# Leverage and the Macroeconomy: Implications of Low Interest Rates for Corporate Debt

Effi Benmelech (Kellogg and NBER)

# How worried should we be about the level of corporate debt?

U.S. Nonfinancial Corporate Business Debt ($ Billions)
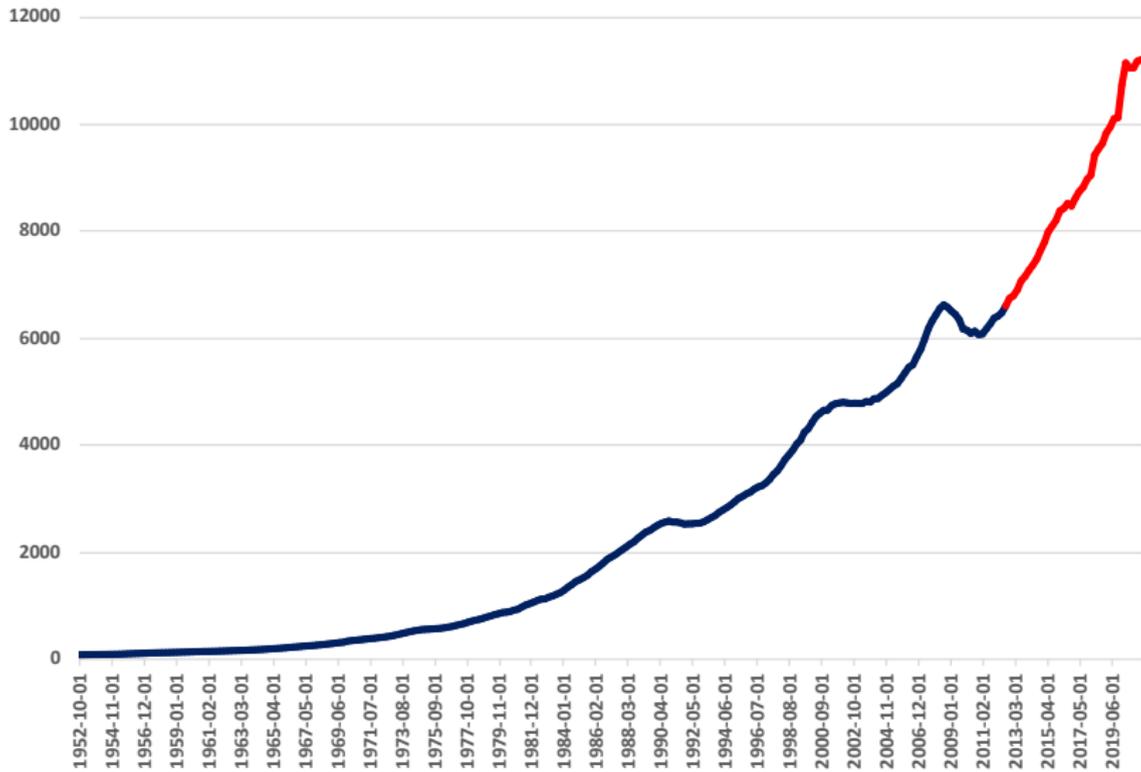
- Should we be concerned about the potential effects of high debt burden on financial stability and the real economy?

- What role does a greater reliance on credit by nonfinancial firms play in output and employment fluctuations?

- Are the adverse effects of high leverage potentially less damaging in a low interest rates environment?

- Elevated debt levels always pose **some risks** for financial stability and the real economy. However, this debt cycle is somewhat **different**:

