66
          36 |       5,758        1.36       95.02
          37 |       5,519        1.30       96.32
          38 |       5,398        1.27       97.59
          39 |       5,202        1.22       98.81
          40 |       4,903        1.15       99.97
          41 |         118        0.03       99.99
          42 |          18        0.00      100.00
          43 |           4        0.00      100.00
-------------+-----------------------------------
       Total |     424,699      100.00
. drop if dup<4
(51,602 observations deleted)
. drop cshoq_dc dicq_dc dittq_dc dpq_dc ibadjq_dc ibq_dc lseq_dc
ltq_dc niq_dc p
pegtq_dc saleq_dc txditcq_dc xintq_dc dltisy_dc prstkcy_dc sstky_dc
cshoq_fn d
> lcq_fn1
. summarize
. distinct gvkey
. egen x=group(gvkey)

. sum x

    Variable |        Obs        Mean    Std. Dev.       Min
Max
-------------+---------------------------------------------------------
-
           x |    138,886     4343.87    2823.098          1
10532

.gen time = date(datadate,"MDY")
.format time%td
```

```
.drop datadate
(0 observations deleted)
.rename time datadate
.gen cyear = year(datadate)
(802 observations missing)
.merge 1:1 gvkey datadate using firm_q_adj
.drop if _merge != 3 //???
(1,612 observations deleted)
.drop _merge
(3,602 observations deleted)
.destring gvkey, replace
.xtset gvkey datadate
.xtreg debtissue i.fqtr i.datacqtr vio vio[_n-1] Book_debt[_n-1]
Net_worth[_n-1]
.Cash[_n-1]  EBITDA EBITDA[_n-1] Cash_flow Cash_flow[_n-1] Net_income
Net_income[_n-1]  Interest_exp Interest_exp[_n-1], cluster(gvkey)
robust
.gen c1 = Book_debt[_n-1] * Cash_flow[_n-1]
.gen c2 = Book_debt[_n-1] * EBITDA[_n-1]
.gen c3 = Book_debt[_n-1] * Net_worth[_n-1]
.gen c4 = EBITDA[_n-1] * Interest_exp[_n-1]
.regress debtissue i.fqtr i.datacqtr vio vio[_n-1]  Book_debt[_n-1]
Net_worth[_n-1]
.Cash[_n-1]  EBITDA EBITDA[_n-1] Cash_flow Cash_flow[_n-1] Net_income
Net_income[_n-1]  Interest_exp Interest_exp[_n-1], c1, c2, c3, c4,
cluster(gvkey) robust
gen Deb = debtissue - debtissue[_n-1]
.regress Deb i.fqtr i.datacqtr viol vio[_n-1]  Book_debt[_n-1]
Net_worth[_n-1]  Cash[_n-1]  EBITDA EBITDA[_n-1] Cash_flow
Cash_flow[_n-1] Net_income Net_income[_n-1]  Interest_exp
Interest_exp[_n-1], c1, c2, c3, c4, cluster(gvkey) robust
```