Online-Appendix zu

„Investment-Cash Flow Sensitivity – A Focus on the Panel-Data Econometrics Involved“

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Junior Management Science 2(1), 2017, 17-48

10. Appendix

Stata Commands

```
capture log close
clear
set more off

log using "/Users/philipschnorpfeil/Desktop/Master/3. Semester : Master Thesis/Stata/20160201.log"

use "/Users/philipschnorpfeil/Desktop/Master/3. Semester : Master Thesis/Stata/MT Data.dta"

*Data management
**Cleaning data, i.e., dropping false values
drop if capxv < 0
drop if sale < 0
drop if dvt < 0
drop if ch < 0
drop if dp < 0
drop if invfg < 0
drop if dlc < 0
drop if dltt < 0
drop if che < 0
drop if dltis < 0
drop if xrd < 0
**Destring gvkey, i.e., convert string variable into numeric variable
destring gvkey, replace
**Declare data to be panel data
xtset gvkey fyear, yearly
**Create lagged variables
tstransform ppent, lag(1)
tstransform che, lag(1)
```

```
generate Q = (cstk*prcc_f+(dlc+dltt))/at
drop if Q<0
tstransform Q, lag(1)
tstransform Q, lag(2)
generate Prod = sale+invfg
tstransform Prod, lag(1)
tstransform ch, lag(1)
tstransform at, lag(1)
**Create variables of interest, inter alia, by normalizations
generate RDbyA_L1 = xrd/at_L1
generate IbyA_L1 = capxv/at_L1
generate TIbyA_L1 = (xrd+capxv)/at_L1
tstransform TIbyA_L1, lag(1)
generate IbyK_L1 = capxv/ppent_L1
tstransform IbyK_L1, lag(1)
generate CSTbyK_L1=cshi/ppent_L1
generate CSTbyA_L1=cshi/at_L1
generate LTDbyK_L1=dltis/ppent_L1
generate LTDbyA_L1=dltis/at_L1
generate CF = ni+dp-dvt
generate CFbyA_L1 = CF/at_L1
tstransform CFbyA_L1, lag(1)
generate CFbyK_L1 = CF/ppent_L1
tstransform CFbyK_L1, lag(1)
tstransform CFbyK_L1, lag(2)
generate Liq_L1byK_L1 = che_L1/ppent_L1
generate ProdbyK_L1 = Prod/ppent_L1
generate CashStock_L1byK_L1 = che_L1/ppent_L1
generate FlowandStockbyK_L1 = CFbyK_L1 + Liq_L1byK_L1
generate SalesbyA_L1 = sale/at_L1
tstransform SalesbyA_L1, lag (1)
tstransform SalesbyA_L1, lag (2)
```

```
tstransform SalesbyA_L1, lag (3)
generate SalesbyK_L1 = sale/ppent_L1
tstransform SalesbyK_L1, lag (1)
tstransform SalesbyK_L1, lag (2)
tstransform SalesbyK_L1, lag (3)
**Robust regression
***Robust regression
rreg IbyK_L1 CFbyK_L1 Q_L1
****Save output in Excel
outreg2 using TableRobust, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(Robust, Before Dropping) replace
***Compare with OLS
regress IbyK_L1 CFbyK_L1 Q_L1
outreg2 using TableRobust, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, Before Dropping)
***Figure 1: Create graph showing leverage versus the squared residuals, label with gvkey
lvr2plot, mlabel(gvkey)
***Create a new variable containing the values of Cook's D
predict Cook, cooksd
***List all companies with Cook's D>1 (in robust regression, these companies are immediately dropped)
clist gvkey Cook if Cook>1 & Cook!=.
***Drop these companies
drop if (Cook>1 & Cook!=.)
***Conduct initial procedure again
rreg IbyK_L1 CFbyK_L1 Q_L1
outreg2 using TableRobust, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(Robust, After Dropping)
regress IbyK_L1 CFbyK_L1 Q_L1
outreg2 using TableRobust, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, After Dropping)
```

```
*Creation of sub-samples
**Generate classification variable
generate DivbyNI = dvt/ni
**Generate time dummies
gen period=0
replace period = 1 if fyear>=1990 & fyear<=2002
replace period = 2 if fyear>=2003 & fyear<=2015
**Generate variable that counts occurences of classfication variable in each of the two time periods
egen nobs=count(DivbyNI), by(gvkey period)
browse gvkey fyear nobs DivbyNI
