Corporate Finance Problem Set 2

March 8, 2025

Questions 1-3

Table 1: Dependent variable: **Investment**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Q_{i,t-1}$	0.003***	0.003***	0.004***	0.004***	0.001***	0.003***	0.018***	0.021***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash Flow$_{i,t}$		-0.012***		-0.002				
		(0.001)		(0.001)				
Cash Flow$_{i,t-1}$					-0.017***	-0.015***		
					(0.001)	(0.001)		
$Q^2_{i,t-1}$							-0.000***	-0.000***
							(0.000)	(0.000)
Constant	0.189***	0.191***	0.184***	0.184***	0.165***	0.161***	0.156***	0.145***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	166,219	164,540	164,368	162,684	148,190	146,332	166,219	164,368
R-squared	0.012	0.013	0.273	0.274	0.012	0.264	0.036	0.289
Firm FE	No	No	Yes	Yes	No	Yes	No	Yes

*** p<0.01, ** p<0.05, * p<0.1 All variables are winsorized at the 1% level.

Q1

In all of regression specifications (1-4), high average Q is significantly associated with high levels of investment in the next year. Including firm FE does not affect the coefficient of Q substantially, but greatly increases the R^2.

The relationship between Cash Flows and next year's investment is negative in the data, and significant without firm fixed effects. This seems to be contrary to models where firms are financially constrained.

These results for cash flows are substantially different from Fazzari et al. (1988) (FHP), which shows that **contemporaneous** Q and cash flows are both significantly positively related to investment. They also include specifications with year fixed effects in addition to firm fixed effects (i.e. they use quarterly data). Finally, they use data from 1970 - 1984 while I use data from 1980-2024.

Q2

Columns 5 and 6 show the impact of rerunning using lagged cash flows instead of cash flows.

The coefficient of cash flows becomes more negative when comparing (5) to (2) and (6) to (4). The coefficient of Q also attenuates somewhat in both regression specifications.

Q3

Including a quadratic term for Q greatly increases the coefficient of lagged Q in (7) relative to (1) and in (8) relative to (3).

Furthermore, the coefficients of both the term in levels and the quadratic term are significant and positive, indicating there may be functional form misspecification in Q. Rising levels of Q are associated with a falling marginal effect on investment.

Questions 4 and 5

Table 2: Dependent variable: **Investment**

	(1)	(2)	(3)	(4)
$Q_{i,t-1}$	0.003***	0.003***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)
Cash Flow$_{i,t}$		-0.012***		-0.002
		(0.002)		(0.003)
Constant	0.189***	0.191***	0.184***	0.184***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	166,219	164,540	164,368	162,684
R-squared	0.012	0.013	0.273	0.274
Firm FE	No	No	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1
All variables are winsorized at the 1% level.

Q4

Inspecting the results, robust standard errors are larger as expected but inference has not meaningfully changed from Q1.

Q5

A t-test for equal slopes rejects the hypothesis the null that the slopes are equal at a 1% level when using no firm FEs and at a 5% level (p-value of 0.0321) when using firm FEs.

Q6 and Q7

Table 3: Dependent variable: **Investment**

	Book Leverage Quintiles					**Financial Constraint Quintiles**				
	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th
$Q_{i,t-1}$	0.007***	0.011***	0.009***	0.014***	0.001***	0.020***	0.038***	0.035***	0.016***	0.001***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.002)	(0.003)	(0.005)	(0.002)	(0.000)
Cash Flow$_{i,t}$	0.003	-0.004	-0.009**	0.005	-0.013***	0.011	0.071**	0.018	0.003	-0.014***
	(0.010)	(0.003)	(0.004)	(0.005)	(0.002)	(0.051)	(0.029)	(0.025)	(0.012)	(0.003)
Constant	0.218***	0.172***	0.146***	0.135***	0.163***	0.075***	0.097***	0.156***	0.200***	0.202***
	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.006)	(0.011)	(0.005)	(0.003)
Observations	29,073	29,778	31,318	31,382	29,652	35,890	34,296	31,523	30,104	26,822
R-squared	0.366	0.410	0.429	0.433	0.369	0.387	0.497	0.466	0.378	0.307
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Firm					Firm	Firm	Firm	Firm	Firm

*** p<0.01, ** p<0.05, * p<0.1
Robust SE are in parenthesizes. All variables are winsorized at the 1% level.

Q6

For Q, the cash flow coefficients are not stable across bins, wit coefficients for the 1st, 2nd and 4th quintiles being insignificant (and even positive for the 1st and 4th).

The result for the whole sample is driven by the 3rd and 5th quintiles of the firm leverage distribution. In particular, the most levered firms reduce their investment in response to greater cash flows.

Q7

The response of Investment to Q is highest for the least constrained firms. Furthermore, the influence of cashflows on investment is positive except for the most constrained firms.

This again, does not seem to reflect the theory of financial constraints.

Q8

Table 4: Dependent variable: **Investment**

	(1)	(2)
$Q_{i,t-1}$	-0.008***	-0.004***
	(0.001)	(0.000)
Cash Flow$_{i,t}$		-0.056***
		(0.003)
Constant	0.231***	0.207***
	(0.004)	(0.001)
Observations	166,219	164,540

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses.

Controlling for measurement error in Q using the high order cumulants method of Erickson and Whited leads the sign of Q to flip and the coefficient of cash flows to become even more negative.

Q9

Table 5: Dependent variable: **Investment**

	(1)	(2)
$Q^{\text{tot}}_{i,t-1}$	0.025***	0.029***
	(0.000)	(0.000)
Constant	0.152***	0.143***
	(0.001)	(0.001)
Observations	170,524	168,722
R-squared	0.126	0.353
Firm FE	No	Yes

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses.

The response of investment to Q total are considerably higher than using Q as definied in Question 1. Furthermore, the R^2 values are also considerably higher, indicating that Q-total does do a better job of explaining investment than traditional Q.