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Technical Description of Data Source and Routines used in the paper:

"Determinants of Business Fixed Investment: Evidence from German Firm-Level Data", by Thiess Buettner, Anja Hoenig

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## I. INTRODUCTION

This study uses data from the EBDC Business Expectations Panel (EBDC BEPS), a combined dataset of balance sheet data from firm databases and survey data. The data is provided by the Economics and Business Data Center, which is a cooperation of the University of Munich and the Ifo Institute for Economic Research and which can be accessed at the local premises in Munich.

Detailed information on the data and access formalities be found on the website:

<https://www.cesifo-group.de/de/ifoHome/facts/EBDC/EBDC-Business-Panels.html>

A general overview of the data is provided by Hoenig, A. (2010). Linkage of ifo Survey and Balance-Sheet Data: The EBDC Business Expectations Panel & the EBDC Business Investment Panel. Schmollers Jahrbuch 130 (4), 633-642.

Raw data file:

VG\_Hoppenstedt\_Datensatz.dta

Data organization and estimations are implemented using Stata 12.

## II. LIST OF VARIABLES

str	statutory corporation tax rate
pi	inflation rate in price of output
i	nominal interest rate
m_i	personal tax rate interest income
z	tax rate capital gains
rho	tax adjusted nominal discount rate
pi_I	increase in price of capital stock
delta	economic depreciation rate for specific firm
psi	capital allowance rate
c	tax credit dividend income
coc	cost of capital
sal	sales
cap	log of capital stock
sachanlagen	capital stock
eigenkapital	equity
t_GSt	business tax in %, average
hebesatz_gewst	municipal collection rate (Hebesatz)
t_Ref_GSt	reference rate business tax
ltr	implied local business tax rate
stb_appraisal_beg	business situation
comexp_beg	business expectations
legal_form	legal form
EBDC_ID	firm ID in the raw data
year	year of observation
nettoumsatzerloese	net sales
CF	cash flow
cfk	CF/total capital



```

gen comexp_beg= comexp

order comexp_beg

replace comexp_beg=. if month>6

*****

* alternative indicator: end of year

gen comexp_end= comexp
order comexp_end
replace comexp_end=. if month < 6

*****

* means, standard deviation and variation coefficient of business appraisal

bysort EBDC_ID_new year: egen avgstb= mean(statebus)
bysort EBDC_ID_new year: egen sdstb= sd(statebus)
gen varcoeffstb= sdstb/ avgstb
order statebus avgstb sdstb varcoeffstb

*****

* means, standard deviation and variation coefficient of business
* expectations

bysort EBDC_ID_new year: egen avgexp= mean(comexp)
bysort EBDC_ID_new year: egen sdexp= sd(comexp)
gen varcoeffexp= sdexp/ avgexp

order comexp avgexp sdexp varcoeffexp

*****

```

#delimit ;

sort EBDC\_ID\_new year month;

collapse (median)

month\_counter months\_covered

westeast Bundesland hebesatz\_grst\_a hebesatz\_grst\_b hebesatz\_gewst

(mean)

stb\_appraisal\_beg stb\_appraisal\_end comexp\_beg comexp\_end avgstb sdstb  
varcoeffstb avgexp sdexp varcoeffexp

stbopti stbpepsi netstbopti expopti exppepsi netexpopti

szrg statebus provpm stin demand ordvpm  
orders

pricevpm proexp priceexp expexp comexp foreord  
salesexp

ranord ranord2 uticappc uticappc2 uticapap constrain  
ordlack

mplack matlack techcap skelllack bastlack difffin  
proexpen

proqual proprio weather overtime ovtimemo stwork  
stworkexp

emplexp emplinc empldec hcount festwe stinwe  
fest

compos1 compos2 compos3 emppro emppro2 othrea  
prof

profch credit

(median)

anlagevermoegen immaterielles\_vermoegen sachenlagen dav\_grundstuecke\_bauten  
dav\_anlagen\_maschinen

finanzanlagen dav\_beteil\_verb\_untern umlaufvermoegen vorraete  
roh\_hilfs\_betr\_stoffe unfertige\_fertige\_erzeug

sonstige\_vorraete minus\_anzahl\_abzuege ford\_sonst\_vermoegensggst  
ford\_aus\_liefer\_leist ford\_an\_bet\_verb\_unt