1. Largest borrowers are large firm, with stable cash flows and high cash holdings.

2. Smaller firms borrow and hoard cash at the same time – resulting in historically low net leverage.

3. Firms save about 30% of their debt issuance.

4. Low interest rates reduced interest expenses for firms despite the fact that borrowing increased.

# Cash Holdings and 10-Year Treasury Rates, 1970-2018
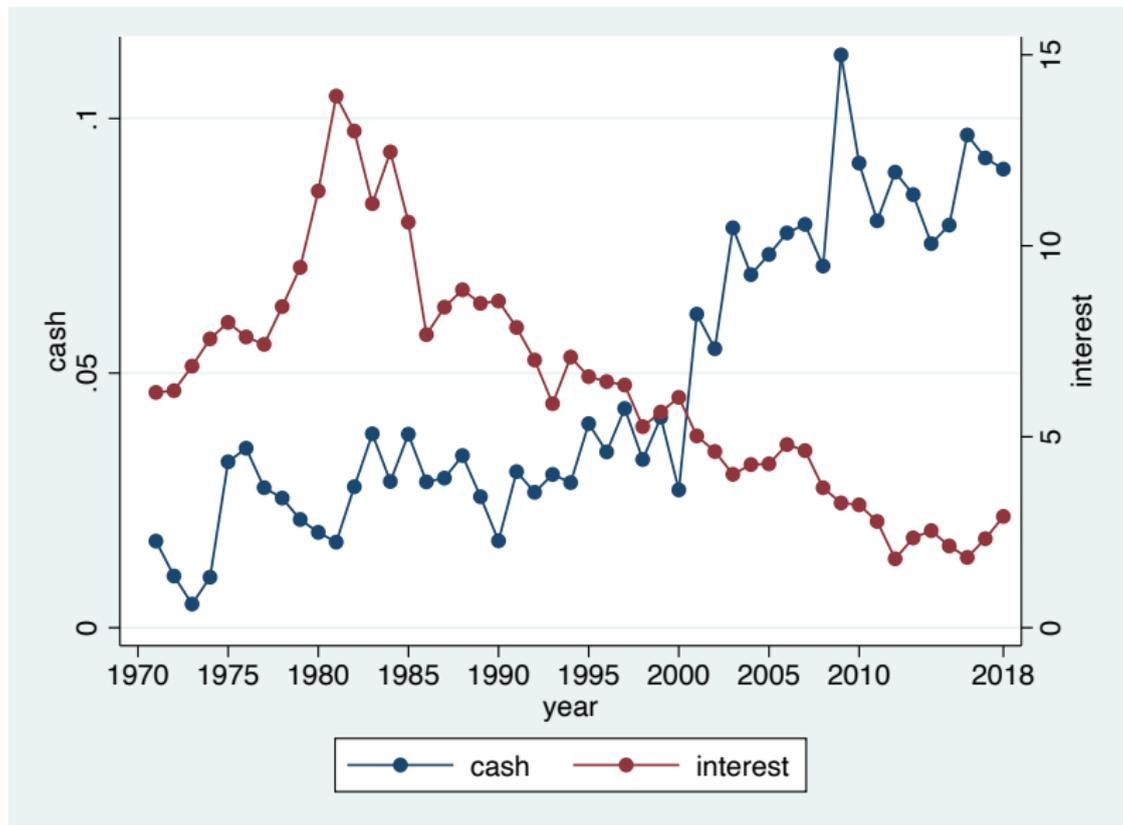
Median Cash Holdings: First Size Quartile, 1975-2020
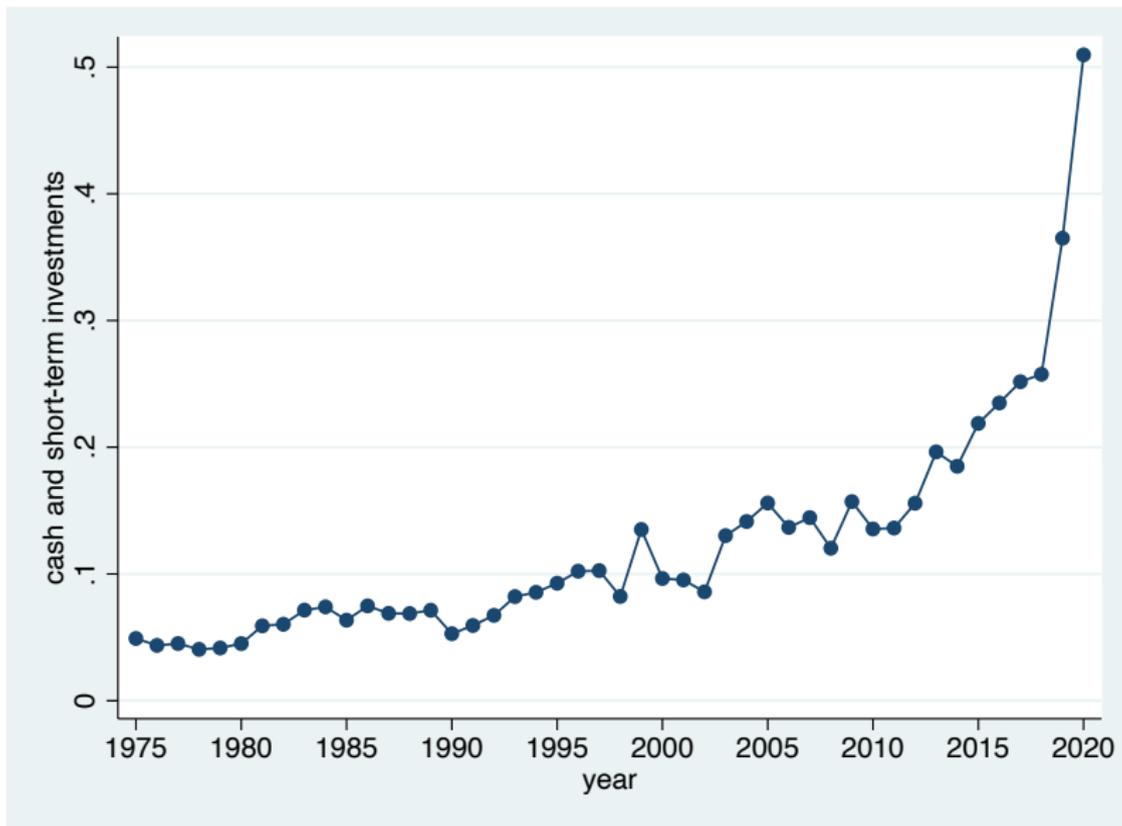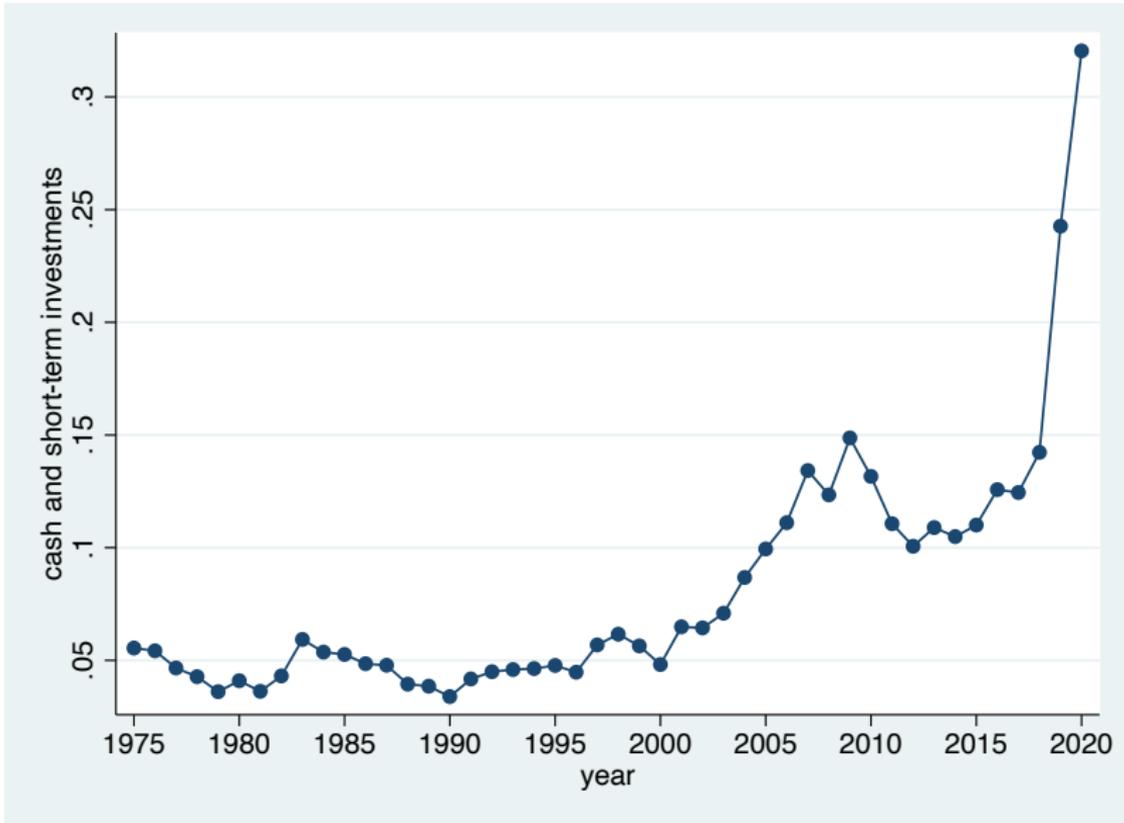
Median Cash Holdings: Third Size Quartile, 1975-2020
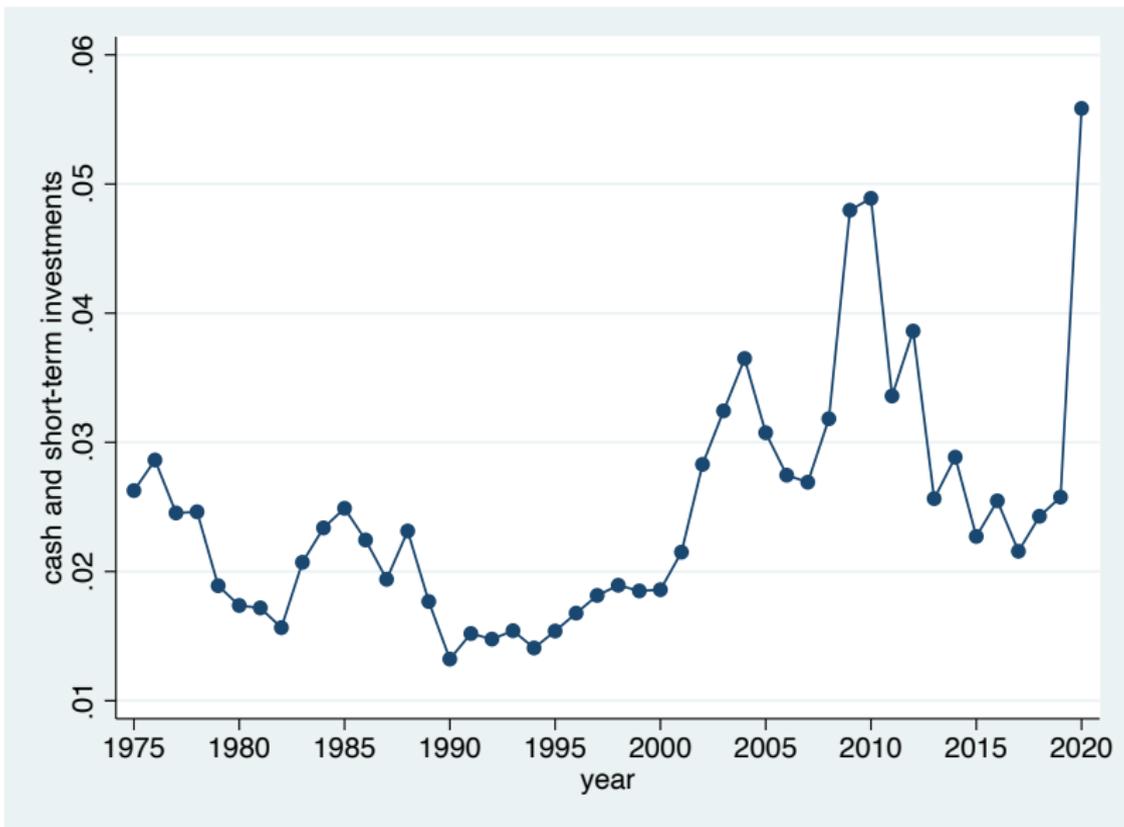
Cash Holdings