**Exemplary regression on companies with observable payout ratio in at least eight years in first time period
regress IbyK_L1 CFbyK_L1 Q_L1 if period==1 & nobs>=8, vce(cluster gvkey)
***Compare with number of observations in unrestricted regression in order to see how many observations are lost
regress IbyK_L1 CFbyK_L1 Q_L1 if period==1, vce(cluster gvkey)
**Generate payout ratio dummies
***Low-payout ratio dummy
gen d1_DivbyNI = 0
replace d1_DivbyNI = 1 if DivbyNI<0.1
***Medium-payout ratio dummy
gen d2_DivbyNI = 0
replace d2_DivbyNI = 1 if DivbyNI>0.1 & DivbyNI<0.3
***High-payout ratio dummy
gen d3_DivbyNI = 0
replace d3_DivbyNI = 1 if DivbyNI>0.3
**Generate variables that count occurences of d_DivbyNI equaling 1 in each of the two time periods
egen dd1 = total(d1_DivbyNI), by(gvkey period)
browse gvkey fyear dd1 d1_DivbyNI DivbyNI nobs
```

```
egen dd2 = total(d2_DivbyNI), by(gvkey period)
egen dd3 = total(d3_DivbyNI), by(gvkey period)
***Exemplary regression on companies with payout ratio of <0.1 in at least eight years of first time period
regress IbyK_L1 CFbyK_L1 Q_L1 if period==1 & dd1>=8, vce(cluster gvkey)
**Generate variables that count occurences of d_DivbyNI equaling 1 over entire sample period
egen dd1_sample = total(d1_DivbyNI), by(gvkey)
browse gvkey fyear dd1 dd1_sample d1_DivbyNI DivbyNI nobs
egen dd2_sample = total(d2_DivbyNI), by(gvkey)
egen dd3_sample = total(d3_DivbyNI), by(gvkey)
***Exemplary regression on companies with payout ratio of <0.1 in at least fifteen years of entire sample period
regress IbyK_L1 CFbyK_L1 Q_L1 if dd1_sample>=15, vce(cluster gvkey)

*Summary statistics
**Number of observations
summarize gvkey if dd1_sample>=16, d
summarize gvkey if dd2_sample>=15, d
summarize gvkey if dd3_sample>=15, d
**Median payout ratio
summarize DivbyNI if dd1_sample>=16, d
summarize DivbyNI if dd2_sample>=15, d
summarize DivbyNI if dd3_sample>=15, d
**Average number of years with positive dividends
egen nobs_pos = total(dvt>0), by(gvkey)
summarize nobs_pos if dd1_sample>=16, d
summarize nobs_pos if dd2_sample>=15, d
summarize nobs_pos if dd3_sample>=15, d
**Median sales growth
tstransform sale, lag (1)
generate SalesGrowth = (d.sale/sale_L1)
```

```
browse gvkey fyear SalesGrowth sale sale_L1
summarize SalesGrowth if dd1_sample>=16, d
summarize SalesGrowth if dd2_sample>=15, d
summarize SalesGrowth if dd3_sample>=15, d
**Median and standard deviation investment-capital ratio
summarize IbyK_L1 if dd1_sample>=16, d
summarize IbyK_L1 if dd2_sample>=15, d
summarize IbyK_L1 if dd3_sample>=15, d
**Median and standard deviation cash flow-capital ratio
summarize CFbyK_L1 if dd1_sample>=16, d
summarize CFbyK_L1 if dd2_sample>=15, d
summarize CFbyK_L1 if dd3_sample>=15, d
**Average and median capital stock
***1990
summarize ppent if dd1_sample>=16 & fyear==1990, d
summarize ppent if dd2_sample>=15 & fyear==1990, d
summarize ppent if dd3_sample>=15 & fyear==1990, d
***2015
summarize ppent if dd1_sample>=16 & fyear==2015, d
summarize ppent if dd2_sample>=15 & fyear==2015, d
summarize ppent if dd3_sample>=15 & fyear==2015, d
**Average and median Q
summarize Q if dd1_sample>=16, d
summarize Q if dd2_sample>=15, d
summarize Q if dd3_sample>=15, d

*Table 5: Effects of Q and Cash Flow on Investment, various periods (FHP, table 4)
**Period 1
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==1 & dd1>=8, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***,
**, *) append cttop(Class 1, Period 1) replace
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==1 & dd2>=7, fe vce(cluster gvkey)
```

outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 1)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==1 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 1)
**Period 2
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==2 & dd1>=8, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 2)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==2 & dd2>=7, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 2)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==2 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 2)
**Total sample period
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Total Sample)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Total Sample)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table5, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Total Sample)

*Table 6: Effects of Q and Cash Flow on Investment: alternative specifications, various periods (FHP, table 6)
**Class 1
xtreg IbyK_L1 CFbyK_L1 CFbyK_L1_L1 CFbyK_L1_L2 Q_L1 i.fyear if period==1 & dd1>=8, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 1, CF lags) replace

xtreg IbyK_L1 CFbyK_L1 CFbyK_L1_L1 CFbyK_L1_L2 Q_L1 i.fyear if period==2 & dd1>=8, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 2, CF lags)

xtreg IbyK_L1 CFbyK_L1 Q_L1 Q_L2 i.fyear if period==1 & dd1>=8, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 1, Q lags)

xtreg IbyK_L1 CFbyK_L1 Q_L1 Q_L2 i.fyear if period==2 & dd1>=8, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 2, Q lags)

**Class 2

xtreg IbyK_L1 CFbyK_L1 CFbyK_L1_L1 CFbyK_L1_L2 Q_L1 i.fyear if period==1 & dd2>=7, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 1, CF lags)

xtreg IbyK_L1 CFbyK_L1 CFbyK_L1_L1 CFbyK_L1_L2 Q_L1 i.fyear if period==2 & dd2>=7, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 2, CF lags)

xtreg IbyK_L1 CFbyK_L1 Q_L1 Q_L2 i.fyear if period==1 & dd2>=7, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 1, Q lags)

xtreg IbyK_L1 CFbyK_L1 Q_L1 Q_L2 i.fyear if period==2 & dd2>=7, fe vce(cluster gvkey)

outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 2, Q lags)

**Class 3

xtreg IbyK_L1 CFbyK_L1 CFbyK_L1_L1 CFbyK_L1_L2 Q_L1 i.fyear if period==1 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 1, CF lags)
xtreg IbyK_L1 CFbyK_L1 CFbyK_L1_L1 CFbyK_L1_L2 Q_L1 i.fyear if period==2 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 2, CF lags)
xtreg IbyK_L1 CFbyK_L1 Q_L1 Q_L2 i.fyear if period==1 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 1, Q lags)
xtreg IbyK_L1 CFbyK_L1 Q_L1 Q_L2 i.fyear if period==2 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table6, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 2, Q lags)