sonst\_ford\_vermoegen minus\_anzahlungen\_abzuege wertpapiere\_liquide\_mittel  
dav\_kasse\_buba\_postgiro aktive\_rechnungsabgrenzung





```

gen double real_debt = anleihen + verb
* corporations are assumed to finance investments through
* a) debt finance
* b) retained earnings

*****

* a) Calculation of share of debt finance

gen double lambda= real_debt / total_capital

drop if lambda >1

tsset EBDC_ID_new year

gen resid = 1 - lambda

order lambda resid

drop if resid <0

***** Calculating parameters for CoC *****

***** Corporate tax rates *****
* tax rate on retained earnings

gen ltr=0.05*(hebesatz_gewst/100)/(1+0.05*(hebesatz_gewst/100))
gen str=0.250*(1-ltr)*(1.055)+ltr
replace str=0.265*(1-ltr)*(1.055)+ltr if year==2003
replace str=0.400*(1-ltr)*(1.055)+ltr if year==2000 | year==1999
replace str=0.450*(1-ltr)*(1.055)+ltr if year==1998
replace str=0.450*(1-ltr)*(1.075)+ltr if year<=1997 & year >= 1995
replace str=0.450*(1-ltr)+ltr if year==1994
replace str=0.500*(1-ltr)+ltr if year==1993

```

```
label variable str ` "statutory corporation tax rate "`
```

```
gen cstr= 1 - str
```

```
*** price index
```

```
gen pi= 0.028
```

```
replace pi= 0.018 if year==1995
```

```
replace pi= 0.014 if year==1996
```

```
replace pi= 0.019 if year==1997
```

```
replace pi= 0.010 if year==1998
```

```
replace pi= 0.006 if year==1999
```

```
replace pi= 0.014 if year==2000
```

```
replace pi= 0.019 if year==2001
```

```
replace pi= 0.015 if year==2002
```

```
replace pi= 0.010 if year==2003
```

```
replace pi= 0.017 if year==2004
```

```
replace pi= 0.015 if year==2005
```

```
replace pi= 0.016 if year==2006
```

```
replace pi= 0.023 if year==2007
```

```
replace pi= 0.026 if year==2008
```

```
label variable pi ` "inflation rate in price of output"'
```

\* In OECD (1991) and Devereux -calculations assumed rate of 3.5% , Egger 2,5 %, but EU as a whole

```
*** interest rate
```

```
gen i= 0.067
```

```
replace i=0.065 if year==1995
```

```
replace i=0.056 if year==1996
```

```
replace i=0.051 if year==1997
```

```
replace i=0.044 if year==1998
```

```
replace i=0.043 if year==1999
```

```
replace i=0.053 if year==2000
```

```
replace i=0.047 if year==2001
```

```

replace i=0.046 if year==2002
replace i=0.038 if year==2003
replace i=0.037 if year==2004
replace i=0.032 if year==2005
replace i=0.037 if year==2006
replace i=0.043 if year==2007

gen r = (1 + i)/(1+pi) - 1
label variable i `nominal interest rate'

*** discount rate
gen m_i=0
gen z =0
gen rho= (1 - m_i)*i / (1 - z)

label variable rho `tax adjusted nominal discount rate'

*** price index investment goods assumed to be the same as pi
gen pi_I= pi

*alternative
*replace pi_I= - 0.012 if year==1996
*replace pi_I= 0.0125 if year==1997
*replace pi_I= 0.0045 if year==1998
*replace pi_I= - 0.010 if year==1999
*replace pi_I= 0.031 if year==2000
*replace pi_I= 0.0298 if year==2001
*replace pi_I= - 0.006 if year==2002
*replace pi_I= 0.01725 if year==2003
*replace pi_I= 0.0159 if year==2004
*replace pi_I= 0.0438 if year==2005
*replace pi_I= 0.054 if year==2006
*replace pi_I= 0.013 if year==2007
*replace pi_I= 0.05524 if year==2008

