



## Essays in Social Economics

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Thesis advisor

Author

**Dr. Lawrence Katz**

**Elizabeth Longenecker Greenwood**

## **Essays in Social Economics**

# **Abstract**

This dissertation consists of three essays using economic methods to understand social policy issues.

The first chapter uses a regression discontinuity framework to understand how teen birth rates respond to the first college opening in a county. The predicted effect of a college opening on teen births is ambiguous. Teen births could fall if college and motherhood are substitutes, but they could rise if a local college allows teen mothers to attend college or if teen mothers are not on the margin for attending college. Using data on teen births and college openings from 1969-1988, I find that teen births do not fall and may increase following a college opening. The effect is strongest among older teens, lending support to the notion that a local college allows more women to simultaneously become a mother and go to college.

The second chapter examines why whites tend not to support welfare programs to the extent that blacks do. I recruited a racially and economically diverse set of subjects in Chicago Heights, IL and Boston and collected an original dataset combining survey questions and preferences for redistribution plans with economic consequences. Black subjects were not systematically more risk or inequity averse than white subjects and were only less confident when the task was a trivia quiz.

Blacks preferred less redistribution than whites in each task, but the fraction of blacks preferring redistribution on luck-based tasks was larger than the fraction of whites preferring redistribution on effort-based tasks. This result could mean that blacks and whites have different beliefs about the drivers of success, although survey data does not support this conclusion.

The third chapter provides a preliminary discussion of how recent changes in the United States labor market could affect men and women differently. I develop a model of occupational segregation assuming that men and women are equally intelligent but that men are stronger than women and predict how skill-biased technical change and offshoring might impact men and women differently in this context. I present some preliminary time-series evidence on changes in the skill composition of men's and women's jobs over time.

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Finally, I am very grateful for the support of my family, friends, and especially Alex Scott throughout the process.

# Chapter 1

## The Effect of Access to Higher Education On Teen Birth Rates

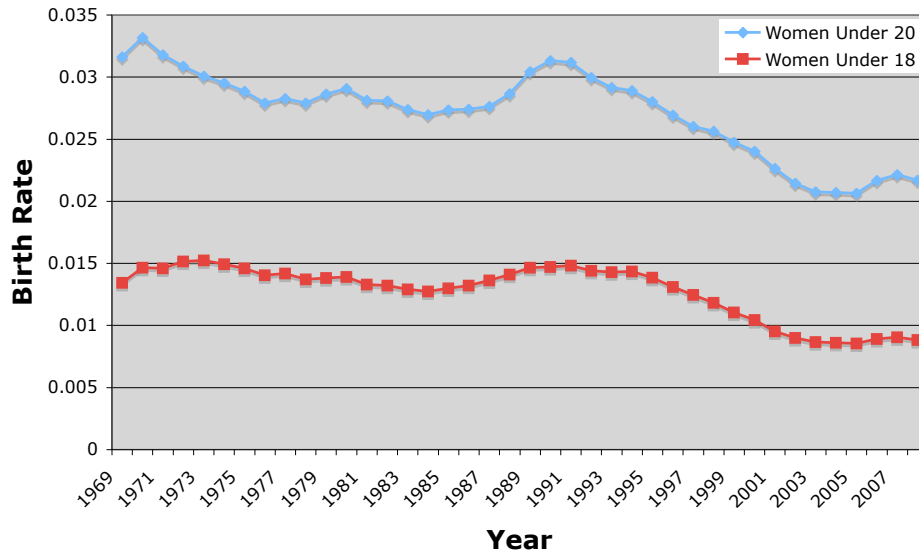
### 1.1 Introduction

In 2008, slightly more than two out of every 100 American women aged ten to 20 gave birth. Although the annual teen birth rate in the United States has fallen from over 3 percent in the 1960s, it remains substantially higher than in every other developed nation. Figure 1.1 shows that after declining throughout the 1990s, the teen birth rate has begun to increase slightly over the past decade.

Focusing on the drop in the overall teen birth rate masks some more troublesome facts. Births to unmarried teens have increased considerably since the 1970s, as shown in Figure 1.2, and did not fall as much as all teen births. Births to unmarried women under 18, perhaps the group of teen mothers least equipped to care for their children, fell only slightly and have stayed the same since the early 2000s.

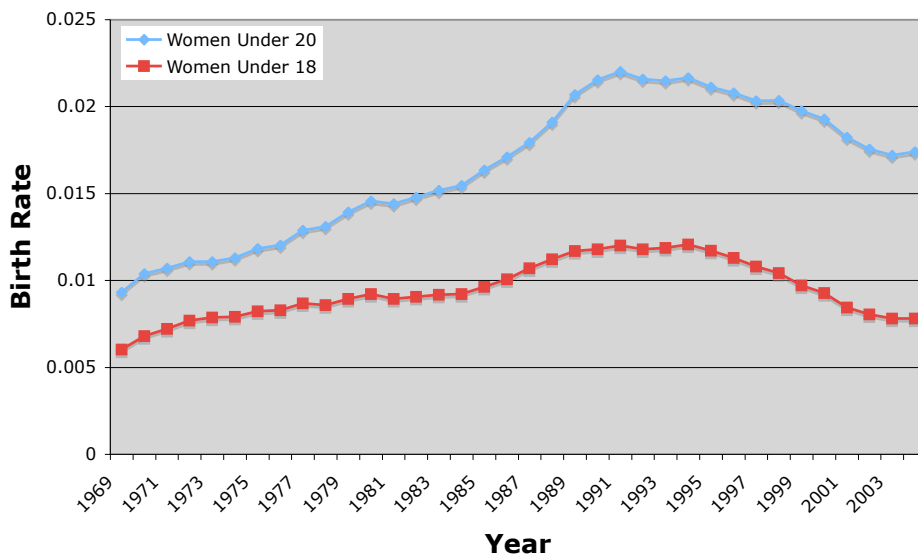


Figure 1.1: Teen Birth Rates



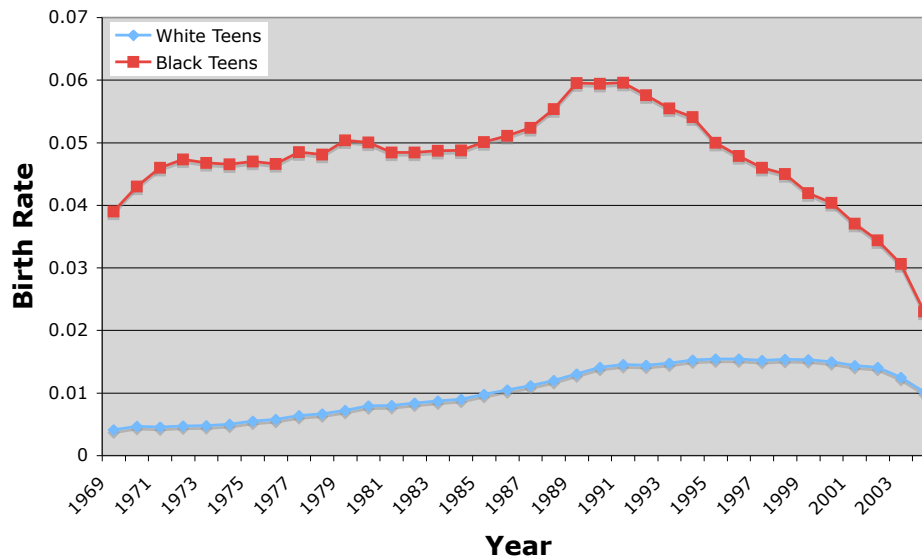
Denominator is women between ages 10-19 for teen mothers and between ages 10-17 for mothers under 18.

Figure 1.2: Unmarried Teen Birth Rates



Denominator is women between ages 10-19 for teen mothers and between ages 10-17 for mothers under 18. Unmarried teen births exclude 14 states with incomplete mother's marital status data.

Figure 1.3: Unmarried Teen Birth Rates by Race



Denominator is women between ages 10-19 for teen mothers and between ages 10-17 for mothers under 18. Unmarried teen births exclude 14 states with incomplete mother's marital status data.

Breaking the unmarried teen birth rate down by race, as in Figure 1.3, shows that the race gap in teen births has narrowed considerably in recent years. The birth rate for unmarried black teens fell from a high of 6 percent around 1990 to slightly above 2 percent in 2004. Births to unmarried white teens increased gradually through 1990 before stabilizing and falling in the early 2000s.

Births to teenagers are an important policy concern because young motherhood is associated with worse outcomes for both mothers and children. According to the National Campaign to Prevent Teen and Unplanned Pregnancy, children born to unmarried teen mothers are more likely to grow up in poverty, to be born prematurely or underweight, to suffer abuse or neglect, and to enter the foster care system. Teen mothers themselves are often poor and have difficulty completing

their educations and establishing their careers while caring for a young child.

Because teen mothers are often poor, however, it can be difficult to uncouple the effect of young motherhood on their children from the effect of growing up in a poor household. Similarly, teen mothers are typically single, and growing up in a single-parent household can also have a negative effect on children regardless of their mother's age.

Even looking within the set of disadvantaged teens, there may be important selection effects driving the decision to become pregnant. Teens who expect to become successful later in life may work harder to avoid a pregnancy. The causal link between teen pregnancy and other negative outcomes is therefore difficult to establish.

Ashcraft and Lang (2006) compare outcomes for women who had a teenage birth to those for women who became pregnant as a teenager but miscarried. They find only small differences in average outcomes for these two groups of women. Teen motherhood reduces a young woman's education by 0.15 years relative to teens who miscarried and has almost no effect on family income. Although this approach cannot determine the effect of young motherhood on children's outcomes, the results imply that selection effects are important in understanding the causal effects of teen births on mothers.

Despite the lack of definitive evidence that teen motherhood negatively affects women and children, however, it remains a major policy concern. Policymakers have tried to reduce teen births both through direct interventions, like sex education, and through indirect interventions, like job training that could improve

teens' economic prospects. Although policy efforts tend to focus on reducing births to unwed teenagers, the desired outcome seems to be delaying these births until mothers are older rather than encouraging unwed pregnant teenagers to marry.

In this chapter, I look at the relationship between economic opportunities and teen birth rates from a new angle. When a new college opens, the cost of obtaining additional years of schooling decreases for local teenagers. This increase in access to education reflects new economic opportunities, which may in turn have an effect on teen birth rates.

Currie and Moretti (2003) show both that the fraction of individuals in a county attending college increases when the number of colleges increases and that when mothers receive this additional education, the health of their infants improves. Because more individuals in a county attend college when a new college opens, the opening must lower the cost of attending college for at least some people in that county. Thus this set of college openings provides a new mechanism for examining the relationship between economic opportunities and teen births.

The typical policy discussion about teen births in the United States centers on the effectiveness of abstinence-only programs versus sex education programs that discuss other methods of pregnancy prevention. This chapter departs from this discussion entirely, in part because these programs have not been shown to be particularly effective.

A report by Trenholm (2006) evaluating four different abstinence-only programs found that these programs neither reduced sexual intercourse among teens nor increased the frequency of unprotected sex. In the economics literature, Oet-

tinger (1999) finds that sex education increases the hazard rate of sexual activity and does not reduce and may even increase teen births. The effect of this information is strongest among younger teens, who may not have previously received this information from another source.

Qualitative research also suggests that additional sex education may not be the most effective strategy for reducing teen births. Edin and Kefalas (2005) interviewed single mothers of all ages and found that many of their subjects saw no reason to delay childbearing. Being a mother gave the subjects a sense of purpose and fulfilled a desire to be needed. The subjects generally felt that they did understand how to prevent a pregnancy and had access to the required technology. These interviews suggest that some teens do make an active choice to become mothers either by trying to become pregnant or by keeping an unintended pregnancy.

A recent publication by the National Campaign to Prevent Teen and Unplanned Pregnancy (Suellentrop (2010)) describes 24 different programs designed to reduce sexual activity and pregnancy among teenagers. All of these were evaluated using randomized trials. These programs were typically time-intensive, combining both sexual education and activities stressing community involvement or life skills, and were directed mostly at young, urban teens. Many of them were successful at reducing or delaying sexual activity in the short run, but few of them reported that they successfully reduced teen births, often because this outcome was not measured.

Although sex education has not proven to be very effective in reducing teen

births, some other types of interventions have had an impact. Kearney and Levine (2009) find that Medicaid-funded family planning services, which subsidize contraception, do reduce teen births, implying that some pregnant teens would have preferred to avoid a pregnancy if the cost of doing so were cheaper.

Kane and Staiger (1996) find that when abortion first became available, teen births fell considerably. Births did not increase following subsequent restrictions to abortion access, however. They argue that the increased cost of abortion did not just cause some teens to choose birth over abortion but also led other teens to take more steps to avoid pregnancy altogether.

Levine (2001) finds that when the teen-to-employment ratio is higher, teen pregnancy rates fall. Similarly, Duncan and Hoffman (1990) find that higher predicted economic opportunities are associated with lower rates of teen pregnancy. Kearney and Levine (2011) compare teen pregnancy rates across states with different levels of inequality to argue that higher levels of economic despair are associated with more teen births.

Finally, a large literature examines the effect of the AFDC program, which seemed to incentivize single and teen motherhood by providing greater benefits for single mothers than for two-parent families. Researchers have drawn different conclusions depending on the study design and the data used to look at these effects (Duncan and Hoffman (1990); Rosenzweig (1999)).

Because several types of economic opportunities have been shown to have an impact on teen birth rates but sex education has not, teenage women are probably not becoming mothers because they lack information on how to prevent this

outcome. Rather, they may see it as the best choice given their current situation. I therefore examine how their decisions change when access to education increases.

Access to education is sometimes seen as an easy fix for any number of social problems. Although education itself can help individuals make better decisions, simply making education more accessible may not always have the desired policy effect. In particular, a drop in the cost of attending college does not necessarily mean that the teen pregnancy rate will fall. Basic economic theory says that when the price of one good changes, the quantity demanded of a second normal good can rise or fall depending on whether the income or substitution effect dominates.

This logic can be extended to the case of a teenager deciding whether to give birth or continue schooling. If schooling becomes less costly, this teenager may choose to forgo motherhood in order to obtain even more schooling, but she might decide she has enough resources to do both at the same time. Thus the predicted effect of college openings on teen birth rates is ambiguous.

Combining data on college openings in the United States with data on teen births between the years 1969-1988, I find that teen birth rates do not fall and may even rise in the years following the first college opening in a county. This effect is robust across regions and type of college institutions, but is stronger for white teens than black teens and for older teens than younger teens.

