```
* Illustration of importance of statistical power and how misleading p-values
sometimes are

clear

set matsize 11000
set obs 100000
set seed 12345

* Generate data set
gen x = rnormal(2.5,0.4)
gen y = 5*x + exp(rnormal(5,0.5))

reg y x

twoway (scatter y x, msize(tiny) msymbol(circle)) (lfit y x, lcolor(black)), ///
        legend(off) ytitle(Årsinkomst i tusentals kronor) xtitle(Antal portioner
fisk och spenat per vecka) ///
        scheme(s1mono)
graph export scatter.png, replace


* 1000 hypothetical studies with 50,000 obs

matrix A = J(1000,1,0)
matrix p = J(1000,1,0)
matrix se = J(1000,1,0)

forvalues i = 1(1)1000 {
        display `i' " " _continue
        preserve
        quietly sample 50
        quietly reg y x
        matrix TEMP = r(table)
        matrix A[`i',1] = TEMP["b","x"]
        matrix p[`i',1] = TEMP["pvalue","x"]
        matrix se[`i',1] = TEMP["se","x"]
        restore
}

svmat A
svmat p
svmat se
sum se
sum p
histogram A1, lcolor(black) color(red) ylabel(none) xtitle("") ytitle("")
scheme(s1mono)
graph export wellpowered.png, replace
keep x y

* 1000 hypothetical studies with 1,000 obs

matrix A = J(1000,1,0)
matrix p = J(1000,1,0)
matrix se = J(1000,1,0)

forvalues i = 1(1)1000 {
        display `i' " " _continue
        preserve
        quietly sample 1
        quietly reg y x
        matrix TEMP = r(table)
```

```
        matrix A[`i',1] = TEMP["b","x"]
        matrix p[`i',1] = TEMP["pvalue","x"]
        matrix se[`i',1] = TEMP["se","x"]
        restore
}

svmat A
svmat p
svmat se
sum se
gen sig = (p1 <= 0.05)
replace sig = . if p1 == .
tab sig
gen bin = round(A1)
gen b1 = A1 if sig == 1
gen b2 = A1 if sig == 0
graph bar (count) b1 (count) b2, over(bin, label(labcolor("0 0 0")
labsize(vsmall))) stack bar(1, fcolor(green)) bar(2, fcolor(red)) ylabel(none)
legend(order(1 "Signifikant" 2 "Icke-signifikant")) scheme(s1mono)
graph export underpowered.png, replace
keep x y

* 1000 hypothetical studies with 100 obs

matrix A = J(1000,1,0)
matrix p = J(1000,1,0)
matrix se = J(1000,1,0)

forvalues i = 1(1)1000 {
        display `i' " " _continue
        preserve
        quietly sample 0.1
        quietly reg y x
        matrix TEMP = r(table)
        matrix A[`i',1] = TEMP["b","x"]
        matrix p[`i',1] = TEMP["pvalue","x"]
        matrix se[`i',1] = TEMP["se","x"]
        restore
}

svmat A
svmat p
svmat se
sum se
gen sig = (p1 <= 0.05)
replace sig = . if p1 == .
tab sig
gen bin = round(A1/10)*10
gen b1 = A1 if sig == 1
gen b2 = A1 if sig == 0
graph bar (count) b1 (count) b2, over(bin, label(labcolor("0 0 0")
labsize(vsmall))) stack bar(1, fcolor(green)) bar(2, fcolor(red)) ylabel(none)
legend(order(1 "Signifikant" 2 "Icke-signifikant")) scheme(s1mono)
graph export veryunderpowered.png, replace
```