```

```
label variable pi_I `increase in price of capital stock''
```

```
***** Firm specific economic depreciation rates *****
```

```
gen weight_build = dav_grundstuecke_bauten / (sachanlagen)
```

```
gen weight_mach = dav_anlagen_maschinen / (sachanlagen)
```

```
gen weight_int = 0
```

```
gen weight_stocks = vorraete / (sachanlagen)
```

```
***** afa
```

```
gen afa_build= 0.0361
```

```
* buildings are discounted linearly over 25 or 27,7 years
```

```
* OECD (1991) assumes depreciation rate of 3.61%. But ZEW 08 uses 3,1 %
```

```
gen afa_mach= 0.1225
```

```
* average discount period: 8.2 years
```

```
* fits quite good, is also assumed by IFS, but OECD and ZEW 08 assume a rate of 17.5%.
```

```
gen afa_int= 0.15
```

```
* fits quite good, confirmed twice (OECD, IFS???) , ZEW 08 15,35%.
```

```
gen afa_inv=0
```

```
* Inventory/stocks not depreciable
```

```
**** total depreciation ****
```

```
gen delta= (afa_build*weight_build) + (afa_mach*weight_mach) +  
(afa_int*weight_int) + (afa_inv*weight_stocks)
```

```
label variable delta `economic depreciation rate for specific firm''
```

\*\*\*\* Firm specific capital allowances \*\*\*\*

gen afast\_build= 0.04 if year<=2000

replace afast\_build= 0.03 if year >=2001

gen afast\_mach= 0.3

replace afast\_mach = 0.2 if year >=2001 & year <=2005

\* here estimated 10% of the machines from OECD

gen afast\_int= 0.2

gen afast\_inv= 0

\* inventories are not tax depreciable

gen psi= (afast\_build\* weight\_build) + (afast\_mach\*weight\_mach) +  
(afast\_int\*weight\_int) + (afast\_inv\*weight\_stocks)

label variable psi `capital allowance rate''

\* tax depreciation allowances initial period/ year of investment

\*\*\*\*\* Calculation of NPV \*\*\*\*\*

\* Depreciated according to DB-method, buildings and intangibles are depreciated  
straight-line

gen A\_mach= str\* afast\_mach\* (1 + rho)/(afast\_mach + rho)

\* normal calculation according to DB-method

\*\*\*

gen n\_build= 25 if year <=2000

replace n\_build = 33.3 if year >=2001

\*\*\*

gen A\_build= str\* afast\_build\* (1 + rho)/(rho) \* (1 - (1/ (1+rho)^n\_build))

```

***
gen n_int= 5

***

gen A_int= str* afast_int* (1 + rho)/(rho) * (1 - (1/ (1+rho)^n_int))

gen A_inv=0

gen A = (A_mach*weight_mach) + (A_build*weight_build) + (A_int*weight_int) +
(A_inv*weight_stocks)

* NPV of depreciation allowances, depending on tax depreciation rates and
allowance scheme

*****

*****      Cost of Capital for Retained Earnings      *****

gen cocre= (1-A) / ((1-str)*(1+pi)) * (rho + delta*(1+ pi_I) - pi_I) - delta

*****      Difference to Cost of Capital with debt      *****

gen diff_cocd= (1- str * psi)*((1- str)*i - rho) / ((1- str)*(1+ pi))

*****      Cost of Capital in total      *****

gen coc = cocre + lambda* diff_cocd

bysort year: sum coc

histogram coc

gen coc_abs=coc

replace coc= log(coc)

*****

```

```
save " COC_REV_01-i.dta", replace
```

```
log close
```

```
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```



```

gen LTAN=L.sachanlagen

gen CF = (jahresergebnis+ steuern_steuernerstattungen + dav_zinsaufwand +
dav_abschreibungen )

gen log_CF=log(CF)

gen cfk=(CF/(l.total_capital))

sort EBDC_ID_new year

drop if year==2008

*****
* SUMMARY STATISTICS

*delete tails of capital, net sales and cfk
foreach var of varlist sachanlagen nettoumsatzerloese cfk {
cap drop `var'_corr
gen `var'_corr = `var'
sum `var',d
replace `var'_corr = . if `var' > r(p99)
replace `var'_corr = . if `var' < r(p1)
}

sum sachanlagen sachanlagen_corr nettoumsatzerloese nettoumsatzerloese_corr

drop stb_good
gen stb_good=. if statebus~=.
replace stb_good=1 if statebus >0
replace stb_good=0 if statebus<0
gen stb_bad=1 if stb_good==0
replace stb_bad=0 if stb_good==1
sum stb_good stb_bad
bysort year: sum stb_good stb_bad

```

\*\*\*\*\*

\*calculating (corrected) capital in real terms