I argue that there are two possible explanations for these results. The simplest is that when the cost of attending college falls, more young women are able to go to college and become mothers simultaneously, so the teen birth rate rises as women have less reason to delay giving birth.

A second explanation assumes that most young women are not simultaneously on the margin for going to college and giving birth. In this case, when a college opens, some high-ability high school graduates attend college, reducing the average ability of the pool of high school graduates with no college education. As Bedard (2001) shows, the wage premium for having a high school diploma and no college education falls. The opportunity cost of young motherhood for women on the margin of finishing high school therefore decreases because a high school diploma is worth less, and some women may be choosing to drop out of high school and give birth instead.

Determining which of these explanations is more plausible requires data on whether more young mothers are on the margin for attending college or dropping out of high school. Data with this level of detail on teen mothers is not currently available on a large scale. However, I hypothesize that since the positive effect of a college opening on teen births is stronger for older teens, the first explanation is more plausible.

The rest of the chapter proceeds as follows. Section 1.2 discusses an economic framework for the relationship between college openings and teen pregnancy. Section 1.3 describes the data used in the chapter, Section 1.4 presents the empirical strategy and the results, and Section 1.5 concludes.

## **1.2 Economic Framework**

In this section, I review the different hypotheses for how a college opening could affect the decision to have a child as a teenager. I first discuss why one might



think a college opening could lower teen birth rates and then discuss how it could instead raise teen birth rates. The overall predicted effect is therefore ambiguous. I then develop a simple model of the factors involved in this decision.

Throughout the chapter, I assume that teens become parents deliberately. Teen pregnancy rates vary considerably across developed countries and across states within the United States. Explanations for teen births that emphasize impulsiveness or hyperbolic discounting would therefore have to explain why these factors systematically vary between teens in different locations. I also assume teens are informed about how to avoid pregnancy.

### **1.2.1 Ambiguous Effect of a College Opening on Teen Births**

Currie and Moretti (2003) show that when a college opens in a county, more individuals in that county choose to go to college. I therefore assume that a college opening reduces the cost of obtaining a college education for at least some people in that county. Tuition costs may not be lower at a new local college than at a college in a different county. Being able to attend college locally, however, reduces transportation and housing costs. Students who need to work while in school may have an easier time finding a job or continuing work at a current job in their hometown. Finally, there may be a psychic cost associated with leaving home for some individuals.

If motherhood is a substitute for pursuing an education and career, then if the cost of attending college falls and the cost of becoming a mother remains the same, teen motherhood should fall and college attendance should rise. Becom-

ing a mother may be a substitute for attending higher education in the sense that both require a large investment of time and can provide personal fulfillment. If attending college is very expensive, becoming a mother may be seen as a reasonable alternative use of one's time. In interviews, teens have explained that they chose to become mothers because they craved the control and sense of purpose associated with caring for a child. Attending college and subsequently pursuing a career can also provide these things.

A local college opening likely does reduce the cost of attending college but does not reduce the cost of becoming a mother. Thus, if teen motherhood is a substitute for going to college, the teen birth rate in a county should fall when a college opens.

Another hypothesis that could explain an inverse relationship between college openings and teen births has been discussed elsewhere in the literature (Kearney and Levine (2011)). Teens become pregnant because of a "culture of despair." In this scenario, teens know that they eventually want to become mothers. They choose not to delay motherhood because they believe they have slim outside options and therefore have nothing to gain from delaying.

This model differs somewhat from the model in which college and motherhood are substitutes. Under the "culture of despair" model, teens start a family as soon as they think the opportunity cost of giving birth is low enough. If they feel the chance of success, and thus the opportunity cost, is low, they have a child immediately. A college opening would be most likely to increase the perceived probability of success for teens who are close to the margin for going to college.

Although one might assume a college opening would unambiguously lower

teen birth rates, it could instead cause teen birth rates to rise for several reasons. The most straightforward of these is that a local college could make it easier to be a mother and a student simultaneously. If a young single mother can attend college while living at home, her family members may be able to provide childcare.

It seems counterintuitive to think that more teenagers would choose to give birth when the cost of attending college falls. One plausible mechanism such an increase, however, is a teenager becoming pregnant by accident and choosing to keep her baby when she does not have to forgo a college education to do so. If motherhood and college are not substitutes, then, a drop in the price of college could lead more women to become teen mothers.

A second hypothesis for why college openings could raise teen birth rates comes from Bedard (2001). When a college opens locally, some students who previously chose a high school education will choose to attend some college or obtain a degree instead. Assuming the highest ability individuals leave the pool of high school educated workers to obtain more education, the average ability level signaled by a high school degree falls. The high school wage premium falls, and individuals with a high cost of obtaining a high school degree no longer find this pursuit worthwhile.

The cost of obtaining a high school diploma may be particularly high for women who want to become young mothers. Either they must delay motherhood and incur an opportunity cost, or they must try to balance school and motherhood. Teens on the margin for giving birth may therefore be particularly at risk for dropping out when the high school wage premium falls. If the average young woman con-

sidering motherhood is closer to the margin for dropping out of high school than for attending college, a local college opening could increase teen birth rates. Under the “culture of despair” hypothesis, a college opening could make relative success seem more unattainable for women who believe they cannot attend college, also leading to an increase in teen births.

## 1.2.2 Framework

In this subsection, I develop a basic framework incorporating the hypotheses described above.

A young woman’s utility is given by a function  $U(B, S, C)$  where  $B$  is children,  $S$  is schooling, and  $C$  is all other consumption. For simplicity, I assume schooling enters directly into the utility function. In practice, schooling is typically thought of as a costly experience that provides benefits in the form of future consumption. These benefits must outweigh the costs in order for individuals to choose to attend school. Because the mapping from schooling to future consumption does not change throughout this analysis and individuals get lifetime utility from future consumption, I make the simplification that utility is a function of schooling itself rather than a function of future consumption.

For the set of women who do give birth or are on the margin for giving birth,  $\frac{\partial U}{\partial B} > 0$ . I also assume that  $\frac{\partial U}{\partial S} > 0$ . As is standard, utility is also increasing in consumption.

Women have a finite set of current resources  $W$  that can be devoted to child-rearing, school attendance, or obtaining all other consumption. They therefore

face a budget constraint  $W = p_B B + p_S S + C$ , where the price of consumption has been normalized to 1. I discuss the budget constraint in terms of total resources because both children and school involve both monetary and non-monetary costs and both types of costs of attending school fall when a local college opens. In practice, however,  $p_B$  and  $p_S$  can be thought of as the prices of children and schooling, respectively.

The equilibrium amounts of children, schooling, and other consumption are found by solving a simple constrained maximization problem using the Lagrangian:

$$\mathcal{L} = U(B, S, C) + \lambda(W - p_B B - p_S S - C)$$

Deriving the first order conditions gives four equations and four unknowns. The equilibrium number of children can therefore be expressed as a function of the parameters  $B = B(p_B, p_S, W)$ . The effect of a change in the price of schooling on the number of children is given by the Slutsky decomposition:

$$\frac{\partial B}{\partial p_S} = S_{BS} - \frac{\partial B}{\partial W} S^*$$

$S_{BS}$ , or the change in the compensated demand for children due to a change in the price of schooling, is the substitution effect. If the price of schooling fell but utility was constrained to remain the same as before, women would demand fewer children and more years of schooling, and expenditures would fall. The substitution effect therefore unambiguously causes teen birth rates to fall when the cost of education falls.

$\frac{\partial B}{\partial W} S^*$  is the income effect. When the price of schooling falls, more resources are

available to be spent on everything else. If women demand more children when they have more resources, the income effect would cause teen birth rates to rise, at least among teens who were already consuming some schooling. Also, in this specific case, teens who would not have previously purchased college education but who were induced to by the lower cost could also see an increase in lifetime income due to the additional schooling.

The assumption that children are a normal good is not at all obvious. Poor women experience more teen births than wealthier women, so young motherhood may be an inferior good for at least some income ranges. An increase in teen birth rates following a drop in the cost of schooling would provide evidence that teen births are a normal good for women on the margin of giving birth.

The overall effect of college openings on teen birth rates is therefore ambiguous. If the income effect dominates the substitution effect and teen births are a normal good, teen birth rates will rise when a local college opens. However, if the substitution effect dominates the income effect or teen births are an inferior good, teen birth rates would fall following a college opening.

The other hypotheses explaining the relationship between college openings and teen birth rates that were discussed above come from previous literature, but they can fit into this framework as well. Bedard (2001) describes a scenario where lowering the cost of attending college increases the high school drop-out rate. If teens at risk for becoming mothers tend to be on the margin for dropping out rather than for attending college, birth rates could increase.

Under this scenario,  $p_S$  stays the same for teens on the margin for dropping out

of high school because the cost of attending high school has not changed and these students are not considering college. Instead,  $p_B$  falls because the opportunity cost of having a child is lower, as the premium for a high school diploma has fallen. The teen birth rate unambiguously increases following a drop in  $p_B$  because births have positive marginal utility.

Along similar lines, under the “culture of despair” hypothesis (Kearney and Levine (2011)), teenage women who are simultaneously on the margin for attending college and for giving birth experience both a drop in  $p_S$  and an increase in  $p_B$ . Since the perceived probability of success has risen, the opportunity cost of teen motherhood is higher. The increase in  $p_B$  tends to reduce the demand for children, likely leading to a drop in the teen birth rate unless the income effect of the drop in  $p_S$  is very large. Alternatively, if a college opening lowers the perceived probability of relative success,  $p_B$  could fall. Then, the teen birth rate would rise, as described in the previous paragraph.

I have therefore shown that under the basic assumptions that utility is increasing in both births and schooling and that teenage women have finite resources, a decrease in the cost of attending school has a theoretically ambiguous effect on the teenage birth rate. The following empirical sections aim to establish the direction and magnitude of this effect.

### 1.3 Data

This chapter combines data on teen births from *Vital Statistics of the United States*, data on college openings from 1960-1996<sup>1</sup>, and population data from the *Survey for Epidemiology and End Results*. I use the *Survey for Epidemiology and End Results* because it provides annual population data broken down by age, gender, and race. I can therefore create time series of birth rates for very specific age groups.

The publicly available data from *Vital Statistics* includes data on births from all counties only in the years from 1969-1988. Starting in 1989, births are only assigned to a county if that county has a population over 100,000. Nearly all of the counties of that size contain at least one college throughout the sample period, so I focus only on the years 1969-1988.

I dropped 14 states<sup>2</sup> that did not collect mothers' marital status data in all years of the sample. I also dropped Alaska because its county names and boundaries changed during the sample time period.

The college openings dataset contains information on every college in the United States that opened from 1960 to 1996. I primarily look at the effect of the first college that opened in a county because these openings likely have the strongest impact on the cost of attending college. In my specifications, I require five years of data before and after the opening. The results are robust to requiring different numbers of years before and after the opening.

The sample therefore includes only college openings between the years 1974

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<sup>1</sup>This data was generously provided by Janet Currie and Enrico Moretti. I include only data on new college openings and not the data on single gender colleges becoming co-educational.

<sup>2</sup>The dropped states are CA, CT, GA, ID MD, MA, MI, MT, NV, NM, NY, OH, TX, and VT.



Table 1.1: County and Year of First College Openings in Sample

All College Openings			
County	Year	County	Year
Houston, AL	1974	Warren, VA	1977
Russell, AL*	1974	Isanti, MN*	1978
Baxter, AR*	1974	Brunswick, NC*	1979
Boone, AR*	1974	Rolette, ND*	1979
Mississippi, AR*	1974	Roberts, SD*	1979
St. Francis, AR*	1974	Charlotte, FL*	1980
Wayne, IL*	1974	Linn, IA*	1980
Hamilton, TN*	1974	Davison, SD*	1980
Ashley, AR*	1975	Tillamook, OR*	1981
Independence, AR*	1975	Santa Rosa, FL*	1982
Izard, AR*	1975	Sussex, NJ*	1982
Adams, IL*	1975	Warren, NJ*	1982
Kiowa, KS	1975	Kitsap, WA	1982
Hudson, NJ*	1975	Yakima, WA	1982
Osceola, FL	1976	Sawyer, WI*	1982
McLeod, MN*	1976	Polk, AR*	1983
Attala, MS	1976	Pennington, SD*	1983
Hardeman, TN*	1976	Shannon, SD	1983
Morehouse, LA*	1977		

\*Denotes two-year college

and 1983. These restrictions on the data leave a set of 37 total college openings and 28 two-year college openings. Table 1.1 lists their locations and years. The openings are in 18 different states, and every year in the date range has at least one opening. I also use as a control group 776 counties that contain no colleges during the entire time period and are in the same states as counties with college openings.