- Cash holdings by smaller Compustat firms increased from about 5% in the 1970s to over 20% in 2015 and remained elevated since then.

- Similar pattern is observed for firms in the 2nd size quartile.

- Larger firms also increased their cash holdings over the same time-period.

- Results are not driven by the Covid-19 pandemic in which cash holdings increased even further.
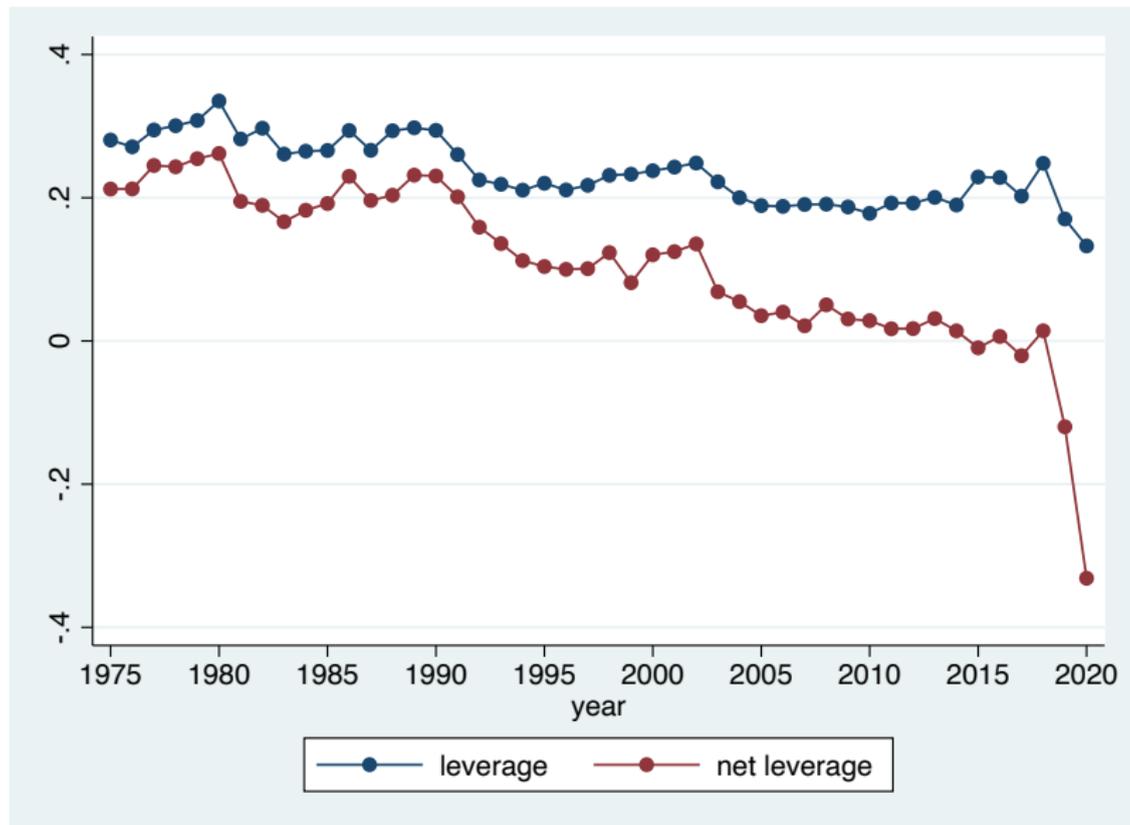
Median Leverage and Net Leverage: Second Size Quartile, 1975-2020
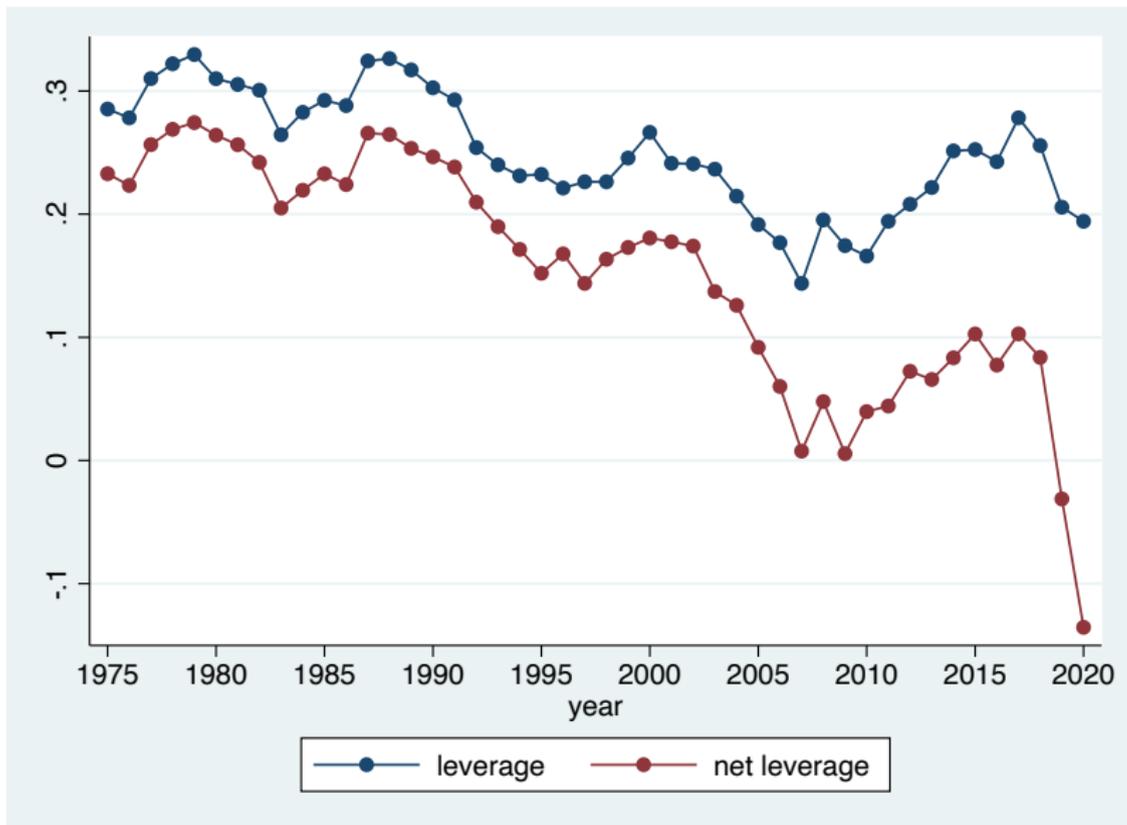
Median Leverage and Net Leverage: Third Size Quartile, 1975-2020
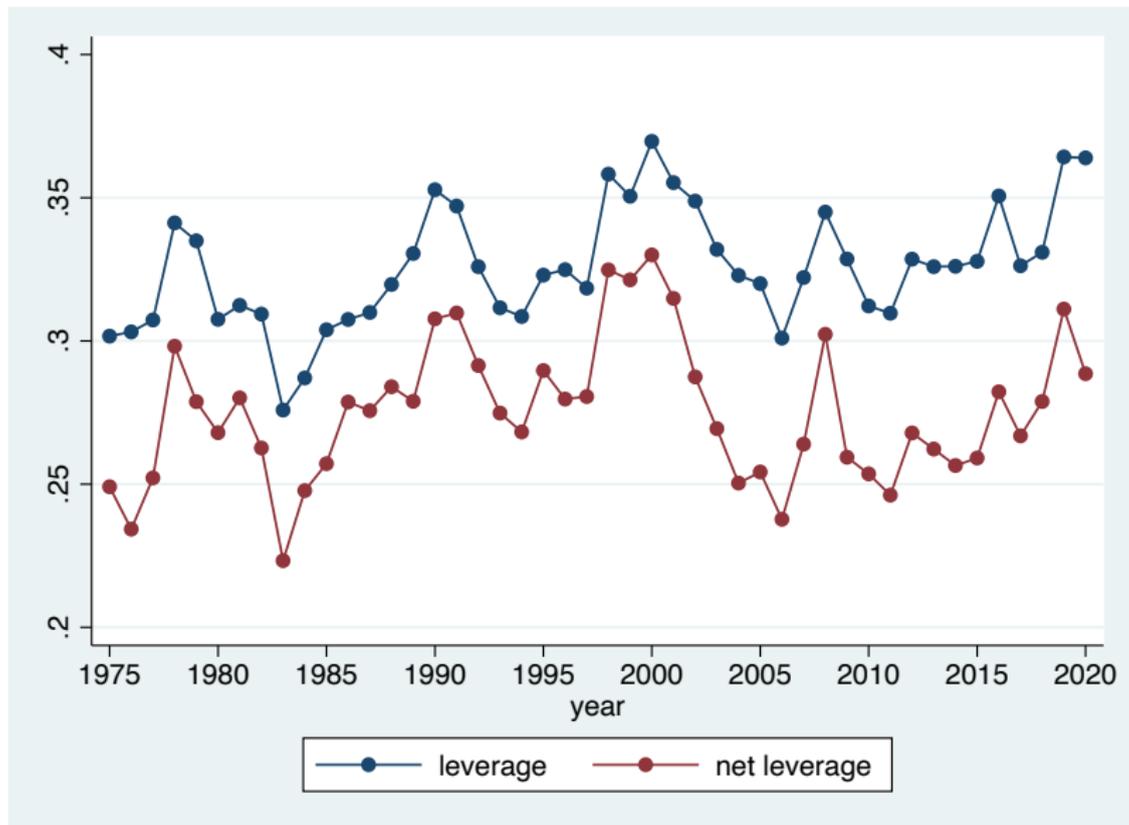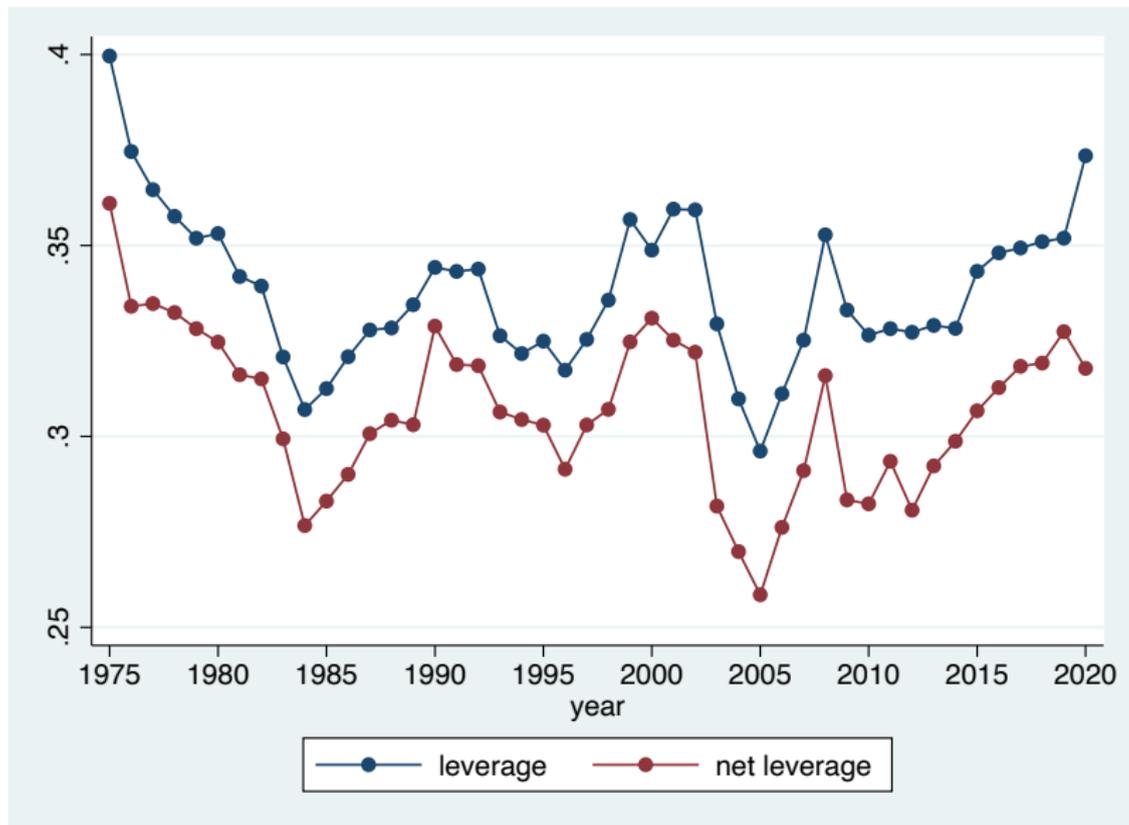
Median Leverage and Net Leverage
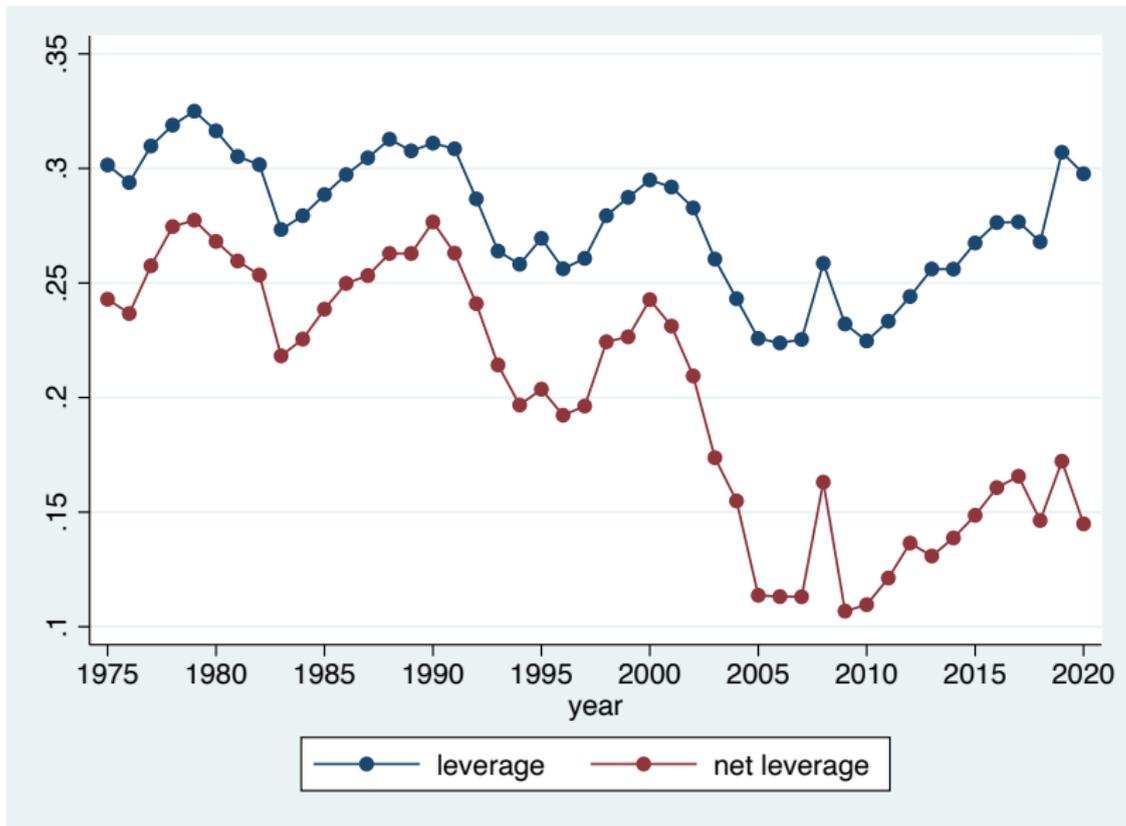
Cash, Leverage and Net Leverage