```
gen      SA=sachanlagen if year==2005
replace SA=sachanlagen/1.054 if year==2006
replace SA=sachanlagen/(1.013*1.054) if year==2007
replace SA=sachanlagen*1.0438 if year==2004
replace SA=sachanlagen*1.0438*1.0159 if year==2003
replace SA=sachanlagen*1.0438*1.0159*1.01725 if year==2002
replace SA=sachanlagen*1.0438*1.0159*1.01725*0.994 if year==2001
replace SA=sachanlagen*1.0438*1.0159*1.01725*0.994*1.0298 if year==2000
replace SA=sachanlagen*1.0438*1.0159*1.01725*0.994*1.0298*1.031 if year==1999
replace SA=sachanlagen*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99 if
year==1998
replace SA=sachanlagen*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045 if
year==1997
replace
SA=sachanlagen*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045*1.0125 if
year==1996
replace
SA=sachanlagen*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045*1.0125*0.98
8 if year==1995 | year==1994

rename SA sachalt_real

gen SA_real=sachanlagen_corr if year==2005
replace SA_real=sachanlagen_corr/1.054 if year==2006
replace SA_real=sachanlagen_corr/(1.013*1.054) if year==2007
replace SA_real=sachanlagen_corr*1.0438 if year==2004
replace SA_real=sachanlagen_corr*1.0438*1.0159 if year==2003
replace SA_real=sachanlagen_corr*1.0438*1.0159*1.01725 if year==2002
replace SA_real=sachanlagen_corr*1.0438*1.0159*1.01725*0.994 if year==2001
replace SA_real=sachanlagen_corr*1.0438*1.0159*1.01725*0.994*1.0298 if
year==2000
replace SA_real=sachanlagen_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031 if
year==1999
```

```

replace SA_real=sachanlagen_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99
if year==1998

replace
SA_real=sachanlagen_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045
if year==1997

replace
SA_real=sachanlagen_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045*1
.0125 if year==1996

replace
SA_real=sachanlagen_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045*1
.0125*0.988 if year==1995 | year==1994

rename SA_real sach_real

bysort year: sum sachanlagen sachalt_real sachanlagen_corr sach_real

*****

*calculating (corrected) net sales in real terms

gen Um=nettoumsatzerloese if year==2005

replace Um=nettoumsatzerloese/1.054 if year==2006

replace Um=nettoumsatzerloese/(1.013*1.054) if year==2007

replace Um=nettoumsatzerloese*1.0438 if year==2004

replace Um=nettoumsatzerloese*1.0438*1.0159 if year==2003

replace Um=nettoumsatzerloese*1.0438*1.0159*1.01725 if year==2002

replace Um=nettoumsatzerloese*1.0438*1.0159*1.01725*0.994 if year==2001

replace Um=nettoumsatzerloese*1.0438*1.0159*1.01725*0.994*1.0298 if year==2000

replace Um=nettoumsatzerloese*1.0438*1.0159*1.01725*0.994*1.0298*1.031 if
year==1999

replace Um=nettoumsatzerloese*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99 if
year==1998

replace
Um=nettoumsatzerloese*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045 if
year==1997

replace
Um=nettoumsatzerloese*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045*1.01
25 if year==1996

replace
Um=nettoumsatzerloese*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1.0045*1.01
25*0.988 if year==1995 | year==1994

```

```

rename Um nettoum_real

gen Um_real=nettoumsatzerloese_corr if year==2005
replace Um_real=nettoumsatzerloese_corr/1.054 if year==2006
replace Um_real=nettoumsatzerloese_corr/(1.013*1.054) if year==2007
replace Um_real=nettoumsatzerloese_corr*1.0438 if year==2004
replace Um_real=nettoumsatzerloese_corr*1.0438*1.0159 if year==2003
replace Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725 if year==2002
replace Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725*0.994 if
year==2001
replace Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725*0.994*1.0298 if
year==2000

replace
Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031 if
year==1999

replace
Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99
if year==1998

replace
Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1
.0045 if year==1997

replace
Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1
.0045*1.0125 if year==1996

replace
Um_real=nettoumsatzerloese_corr*1.0438*1.0159*1.01725*0.994*1.0298*1.031*0.99*1
.0045*1.0125*0.988 if year==1995 | year==1994

```

```

rename Um_real nettoum_correal

```

```

bysort year: sum nettoumsatzerloese nettoum_real nettoumsatzerloese_corr
nettoum_correal

```

