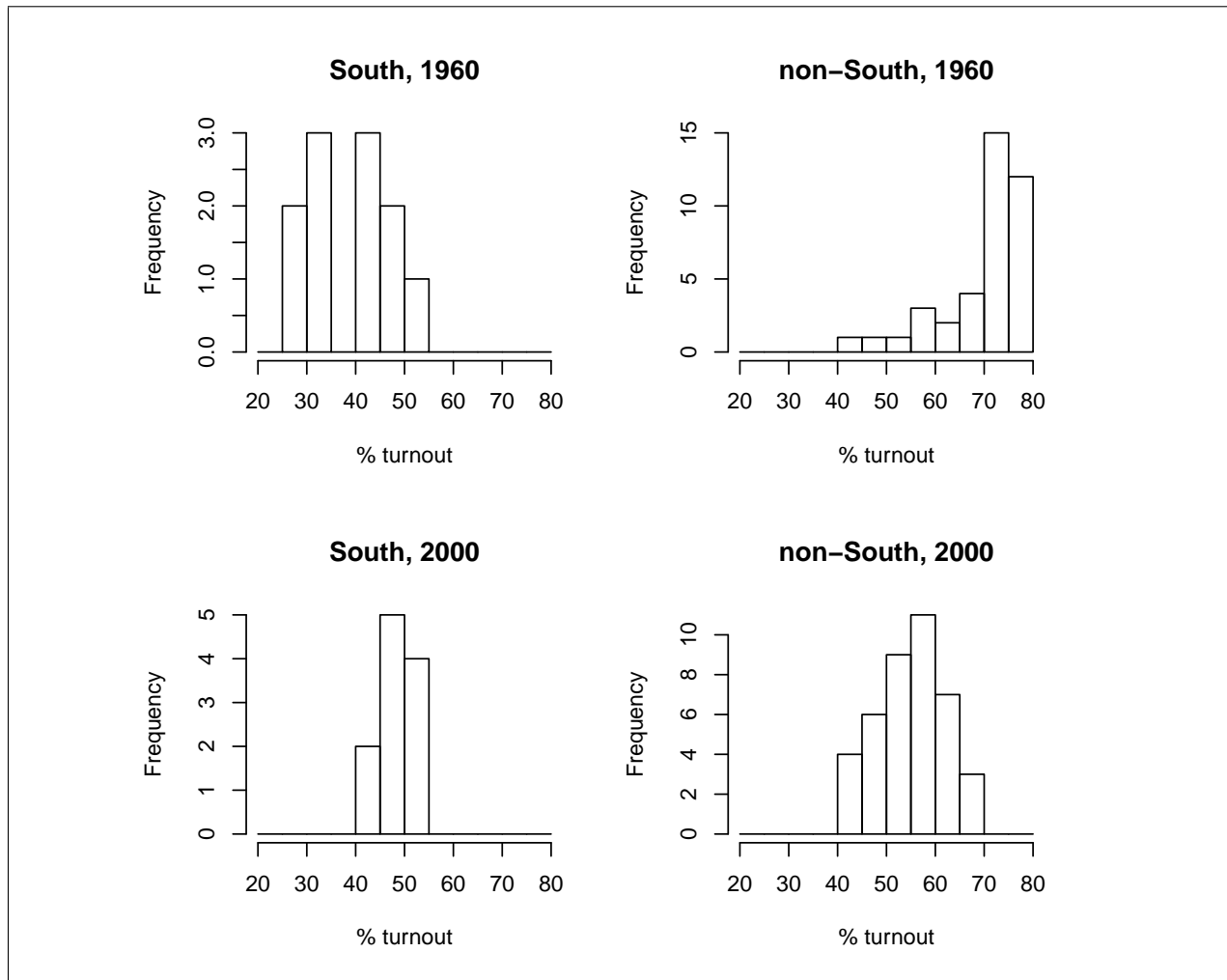# 1   Motivation

In HW1, we took a cursory look at differences in turnout over time between the South and the rest of the Union using histograms and boxplots.

Let's continue to analyze these data, assuming turnout in each region is normally distributed.

2   Exercises

Exercise 1: Create density curves for Southern and non-Southern states in 1960 and place them on the same plot. Do the same for 2000. You should have 2 plots with 2 curves each. Calculate the density curves assuming turnout within each region is normally distributed. Be sure to label the x and y axes, give your plots titles, and make sure your plot areas are not truncated.

Exercise 2: For each year (1960 and 2000), answer this question in around 250 words: based on just a visual inspection, is it plausible that the two regions are more or less from the same population? Why or why not?

Exercise 3: Answer the following in around 500 words: In HW1, it looked like the gap in turnout between the South and the rest decreased from 1960 onwards. Is this observation supported by exercises 1 and 2? If we were to redraw these plots for all the other elections between 1960 and 2000, what trends would we expect to see?

Exercise 4: Assuming normally distributed turnout by region, estimate the Pr that...

1. a random Southern state in 1960 has turnout < 50%

2. a random non-Southern state in 1960 has turnout > 70%

3. a random Southern state in 2000 has turnout between 40% and 60%

4. a random non-Southern state in 2000 has turnout between 40% and 60%

Exercise 5: Answer the following in around 500 words: How do the numbers you estimated in exercise 4 relate to the density plots you drew in exercise 1? If you were to calculate them again for all the other elections between 1960 and 2000, what trends would you expect to see?

3   Administrative details

- This assignment is due at 11:59 PM, 4/15/2014 via Turnitin.

- You may work with one partner. If you do work with a partner, include your partner's name under yours in the heading. Remember that working with a partner does not mean copy from each other. Your submission **must be** your own work.

- You **do not** need to submit your R code.

- See the syllabus for policies regarding late submissions and plagiarism.

4   Pointers

▶ **Density plots:** Below is sample code for drawing 1972 South and non-South normal density curves on the same plot.

```
> S72 = turnout$p1972[turnout$deepsouth == 1]
> N72 = turnout$p1972[turnout$deepsouth == 0]
> mu.S72 = mean(S72)
> mu.N72 = mean(N72)
> sig.S72 = sd(S72)
> sig.N72 = sd(N72)
> Xs = 30:80
> Ys.S72 = dnorm(Xs, mu.S72, sig.S72)
> Ys.N72 = dnorm(Xs, mu.N72, sig.N72)
> xlims = c(30, 80)
> plot(NA, NA, type='n', main='turnout 1972, normal dens. by region',
+                 xlim = xlims, ylim = c(0, max(c(Ys.S72, Ys.N72))),
+                 xlab = '% turnout', ylab = 'density')
> lines(Xs, Ys.N72, col='blue', lwd=2)
> lines(Xs, Ys.S72, col='grey', lwd=2)
```

turnout 1972, normal dens. by region