Table II: Leverage, Net Leverage, and Cash over Time

|	(1)	(2)	(3)	(4)	(5)
Year	Leverage (including leases)	Leverage (excluding leases)	Net Leverage (including leases)	Net Leverage (excluding leases)	Cash & ST Investments
1970	0.289	0.313	0.219	0.211	0.073
1975	0.307	0.295	0.237	0.225	0.071
1980	0.314	0.289	0.248	0.223	0.066
1985	0.310	0.290	0.213	0.195	0.095
1990	0.330	0.321	0.245	0.238	0.082
1995	0.295	0.285	0.177	0.169	0.116
2000	0.334	0.328	0.201	0.198	0.130
2005	0.299	0.295	0.140	0.142	0.154
2010	0.302	0.298	0.146	0.146	0.153
2015	0.349	0.343	0.180	0.181	0.163
2018	0.362	0.355	0.180	0.180	0.176
2019	0.353	0.340	0.123	0.115	0.225
2020	0.329	0.317	0.045	0.039	0.278

Net Leverage and Interest Rates

- Larger firms increase leverage during periods of low rates - probably due to access to the bond market (Benmelech and Becker (2021)).

- Smaller firms increase cash holdings during periods with low rates.

- Larger firms also increased their cash holdings over the same time-period.

- As a result firms in the first two size quartiles have lower net leverage when rates are low.