Table 1.2 compares some basic demographics of sample counties to those of control counties and all counties with consistently available data. Percent black is an annual series taken from the *Survey for Epidemiology and End Results*, whereas percent urban and percent low income come from US Census data and are updated

Table 1.2: Characteristics of Treatment, Control, and All Counties

	Counties with College Openings	Control Counties	All Counties
Percent Urban	.151	.070	.141
Percent Black	.100	.111	.073
Percent Low Income	.067	.072	.058

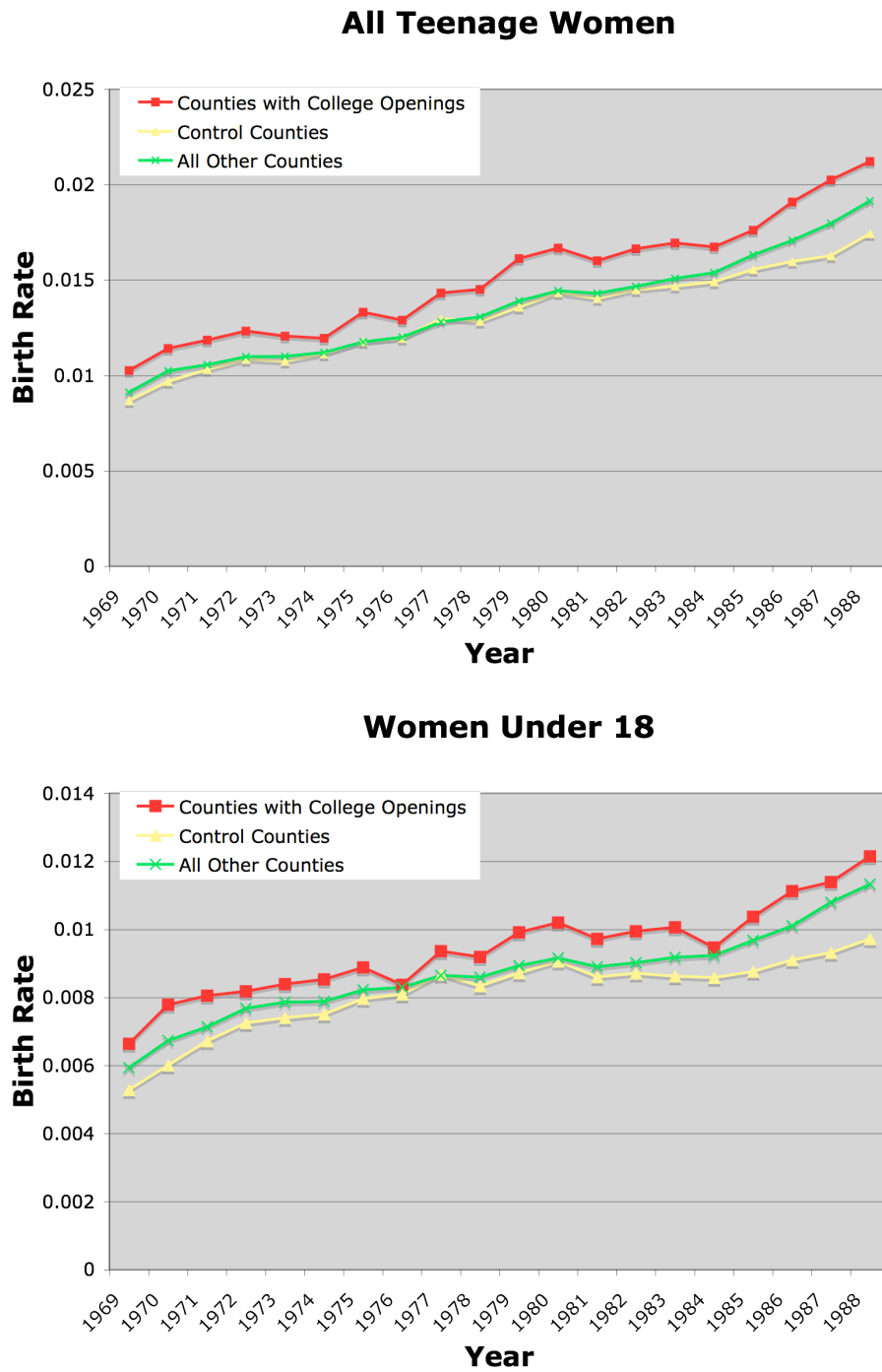
every ten years. This table is based on averages across each set of counties and the entire time period.

Counties with one college opening are more than twice as urban as counties in the control group on average. The presence of more urban areas may have attracted new colleges, so this difference is not surprising. Counties with college openings are only slightly more urban than the entire sample of counties on average. Percent black and percent low income are similar in counties with college openings and control counties but are larger in both of these sets of counties than in the entire sample on average.

The first graph in Figure 1.4 shows trends in unmarried teen birth rates in counties with one college opening, counties in the control group, and all other counties with consistently available data over the time period. This third group includes counties with more than one college and counties in states where no county obtains its first college in the time period, but excludes counties in states with incomplete marital status data.

Over this time period, the teen birth rate nearly doubles from around one birth per 100 teens in 1969 to nearly two births per every 100 teens in 1988. Counties with one college opening have slightly more births on average than control counties and

Figure 1.4: Unmarried Teen Births in Treatment, Control, and all Other Counties



Denominator is the total population of women between ages 10-19 for teen mothers and between ages 10-17 for mothers under 18.

other counties. All three groups of counties have increasing teen birth rates over time. In a preview of the results, the average birth rate for counties with a college opening diverges from that of the control counties in the 1980s.

The second graph in Figure 1.4 shows average birth rates in these groups of counties for teens under 18 years old. I look separately at women under 18 years old because the decision to go to college requires a high school degree. Women under 18 may be more likely to respond to a college opening than women who have already chosen to drop out of high school or finish their education with a high school diploma. In the subsequent analysis I present results for both groups.

Women under 18 have fewer births per capita. The birth rate rises from about six births per every 1000 women in 1969 to around one birth per every 100 women in 1988. The birth rate also increases less for this group than for all teens. Again, the treatment group has a larger birth rate than the control group, and these groups diverge somewhat in the 1980s.

## **1.4 Results**

To determine the effect of a college opening on teen birth rates, I first examine the data visually and then present regression results. The graphs in Figure 1.5 show average unmarried birth rates in the years before and after a new college opens. I focus on births to unmarried young women since they are of larger policy concern than births to married young women. Because college openings occur in different years in different counties, I normalize the year of the opening to 0 and present birth rates five years before and after the opening. These graphs include

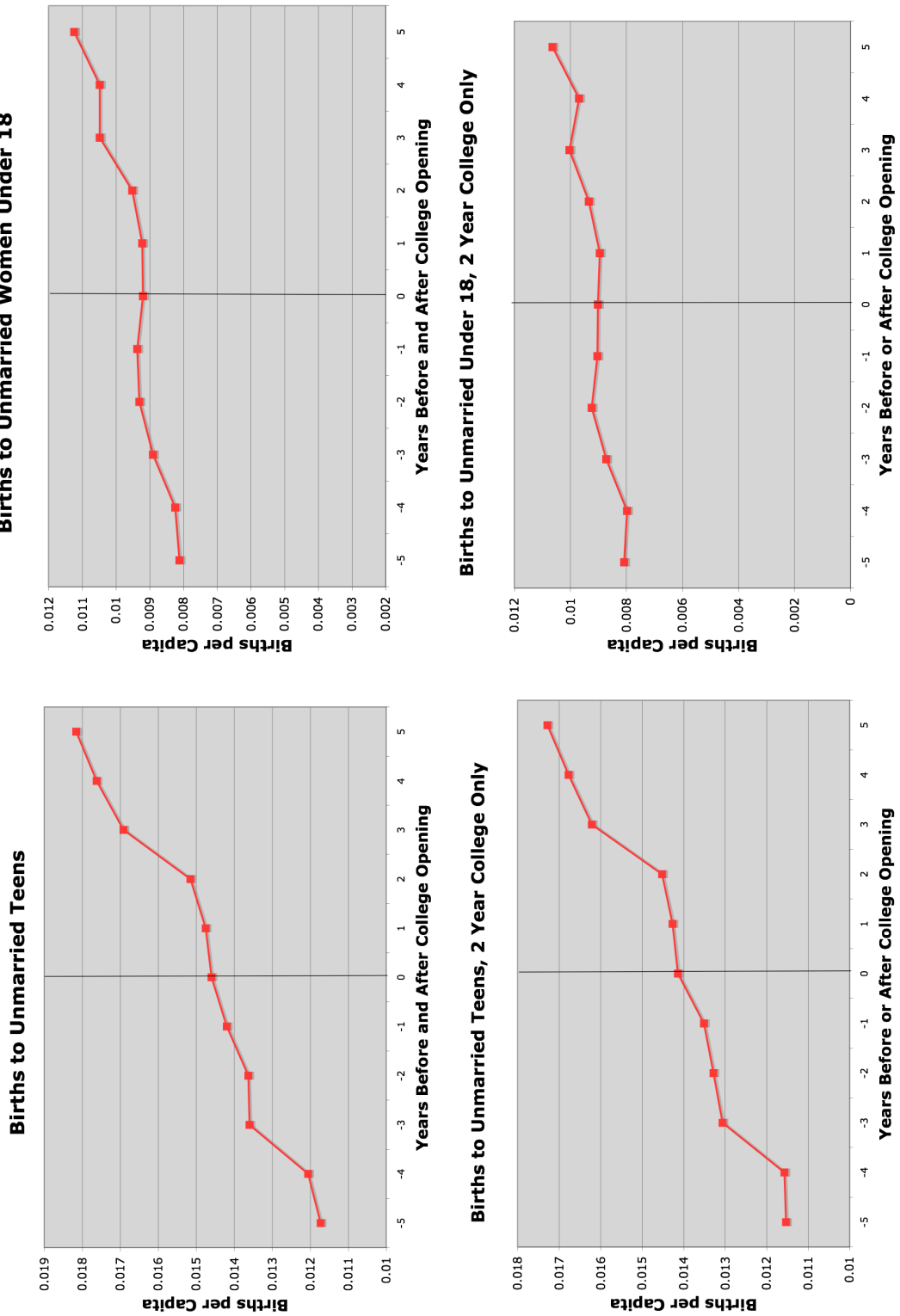
only the 37 counties with a first college opening or the 28 of these counties where the first college opening is a two-year college. Control counties are not included because they have no college openings to assign to year zero.

These graphs provide visual evidence both for whether the trend in teen births changed following the college opening and for whether the effect of the opening became stronger or weaker after a few years. A college opening could have a stronger effect in the long run than in the short run. An older teen at the time of the college opening would have faced a higher expected cost of attending college early in her high school career and thus may have had less incentive to perform well. As a result, she might be unable to take advantage of the new, lower cost of college.

The first of the graphs in Figure 1.5 shows trends in births to unmarried teens before and after a college opening. The average number of births per capita in sample counties ranges from 0.012 births five years before the college opening to 0.018 births five years after the college opening, an increase of six births per thousand teenage women over the ten years. The birth rate among unmarried teens increases almost as much in the five years before the opening as in the five years after. Furthermore, the birth rate increases by only about .0015 in the two years before and after the college opening. Although this graph demonstrates that births to unmarried teenage women increased during the time period, it provides scant evidence for a short-run effect of college openings on teen birth rates.

The second graph shows births to women under age 18 before and after a college opening. Average births per capita in sample counties range from about .008

Figure 1.5: Births Before and After College Opening



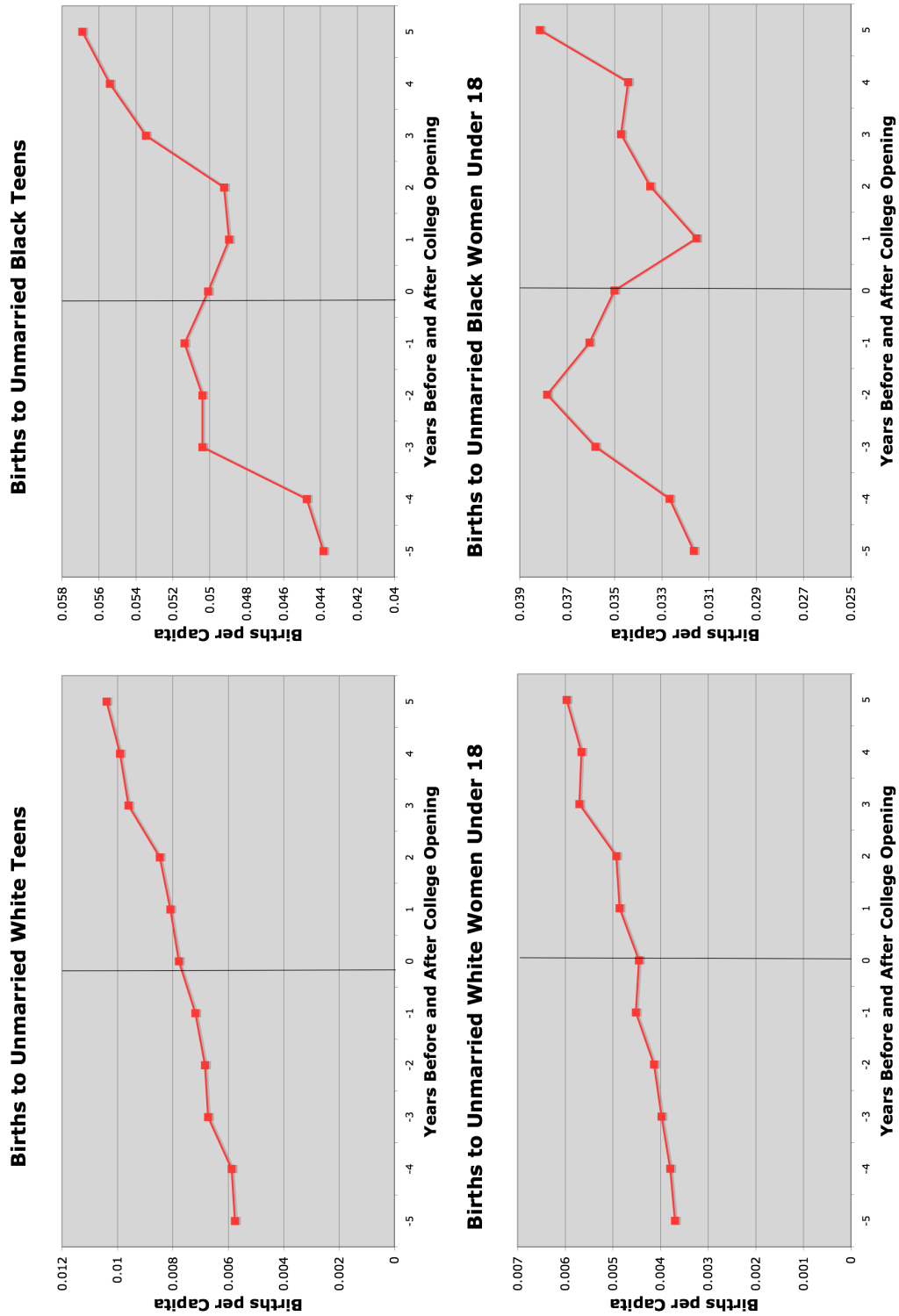
births to .011 births. Again, because birth rates are flat in the years before and after the college opening, this graph provides little evidence to suggest that college openings affect teen birth rates. The birth rate for women under 18 does not jump between years 2 and 3, so the birth rate increase experienced by all unmarried teens must have been driven by older teens.

The following two graphs in Figure 1.5 show the effects of two-year college openings on all unmarried teens and on unmarried women under 18. These colleges could have a stronger effect on teen birth rates than the full sample because they are more accessible to lower-income teens who are more likely to give birth. The trends in these graphs are similar to the trends in the graphs looking at all college openings. Two-year college openings do not appear to have a different or stronger effect on teen decision-making.

Figure 1.6 illustrates the trends in teen birth rates before and after college openings separately by race. The average number of births per capita to white teens and to white women under 18 both steadily increase over the ten years. Five years before a college opens, six out of every thousand white teens and 3.5 out of every thousand white high schoolers give birth in sample counties. These rates increase to ten out of every thousand and six out of every thousand, respectively. Although births to white teens did not fall when a college opened, the lack of a trend break implies that the college opening did not cause them to rise more quickly than they may have on their own.