*Table 7: Effects of Cash Stock and Cash Flow on Investment (FHP, table 10)
**CF and Cash Stock as individual regressors
xtreg IbyK_L1 Q_L1 CFbyK_L1 CashStock_L1byK_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table7, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Cash Stock) replace
xtreg IbyK_L1 Q_L1 CFbyK_L1 CashStock_L1byK_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table7, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Cash Stock)
xtreg IbyK_L1 Q_L1 CFbyK_L1 CashStock_L1byK_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table7, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Cash Stock)
**Liquidity as the sum of CF and Cash Stock

xtreg IbyK_L1 Q_L1 FlowandStockbyK_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table7, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Flow plus Stock)
xtreg IbyK_L1 Q_L1 FlowandStockbyK_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table7, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Flow plus Stock)
xtreg IbyK_L1 Q_L1 FlowandStockbyK_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table7, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Flow plus Stock)

*Table 8: Effects of Sales and Cash Flow on Investment (FHP, table 7)
**Model with sales-capital ratio
xtreg IbyK_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table8, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Sales Lags) replace
xtreg IbyK_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table8, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Sales Lags)
xtreg IbyK_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table8, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Sales Lags)
**Model with sales-capital ratio and Q
xtreg IbyK_L1 Q_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table8, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Sales Lags and Q)

xtreg IbyK_L1 Q_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table8, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Sales Lags and Q)
xtreg IbyK_L1 Q_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table8, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Sales Lags and Q)

*Table 9: Effects of Q and Cash Flow on Investment: consideration of measurement error (FHP, table 5)
**Class 1
regress IbyK_L1 CFbyK_L1 Q_L1 if dd1_sample>=16, vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, Class 1) replace
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FE, Class 1)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, re vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(overall R-sq, e(r2_o)) symbol(***, **, *) append cttop(RE, Class 1)
xtreg d.IbyK_L1 d.CFbyK_L1 d.Q_L1 i.fyear if dd1_sample>=16, vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FD, Class 1)
**Class 2
regress IbyK_L1 CFbyK_L1 Q_L1 if dd2_sample>=15, vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, Class 2)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FE, Class 2)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd2_sample>=15, re vce(cluster gvkey)

outreg2 using Table9, excel bdec(3) tdec(2) addstat(overall R-sq, e(r2_o)) symbol(***, **, *) append cttop(RE, Class 2)
xtreg d.IbyK_L1 d.CFbyK_L1 d.Q_L1 i.fyear if dd2_sample>=15, vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FD, Class 2)
**Class 3
regress IbyK_L1 CFbyK_L1 Q_L1 if dd3_sample>=15, vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, Class 3)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FE, Class 3)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd3_sample>=15, re vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(overall R-sq, e(r2_o)) symbol(***, **, *) append cttop(RE, Class 3)
xtreg d.IbyK_L1 d.CFbyK_L1 d.Q_L1 i.fyear if dd3_sample>=15, vce(cluster gvkey)
outreg2 using Table9, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FD, Class 3)

