```
      name:  <unnamed>
       log:  /Users/erinmarkiewitz/Dropbox/Phd_Coursework/Econ675/hw2\results\
> pset2_stata.smcl
  log type:  smcl
 opened on:  11 Oct 2018, 14:26:11

1 .
2 .
3 . *******
4 . *** Problem 1
5 . *******
6 . /*
  > set obs 10000
  > timer on 1
  > program IMSEsim, rclass
  > drop _all
  > set obs 1000
  > gen x =  rnormal(-1/4, 5/8)
  > gen fx = normalden(-1/4, 5/8)
  > _kdens x, at(x) generate(fxh) bw(.5) kernel(epan2)
  > gen diffLI = (fx - fxh)^2
  > gen diffL0 = 0
  >
  >
  > forvalues i = 1/1000 {
  >         _kdens x if _n != `i', at(x) generate(fxh`i') bw(.5) kernel(epan2)
  >         replace diffL0 = (fx - fxh`i')^2 if _n == `i'
  > }
  >
  > qui summ diffLI
  > return scalar data1 = r(mean)
  > qui summ diffL0
  > return scalar data2 = r(mean)
  > end
  >
  >
  >
  > simulate IMSE_LI=r(data1) IMSE_L0 = r(data2), reps(1) nodots: IMSEsim
  > timer off 1
  > timer list
  > */
```

```
 7 .
 8 .
 9 . *******
10 . *** Problem 3
11 . *******
12 . /*
   > drop _all
   > set obs 1000
   > local theta = 1
   > local d = 5
   > local n = 500
   >
   > forvalues p = 1/14 {
   > gen se_hat`p' = .
   > gen theta_hat`p' = .
   >
   > }
   >
   >
   > mata:
   > void polyloop(i) {
   > real matrix se_hat
   > real matrix theta_hat
   >
   > X       = uniform(`n',`d'):*2 :-1
   > ep      = invnormal(uniform(`n',1)):*0.3637899:*(1 :+ rowsum(X:^2))
   > gx      = exp(rowsum(X:^2))
   > T       = invnormal(uniform(`n',1)) + rowsum(X:^2):^.5 :>= 0
   > Y   = T + gx + ep
   >
   >
   > A = asarray_create("real",1)
   > cons= J(500,1,1)
   > X2      = X:^2
   > X3      = X:^3
   > X4      = X:^4
   > X5      = X:^5
   > X6      = X:^6
   > X7      = X:^7
   > X8      = X:^8
   > X9      = X:^9
   > X10 = X:^10
   >
   > X1k = X#X
   > X2k = X2#X2
   > X3k = X3#X3
   > X4k = X4#X4
   >
   > X1k = X1k[1::`n',2::5], X1k[1::`n', 8::10], X1k[1::`n',14::15], X1k[1::`n',
```

```
> 20]
> X2k = X2k[1::`n',2::5], X2k[1::`n', 8::10], X2k[1::`n',14::15], X2k[1::`n',
> 20]
> X3k = X3k[1::`n',2::5], X3k[1::`n', 8::10], X3k[1::`n',14::15], X3k[1::`n',
> 20]
> X4k = X4k[1::`n',2::5], X4k[1::`n', 8::10], X4k[1::`n',14::15], X4k[1::`n',
> 20]
>
>
> asarray(A,1,X)
> asarray(A,2,(asarray(A,1),X2))
> asarray(A,3,(asarray(A,2),X1k))
> asarray(A,4,(asarray(A,3),X3))
> asarray(A,5,(asarray(A,4),X2k))
> asarray(A,6,(asarray(A,5),X4))
> asarray(A,7,(asarray(A,6),X3k))
> asarray(A,8,(asarray(A,7),X5))
> asarray(A,9,(asarray(A,8),X4k))
> asarray(A,10,(asarray(A,9),X6))
> asarray(A,11,(asarray(A,10),X7))
> asarray(A,12,(asarray(A,11),X8))
> asarray(A,13,(asarray(A,12),X9))
> asarray(A,14,(asarray(A,13),X10))
>
>
> theta_hat = I(1,14):*0
> se_hat = I(1,14):*0
> k_hat = I(1,14):*0
>
> for (j=1; j<=14; j++) {
>
> Z = qrsolve(cons,(T,asarray(A,j)))
> ZZ  = Z*Z'
> Yhat = ZZ*Y
> W = diag(ZZ)
> ZQ = (cons,asarray(A,j))*invsym((cons,asarray(A,j))'*(cons,asarray(A,j)))*(c
> ons,asarray(A,j))'
> M = I(`n') - ZQ
> YM = M*Y
> TM = M*T
> theta_hat[1,j] = (TM'*YM) / (TM'*TM)
> sigma = diag(ZQ*(Y-T*theta_hat[1,j]))
> se_hat[1,j] = sqrt(invsym(T'*ZQ*T)*(T'*ZQ*sigma*ZQ*T)*invsym(T'*ZQ*T))
> st_store(i, "se_hat"+strofreal(j), se_hat[1,j])
> st_store(i, "theta_hat"+strofreal(j), theta_hat[1,j])
> }
>
> }
>  end
```

```
   >
   >
   > forvalues i = 1/1000 {
   > mata polyloop(`i')
   > }
   > save output_q3.dta, replace
   >
   > */
13 .
14 . use output_q3,clear

15 . gen obs = _n

16 . reshape long se_hat theta_hat, i(obs) j(k)
   (note: j = 1 2 3 4 5 6 7 8 9 10 11 12 13 14)

   Data                                wide   ->   long
   -----------------------------------------------------------------------------
   Number of obs.                      1000   ->   14000
   Number of variables                   29   ->       4
   j variable (14 values)                     ->   k
   xij variables:
               se_hat1 se_hat2 ... se_hat14   ->   se_hat
     theta_hat1 theta_hat2 ... theta_hat14    ->   theta_hat
   -----------------------------------------------------------------------------

17 . collapse (mean) mean_se_hat= se_hat  mean_theta_hat=theta_hat (sd) sd_theta_
   > hat = theta_hat, by(k)

18 .
19 . log close
         name:  <unnamed>
          log:  /Users/erinmarkiewitz/Dropbox/Phd_Coursework/Econ675/hw2\results\
   > pset2_stata.smcl
     log type:  smcl
    closed on:  11 Oct 2018, 14:26:11
   -----------------------------------------------------------------------------
```