The average birth rates for unmarried black teens and women under 18 in sample counties are noisier than the average birth rates in the full samples. Because

Figure 1.6: Births Before and After College Opening by Race





black women make up about ten percent of the sample, however, the extra variation is not surprising. In both graphs, the birth rate seems to be trending downward before and immediately after the college opening before reversing direction, but this trend break could be an artifact of the small sample and unrelated to the college openings. Over the course of the entire ten years, the average birth rate for black teens climbs from .044 to .057 and for high schoolers from .031 to .039. Thus the overall trend is similar for black teens even if the data itself is noisier.

These graphs show little evidence that teen birth rates respond to college openings. However, they might not be telling the whole story if teen births rose substantially more or less on average in control counties than in counties with college openings in the years following the college openings. I therefore also run variations of the following regression on the set of sample and control counties:

$$y_{c,t} = \sum_k \beta_k \text{opening}_{c,t}^k + \lambda X_{c,t} + \sum_s \sum_t \eta_{s,t} \text{state}_s \text{year}_t + \epsilon_{s,t}$$

In this equation,  $y_{c,t}$  is the log teen pregnancy rate in county  $c$  and year  $t$ .  $\text{opening}^k$  is a set of dummy variables equal to one if a college opened in that county  $k$  years ago or will open in  $k$  years.  $X_{c,t}$  is a vector of county controls including percent urban, percent black, and percent low income.

Regressions also include state-year fixed effects. Including this term controls for the state level policies and characteristics in a given year that may make young motherhood more or less appealing. Counties with a college opening are therefore compared to counties with no college openings in the same state and year. Assuming the fixed effects and county level controls explain the remaining non-random

variation in teen birth rates across space and time,  $\beta_k$  gives the percentage change in teen birth rates due to the opening of a college  $k$  years ago or  $k$  years in the future.

This identification strategy assumes that controlling for state-year fixed effects and county characteristics, the decision to place a college in a county is essentially random or at least unrelated to factors affecting the teen birth rate. Colleges likely do not consider the teen birth rate when choosing where to open. Colleges probably do consider the size of the teen population, but the birth rate should not be affected by the total number of teens. If a college opening is unrelated to underlying trends in the teen birth rate or trends in factors that predict the teen birth rate, any change in the difference in birth rates between treatment and control counties should be related to the college opening itself.

Table 1.3 reports the results of these regressions when the dependent variable is births to unmarried teens per capita and births to unmarried women under 18 per capita. I run specifications with and without dummies for years before the college opening and with and without county controls.

The first two columns in Table 1.3 show that teen birth rates are significantly higher in counties following a college opening than in counties in the same state and year with no colleges. Five years after a college opens, the teen birth rate is 37 percent higher than in a similar county with no college opening. Assuming the baseline teen birth rate for an average county is around 1 birth per 100 teens, this effect implies an increase to 1.37 births per 100 teens.

The fact that teen birth rates are clearly higher in counties following a college

Table 1.3: *Effect of College Openings on Unmarried Teen and Under 18 Births*

	log Teen Births per Capita				log Under 18 Births per Capita			
Five Years Pre			.261	.255			.290	.297
			(.107)	(.089)			(.114)	(.098)
Four Years Pre			.201	.209			.157	.180
			(.105)	(.088)			(.113)	(.096)
Three Years Pre			.182	.197			.244	.231
			(.105)	(.088)			(.117)	(.101)
Two Years Pre			.196	.184			.219	.226
			(.108)	(.090)			(.116)	(.099)
One Year Pre			.251	.248			.270	.255
			(.107)	(.089)			(.116)	(.099)
Year of Opening	.212	.209	.221	.221	.133	.144	.138	.151
	(.107)	(.089)	(.107)	(.089)	(.113)	(.096)	(.113)	(.096)
One Year Post	.278	.279	.283	.287	.237	.236	.241	.241
	(.105)	(.088)	(.105)	(.088)	(.113)	(.096)	(.113)	(.096)
Two Years Post	.193	.201	.198	.207	.114	.128	.119	.134
	(.107)	(.089)	(.107)	(.089)	(.113)	(.096)	(.113)	(.096)
Three Years Post	.327	.335	.332	.340	.252	.265	.256	.270
	(.107)	(.089)	(.107)	(.089)	(.113)	(.096)	(.113)	(.096)
Four Years Post	.294	.302	.297	.305	.232	.238	.237	.242
	(.105)	(.088)	(.105)	(.088)	(.114)	(.098)	(.114)	(.098)
Five Years Post	.367	.371	.371	.374	.285	.296	.288	.300
	(.105)	(.088)	(.105)	(.088)	(.111)	(.095)	(.111)	(.095)
% Urban		.320		.287		.228		.205
		(.035)		(.035)		(.040)		(.040)
% Black		2.680		2.685		2.574		2.575
		(.037)		(.037)		(.040)		(.040)
% Low Income		1.129		1.119		1.082		1.078
		(.121)		(.121)		(.137)		(.137)

Standard errors in parentheses. All regressions include state-year fixed effects.

opening than in comparison counties does not itself imply that the college opening caused teen births to increase. Teen birth rates in these counties may have been larger than the teen birth rates in comparison counties before the opening as well.

Columns 3 and 4 of Table 1.3 include the five years prior to the college opening. Teen birth rates were around 20 percent higher in counties with a college opening in the years prior to the opening than in comparison counties. The teen birth rate in counties following a college opening does appear to have climbed somewhat relative to comparison counties with no colleges. The largest difference between college opening counties and comparison counties is 26 percent five years before the opening and 37 percent five years after. This difference is not statistically significant and only implies an 11 percentage point increase in the teen birth rate, which roughly maps to one more birth per thousand teens.

The last four columns in Table 1.3 present the same results for unmarried women under 18 only. The average birth rate is higher for women under 18 in a county with a college opening than in comparison counties both before and after the opening. In most years, the birth rate is roughly 25 percent higher in the sample counties. However, the birth rate does not seem to increase following the opening to the extent that it does for all teens. In column 8, the birth rate is 30.7 percent higher in counties with college openings five years before the opening, but it is never that much higher in years following the college opening. To the extent that a college opening does affect teen birth rates, then, it appears to be concentrated among older teens.

Table 1.4 presents the results of the above regression run on some subsets of

the full sample. All of the columns look at the effect of college openings on births to unmarried teens only. The first column shows the effect of a two-year college opening. Two-year colleges are typically less expensive and less selective than four-year colleges, so they may be more accessible to young women on the margin for giving birth. The effect of a two-year college opening could therefore be somewhat stronger than the overall effect of all college openings.

The results in the first column imply that the effect of a two-year college opening is similar to the effect of any college opening. Since most of the colleges in the sample are two-year colleges, this result is not a surprise. The teen birth rate in counties with a two-year college is about 20 percent larger before the college opens, but increases to around 30 percent larger than comparison counties in most years following the college openings.

The second two columns in Table 1.4 show the results separately for white and black teens. Breaking the results down by race is important because black teens give birth at a much higher rate than white teens. Race therefore may be an important factor or may be correlated with an important factor in the decision to give birth, and this factor may change the effect of a college opening.

The results in columns 2 and 3 show that the effect of a college opening does appear to differ by race. For white teens, the birth rate in counties with a college opening is around 10 percent higher than in comparison counties before the college opening but approaches 20 percent higher following the opening. The birth rate to white teens thus follows the same pattern as the full sample of teens. The difference between births to black teens in treatment and control counties fluctuates from year

Table 1.4: *Effect of College Openings on Births to Unmarried Teens by Subset*

	Two-Year Colleges	White Teens	Black Teens	East	South	Midwest	West
Five Years Pre	.184 (.102)	.191 (.096)	.023 (.129)	.222 (.258)	-.038 (.108)	.571 (.166)	.281 (.313)
Four Years Pre	.114 (.100)	.133 (.094)	-.011 (.132)	.237 (.258)	-.080 (.105)	.442 (.166)	.361 (.312)
Three Years Pre	.160 (.100)	.081 (.092)	.052 (.130)	.388 (.256)	-.024 (.105)	.354 (.166)	.276 (.312)
Two Years Pre	.185 (.102)	.072 (.096)	-.029 (.125)	.140 (.256)	.051 (.108)	.314 (.173)	.095 (.313)
One Year Pre	.196 (.100)	.053 (.095)	.010 (.123)	.398 (.255)	-.027 (.105)	.493 (.173)	.394 (.313)
Year of Opening	.166 (.100)	.091 (.092)	-.103 (.126)	.382 (.256)	.008 (.105)	.435 (.173)	.098 (.313)
One Year Post	.305 (.100)	.141 (.092)	.215 (.127)	.352 (.255)	.125 (.105)	.448 (.166)	.165 (.313)
Two Years Post	.125 (.100)	.129 (.093)	-.171 (.119)	.491 (.255)	.037 (.105)	.332 (.173)	.291 (.313)
Three Years Post	.312 (.100)	.181 (.093)	-.037 (.121)	.491 (.256)	.149 (.105)	.584 (.173)	.310 (.314)
Four Years Post	.276 (.100)	.177 (.091)	.001 (.121)	.545 (.256)	.050 (.105)	.557 (.166)	.452 (.314)
Five Years Post	.322 (.100)	.247 (.092)	-.078 (.122)	.519 (.260)	.187 (.105)	.613 (.166)	.290 (.314)
% Urban	.214 (.047)	.089 (.039)	.180 (.052)	.414 (.070)	.460 (.053)	.038 (.064)	-.241 (.152)
% Black	2.882 (.047)	-.102 (.041)	-.099 (.045)	2.523 (.059)	2.853 (.039)	4.997 (.342)	3.101 (5.145)
% Low Income	1.345 (.145)	1.545 (.140)	.518 (.163)	-.002 (.304)	.214 (.137)	3.323 (.257)	1.820 (1.208)

Standard errors in parentheses. All regressions include state-year fixed effects. All regressions except the first column include the full sample of college openings.

to year. One year after a college opening, the birth rate is 21.5 percent higher in counties with a new college, but two years after the opening it is 17 percent lower in these counties than in control counties. Either college openings do not have an effect on births to black teenagers, or the sample is too small to draw conclusions.

The final four columns in Table 1.4 show the results separately by region. I define regions somewhat differently from the census because New Jersey is the only northeastern state in the sample. The east consists of New Jersey, North Carolina, and Virginia, the south consists of Alabama, Arkansas, Florida, Louisiana, Mississippi, and Tennessee, the midwest consists of Illinois, Iowa, Kansas, Minnesota, North Dakota, South Dakota, and Wisconsin, and the west consists of Oregon and Washington.

The effect of a college opening is similar in all four regions, although the baseline gaps between treatment and control counties differ somewhat. In the south, the teen birth rate is actually slightly smaller in counties with a new college before the opening but is larger in these counties following the opening. In the east, the teen birth rate in treatment counties is 39.8 percent higher in the year before the college opening, but it is 49.1 percent higher two years after and climbs to over 50 percent higher four and five years after the opening. In the other two regions, the difference in teen birth rate is higher a few years after the opening than it was before the opening, but the difference is not as large.

## 1.5 Conclusion

This analysis of the effect of college openings on teen birth rates leads to several conclusions. First, teen birth rates do not fall following a college opening. The teen birth rate was 18.4 percent higher two years before a college opening, and 37.4 percent higher five years after in counties that had a college opening compared to those that did not. Assuming the exclusion restrictions hold and college openings are unrelated to factors predicting underlying trends in teen births, these results reflect the actual effect of college openings on teen births.

If anything, college openings appear to cause teen birth rates to rise, although the results are not statistically significant. Since the birth rate increases by approximately 10 percent, and the underlying birth rate is between 1 and 2 percent, the effect of a college opening is roughly one or two more births to every one thousand teens.

Second, the increase in teen birth rates appears to be concentrated among white teens over the age of 17. The birth rate for women under 18 rises less than the birth rate for all teens, implying that the effect is mainly driven by additional births to older teens. The birth rate to black teens does not appear to change substantially following a college opening. College openings also have a stronger effect in the east and south than in the midwest or west.

Previous research has shown that the opening of a new college does cause at least some people to get more schooling, so these openings reduce the cost of obtaining a college education for some students. If teens at risk for giving birth are also on the margin for more schooling, this analysis indicates that lowering the



cost of higher education raises or at least does not lower the teen birth rate.

Teen births rise when the cost of education falls if young motherhood rises with income and if the income effect of the drop in the cost of college dominates the substitution effect. Essentially, that could mean that teens want to become mothers and go to school simultaneously, and they find it easier to do both when a college opens locally. The fact that the increase in teen births is concentrated among older teens lends some credence to the hypothesis that women want to attend school and become mothers at the same time.

Several alternative explanations for these results hinge on the assumption that few teens are simultaneously on the margin for giving birth and attending college. A drop in the cost of college has been shown to reduce the average ability in the pool of high school graduates since the highest ability high school graduates take advantage of this price decrease. The high school diploma wage premium consequently falls, and low ability high school graduates may choose to drop out instead. If women on the margin of giving birth are also on the margin of dropping out of high school, the college opening may drive these women to become mothers, increasing the teen birth rate.

Similarly, under the “despair” hypothesis, a college opening could increase the gap between success and failure, leading to more teen births due to increased despair.

A third possibility stems from the fact that the increase in births is concentrated among older teens. The presence of a college could change the composition of the college-aged population. If students migrating to the county to attend school also

give birth more frequently, the birth rate would increase. It seems unlikely that teens who attend college out of town are more likely to give birth than average, however. Moreover, most recently opened colleges do not draw many non-local students, particularly if they are two-year colleges. The effect of a two-year college opening is similar to that of any college opening.

Finally, because the data in this chapter is on the county-year level, one must keep in mind that many other changes could possibly be occurring at the same time as any given college opening. Although the methodology attempts to control for many of these changes by comparing counties with college openings to the most similar counties, the effects measured here could be contaminated by concurrent events such as other colleges expanding or rising or falling tuition at existing colleges.

Distinguishing between the explanations for these results would require more information about which teenagers give birth. If teen mothers in these counties largely attend college, then the teen birth rate likely rose because the income effect of a drop in college costs allowed some women to become mothers while attending school. If instead teen mothers are largely high school dropouts or high school graduates who do not attend college, then the increase in births is likely driven by a decrease in the probability or perceived probability of economic success if motherhood is delayed. In any case, however, it is clear from these results that teen motherhood is not a social policy problem that can be solved simply by increasing access to additional years of education.

## Chapter 2

# Racial Differences in Preferences for Redistribution

### 2.1 Introduction

Redistribution programs are more generous throughout Western Europe than they are in the United States. This gap is an important driver of differing levels of inequality. Historically different institutions in America and Europe are one important explanation for Europe's larger welfare state, but a growing empirical literature demonstrates that people also tend to prefer less redistribution in more diverse societies. Alesina and Glaeser (2004) attribute half of the differences in the levels of generosity of social welfare programs in the United States and Europe to differences in racial or ethnic heterogeneity.