Determinants of Net Debt

Dependent Variable	Net Leverage	Leverage	Cash	Leverage	Cash	Net Leverage
Log(assets)$_{t-1}$	0.035**	-0.0005	-0.004 ***			
	(0.0015)	(0.001)	(0.001)			
Q$_{t-1}$	-0.026 ***	0.0004	0.027 ***	-0.001	0.028 ***	-0.029 ***
	(0.004)	(0.003)	(0.002)	(0.003)	(0.002)	(0.004)
Profitability$_{t-1}$	-0.130 ***	-0.187 ***.	-0.057 ***	-0.210 ***	-0.054 ***	-0.156 ***
	(0.013)	(0.010)	(0.008)	(0.011)	(0.007)	(0.013)
Tangibility$_{t-1}$	0.349 ***	0.163 ***	-0.186 ***	0.160 ***	-0.185 ***	0.344 ***
	(0.018)	(0.014)	(0.009)	(0.014)	(0.008)	(0.018)
Assets Quartile 1$_{t-1}$				-0.083 ***	0.074 ***	-0.157 ***
				(0.013)	(0.008)	(0.017)
× 10Y Treasury$_t$				1.003 ***	-0.696***	1.699 ***
				(0.171)	(0.104)	(0.222)
Assets Quartile 2$_{t-1}$				-0.072 ***	0.088 ***	-0.159 ***
				(0.011)	(0.007)	(0.014)
× 10Y Treasury$_t$				0.807 ***	-0.707 ***	1.514 ***
				(0.144)	(0.085)	(0.180)
Assets Quartile 3$_{t-1}$				0.016	0.032 ***	-0.015
				(0.010)	(0.006)	(0.013)
× 10Y Treasury$_t$				-0.094	-0.221 ***	0.126
				(0.134)	(0.071)	(0.165)
Adjusted R^2	0.281	0.172	0.472	0.180	0.461	0.283
Observations	63,108	63,109	63,108	61,892	61,891	61,891
Fixed Effects						

- To assess the impact of high leverage on the real economy we need to gain better understanding of what firms do with the debt they raise.

- Are the funds used to finance investment, pay for operating costs or being hoarded as cash?

- The difficulty is that firms do not report how they allocate the capital they raise to different uses.

A New Methodology

- Estimate the following flow regressions:

- $\Delta y_{m,i,t} = \alpha + \beta_m * debt\ issuance_{i,t} + Z_{i,t}\Lambda + v_t + w_i + \varepsilon_{i,t}$

- Where $\Delta y_{m,i,t}$ is either: debt repayment, acquisition, investment, $\Delta cash_{i,t}$, SG&A, share repurchase, dividends.

- Not imposing any structure on the set of regressions (not using SUR model)

- If using all potential outcome variables: $\sum\limits_{m=1}^{M} \beta_m = 1$

Financial and Operational Uses of Net Debt Issuance
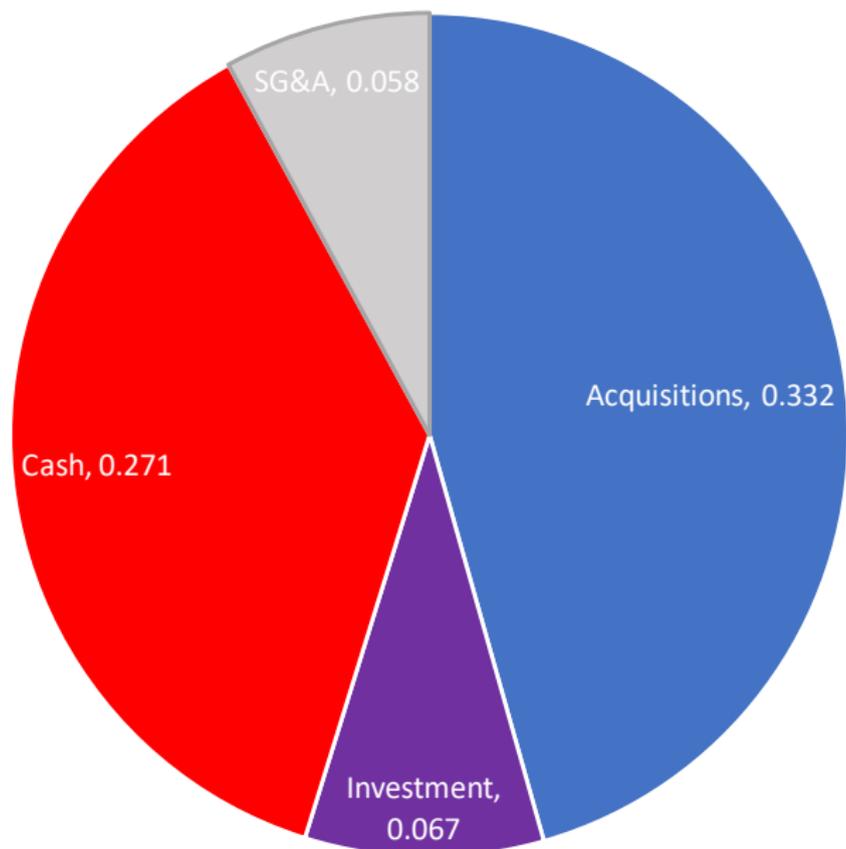
What Do Firms Do with Debt?

- Dramatic changes in the uses of debt:

- in the 1970s and 1980s much more of the debt was used for financing investment.

- In recent years, firms choose to raise debt and instead of investing it in property, plant and equipment, they hoard the cash and increase corporate savings.

- Results are consistent with the facts documented earlier about the increased tendency to hold cash and with the literature on the decline in investment (Eberly and Crouzet (2019)).