*Tests
**Chow test for structural change
***Sort after years, so that I can be ovserved at which observation numbers events happen
sort fyear gvkey
browse fyear gvkey IbyK_L1 CFbyK_L1 Q_L1 if IbyK_L1!=. & CFbyK_L1!=. & Q_L1!=.
***Dot-com crisis
chowreg IbyK_L1 CFbyK_L1 Q_L1, dum(65000) vce(cluster gvkey)
***Financial crisis
chowreg IbyK_L1 CFbyK_L1 Q_L1, dum(95000) vce(cluster gvkey)
**F test on fixed effects
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear, fe vce(cluster gvkey)

```
scalar rss1 = e(rss)
scalar dfr = e(df_r)
scalar dfa = e(df_a)
regress IbyK_L1 CFbyK_L1 Q_L1, vce(cluster gvkey)
scalar rss2 = e(rss)
scalar fstat = ((rss2-rss1)/dfa)/(rss1/dfr)
di "Resid SS with dummies " rss1
di "Resid SS without dummies " rss2
di "F statistic with " dfa " and " dfr " d.f.=" fstat
**Hausman test
xtset gvkey fyear, yearly
xtreg IbyK_L1 CFbyK_L1 Q_L1, fe
estimates store fixed
xtreg IbyK_L1 CFbyK_L1 Q_L1, re
estimates store random
hausman fixed random, sigmamore
**Breusch-Pagan test
xtreg IbyK_L1 CFbyK_L1 Q_L1, re
estimates store random
xttest0
**Test whether time fixed effects are needed
***With classification scheme
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
testparm i.fyear
***Without classification scheme
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear, fe vce(cluster gvkey)
testparm i.fyear

*Test of strict exogeneity assumption
**Table 11: FE
***Test on single basic key explanatory variable and total sample period
```

```
xtreg IbyK_L1_L1 CFbyK_L1 CFbyK_L1_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Single) replace
xtreg IbyK_L1_L1 CFbyK_L1 CFbyK_L1_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Single)
xtreg IbyK_L1_L1 CFbyK_L1 CFbyK_L1_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Single)
***Test on all basic explanatory variables and total sample period
xtreg IbyK_L1_L1 CFbyK_L1 CFbyK_L1_L1 Q_L1 Q_L2 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, All)
xtreg IbyK_L1_L1 CFbyK_L1 CFbyK_L1_L1 Q_L1 Q_L2 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, All)
xtreg IbyK_L1_L1 CFbyK_L1 CFbyK_L1_L1 Q_L1 Q_L2 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, All)
***Test on single CF/A variable when total investment is dependent variable
****Period 1
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if period==1 & dd1>=8, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 1, Single, TI)
```

```
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if period==1 & dd2>=7, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 1, Single, TI)
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if period==1 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 1, Single, TI)
****Period 2
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if period==2 & dd1>=8, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 2, Single, TI)
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if period==2 & dd2>=7, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 2, Single, TI)
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if period==2 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 2, Single, TI)
****Total sample period
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Total, Single, TI)
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Total, Single, TI)
xtreg TIbyA_L1_L1 CFbyA_L1 CFbyA_L1_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
```

outreg2 using Table11, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Total, Single, TI)

**Table 12: FD

***Test on single basic key explanatory variable and total sample period

xtreg d.IbyK_L1 d.CFbyK_L1 CFbyK_L1 i.fyear if dd1_sample>=16, vce(cluster gvkey)

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Single) replace

xtreg d.IbyK_L1 d.CFbyK_L1 CFbyK_L1 i.fyear if dd2_sample>=15, vce(cluster gvkey)

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Single)

xtreg d.IbyK_L1 d.CFbyK_L1 CFbyK_L1 i.fyear if dd3_sample>=15, vce(cluster gvkey)

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Single)

***Test on all basic explanatory variables and total sample period

xtreg d.IbyK_L1 d.CFbyK_L1 CFbyK_L1 d.Q_L1 Q_L1 i.fyear if dd1_sample>=16, vce(cluster gvkey)

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, All)

xtreg d.IbyK_L1 d.CFbyK_L1 CFbyK_L1 d.Q_L1 Q_L1 i.fyear if dd2_sample>=15, vce(cluster gvkey)

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, All)

xtreg d.IbyK_L1 d.CFbyK_L1 CFbyK_L1 d.Q_L1 Q_L1 i.fyear if dd3_sample>=15, vce(cluster gvkey)

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, All)

***Test on single CF/A variable when total investment is dependent variable

****Period 1

```
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if period==1 & dd1>=8, fe vce(cluster gvkey)
outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 1, Single, TI)
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if period==1 & dd2>=7, fe vce(cluster gvkey)
outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 1, Single, TI)
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if period==1 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 1, Single, TI)
****Period 2
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if period==2 & dd1>=8, fe vce(cluster gvkey)
outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 2, Single, TI)
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if period==2 & dd2>=7, fe vce(cluster gvkey)
outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 2, Single, TI)
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if period==2 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 2, Single, TI)
****Total sample period
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Total, Single, TI)
xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
```