Looking specifically within the United States, Luttmer (2001) finds that individuals increase their support for welfare programs when a larger fraction of local

beneficiaries are members of their same racial group. Alesina et al. (1999) find that more racial fragmentation in cities implies a lower provision of productive public goods and more money spent on patronage.

A broader literature explores the relationship between diversity and public goods provision both in the United States and in developing countries. Looking at data on school funding and water wells in Kenya, Miguel and Gugerty (2005) find evidence for more funding in ethnically homogenous areas. They argue that social sanctions for not cooperating are easier to enforce within an ethnic group. Habyarimana et al. (2007) run a set of experimental games with subjects in Kampala, Uganda to understand why public good provision is higher among subjects with the same ethnic background. They find that co-ethnic individuals are more likely to play cooperative strategies and that threats of sanctions are more effective within an ethnic group.

In the United States, Vigdor (2004) finds that individuals in more heterogeneous counties were less likely to return their census forms. Blacks and people with college degrees were particularly sensitive to the share of like individuals in their counties. Kuziemko et al. (2010) find both experimental and empirical evidence suggesting that last place aversion may explain poor whites' lack of support for programs that benefit the poor, particularly if those programs benefit poor African-Americans. In this model, poor whites prefer a steeper payment scheme where they receive less money than a flatter payment scheme where they receive more money because they derive substantial utility from not being at the bottom.

In more diverse countries like the United States, support for redistribution pro-

grams is lower because poorer members of a richer majority group tend to prefer less redistribution than they might in a more homogenous country. By contrast, richer members of a poorer minority group tend to favor redistribution. In survey data, opinions about redistribution generally split along racial lines rather than class lines even though these programs move wealth from the rich to the poor regardless of race.

Figure 2.1 shows how higher and lower income<sup>1</sup> black and white General Social Survey (GSS) respondents answered the question of whether the government spends too much, too little, or about the right amount of money on welfare. Nearly half (48.1 percent) of poor blacks said the government spends too little on welfare, whereas 21.5 percent of poor whites thought the government spends too little on welfare. By contrast, 60 percent of rich whites said the government spends too much on welfare, compared to only 34.2 percent of rich blacks.

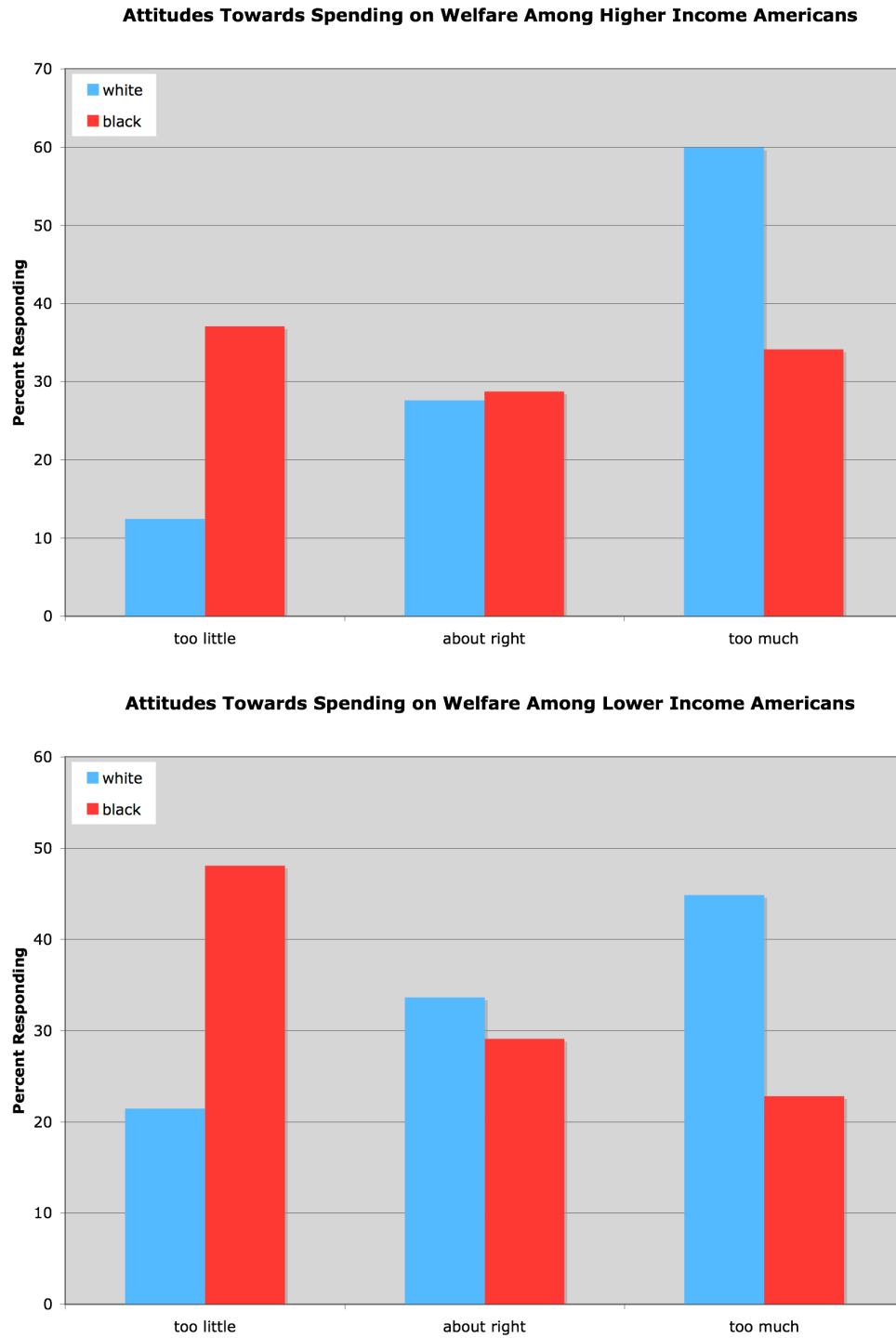
Figure 2.2 shows the same breakdown for blacks and whites who report having ever received government aid and those who do not. Only 18.1 percent of whites who have received government aid said the government spends too little on welfare, whereas 52.6 percent said the government spends too much. Among blacks who have received government aid, on the other hand, 52.5 percent felt the government does not spend enough and just 21.2 percent felt the government spends too much.

One could argue that these observed racial differences are actually being driven

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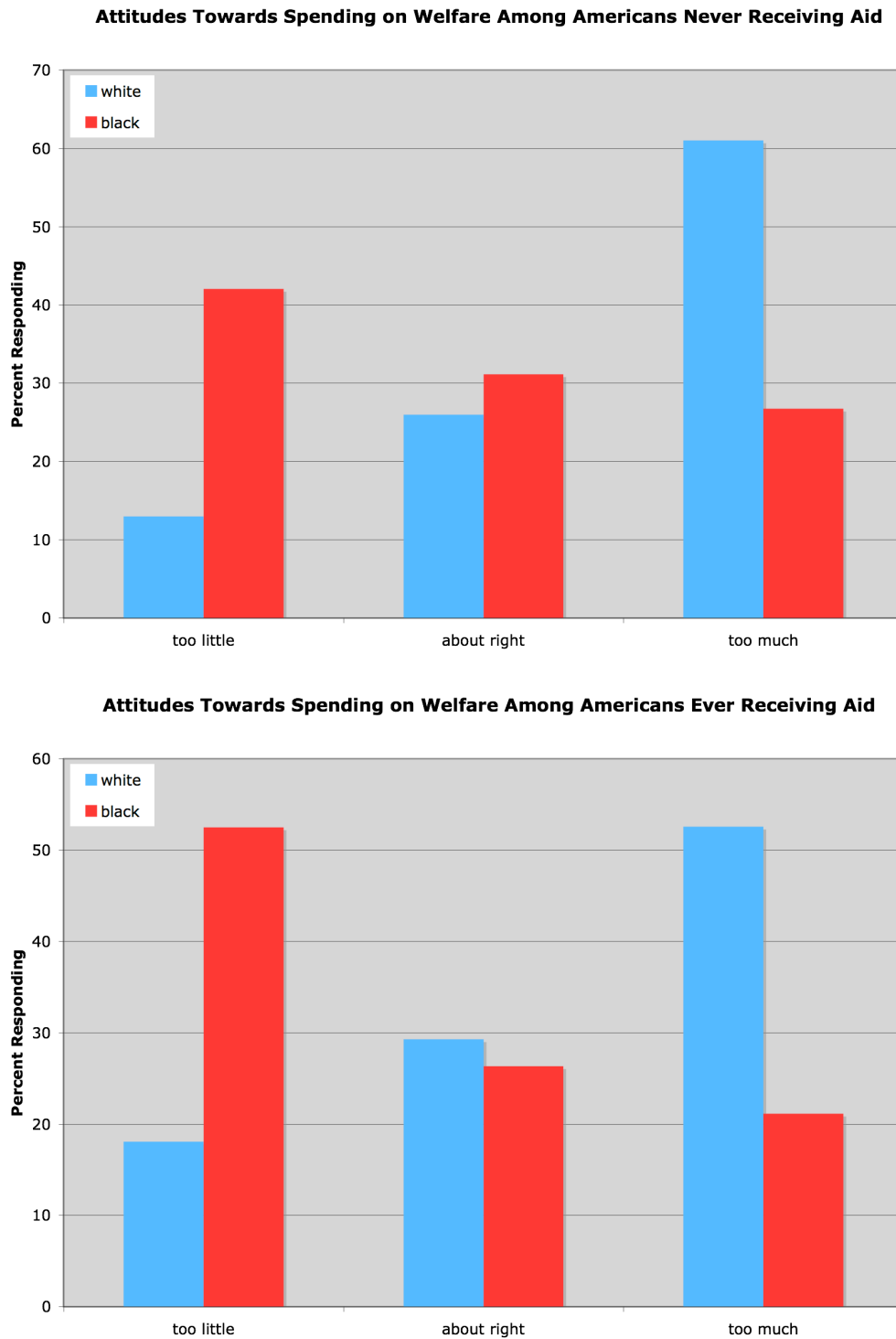
<sup>1</sup>Higher income is roughly defined as reported household income greater than \$60,000 in 2006 dollars, and lower income is roughly defined as reported household income less than \$35,000 in 2006 dollars.

Figure 2.1: Attitudes Toward Welfare Spending by Race and Income



Source: GSS 1972-2008. Higher income is reported household income greater than \$60,000 in 2006 dollars, and lower income is reported household income less than \$35,000 in 2006 dollars.

Figure 2.2: Attitudes Toward Welfare Spending by Race and Government Aid Status



Source: GSS 1972-1987.

by an omitted variable that differs by race and affects opinions about welfare, such as political party or permanent income. Table 2.1 shows the effect of race on opinion about welfare spending when controlling for education, age, region, political party, and permanent income, as represented by occupational prestige. The effect of race on believing the government spends too little or too much on welfare is actually stronger when controls are included. Blacks are 16.8 percent more likely than whites to say the government spends too little on welfare, whereas Democrats are only 5 percent more likely than Republicans to say so.<sup>2</sup>

A similar GSS question with the less politically charged phrase “assistance to the poor” rather than “welfare” asked of fewer respondents is also divided by race. A majority of all groups think the government spends too little on assistance to the poor, but 88 percent of rich blacks think the government spends too little, compared to 67 percent of poor whites.

This chapter will explore several possible explanations for why black and white Americans have such different opinions about spending on welfare. Several simple hypotheses that have not been previously explored in the literature are that blacks are systematically more risk averse, more inequity averse, or less confident than whites. Any of these could induce racial differences in preferences for redistribution holding income constant.

An alternative hypothesis with a stronger basis in historical fact is that blacks and whites could have different beliefs about the drivers of success. Alesina and

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<sup>2</sup>A common argument for why poor whites support anti-redistributive policies is that they tend to be socially conservative and socially conservative politicians tend to be anti-redistribution. This result implies that social conservatism among poor whites does not entirely explain racial differences in preferences for redistribution.



Table 2.1: *Demographics and Opinions about Welfare Spending*

	Gov't Spends Too Little		Gov't Spends Too Much	
	(1)	(2)	(3)	(4)
Black	.140 (.004)	.168 (.007)	-.131 (.005)	-.158 (.009)
Low Income	.034 (.003)	.023 (.006)	-.040 (.005)	-.031 (.007)
High Income	-.018 (.004)	-.013 (.006)	.049 (.006)	.039 (.008)
Female		-.002 (.004)		-.025 (.006)
Age		-.001 (.0001)		.0003 (.0002)
High School		-.035 (.006)		.043 (.007)
Some College		-.041 (.013)		.058 (.017)
College		-.010 (.009)		-.015 (.012)
Grad Degree		.028 (.012)		-.084 (.016)
Prestige		-.001 (.0002)		.002 (.0002)
Democrat		.050 (.005)		-.068 (.006)
Independent		.026 (.007)		-.045 (.009)
Observations	50637	23736	50637	23736
R-Squared	.060	.090	.137	.199

Source: GSS 1972-2008. Regressions include a set of region dummies and year effects. Excluded education level is less than high school and excluded political party is Republican. Prestige is coded as the first digit of the survey respondent's occupational prestige score.

Glaeser (2004) show that Europeans tend to believe the poor are unlucky, whereas Americans tend to believe the poor are lazy. If American blacks and whites also held different beliefs about the drivers of poverty, then these beliefs could cause differing opinions about government spending on redistributive programs.

Piketty (1995) develops a model explaining how different preferences for redistribution may arise within or between societies. He assumes that agents differ in their beliefs about the relationship between effort and social mobility. Agents are unwilling or unable to definitively determine the true relationship between effort and mobility through experimentation because of a finite life span. They therefore have to draw inferences from their familial dynasties' past experiences. With these assumptions, he shows that different familial dynasties within the same society can converge to different stable beliefs about the drivers of inequality even when the true relative effects of luck and effort are the same for everyone.

Piketty's results hold even when opportunities for social mobility are the same across groups, but in the United States, blacks and whites have historically had very different opportunities. Because the effects of effort and luck on success have differed for blacks and whites, beliefs about the effects of effort and luck likely differ across races as well.