Mean Bond Yields at Issuance by Credit Rating
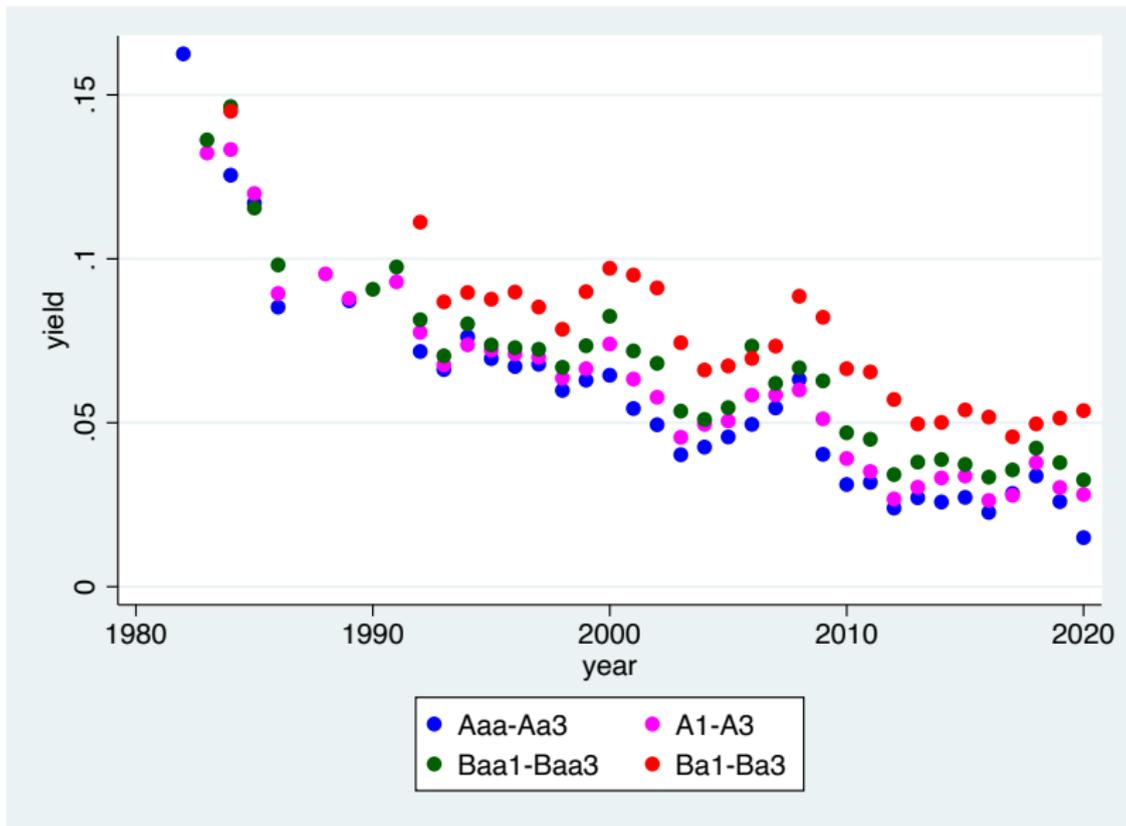
Median Leverage and Interest Expenses to Debt
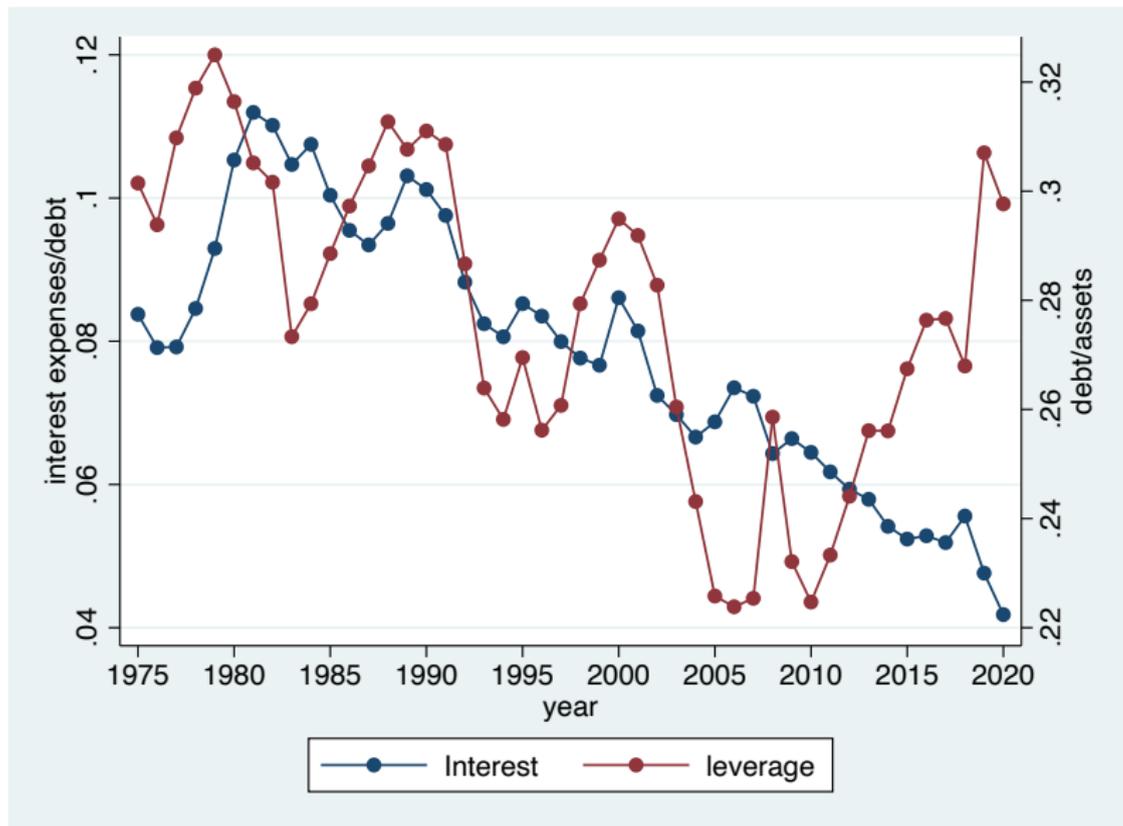
Median Leverage and Interest Expenses to Assets
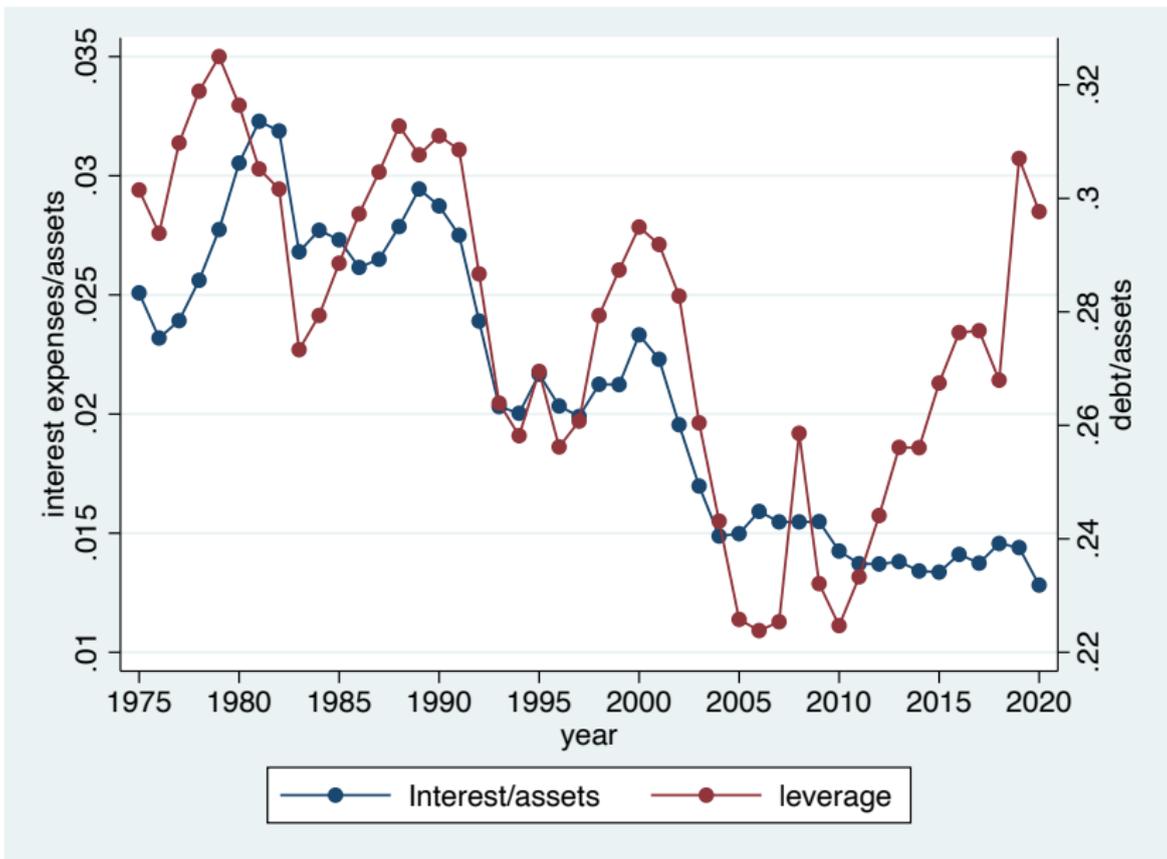
Table IV: Interest/Debt Over Time