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Total, Single, TI)

xtreg d.TIbyA_L1_L1 d.CFbyA_L1 CFbyA_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table12, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Total, Single, TI)

*Robustness

**Table 13: Research and Development Expenses as Dependent Variable

***Basic M/B equation

xtreg RDbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, MB, RD) replace

xtreg RDbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, MB, RD)

xtreg RDbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, MB, RD)

***Sales Accelerator equation

xtreg RDbyA_L1 Q_L1 CFbyA_L1 SalesbyA_L1 SalesbyA_L1_L1 SalesbyA_L1_L2 SalesbyA_L1_L3 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Sales, RD)

xtreg RDbyA_L1 Q_L1 CFbyA_L1 SalesbyA_L1 SalesbyA_L1_L1 SalesbyA_L1_L2 SalesbyA_L1_L3 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Sales, RD)

xtreg RDbyA_L1 Q_L1 CFbyA_L1 SalesbyA_L1 SalesbyA_L1_L1 SalesbyA_L1_L2 SalesbyA_L1_L3 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Sales, RD)

**Total Investment as Dependent Variable

***Basic M/B equation

xtreg TIbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, MB, TI)

xtreg TIbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, MB, TI)

xtreg TIbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, MB, TI)

****CF specified with R&D expenses added back

generate GCFbyA_L1 = (CF+xrd)/at_L1

xtreg TIbyA_L1 GCFbyA_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

***Sales Accelerator equation

xtreg TIbyA_L1 Q_L1 CFbyA_L1 SalesbyA_L1 SalesbyA_L1_L1 SalesbyA_L1_L2 SalesbyA_L1_L3 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Sales, TI)

xtreg TIbyA_L1 Q_L1 CFbyA_L1 SalesbyA_L1 SalesbyA_L1_L1 SalesbyA_L1_L2 SalesbyA_L1_L3 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Sales, TI)

xtreg TIbyA_L1 Q_L1 CFbyA_L1 SalesbyA_L1 SalesbyA_L1_L1 SalesbyA_L1_L2 SalesbyA_L1_L3 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Sales, TI)

**Normalization by Total Assets

xtreg IbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, MB, I)

xtreg IbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, MB, I)

xtreg IbyA_L1 CFbyA_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table13, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, MB, I)

**Table 14: Basic M/B equation augmented by external finance

***R&D expense as dependent variable; all variables normalized by total assets

xtreg RDbyA_L1 CFbyA_L1 Q_L1 CSTbyA_L1 LTDbyA_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, RD) replace

xtreg RDbyA_L1 CFbyA_L1 Q_L1 CSTbyA_L1 LTDbyA_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, RD)

xtreg RDbyA_L1 CFbyA_L1 Q_L1 CSTbyA_L1 LTDbyA_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, RD)

***Total investment as dependent variable; all variables normalized by total assets

xtreg TIbyA_L1 CFbyA_L1 Q_L1 CSTbyA_L1 LTDbyA_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, TI)

xtreg TIbyA_L1 CFbyA_L1 Q_L1 CSTbyA_L1 LTDbyA_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, TI)

xtreg TIbyA_L1 CFbyA_L1 Q_L1 CSTbyA_L1 LTDbyA_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, TI)

***CapEx as dependent variable

xtreg IbyK_L1 CFbyK_L1 Q_L1 CSTbyK_L1 LTDbyK_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, I)

xtreg IbyK_L1 CFbyK_L1 Q_L1 CSTbyK_L1 LTDbyK_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, I)

xtreg IbyK_L1 CFbyK_L1 Q_L1 CSTbyK_L1 LTDbyK_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

outreg2 using Table14, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, I)

**Sales Accelerator instead of Sales

***Standard model as reference

xtreg IbyK_L1 CFbyK_L1 SalesbyK_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

***Model including Sales Accelerator

xtreg IbyK_L1 CFbyK_L1 ProdbyK_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