Although the economics literature has examined cross-country differences in beliefs about poverty, it has not looked deeply at whether these beliefs differ between black and white Americans. Few papers in social science address this question. Cozzarelli et al. (2001) find some evidence that whites are more likely than blacks to attribute poverty to internal causes, such as effort, as opposed to external

factors such as luck. They primarily survey white, rural college students, however, so the results are difficult to generalize.

Evidence from the GSS is somewhat mixed and depends on the way the question is phrased. Sixty percent of black GSS respondents say that people primarily get ahead through hard work rather than through lucky breaks and help from other people or through both work and luck equally, compared to 66 percent of whites. When the question was asked another way, 46 percent of whites said that lack of effort was very important for explaining why some people are poor, compared to 36 percent of blacks.

When subjects were asked which factors were important for explaining why someone's life turns out well or poorly, 52 percent of whites and 61 percent of blacks said society giving some people a head start and holding others back was important or very important, and 18 percent of whites and 31 percent of blacks said life being a matter of chance is important or very important. The percent of whites and blacks saying some people working harder than others was important or very important was about the same, however, at 95 percent and 92 percent respectively. Because these questions were asked of only a small number of respondents, breaking that sample down further into rich and poor groups leaves too few people in some groups to draw meaningful conclusions.

Another possibility is that poor whites tend not to support government redistribution programs because they are racist and they believe these programs largely support blacks. Glaeser (1995) discusses this hypothesis. He argues that politicians may find it in their best interest to create hatred for certain groups in order to en-

gender support for certain policies.

An anti-redistribution politician could spread false or exaggerated stories to generate hatred for a poor minority, and gathering true information may be sufficiently costly that members of the majority will accept these stories as true and support anti-redistribution policies. In fact, the rhetoric surrounding welfare in the United States is often racially charged. Even whites who themselves benefit from welfare programs may not see themselves as a typical welfare recipient and may be hesitant to support such policies.

A goal of this project, then, is to provide more evidence for whether any of these hypotheses could explain racial differences in preferences for redistribution. To do so, I collected original data about subjects' preferences for several redistribution plans when money was earned based on their performances on several different types of tasks. I also surveyed subjects about their backgrounds and their beliefs using the GSS questions described above.

I test whether blacks and whites have different levels of risk aversion by measuring risk aversion directly with a standard task. I look at how preferences for redistribution plans differ from preferences for corresponding individual payment plans to determine whether blacks and whites have different levels of inequity aversion. If blacks and whites have different preferences for the individual payment plans and the corresponding redistribution plans for one particular task, then confidence in performance on that task could be a factor.

I also test whether whites and blacks have different preferences for redistribution programs when money is earned explicitly through luck, ability, or effort. If

blacks and whites do not have different preferences when money is earned through an explicit channel, then different beliefs about the drivers of poverty in the real world are likely a factor in explaining different opinions about government spending.

I cannot directly test the final hypothesis that differences in preferences for redistribution are driven by racism. To do so, I would need to recruit a much larger number of subjects and systematically vary the racial composition of the groups over which redistribution takes place. Finding no evidence to support any of the competing hypotheses, however, would tend to support this notion.

I do look at the relationship between stated beliefs about government spending on the poor and behavior in the game. If those who believe the government spends too much on the poor are as likely to vote for redistribution as those who do not, it may be the case that responses to survey questions about redistribution do not reflect people's economic realities because these questions have no economic consequences. The observed racial differences in survey responses could therefore be politically or racially motivated if people do not consider their own economic situations when answering such questions.

I find that in this data, black and white subjects do not appear to differ in risk aversion, inequity aversion, or confidence in a way that would produce the results found in survey data. In general, black subjects tended to vote for redistribution plans less frequently than white subjects did. The data from the redistribution tasks does support the idea that blacks and whites have different beliefs about the drivers of poverty in that black subjects would vote for redistribution more than

white subjects only if the black subjects believed money was earned by luck and the white subjects believed money was earned by effort.

Evidence from the survey, however, suggests that blacks and whites do not have different underlying beliefs about the drivers of poverty, which is the premise of the hypothesis. Thus, although this hypothesis could explain both the data collected in this project and the GSS survey data, it seems unlikely to be true if the premise has no basis in fact. Instead, more research is needed to confirm or rule out the idea that racial differences in preferences for redistribution are driven by racism.

I am also able to use the data to examine how overall levels of inequity aversion change depending on how money is earned. As expected, I find individuals prefer more redistribution when money is earned by luck than by effort. However, I also find that subjects prefer flatter individual payment schemes when money is earned by luck than by effort. Thus subjects are not necessarily more generous when money is earned randomly. Instead, they seem to vote for redistribution when money is earned by luck because they are more risk averse when they cannot control the outcome.

In general, subjects are less likely to vote for a given flatter redistribution plan than they are to choose the corresponding payment plan for themselves. Thus, some subjects are actually willing to give up some utility in order to maintain a higher level of inequality in the group. This result holds across all four tasks, so it does not seem to be driven by subjects believing that harder working individuals should maintain their earnings.

Working with subjects in a lab setting can provide new evidence about the drivers of preferences for redistribution because the subjects make decisions based on information that is known and controlled by the researcher, thus allowing different mechanisms to be isolated. At the same time, subjects are still making decisions based on actual economic outcomes. The results need to be interpreted conservatively and with caution, however, because the environment and tasks are very artificial and differ in important ways from opinions about government policies. Nevertheless, they can provide a basis for further empirical work testing the hypotheses that appear viable.

This chapter proceeds as follows. Section 2.2 describes the framework for the design of this study, Section 2.3 explains how the study was implemented, Section 2.4 describes the subjects recruited for the study, and Sections 2.5 presents results. Section 2.6 concludes.

## **2.2 Framework**

### **2.2.1 Model**

In this section, I set forth a basic framework for understanding why two individuals might prefer different levels of government redistribution. I describe how beliefs about the roles of luck or effort in success could affect preferences for redistribution. I also explain how other hypotheses for racial differences in preferences for redistribution fit into this framework.

I start by assuming an individual's utility is a function of his own income and

the incomes of the other members of his reference group:  $U(Y_i, Y_{-i})$ .<sup>3</sup> It has been demonstrated that individuals tend to prefer some income distributions more than others. For example, inequity averse individuals prefer flatter distributions, and Kuziemko et al. (2010) demonstrate that individuals strongly prefer not to be at the bottom of the income distribution.

I define a simple redistribution plan that consists of four parameters: the income below which one receives money from the plan,  $\underline{Y}$ , the income above which one gives money to the plan,  $\bar{Y}$ , the amount a low income individual receives from the plan,  $\alpha$ , and the amount a high income individual gives to the plan,  $\beta$ .

Thus, the utility an individual receives from a redistribution plan is given by:

$$\{Y_i < \underline{Y}\} * U(Y_i + \alpha, Y_{-i}^R) + \{\underline{Y} < Y_i < \bar{Y}\} * U(Y_i, Y_{-i}^R) + \{Y_i > \bar{Y}\} * U(Y_i - \beta, Y_{-i}^R)$$

If his income is below  $\underline{Y}$ , he receives  $Y_i + \alpha$ , and if his income is above  $\bar{Y}$ , he receives  $Y_i - \beta$ . There may be a range of incomes for which an individual does not give or receive money.  $Y_{-i}^R$  is the new distribution of incomes in the group following redistribution.

If incomes are randomly assigned to individuals, then an individual prefers a given redistribution plan if:

$$U(Y_i, Y_{-i}) < \{Y_i < \underline{Y}\} * U(Y_i + \alpha, Y_{-i}^R) \\ + \{\underline{Y} < Y_i < \bar{Y}\} * U(Y_i, Y_{-i}^R) + \{Y_i > \bar{Y}\} * U(Y_i - \beta, Y_{-i}^R)$$

In the case where an individual is deciding on a redistribution plan in the future,

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<sup>3</sup>In the context of the data in this chapter, the reference group is assumed to be the other participants in the subject's session of the study. More generally, the reference group could be as small as one's community or as broad as one's entire country.



his decision is based on the probability of landing in each income bracket, so that the utility from a given redistribution plan is:

$$\begin{aligned} \pi_1(Y_i < \underline{Y}) * U(Y_i + \alpha, Y_{-i}^R) + \pi_2(\underline{Y} < Y_i < \bar{Y}) * U(Y_i, Y_{-i}^R) \\ + (1 - \pi_1 - \pi_2)(Y_i > \bar{Y}) * U(Y_i - \beta, Y_{-i}^R) \end{aligned}$$

where  $\pi_1$  is the probability of landing in the lower income bracket and  $\pi_2$  is the probability of landing in the middle income bracket.

The decision becomes more complicated if income is determined by both luck and effort. Then, an individual chooses an optimal level of effort given a particular redistribution regime. The amount of money one expects to receive for a given level of effort differs between the two plans, so the optimal level of effort likely differs as well. Thus  $Y_i$  differs between the two states. If  $Y_i$  is income given the optimal level of effort with no redistribution and  $Y_i^R$  is income given the optimal level of effort with redistribution, then an individual chooses redistribution if:

$$\begin{aligned} U(Y_i, Y_{-i}) < \{Y_i^R < \underline{Y}\} * U(Y_i^R + \alpha, Y_{-i}^R) \\ + \{\underline{Y} < Y_i^R < \bar{Y}\} * U(Y_i^R, Y_{-i}^R) + \{Y_i^R > \bar{Y}\} * U(Y_i^R - \beta, Y_{-i}^R) \end{aligned}$$

As before, this equation could be rewritten using the probabilities of landing in each income bracket if an individual is deciding on a redistribution plan in the future.

### 2.2.2 Differences in Preferences

In this framework, the same redistribution plan parameters apply to all members of a group. Nevertheless, two individuals with the same earning potential

might have different preferences. I discuss several different reasons why this may be the case.

First, the individuals may have different beliefs about the relative importance of luck and effort in determining income. All else equal, individuals who believe effort is a major factor in determining income might prefer less redistribution. Individuals who believe success is largely driven by effort believe by extension that they can choose which bracket they end up in based on how hard they work. In particular, wealthier individuals who believe they attained their wealth by working hard would be unlikely to vote to support lazier individuals.

On the other hand, individuals who believe income is mostly determined by luck might tend to prefer more redistribution. Those who believe wealth is a matter of chance think people have little control over the income bracket they end up in. Thus they might be more inclined to support the poor and they might be concerned that they could end up in a lower income bracket despite a high level of effort. The larger an individual perceives the effect of luck on income to be, the more he thinks he might end up in a different income bracket than the one he prefers.

In the context of the model, different beliefs about the relative importance of luck and effort manifest themselves in two ways. First, the greater the perceived effect of effort on income, the more an individual thinks he can control his income bracket. This implies a higher probability of being in the anticipated income bracket given the individual's chosen level of effort and a lower probability of ending up in one of the other brackets. Second, an individual who believes success is

driven by effort might be comfortable with a more unequal  $Y_{-i}^R$  than an individual who believes success is driven by luck.

To determine whether whites and blacks may have different preferences for redistribution because they have systematically different beliefs about the drivers of success, I tell subjects exactly how they will earn money in a round and then ask them to vote for or against a set of redistribution plans. If different beliefs about the determinants of success are the only driver of racial differences in preferences for redistribution, there should be no detectable racial differences when the determinants of success are transparent.

This treatment only examines whether beliefs about the drivers of success could be different between races. It does not, however, determine whether some individuals have incorrect beliefs about the drivers of social mobility or whether the social mobility functions actually differ across groups.

Two individuals could agree on the function by which luck and effort determine income but still have different preferences for redistribution for several reasons. First, they could have different levels of risk aversion. More risk averse individuals would be more likely to prefer redistribution when there is any uncertainty about income because the payment scheme is flatter under the redistribution plans.

Second, the two individuals could have different levels of inequity aversion. In this case, the individuals could have the exact same expected  $Y_i$  under both scenarios, but one individual prefers a flatter  $Y_{-i}$  distribution than the other and thus is more likely to support a redistribution plan.

Third, the two individuals could have different expectations about their future incomes for a given mapping of luck and effort to income. An individual who has a high cost of effort, for example, would be more likely to vote for a redistribution plan if he believes effort is an important factor in success. Alternatively, an individual who thinks he is unlucky and places a higher probability on ending up in the lower income bracket would also be more likely to vote for redistribution.

Finally, an individual may derive less utility from the resulting income distribution  $Y_{-i}^R$  than another individual for some reason unrelated to the amount of inequity in that income distribution. The hypothesis that whites tend not to support welfare programs because they believe these programs transfer money from whites to blacks fits into this category of explanations. Unlike the other hypotheses, this one cannot be directly tested given the data collected in this project.

## 2.3 Methods

### 2.3.1 Subjects

Subjects were recruited in Chicago Heights, IL, a racially and economically diverse community in Cook County, and in Boston, MA. Participants in the Chicago Heights rounds of the study were recruited from lists of adults who had previously been assigned to the treatment or control groups of experiments conducted by other researchers in the community. These subjects were recruited for the prior experiments because they were parents or guardians of children at local schools. By contrast, the Boston subject pool was recruited through the Harvard Business

School CLER lab and thus consists of more typical participants in university lab experiments.

All subjects were over 18, and participants that did not identify as white or black were excluded from the analysis. Power calculations using a result from a previous pilot study determined that 500 subjects would be necessary to convincingly argue that blacks and whites had the same preferences for redistribution for a particular task if that was in fact the case. The target recruitment total was therefore 250 white subjects and 250 black subjects.

The pool of available subjects in Chicago Heights was about 400 people. Because many of the individuals were currently participating in other, long-term experiments, I could not recruit too aggressively and risk anyone dropping out of the entire program. Thus, I tried to make contact with all of the subjects by phone and did not continue to contact anyone who was not interested. In total, 52 of the 400 available subjects in Chicago Heights participated. This group was comprised of 18 white subjects and 34 black subjects.

In Boston, I recruited 80 additional subjects. Of these, 67 were white and 13 were black. I decided that continuing to recruit Boston subjects would not improve the study because the subject pool is heavily white and, as a university subject pool, not particularly representative of the general population. Ideally, this project would be carried out in a variety of different geographic areas with a broad cross-section of Americans. Unfortunately, these were the only subject pools I could access.

I ran three sessions of the study in Chicago and four sessions in Boston. I aimed

to recruit about 20 subjects per study. The largest session consisted of 24 subjects and the smallest of 14 subjects.

### **2.3.2 Data Collection**

Each session of the study consisted of an assessment to measure risk aversion, four tasks, and a survey.<sup>4</sup> The risk aversion assessment asked subjects a series of questions about which of two lotteries were preferable (see Figure B.1 in the Appendix). Subjects were paid based on a randomly selected question after the assessment was completed.