```

*****

```

```

gen sachenlagen_alt=sachenlagen

```

```

drop sachenlagen

```

```
gen sachanlagen= sachanlagen_corr
```

```
*****
```

```
gen nettoumsatzerloese_alt= nettoumsatzerloese
```

```
drop nettoumsatzerloese
```

```
gen nettoumsatzerloese = nettoumsatzerloese_corr
```

```
*****
```

```
gen cfk_alt= cfk
```

```
drop cfk
```

```
gen cfk = cfk_corr
```

```
*****
```

```
sort EBDC_ID_new year
```

```
gen cap =log(sachanlagen)
```

```
gen dcap =d.cap
```

```
*****
```

```
gen sal =log(nettoumsatzerloese)
```

```
drop if sachanlagen<0
```

```
gen Lorders=L.orders
```

\*generate year dummies for year fixed effects

```
gen _Iyear_1995=0
replace _Iyear_1995=1 if year==1995
gen _Iyear_1996=0
replace _Iyear_1996=1 if year==1996
gen _Iyear_1997=0
replace _Iyear_1997=1 if year==1997
gen _Iyear_1998=0
replace _Iyear_1998=1 if year==1998
gen _Iyear_1999=0
replace _Iyear_1999=1 if year==1999
gen _Iyear_2000=0
replace _Iyear_2000=1 if year==2000
gen _Iyear_2002=0
replace _Iyear_2002=1 if year==2002
gen _Iyear_2003=0
replace _Iyear_2003=1 if year==2003
gen _Iyear_2004=0
replace _Iyear_2004=1 if year==2004
gen _Iyear_2005=0
replace _Iyear_2005=1 if year==2005
gen _Iyear_2006=0
replace _Iyear_2006=1 if year==2006
gen _Iyear_2007=0
replace _Iyear_2007=1 if year==2007
```

\*\*\*\*\*

\* Generate base estimation sample

```
xi: xtreg cap sal coc comexp_beg stb_appraisal_beg i.year ,fe
gen sample=e(sample)
```

```
sum sachanlagen nettoumsatzerloese coc_abs stb_appraisal_beg
comexp_beg if sample
```

```
bysort year: sum sachanlagen nettoumsatzerloese coc_abs stb_appraisal_beg  
comexp_beg if sample
```

```
sort EBDC_ID year
```

```
*****
```

```
* Differenced simple OLS
```

```
*****
```

```
xi: xtreg d.cap d.sal d.coc  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust fe  
estimates store xt1a
```

```
*xi: areg d.cap d.sal d.coc i.EBDC_ID  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust  
absorb(EBDC_ID)
```

```
xi: xtreg d.cap d.sal d.coc stb_appraisal_beg  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust fe  
estimates store xt2a
```

```
*xi: areg d.cap d.sal d.coc stb_appraisal_beg i.EBDC_ID  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust  
absorb(EBDC_ID)
```

```
xi: xtreg d.cap d.sal d.coc comexp_beg  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust fe  
estimates store xt3a
```

```
*xi: areg d.cap d.sal d.coc comexp_beg i.EBDC_ID  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust  
absorb(EBDC_ID)
```

```
xi: xtreg d.cap d.sal d.coc stb_appraisal_beg comexp_beg  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust fe  
estimates store xt4a
```

```
*xi: areg d.cap d.sal d.coc stb_appraisal_beg comexp_beg i.EBDC_ID  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust  
absorb(EBDC_ID)
```

```
xi: xtreg d.cap d.sal d.coc  
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust re  
estimates store xt1b
```

```
xi: xtreg d.cap d.sal d.coc stb_appraisal_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust re
estimates store xt2b
```

```
xi: xtreg d.cap d.sal d.coc comexp_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust re
estimates store xt3b
```

```
xi: xtreg d.cap d.sal d.coc stb_appraisal_beg comexp_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, robust re
estimates store xt4b
```

```
*****
* Differenced simple GMM
*****
```

```
xi: xtabond2 d.cap d.sal d.coc
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (i.year) twostep robust small
estimates store est1
```

```
xi: xtabond2 d.cap d.sal d.coc stb_appraisal_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (stb_appraisal_beg i.year) twostep robust small
estimates store est2
```

```
xi: xtabond2 d.cap d.sal d.coc comexp_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (comexp_beg i.year) twostep robust small
estimates store est3
```

```
xi: xtabond2 d.cap d.sal d.coc stb_appraisal_beg comexp_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (stb_appraisal_beg comexp_beg i.year) twostep
robust small
estimates store est4
```

\*\*\*\*\*

\* Differenced with lag GMM

\*\*\*\*\*

```
xi: xtabond2 d.cap l.cap d.sal d.coc
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (i.year) twostep robust small
```

estimates store est1b

