



Online-Appendix zu

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

Philip Schnorpfeil

Otto Beisheim Schools of Management

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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 occurrences of classification 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 lbyK_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 lbyK_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 occurrences 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 lbyK_L1 CFbyK_L1 Q_L1 if period==1 & dd1>=8, vce(cluster gvkey)
**Generate variables that count occurrences 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 lbyK_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 lbyK_L1 if dd1_sample>=16, d
summarize lbyK_L1 if dd2_sample>=15, d
summarize lbyK_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 lbyK_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 lbyK_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 observed 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.TlbyA_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.TlbyA_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.TlbyA_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.TlbyA_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.TlbyA_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.TlbyA_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.TlbyA_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.TlbyA_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 lbyA_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 lbyK_L1 CFbyK_L1 Q_L1 if fyear>=1990 & fyear<=2002, vce(cluster gvkey)
**Dummies
regress lbyK_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 lbyK_L1 CFbyK_L1 Q_L1 i.fyear i.sic2 if period==1, vce(cluster gvkey)

log close

```