In each of the following four rounds, subjects earned money in different ways. In two of the rounds, subjects earned money randomly, so that success was based entirely on luck. In one of these rounds, two-thirds of subjects randomly received \$10 and the other one-third randomly received \$0. In the other, the numbers of subjects who would earn \$10 and \$0 was chosen randomly. Subjects were therefore uncertain both about whether they would earn money and how likely they were to earn money.

In a third round, subjects earned money based on their performance on a general knowledge trivia quiz (see Figure B.2 in the Appendix). This task represented the case where success is driven by ability. People who perform well on the ability task could be viewed by other subjects as earning money due to luck in the sense that some people are born with talents in particular areas and others are not. At the same time, people might be more comfortable with inequality driven by

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<sup>4</sup>The risk assessment was added after the first session.

differences in ability than inequality driven by random chance.

In a fourth round, subjects earned money based on how many circles they could color in a minute (see Figure B.3 in the Appendix). This task was designed so that success was based on effort in the form of coloring speed rather than any predetermined ability. Subjects all had the same writing utensils and presumably were not able to practice ahead of time. This task did not require strength or fitness, so two people coloring at the same speed should have colored about the same number of circles.<sup>5</sup>

For both the ability and the effort task, performances in the top two-thirds earned ten dollars and performances in the bottom earned nothing. At the end of the study, one of the decisions in one of the rounds was randomly chosen for payment. Because subjects might have learned how to make decisions over time through experience, the order of the rounds was changed from session to session.

Before completing each task, subjects learned how money would be earned in that round and then made a series of choices. They first voted on five redistribution plans: taking \$2 from individuals earning \$10 and giving \$3 to individuals earning \$0; taking \$3 from individuals earning \$10 and giving \$2 to individuals earning \$0; taking \$3 from individuals earning \$10 and giving \$3 to individuals earning \$0; taking \$3 from individuals earning \$10 and giving \$4 to individuals earning \$0; and taking \$4 from individuals earning \$10 and giving \$3 to individuals earning \$0.

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<sup>5</sup>In practice, circle coloring turned out to involve a certain amount of strategy. Some subjects colored in a circular motion and were less effective than subjects who colored using straight lines. As long as the task was perceived by the subjects to be about coloring and not intelligence, however, this fact should not affect the results.

Each plan was voted on separately, so that subjects voted whether they would prefer a given plan or no plan at all. A plan was enacted if more than half of subjects voted for it.

Subjects also answered a series of binary questions about how they would prefer to be paid in the absence of redistribution. Each of these binary choices corresponded one of the redistribution plan votes described above. For example, the first redistribution plan took \$2 from subjects earning \$10 and gave \$3 to subjects earning \$0. Subjects would thus also decide whether they would prefer to earn \$10 if they performed well on a task and \$0 if they performed poorly or \$8 if they performed well and \$3 if they performed poorly. The second option would pay the same as the corresponding redistribution plan, but it would not affect the earnings of other subjects.

Subjects made 40 decisions in all in the course of completing the study; these decisions are shown in Table 2.2. The redistribution and payment plan worksheet that subjects completed before each task may be found in Figure B.4 and Figure B.5 in the Appendix.

Although subjects learned how money would be earned in each round before making decisions, they did not actually complete any of the tasks until after voting. Decisions were therefore based on beliefs about future performance on the task rather than feelings about past performance. Subjects were not allowed to discuss voting or other decisions with one another but were allowed to ask the researcher for clarification at any time.

Following all of the tasks, subjects completed a survey including basic demo-



Table 2.2: Decisions Made By Subjects

How Money Is Earned	Who Decision Affects	Payments Payments	How Money Is Earned	Who Decision Affects	Payments Payments
Effort	Group	(10, 0) or (8, 3)	Ability	Group	(10, 0) or (8, 3)
		(10, 0) or (7, 2)			(10, 0) or (7, 2)
	(10, 0) or (7, 3)	(10, 0) or (7, 3)			
	(10, 0) or (7, 4)	(10, 0) or (7, 4)			
Luck with 2/3 Chance of Large Payment	Group	(10, 0) or (6, 3)	Luck with Random Chance of Large Payment	Group	(10, 0) or (6, 3)
		(10, 0) or (8, 3)			(10, 0) or (8, 3)
	(10, 0) or (7, 2)	(10, 0) or (7, 2)			
	(10, 0) or (7, 3)	(10, 0) or (7, 3)			
Luck with 2/3 Chance of Large Payment	Self	(10, 0) or (7, 4)	Luck with Random Chance of Large Payment	Self	(10, 0) or (7, 4)
		(10, 0) or (6, 3)			(10, 0) or (6, 3)
	(10, 0) or (8, 3)	(10, 0) or (8, 3)			
	(10, 0) or (7, 2)	(10, 0) or (7, 2)			
Luck with 2/3 Chance of Large Payment	Self	(10, 0) or (7, 3)	Luck with Random Chance of Large Payment	Self	(10, 0) or (7, 3)
		(10, 0) or (7, 4)			(10, 0) or (7, 4)
	(10, 0) or (6, 3)	(10, 0) or (6, 3)			
	(10, 0) or (8, 3)	(10, 0) or (8, 3)			

graphics, questions about last year's income and whether that was more or less than usual, and questions taken from the GSS about opinions on government redistribution programs and opinions on the drivers of success in society. These questions provide a check that this sample, like the sample surveyed in the GSS, does exhibit racial differences in preferences for redistribution programs. These questions also provide additional evidence as to whether beliefs about the drivers of poverty in the US might differ by race.

## **2.4 Sample Demographics**

Table 2.3 shows the overall demographics for the entire sample as well as separate breakdowns for white and black subjects and for Chicago and Boston subjects. The sample consists of 85 white and 47 black subjects and of 52 Chicago and 80 Boston subjects.

In the full sample, 60.6 percent of the subjects are female. The average age is 33.3. Nearly all (98.5 percent) of the subjects have completed high school, 90.7 percent have completed at least some college, and 55.5 percent have a college degree. A slight majority (52.3 percent) of the subjects identify as Democrats, and only 6.8 percent identify as Republicans. The remainder of the sample identify as an independent or some other party. 35 percent have received government aid at some point.

Reported household income ranges from less than \$9,000 to over \$100,000, with an average around \$52,000, although this average is right-censored. The reported income data is less meaningful for Boston subjects because students' reported in-

Table 2.3: Summary Statistics

	<u>All</u>	<u>White</u>	<u>Black</u>	<u>Boston</u>	<u>Chicago</u>
% Female	.606	.529	.745	.463	.827
Age	33.3	31.6	36.4	29.6	39.1
% Some College	.907	.941	.841	.975	.8
% College Degree	.555	.571	.523	.544	.571
% Democrat	.523	.435	.681	.450	.635
% Republican	.068	.106	0	.075	.058
Income	\$52,480	\$56,772	\$44,773	\$56,250	\$42,157
% Receive Aid	.350	.275	.488	.240	.521
% Black	.356	–	–	.163	.654
% Boston	.606	.788	.277	–	–
Spending on Poor Too Little	.515	.482	.574	.550	.462
Spending on Poor Just Right	.220	.259	.149	.238	.192
Spending on Poor Too Much	.167	.176	.149	.125	.231
Work More Important	.682	.706	.638	.663	.712
Society Very Important	.431	.459	.368	.525	.256
Effort Very Important	.691	.718	.632	.713	.651
Observations	132	85	47	80	52

Income is coded as the median of the \$10,000 range reported by subjects. Some percentages do not add to 100% because subjects were allowed to skip questions.

comes varied considerably. This variation is probably because some reported their parents' income and others reported their own income.

Most of the black subjects are from Chicago, and most of the white subjects are from Boston. Similarly, most of the Chicago subjects are black and most of the Boston subjects are white. As a result, the observed differences between black and white subjects or Boston and Chicago subjects are confounded by each other. For example, white subjects are younger than black subjects not because whites are generally younger than blacks but because the Boston sample consists primarily of students.

The Chicago subjects are older and much more likely to be female than the Boston subjects. Chicago subjects are less likely than Boston subjects to have completed some college but are more likely to have a college degree, partly because many Boston subjects are currently in college. Chicago subjects are more likely to identify as Democrats, tend to have lower incomes, and are more likely to receive government aid.

As in the GSS data, opinions on government assistance to the poor differ considerably between black and white subjects. Over half (57.4 percent) of black subjects think the government spends too little on the poor, compared to 48.2 percent of white subjects. Whites are more likely than blacks to say government spending on the poor is just right or too large.

Only 46.2 percent of subjects in the largely black Chicago subject pool, however, said the government spends too little on the poor, compared with 55 percent of subjects in the largely white Boston pool. This result is driven by a very low

percentage (38.9 percent) of whites in Chicago and a very high percentage (76.9 percent) of blacks in Boston agreeing that government spending on the poor is too low. The Chicago subject pool is on average poorer and more likely to receive aid than the Boston subject pool, so this observation matches the observation in the GSS that race is a larger factor than income in predicting support for government redistributive spending.

Subjects were also asked several questions from the GSS about the drivers of success. Of white subjects, 70.6 percent said work was more important than luck or help in determining success, compared to 63.8 percent of black subjects. Similarly, 71.8 percent of white subjects said effort was very important for success, compared to 63.2 percent of black subjects. However, whites were also more likely to say society was very important for success than blacks (45.9 percent compared to 36.8 percent). As in the GSS, these survey questions provide only slight evidence that whites and blacks have systematically different beliefs about the drivers of success.

## **2.5 Results**

### **2.5.1 Aggregate Preferences**

In this section, I first examine how overall preferences for redistribution and individual payment plans vary based on the plan and type of task. I then look more closely at how preferences for these plans vary by race to determine whether the data collected supports or contradicts any of the hypotheses for observed racial differences in preferences for redistribution.

Table 2.4: Percent of all Subjects Choosing Each Plan

	Redistribution Plans			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.603	.576	.720	.750
Take 3, Give 2	.364	.386	.527	.470
Take 3, Give 3	.561	.553	.667	.727
Take 3, Give 4	.462	.462	.568	.591
Take 4, Give 3	.318	.288	.409	.443
	Individual Payment Plans			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.687	.664	.795	.740
Take 3, Give 2	.573	.473	.629	.649
Take 3, Give 3	.611	.588	.750	.740
Take 3, Give 4	.641	.626	.712	.756
Take 4, Give 3	.450	.496	.576	.523

Each plan starts from a base of receiving \$10 for performing well on the task and \$0 for performing poorly. Thus a subject voting for “Take 2, Give 3” would be choosing to receive \$8 if he performs well and \$3 if he performs poorly. The numbers in the table give the percent of all subjects choosing that redistribution or individual payment plan for each task.

Table 2.4 gives the average percent of the entire sample that voted for each of the redistribution plans under each of the different tasks. Recall that each plan in the table is an alternative to receiving \$10 for performing well on that task or \$0 for performing poorly. The table therefore states, for example, that 60.3 percent of all subjects voted to take \$2 from subjects receiving \$10 and give \$3 to subjects receiving \$0. A majority of subjects in a session voting for this plan in a session would mean high-performing subjects would receive \$8 and low-performing subjects would receive \$3.

Similarly, looking at the second panel of the table labelled “Individual Payment Plans,” 68.7 percent of subjects preferred to receive \$8 if they were in the high-performing group and \$3 if they were in the low-performing group rather than

receiving \$10 if they were in the high-performing group or \$0 if they were in the low-performing group.

The percent of subjects choosing a flatter payment scheme varied considerably depending on the scheme, the task, and whether the scheme was applied to the group or the individual. When money was earned by chance, with two-thirds of subjects receiving a large payment, 79.5 percent of subjects chose to individually receive \$8 if they were lucky and \$3 if they were not. By contrast, only 28.8 percent of subjects voted to take \$4 from top performers in the ability task and give \$3 to poor performers.

Several patterns emerge from examining Table 2.4. First, on average subjects were equally or more inclined to choose a given flat payment scheme for themselves than they were to vote for it to apply to the whole group. Votes for the redistribution plans therefore seem to be more selfishly motivated than motivated by generosity or even inequity aversion. Perhaps subjects are less likely to vote for a redistribution plan than to choose it for themselves because they do not want to impose their preferences on others.

Second, subjects unsurprisingly are less likely to choose or vote for payment plans that destroy money than plans that create money or keep the amount the same. Thus plans that take 3 and give 2 or take 4 and give 3 are not popular, with at most 52.7 percent of subjects voting for the “Take 3, Give 2” plan in the 2/3 chance task.

Third, subjects were more inclined to vote for a given redistribution plan when money was earned by chance than when money was earned through effort or abil-

ity. Although this at first seems to imply that subjects are more generous when money is earned by chance, the second panel shows that more subjects also preferred the corresponding flatter individual payment schemes when money was earned by chance. Thus this result may simply mean that subjects were more confident in their ability to land in the high-performing group when they had control over the result than when the high-performing group was chosen randomly.

Finally, subjects tend to make the same choices for the effort and ability task and for the two-thirds chance and random chance tasks. In the ability task, money is earned based on performance, but a successful performance on the task is based at least in part on inherent talent rather than effort. This result implies that people may treat performance-based tasks similarly regardless of whether effort is the only factor in success. Subjects also make roughly the same choices when success is driven by luck regardless of whether the exact probability of success is known or unknown.

## **2.5.2 Race and Risk Aversion**

In this and the following sections, I examine whether the data I collected provides evidence for several hypotheses for why blacks and whites might express different preferences for government redistribution plans in surveys. The first of these is that blacks and whites might have systematically different levels of risk aversion. All else equal, more risk averse individuals would tend to prefer more redistribution since these programs provide a flatter payment scheme.

To test whether blacks and white have different levels of risk aversion, I ad-



ministered a standard test where subjects chose between one more risky and one less risky lottery (see Figure B.1 in the Appendix). For example, subjects chose between a 60 percent chance of \$1.60 and a 40 percent chance of \$2 or a 60 percent chance of \$.10 and a 40 percent chance of \$3.65. The probability of the higher payout increased with each question so that the riskier lottery became more attractive in later questions.