**Cash Flow defined without Dividends

generate CF2 = ni+dp

generate CF2byK_L1 = CF2/ppent_L1

tstransform CF2byK_L1, lag(1)

xtreg IbyK_L1 CF2byK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

xtreg IbyK_L1 CF2byK_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)

xtreg IbyK_L1 CF2byK_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)

**Clustering

***No clustering

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe

***Over firms

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)

***Over industries

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster sic)

**Estimations based on firm-year observations with positive sales growth

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16 & SalesGrowth>0, fe vce(cluster gvkey)

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd2_sample>=15 & SalesGrowth>0, fe vce(cluster gvkey)

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd3_sample>=15 & SalesGrowth>0, fe vce(cluster gvkey)

**Balance panel

***Declare data to be panel data

xtset gvkey fyear, yearly

***Balance

xtbalance , range (1990 2015)

***Table 15: Effects of Q and Cash Flow on Investment, various periods, balanced panel (to be compared with Table 3)

****Period 1

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==1 & dd1>=8, fe vce(cluster gvkey)

outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 1, Balanced Panel) replace

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==1 & dd2>=7, fe vce(cluster gvkey)

outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 1,Balanced Panel)

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==1 & dd3>=7, fe vce(cluster gvkey)

outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 1, Balanced Panel)

****Period 2

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==2 & dd1>=8, fe vce(cluster gvkey)

outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Period 2, Balanced Panel)

xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==2 & dd2>=7, fe vce(cluster gvkey)

```
outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Period 2, Balanced Panel)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if period==2 & dd3>=7, fe vce(cluster gvkey)
outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Period 2, Balanced Panel)
****Total sample period
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Total Sample, Balanced Panel)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Total Sample, Balanced Panel)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using Table15, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Total Sample, Balanced Panel)
***Effects of Q and Cash Flow on Investment: consideration of measurement error, balanced panel (to be compared with Table 2)
****Class 1
regress IbyK_L1 CFbyK_L1 Q_L1 if dd1_sample>=16, vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, Class 1) replace
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FE, Class 1)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd1_sample>=16, re vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(overall R-sq, e(r2_o)) symbol(***, **, *) append cttop(RE, Class 1)
xtreg d.IbyK_L1 d.CFbyK_L1 d.Q_L1 i.fyear if dd1_sample>=16, vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FD, Class 1)
****Class 2
regress IbyK_L1 CFbyK_L1 Q_L1 if dd2_sample>=15, vce(cluster gvkey)
```

```
outreg2 using TableBal, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, Class 2)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FE, Class 2)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd2_sample>=15, re vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(overall R-sq, e(r2_o)) symbol(***, **, *) append cttop(RE, Class 2)
xtreg d.IbyK_L1 d.CFbyK_L1 d.Q_L1 i.fyear if dd2_sample>=15, vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FD, Class 2)
****Class 3
regress IbyK_L1 CFbyK_L1 Q_L1 if dd3_sample>=15, vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) symbol(***, **, *) append cttop(OLS, Class 3)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FE, Class 3)
xtreg IbyK_L1 CFbyK_L1 Q_L1 i.fyear if dd3_sample>=15, re vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(overall R-sq, e(r2_o)) symbol(***, **, *) append cttop(RE, Class 3)
xtreg d.IbyK_L1 d.CFbyK_L1 d.Q_L1 i.fyear if dd3_sample>=15, vce(cluster gvkey)
outreg2 using TableBal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(FD, Class 3)
***Model with sales-capital ratio and Q
xtreg IbyK_L1 Q_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd1_sample>=16, fe vce(cluster gvkey)
outreg2 using TableBalSal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 1, Sales Lags and Q)
xtreg IbyK_L1 Q_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd2_sample>=15, fe vce(cluster gvkey)
```

```
outreg2 using TableBalSal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 2, Sales Lags and Q)
xtreg IbyK_L1 Q_L1 CFbyK_L1 SalesbyK_L1 SalesbyK_L1_L1 SalesbyK_L1_L2 SalesbyK_L1_L3 i.fyear if dd3_sample>=15, fe vce(cluster gvkey)
outreg2 using TableBalSal, excel bdec(3) tdec(2) addstat(within R-sq, e(r2_w)) symbol(***, **, *) append cttop(Class 3, Sales Lags and Q)
***Summary statistics
****Number of observations
summarize gvkey if dd1_sample>=16, d
summarize gvkey if dd2_sample>=15, d
summarize gvkey if dd3_sample>=15, d
****Median payout ratio
summarize DivbyNI if dd1_sample>=16, d
summarize DivbyNI if dd2_sample>=15, d
summarize DivbyNI if dd3_sample>=15, d
****Average number of years with positive dividends
summarize nobs_pos if dd1_sample>=16, d
summarize nobs_pos if dd2_sample>=15, d
summarize nobs_pos if dd3_sample>=15, d
****Median sales growth
summarize SalesGrowth if dd1_sample>=16, d
summarize SalesGrowth if dd2_sample>=15, d
summarize SalesGrowth if dd3_sample>=15, d
****Median and standard deviation investment-capital ratio
summarize IbyK_L1 if dd1_sample>=16, d
summarize IbyK_L1 if dd2_sample>=15, d
summarize IbyK_L1 if dd3_sample>=15, d
****Median and standard deviation cash flow-capital ratio
summarize CFbyK_L1 if dd1_sample>=16, d
summarize CFbyK_L1 if dd2_sample>=15, d
summarize CFbyK_L1 if dd3_sample>=15, d
****Average and median capital stock
```

```
*****1990
summarize ppent if dd1_sample>=16 & fyear==1990, d
summarize ppent if dd2_sample>=15 & fyear==1990, d
summarize ppent if dd3_sample>=15 & fyear==1990, d
*****2015
summarize ppent if dd1_sample>=16 & fyear==2015, d
summarize ppent if dd2_sample>=15 & fyear==2015, d
summarize ppent if dd3_sample>=15 & fyear==2015, d
****Average and median Q
summarize Q if dd1_sample>=16, d
summarize Q if dd2_sample>=15, d
summarize Q if dd3_sample>=15, d

*Sort variables (in Data Browser)
sort gvkey
*Do identifier and time uniquely identify the data?
**http://www.stata.com/support/faqs/data-management/repeated-time-values/
**Check for uniquely identified combination
isid gvkey datadate
**Quantify extent of problem
duplicates report gvkey datadate
**Find duplicates
duplicates list gvkey datadate
**Remove duplicates
duplicates tag gvkey datadate, gen(isdup)
edit if isdup
duplicates drop
*See which packages have previously been installed
ado dir
*Get detailed information on command
help xtbalance
**Detailed summary of variable
```

```
summarize sale, d
*Check whether single panel data (e.g., firm) is included in regression
generate x = 1
egen xx = sum(x), by(gvkey)
**Gives frequency of observations for the panel data variable (gvkey)
tab xx
**Sort after gvkey and fyear in Data Browser
sort gvkey fyear
predict y, resid
**Look at gvkey, fyear, xx, and y to see which y is included in regression
browse gvkey fyear xx y
*Exemplary pooled OLS regressions using different Stata methods with first sample period
**On the fly using if commands
regress IbyK_L1 CFbyK_L1 Q_L1 if fyear>=1990 & fyear<=2002, vce(cluster gvkey)
**Dummies
regress IbyK_L1 CFbyK_L1 Q_L1 if period==1, vce(cluster gvkey)
**Year and industry dummies
***Switch to two-digit SIC codes
destring sic, replace
gen sic2 = int(sic/100)
xi: regress IbyK_L1 CFbyK_L1 Q_L1 i.fyear i.sic2 if period==1, vce(cluster gvkey)

log close
```