```
xi: xtabond2 d.cap l.cap d.sal d.coc stb_appraisal_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (stb_appraisal_beg i.year) twostep robust small
```

estimates store est2b

```
xi: xtabond2 d.cap l.cap d.sal d.coc comexp_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (comexp_beg i.year) twostep robust small
```

estimates store est3b

```
xi: xtabond2 d.cap l.cap d.sal d.coc stb_appraisal_beg comexp_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap
l.sal l.coc) ivstyle (stb_appraisal_beg comexp_beg i.year)
twostep robust small
```

estimates store est4b

\*\*\*\*\*

\* Differenced, 2 GMM

\*\*\*\*\*

```
xi: xtabond2 d.cap d.sal ld.sal d.coc ld.coc
_Iyear_1996-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(l.cap l.sal
l.coc) ivstyle (i.year) twostep robust small
```

estimates store est1d

lincom d.sal+ld.sal

lincom d.coc+ld.coc

```

xi: xtabond2 d.cap d.sal ld.sal d.coc ld.coc stb_appraisal_beg
1.stb_appraisal_beg _Iyear_1996-_Iyear_2000
_Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (stb_appraisal_beg 1.stb_appraisal_beg i.year) twostep robust small
estimates store est2d

lincom d.sal+ld.sal

lincom d.coc+ld.coc

lincom stb_appraisal_beg+1.stb_appraisal_beg

```

```

xi: xtabond2 d.cap d.sal ld.sal d.coc ld.coc
comexp_beg 1.comexp_beg _Iyear_1996-_Iyear_2000 _Iyear_2002-_Iyear_2007 if
sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle (comexp_beg
1.comexp_beg i.year) twostep robust small
estimates store est3d

lincom d.sal+ld.sal

lincom d.coc+ld.coc

lincom comexp_beg+1.comexp_beg

```

```

xi: xtabond2 d.cap d.sal ld.sal d.coc ld.coc stb_appraisal_beg
1.stb_appraisal_beg comexp_beg 1.comexp_beg _Iyear_1996-_Iyear_2000
_Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (stb_appraisal_beg 1.stb_appraisal_beg comexp_beg 1.comexp_beg i.year)
twostep robust small
estimates store est4d

lincom d.sal+ld.sal

lincom d.coc+ld.coc

lincom comexp_beg+1.comexp_beg

lincom stb_appraisal_beg+1.stb_appraisal_beg

```

```

*****
* Differenced, 2 with lag, GMM
*****

```

```

xi: xtabond2 d.cap 1.cap d.sal ld.sal d.coc ld.coc
_Iyear_1996-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal
1.coc) ivstyle (i.year) twostep robust small

xi: xtabond2 d.cap 1.cap d.sal ld.sal d.coc ld.coc stb_appraisal_beg
1.stb_appraisal_beg _Iyear_1996-_Iyear_2000 _Iyear_2002-_
_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle
(stb_appraisal_beg 1.stb_appraisal_beg i.year) twostep robust small

```

```
xi: xtabond2 d.cap l.cap d.sal ld.sal d.coc ld.coc
comexp_beg 1.comexp_beg _Iyear_1996-_Iyear_2000 _Iyear_2002-_Iyear_2007 if
sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle (comexp_beg
1.comexp_beg i.year) twostep robust small
```

```
xi: xtabond2 d.cap l.cap d.sal ld.sal d.coc ld.coc stb_appraisal_beg
1.stb_appraisal_beg comexp_beg 1.comexp_beg _Iyear_1996-_Iyear_2000
_Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (stb_appraisal_beg 1.stb_appraisal_beg comexp_beg 1.comexp_beg i.year)
twostep robust small
```

```
*****
```

```
* Differenced, 3 GMM
```

```
*****
```

```
gen dsal=d.sal
```

```
gen dcoc=d.coc
```

```
xi: xtabond2 d.cap dsal 1.dsal 12.dsal dcoc 1.dcoc 12.dcoc
_Iyear_1996-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal
1.coc) ivstyle (i.year) twostep robust small
```

```
estimates store est1d2
```

```
lincom dsal+1.dsal+12.dsal
```

```
lincom dcoc+1.dcoc+12.dcoc
```

```
xi: xtabond2 d.cap dsal 1.dsal 12.dsal dcoc 1.dcoc 12.dcoc
stb_appraisal_beg 1.stb_appraisal_beg 12.stb_appraisal_beg
_Iyear_1996-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal
1.coc) ivstyle (stb_appraisal_beg 1.stb_appraisal_beg
12.stb_appraisal_beg i.year) twostep robust small
```

