Stata Lecture Notes
Class 1

Sample size calculations (or power calculations) for hypothesis testing with one or two samples is easily accomplished using the `Stata` immediate command `sampsi`. The following are examples of sample size or power calculations based on a scenario from the Lecture Notes:

1) An example of the sample size required (or power) required for a one-sample test of a mean with a specified alternative hypothesis:

```
. sampsi 175 190, sd(50) onesam onesid

Estimated sample size for one-sample comparison of mean
  to hypothesized value

Test Ho: m =    175, where m is the mean in the population

Assumptions:

         alpha =   0.0500  (one-sided)
* Note:  The default is 5% probability of a Type I error
         power =   0.9000
* Note:  The default is 90% power

 alternative m =      190
            sd =       50

Estimated required sample size:

             n =       96
```

```
. sampsi 175 190, sd(50) n(100) onesam onesid

Estimated power for one-sample comparison of mean
  to hypothesized value

Test Ho: m =    175, where m is the mean in the population

Assumptions:

         alpha =   0.0500  (one-sided)
 alternative m =      190
            sd =       50
 sample size n =      100

Estimated power:

         power =   0.9123
```

```
. sampsi 175 190, sd(50) onesam

Estimated sample size for one-sample comparison of mean
  to hypothesized value

Test Ho: m =    175, where m is the mean in the population

Assumptions:

         alpha =   0.0500  (two-sided)
         power =   0.9000
 alternative m =      190
            sd =       50

Estimated required sample size:

             n =      117
```

```
. sampsi 175 190, sd(50) n(10) onesam

Estimated power for one-sample comparison of mean
  to hypothesized value

Test Ho: m =    175, where m is the mean in the population

Assumptions:

         alpha =   0.0500  (two-sided)
 alternative m =      190
            sd =       50
 sample size n =       10

Estimated power:

         power =   0.1559
```

```
. sampsi 175 200, sd(50) n(10) onesam onesid

Estimated power for one-sample comparison of mean
  to hypothesized value

Test Ho: m =    175, where m is the mean in the population

Assumptions:

         alpha =   0.0500  (one-sided)
 alternative m =      200
            sd =       50
 sample size n =       10

Estimated power:

         power =   0.4746
```

2) An example of the sample size (or power) required for a one-sample test of a proportion with a specified alternative hypothesis:

```
. sampsi 0.75 0.5, onesam

Estimated sample size for one-sample comparison of proportion
  to hypothesized value

Test Ho: p = 0.7500, where p is the proportion in the population

Assumptions:

         alpha =   0.0500  (two-sided)
         power =   0.9000
 alternative p =   0.5000

Estimated required sample size:

             n =       36


. sampsi 0.75 0.5, onesam onesid

Estimated sample size for one-sample comparison of proportion
  to hypothesized value

Test Ho: p = 0.7500, where p is the proportion in the population

Assumptions:

         alpha =   0.0500  (one-sided)
         power =   0.9000
 alternative p =   0.5000

Estimated required sample size:

             n =       30

. sampsi 0.75 0.5, onesam n(50)

Estimated power for one-sample comparison of proportion
  to hypothesized value

Test Ho: p = 0.7500, where p is the proportion in the population

Assumptions:

         alpha =   0.0500  (two-sided)
 alternative p =   0.5000
 sample size n =       50

Estimated power:

         power =   0.9670
```

```
. sampsi 0.75 0.5, onesam n(200)

Estimated power for one-sample comparison of proportion
  to hypothesized value

Test Ho: p = 0.7500, where p is the proportion in the population

Assumptions:

         alpha =   0.0500  (two-sided)
 alternative p =   0.5000
 sample size n =      200

Estimated power:

         power =   1.0000
```

```
. sampsi 0.75 0.5, onesam n(20)

Estimated power for one-sample comparison of proportion
  to hypothesized value

Test Ho: p = 0.7500, where p is the proportion in the population

Assumptions:

         alpha =   0.0500  (two-sided)
 alternative p =   0.5000
 sample size n =       20

Estimated power:

         power =   0.7050

Note: For the above sample size(s) and proportion(s), the
      normal approximation to the binomial may not be very
      accurate.  Thus, power calculations are questionable.
```

Recall that the normal approximation of the binomial distribution depends on having a large enough sample size such that np > 5 and nq> 5. Here, p=0.75 and np= 20(0.75) = 15 and nq=20(0.25) =5.