Year	All Firms		Investment Grade		Non-Investment Grade		difference in means	Two-sample t-test
	Mean	Median	Mean	Median	Mean	Median		
1970	7.283%	6.54%	-	-	-	-	-	-
1975	9.774%	8.378%	-	-	-	-	-	-
1980	12.704%	10.634%	-	-	-	-	-	-
1985	11.917%	10.119%	-	-	-	-	-	-
1990	12.414%	10.267%	9.868%	8.994%	12.585%	10.971%	2.718%	3.228
1995	11.596%	8.614%	7.510%	7.678%	10.826%	9.861%	3.147%	5.530
2000	11.698%	8.609%	8.431%	7.073%	10.690%	9.764%	2.259%	2.850
2005	10.198%	6.868%	6.450%	5.956%	10.092%	8.097%	3.643%	4.631
2010	9.794%	6.424%	5.756%	5.675%	8.575%	7.926%	2.820%	7.395
2015	8.295%	5.167%	4.526%	4.532%	6.220%	5.917%	1.694%	9.362
2020	7.244%	4.259%	3.832%	3.569%	6.031%	4.963%	2.220%	3.694

Table V: Interest Expenses to Assets over Time

Year	Median	Mean	0<Lev≤0.2 Median	0.2<Lev≤0.3 Median	0.3<Lev Median	Non Investment Grade Median	Investment Grade Median
1970	0.018	0.020	0.009	0.017	0.028	-	-
1975	0.024	0.025	0.009	0.019	0.032	-	-
1980	0.030	0.034	0.012	0.026	0.040	-	-
1985	0.028	0.031	0.012	0.024	0.039	-	-
1990	0.029	0.034	0.011	0.025	0.041	0.044	0.027
1995	0.022	0.027	0.009	0.020	0.034	0.044	0.023
2000	0.024	0.034	0.008	0.020	0.037	0.043	0.023
2005	0.016	0.028	0.007	0.015	0.029	0.028	0.015
2010	0.016	0.027	0.005	0.014	0.027	0.030	0.016
2015	0.015	0.032	0.005	0.012	0.024	0.025	0.014
2020	0.013	0.022	0.002	0.010	0.021	0.022	0.012

- Interest expenses – relative to either total debt or total assets – declined significantly as treasury rates trended down.

  - Median interest expenses/assets were 0.030 in 1980, declining to 0.024 in 2000, 0.016 in 2010 and 0.013 in 2020.

- Next study whether such a decline affected firms' investment.

Table 9: Interest Expenses and Investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Investment	Investment	Investment	Investment	Investment	Investment	Investment	Investment
Interest Expenses$_t$	-0.032 ***	-0.055 ***						
	(0.003)	(0.011)						
Q$_{t-1}$	0.020 ***	0.007 **	0.019 ***	0.019 ***	0.019 ***	0.019 ***	0.019 ***	0.019 ***
	(0.001)	(0.003)	(0.022)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Cash$_{t-1}$	-0.021 ***	0.039 ***	-0.023	-0.023 ***	-0.022 ***	-0.023***	-0.023 ***	-0.023 ***
	(0.004)	(0.013)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
log(Assets)$_{t-1}$	0.0002	-0.001	0.0004	0.0004	0.0005	0.0004	0.0004	0.0005
	(0.0003)	(0.001)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Profitability$_{t-1}$	0.036 ***	0.179***	0.037 ***	0.037 ***	0.037 ***	0.037 ***	0.037 ***	0.037 ***
	(0.004)	(0.019)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Leverage$_{t-1}$	-0.030 ***	-0.023 ***	-0.026 ***	-0.026 ***	-0.026 ***	-0.026 ***	-0.026 ***	-0.026 ***
	(0.003)	(0.006	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LT debt due issued 2 year ago ×Spread			0.056 ***			0.063 ***		
			(0.022)			(0.021)		
×10Y Treasury			-4.866 ***			-6.035 ***		
			(1.843)			(1.900)		
×10Y Real Rate			-0.531 **			-0.889 ***		
			(0.242)			(0.313)		
LT debt due issued 3 year ago ×Spread				0.055 **			0.049 **	
				(0.022)			(0.020)	
×10Y Treasury				-3.372 *			-4.704 ***	
				(1.807)			(1.807)	
×10Y Real Rate				-1.078 ***			-1.311 ***	
				(0.283)			(0.352)	
LT debt due issued 4 year ago ×Spread					0.044 **			0.037 ***
					(0.021)			(0.018)
×10Y Treasury					-2.596			-3.470 ***
					(1.597)			(1.574)
×10Y Real Rate					-1.014 ***			-1.394 ***
					(0.293)			(0.354)
Adjusted R^2	0.310	0.370	0.304	0.305	0.305	0.305	0.305	0.305
Observations	34,780	10,263	35,698	35,698	35,698	35,698	35,698	35,698
Number of firms	4,933	1,291	5,097	5,097	5,097	5,097	5,097	5,097
Fixed Effects								
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating	No	Yes	No	No	No	No	No	No
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Summary

- Elevated debt levels are a reason for concern. However - this **debt cycle is different**

- Firms appear more levered but net leverage has declined - in particular, for smaller Compustat firms.

- Debt is used mostly to repay debt.

- The importance of debt in financing investment (with the exception of acquisitions) has declined over the years.

- The interest expenses channel is important and with lower interest rate financial constrained have been likely relaxed.