```
estimates store est2d2
```

```
lincom dsal+1.dsal+12.dsal
```

```
lincom dcoc+1.dcoc+12.dcoc
```

```
lincom stb_appraisal_beg+1.stb_appraisal_beg+12.stb_appraisal_be
```

```
xi: xtabond2 d.cap dsal 1.dsal 12.dsal dcoc 1.dcoc 12.dcoc
comexp_beg 1.comexp_beg 12.comexp_beg _Iyear_1996-_Iyear_2000 _Iyear_2002-_
_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle
(comexp_beg 1.comexp_beg 12.comexp_beg i.year) twostep robust small
```

```
estimates store est3d2
```

```
lincom dsal+1.dsal+12.dsal
```

```
lincom dcoc+1.dcoc+12.dcoc
```

```
lincom comexp_beg+1.comexp_beg+12.comexp_beg
```

```

xi: xtabond2 d.cap dsal 1.dsal 12.dsal dcoc 1.dcoc 12.dcoc
stb_appraisal_beg 1.stb_appraisal_beg 12.stb_appraisal_beg
comexp_beg 1.comexp_beg 12.comexp_beg _Iyear_1996-_Iyear_2000 _Iyear_2002-
_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle
(stb_appraisal_beg 1.stb_appraisal_beg 12.stb_appraisal_beg comexp_beg
1.comexp_beg 12.comexp_beg i.year) twostep robust small

```

```
estimates store est4d2
```

```
lincom dsal+1.dsal+12.dsal
```

```
lincom dcoc+1.dcoc+12.dcoc
```

```
lincom comexp_beg+1.comexp_beg+12.comexp_beg
```

```
lincom stb_appraisal_beg+1.stb_appraisal_beg+12.stb_appraisal_be
```

```
*****
```

```
* Level 1
```

```
*****
```

```

xi: xtabond2 cap 1.cap sal coc _Iyear_1995-
_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (i.year) twostep robust small

```

```
estimates store est11
```

```

xi: xtabond2 cap 1.cap sal coc stb_appraisal_beg _Iyear_1995-
_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (1.statebus i.year) twostep robust small

```

```
estimates store est21
```

```

xi: xtabond2 cap 1.cap sal coc comexp_beg _Iyear_1995-
_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (comexp_beg i.year) twostep robust small

```

```
estimates store est31
```

```

xi: xtabond2 cap 1.cap sal coc stb_appraisal_beg comexp_beg _Iyear_1995-
_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (1.statebus comexp_beg i.year) twostep robust small

```

```
estimates store est41
```

\*\*\*\*\*

\* Level 2

\*\*\*\*\*

```
xi: xtabond2  cap 1.cap  d.sal  1.sal d.coc  1.coc
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal
1.coc) ivstyle (i.year) twostep robust small
```

```
estimates store est112
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

```
xi: xtabond2  cap 1.cap  d.sal  1.sal d.coc  1.coc stb_appraisal_beg
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal
1.coc) ivstyle (stb_appraisal_beg i.year) twostep robust small
```

```
estimates store est212
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

```
xi: xtabond2  cap 1.cap  d.sal  1.sal d.coc  1.coc
comexp_beg          _Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007  if
sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle (comexp_beg i.year) twostep robust
small
```

```
estimates store est312
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

```
xi: xtabond2  cap 1.cap  d.sal  1.sal d.coc  1.coc stb_appraisal_beg
comexp_beg          _Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007
if sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle (stb_appraisal_beg comexp_beg
i.year) twostep robust small
```

```
estimates store est412
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

\*\*\*\*\*

\* Level 3

\*\*\*\*\*

```
xi: xtabond2 cap 1.cap d.sal 1.d.sal 1.sal d.coc 1.d.coc 1.coc
_Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal
1.coc) ivstyle (i.year) twostep robust small
```

```
estimates store est113
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

```
xi: xtabond2 cap 1.cap d.sal 1.d.sal 1.sal d.coc 1.d.coc 1.coc
stb_appraisal_beg 1.stb_appraisal_beg _Iyear_1995-
_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (stb_appraisal_beg 1.stb_appraisal_beg i.year) twostep robust small
```

```
estimates store est213
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

```
xi: xtabond2 cap 1.cap d.sal 1.d.sal 1.sal d.coc 1.d.coc 1.coc
comexp_beg 1.comexp_beg _Iyear_1995-_Iyear_2000 _Iyear_2002-_Iyear_2007 if
sample, gmmstyle(1.cap 1.sal 1.coc) ivstyle (comexp_beg 1.comexp_beg i.year)
twostep robust small
```

```
estimates store est313
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

```
xi: xtabond2 cap 1.cap d.sal 1.d.sal 1.sal d.coc 1.d.coc 1.coc
stb_appraisal_beg 1.stb_appraisal_beg comexp_beg 1.comexp_beg _Iyear_1995-
_Iyear_2000 _Iyear_2002-_Iyear_2007 if sample, gmmstyle(1.cap 1.sal 1.coc)
ivstyle (stb_appraisal_beg 1.stb_appraisal_beg comexp_beg 1.comexp_beg i.year)
twostep robust small
```

```
estimates store est413
```

```
nlcom _b[1.cap]-1
```

```
nlcom _b[1.sal]/(_b[1.cap]-1)
```

```
nlcom _b[1.coc]/(_b[1.cap]-1)
```

```
*****
```

```
* RESULTS
```

```
*****
```

```
esttab xt1a xt2a xt3a xt4a , se star(* 0.10 ** 0.05 *** 0.01) mtitles nogaps  
b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p ll)
```

```
esttab xt1a xt2a xt3a xt4a using XTa.tex, replace se star(* 0.10 ** 0.05 ***  
0.01) mtitles nogaps title(Results with P=1) b(%8.3f) t(%6.2f) aic(%8.3f)  
scalars(N r2 r2_p ll)
```

```
esttab xt1b xt2b xt3b xt4b , se star(* 0.10 ** 0.05 *** 0.01) mtitles nogaps  
b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p ll)
```

```
esttab xt1b xt2b xt3b xt4b using XTb.tex, replace se star(* 0.10 ** 0.05 ***  
0.01) mtitles nogaps title(Results with P=1) b(%8.3f) t(%6.2f) aic(%8.3f)  
scalars(N r2 r2_p ll)
```

```
esttab est4 est3 est2 est1, se star(* 0.10 ** 0.05 *** 0.01) mtitles  
nogaps b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p ll)
```

```
esttab est4 est3 est2 est1 using M1.tex, replace se star(* 0.10 ** 0.05 ***  
0.01) mtitles nogaps title(Results with P=1) b(%8.3f) t(%6.2f) aic(%8.3f)  
scalars(N r2 r2_p ll)
```

```
esttab est4d est3d est2d est1d, se star(* 0.10 ** 0.05 *** 0.01) mtitles  
nogaps b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p ll)
```

```
esttab est4d est3d est2d est1d using M2.tex, replace se star(* 0.10 ** 0.05  
*** 0.01) mtitles nogaps title(Results with P=2) b(%8.3f) t(%6.2f) aic(%8.3f)  
scalars(N r2 r2_p ll)
```

```
esttab est4d2 est3d2 est2d2 est1d2, se star(* 0.10 ** 0.05 *** 0.01)  
mtitles nogaps b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p ll)
```

```
esttab est4d2 est3d2 est2d2 est1d2 using M3.tex, replace se star(* 0.10 **  
0.05 *** 0.01) mtitles nogaps title(Results with P=3) b(%8.3f) t(%6.2f)  
aic(%8.3f) scalars(N r2 r2_p ll)
```

```
esttab est41 est31 est21 est11, se star(* 0.10 ** 0.05 *** 0.01) mtitles  
nogaps b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p ll)
```

```
esttab est412 est312 est212 est112, se star(* 0.10 ** 0.05 *** 0.01) mtitles  
nogaps b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p 11)
```

```
esttab est412 est312 est212 est112 using M4.tex, replace se star(* 0.10 **  
0.05 *** 0.01) mtitles nogaps title(Results of ECM Q=1) b(%8.3f) t(%6.2f)  
aic(%8.3f) scalars(N r2 r2_p 11)
```

```
esttab est413 est313 est213 est113, se star(* 0.10 ** 0.05 *** 0.01) mtitles  
nogaps b(%8.3f) t(%6.2f) aic(%8.3f) scalars(N r2 r2_p 11)
```

```
esttab est413 est313 est213 est113 using M5.tex, replace se star(* 0.10 **  
0.05 *** 0.01) mtitles nogaps title(Results of ECM Q=2) b(%8.3f) t(%6.2f)  
aic(%8.3f) scalars(N r2 r2_p 11)
```

```
log close
```

```
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```