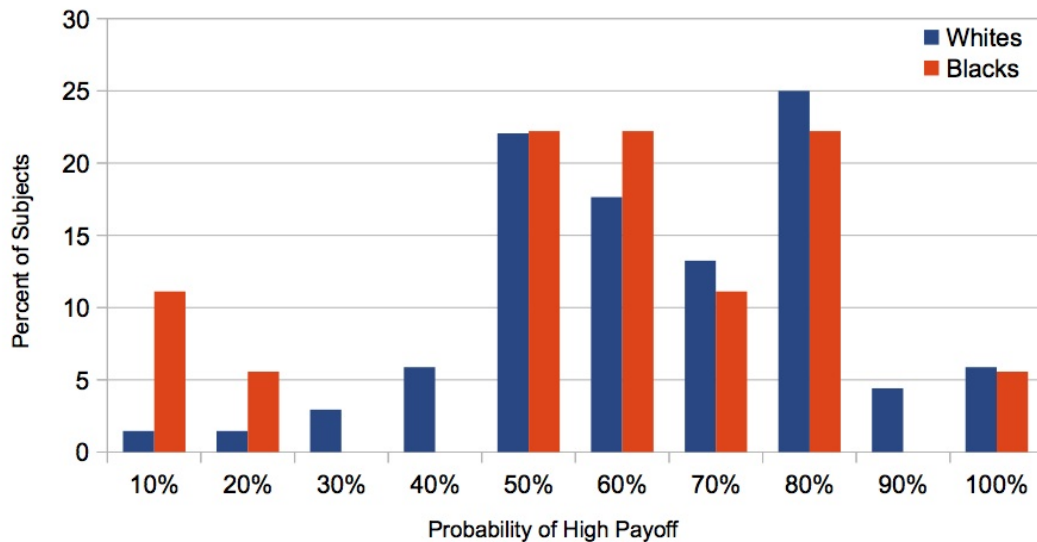
A rational individual would start choosing the less risky lottery and then, when the probability of the high payoff is high enough, switch to choosing the riskier lottery.<sup>6</sup> Subjects should never switch back to the less risky lottery, and they should all choose the riskier lottery when the probability of the high payoff is 100 percent, since that high payoff is higher. I remove from analysis any subjects who violate one of those two rules, leaving me with 86 subjects.<sup>7</sup>

Figure 2.3 shows the percent of white and black subjects who switch to the riskier lottery at each probability of the high payoff. A more risk-averse subject would require a larger probability of the high payout to choose the riskier lottery, so a cutoff of 50 percent implies less risk aversion than a cutoff of 80 percent. The most common cutoff probability for both white and black subjects is 80 percent, with 25 percent of whites and 22 percent of blacks switching to the risky lottery at this level. The same percent of black subjects chose a cutoff of 50 percent and 60 percent, making them as or more likely than white subjects to choose these cutoffs. Black subjects were substantially more likely than white subjects to always choose

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<sup>6</sup>A very risk-loving but rational individual might choose the riskier lottery every time.

<sup>7</sup>I added this test after the first session, so a total of 109 subjects completed this task. 18 of 33 black subjects and 68 of 76 white subjects completed the task correctly; the results reflect the responses of these 86 subjects.

Figure 2.3: *Min High Payout Probability for which Subjects Choose Riskier Lottery*

Based on the 68 white subjects and 18 black subjects who expressed economically rational preferences on the risk aversion assessment.

the riskier lottery.

Black subjects thus do not appear to be more risk averse than white subjects; if anything they appear less risk averse. Regressing the risk cutoff value on race and a set of demographic controls corroborates this conclusion. On average, the minimum probability of a high payout for which blacks are willing to choose a riskier lottery is 10.6 percent lower than that of whites, although this result is not statistically significant.

These results do not support the hypothesis that blacks prefer more government aid to the poor than whites because of risk aversion. If anything, blacks appear to be less risk averse than whites in this sample.

### **2.5.3 Race and Inequity Aversion**

A second hypothesis is that blacks and whites might prefer different levels of inequity. If whites are less inequity averse than blacks, they would tend to support less government redistribution.

Table 2.5 shows the percent of all white and black subjects choosing each redistribution and individual payment plan. If black subjects were more inequity averse than white subjects, we would expect to see a higher percentage of blacks than whites voting for redistribution plans. If blacks were much less likely to prefer the flatter individual payment schemes than whites, we could also argue that blacks were more inequity averse if they preferred more redistribution relative to their baseline individual payment preferences than whites.

Black subjects were not systematically more likely than white subjects to vote for redistribution plans. Only in seven of the twenty scenarios did more black subjects than white subjects vote for redistribution plans. On the other hand, black subjects were actually more likely to choose a flatter individual payment scheme in twelve of the twenty scenarios, particularly for the effort and ability tasks.

White subjects were on average more likely than black subjects to choose flatter individual payment schemes for the luck-based tasks, corroborating the previous result that white subjects were more risk averse than black subjects. Because black subjects were more likely to prefer flat individual payment schemes but less likely to prefer the equivalent redistribution schemes, this table provides little evidence that blacks are more inequity averse than whites.

Although Table 2.5 gives an idea of how black and white subjects' choices dif-

Table 2.5: Percent of Black and White Subjects Choosing Each Plan

	Redistribution Plans – Black Subjects			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.553	.574	.660	.702
Take 3, Give 2	<b>.447</b>	<b>.489</b>	<b>.587</b>	.468
Take 3, Give 3	<b>.596</b>	<b>.638</b>	<b>.702</b>	.681
Take 3, Give 4	.362	.426	.426	.489
Take 4, Give 3	.298	<b>.362</b>	.362	.426
	Redistribution Plans – White Subjects			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.631	.576	.753	.776
Take 3, Give 2	<b>.318</b>	<b>.329</b>	<b>.494</b>	.471
Take 3, Give 3	<b>.541</b>	<b>.506</b>	<b>.647</b>	.753
Take 3, Give 4	.518	.482	.647	.647
Take 4, Give 3	.329	<b>.247</b>	.435	.452
	Individual Payment Plans – Black Subjects			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.681	<b>.739</b>	<b>.830</b>	.630
Take 3, Give 2	<b>.660</b>	<b>.630</b>	.596	<b>.652</b>
Take 3, Give 3	<b>.660</b>	<b>.696</b>	.723	.739
Take 3, Give 4	.617	<b>.696</b>	.660	.674
Take 4, Give 3	<b>.489</b>	<b>.630</b>	<b>.596</b>	<b>.609</b>
	Individual Payment Plans – White Subjects			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.690	<b>.624</b>	<b>.776</b>	.800
Take 3, Give 2	<b>.524</b>	<b>.388</b>	.647	<b>.647</b>
Take 3, Give 3	<b>.583</b>	<b>.529</b>	.765	.741
Take 3, Give 4	.655	<b>.588</b>	.741	.800
Take 4, Give 3	<b>.429</b>	<b>.424</b>	<b>.565</b>	<b>.553</b>

Numbers in bold indicate instances where a larger percentage of blacks than whites chose the flatter payment scheme. Each plan starts from a base of receiving \$10 for performing well on the task and \$0 for performing poorly. Thus a subject voting for "Take 2, Give 3" would be choosing to receive \$8 if he performs well and \$3 if he performs poorly. The numbers in the table give the percent of subjects choosing that redistribution or individual payment plan for each task.

ferred, it does not alone indicate whether race is a strong predictor of preferences for redistribution in any of these scenarios. White and black subjects systematically differed in other ways that could affect these results. I therefore also regressed the choice of flatter payment scheme on race and a set of demographic controls. The results of these regressions are found in Table 2.6 and Table 2.7.

Because the results for the effort and ability tasks and the two random drawing tasks were generally similar, I present only the results for the effort task and the luck with random probability task. The coefficient on race ranges from 19 percent to -18 percent for the effort task and from 10 percent to -4 percent for the luck task and is never statistically significant. Although the standard errors are large due to the small sample size, taken together, these results imply that black subjects are not systematically more likely to vote for redistribution programs than white subjects. By contrast, Boston subjects are significantly more likely than Chicago subjects to vote for redistribution when money is earned by luck.

In Table 2.7, the coefficient on black is positive in nine out of ten cases, although again it is never statistically significant. If anything, however, black subjects may be more likely to choose a flatter payment scheme for themselves than white subjects, which would add to the evidence that blacks are not more inequity averse than whites, since they are equally or less likely to choose a flat payment scheme for the entire group than whites.

Table 2.6: Race and Preferences for Redistribution Plans with Demographic Controls

	Effort				Uncertainty				
	Take 2 Give 3	Take 3 Give 2	Take 3 Give 3	Take 3 Give 4	Take 2 Give 3	Take 3 Give 2	Take 3 Give 3	Take 3 Give 4	Take 4 Give 3
Black	-.026 (.118)	.194 (.110)	.135 (.116)	-.181 (.115)	.050 (.101)	.102 (.116)	.076 (.107)	-.041 (.110)	.034 (.116)
Boston	.137 (.128)	.369* (.120)	.307* (.127)	.180 (.125)	.337* (.110)	.342* (.126)	.247* (.117)	.316* (.120)	.346* (.126)
Female	.025 (.105)	.109 (.097)	.152 (.103)	.047 (.102)	.039 (.090)	.932 (.103)	.106 (.095)	.020 (.098)	.116 (.102)
Age	-.004 (.004)	.005 (.004)	.001 (.004)	-.002 (.004)	-.001 (.003)	.006 (.004)	.000 (.004)	-.004 (.004)	.003 (.004)
Some College	.107 (.191)	-.221 (.178)	.180 (.188)	-.179 (.186)	.005 (.164)	.127 (.188)	.200 (.174)	-.269 (.179)	-.097 (.186)
College Degree	-.100 (.109)	-.072 (.102)	.077 (.108)	.002 (.106)	-.097 (.094)	-.122 (.107)	-.044 (.100)	-.002 (.102)	-.110 (.106)
Low Income	-.028 (.129)	.047 (.120)	.071 (.127)	-.097 (.126)	-.082 (.111)	-.229 (.127)	-.050 (.118)	-.283* (.121)	-.307* (.128)
High Income	-.074 (.124)	-.081 (.116)	-.040 (.122)	-.166 (.121)	.003 (.106)	-.180 (.122)	-.015 (.113)	.042 (.116)	-.151 (.122)
Democrat	.010 (.104)	-.034 (.097)	.022 (.102)	-.165 (.101)	.115 (.089)	-.004 (.102)	.001 (.095)	.046 (.097)	.167 (.101)
Republican	-.288 (.192)	-.122 (.179)	-.223 (.190)	-.356 (.187)	.091 (.165)	-.150 (.189)	.069 (.175)	-.147 (.180)	-.104 (.187)
Receive Aid	.006 (.282)	.042 (.109)	.025 (.115)	-.036 (.114)	.069 (.100)	.145 (.115)	-.059 (.107)	.087 (.110)	.149 (.115)
Observations	119	119	119	119	119	119	119	119	118
R-Squared	.083	.146	.130	.151	.133	.136	.096	.195	.145

\*Significant at the 95% level. Dependent variable is equal to 1 if plan is chosen and 0 if not. Low income and high income are defined as below \$40,000 in 2010 dollars and above \$70,000 in 2010 dollars, respectively.

Table 2.7: Race and Preferences for Individual Payment Plans with Demographic Controls

	Effort				Uncertainty			
	Take 2 Give 3	Take 3 Give 2	Take 3 Give 3	Take 3 Give 4	Take 2 Give 3	Take 3 Give 2	Take 3 Give 3	Take 3 Give 4
Black	.032 (.108)	.223 (.115)	.128 (.117)	-.017 (.115)	.079 (.102)	.038 (.119)	.147 (.110)	.092 (.100)
Boston	.214 (.119)	.356* (.127)	.309* (.128)	.209 (.127)	.351* (.110)	.150 (.128)	.299* (.118)	.278* (.107)
Female	.053 (.096)	.089 (.103)	.097 (.104)	.053 (.103)	.146 (.089)	.120 (.104)	.175 (.096)	.057 (.087)
Age	-.003 (.004)	.004 (.004)	.003 (.004)	-.002 (.004)	-.000 (.003)	-.000 (.004)	-.003 (.004)	-.008* (.003)
Some College	.035 (.175)	-.140 (.187)	.027 (.189)	-.019 (.187)	.207 (.161)	-.113 (.189)	-.198 (.174)	-.245 (.158)
College Degree	-.003 (.100)	.021 (.107)	.069 (.108)	.012 (.107)	.040 (.093)	-.100 (.108)	.048 (.100)	.126 (.091)
Low Income	.022 (.119)	.004 (.127)	-.014 (.129)	.032 (.128)	-.054 (.111)	-.007 (.129)	-.085 (.119)	-.084 (.108)
High Income	.037 (.115)	-.118 (.123)	-.017 (.124)	.034 (.123)	.079 (.106)	.049 (.124)	.035 (.114)	.098 (.104)
Democrat	-.086 (.095)	-.001 (.102)	.117 (.103)	.008 (.102)	.006 (.088)	.059 (.103)	-.083 (.095)	.040 (.086)
Republican	-.523* (.176)	-.201 (.188)	-.125 (.190)	-.340 (.188)	.037 (.162)	-.111 (.190)	-.087 (.175)	-.024 (.159)
Receive Aid	.099 (.107)	.072 (.115)	.079 (.116)	.024 (.115)	.020 (.099)	.173 (.115)	.061 (.106)	.088 (.097)
Observations	118	118	118	118	118	118	118	118
R-Squared	.148	.138	.101	.080	.183	.066	.092	.166

\*Significant at the 95% level. Dependent variable is equal to 1 if plan is chosen and 0 if not. Low income and high income are defined as below \$40,000 in 2010 dollars and above \$70,000 in 2010 dollars, respectively.

### **2.5.4 Race and Confidence**

A third possible explanation for racial differences in preferences for redistribution programs is that blacks and whites agree on whether success is driven by luck or effort but have different expectations about their own chances of success under that regime. Thus if everyone agreed that success was primarily a matter of effort, but whites believed they were able to put forth more effort (regardless of whether this were true), they would prefer less redistribution.

In this framework, I am able to test whether white and black subjects have different beliefs about how they will perform on the tasks in the experiment. If one group chooses the flatter payment scheme on one task more frequently than the other group does, but the groups have similar preferences for the other tasks, then more members of that group think they will perform poorly on that particular task. Since subjects know their probability of success with certainty in one of the luck tasks, seeing racial differences in choosing the flat payment scheme for this task would tend to support differences in risk aversion rather than confidence.

Table 2.5 shows that the only task with clear racial differences in preferences for individual payment schemes is the ability task. More black subjects than white subjects chose the flatter payment scheme for all five schemes.

In some cases the differences were quite large. 63 percent of black subjects chose to receive \$7 if they did well and \$2 if they did poorly, compared to 38.8 percent of white subjects, and 63 percent of black subjects chose to receive \$6 if they did well and \$3 if they did poorly, compared to 42.4 percent of white subjects. These are the two payment schemes that sum to less than \$10, the amount of money subjects



receive if they perform well under the steep payment scheme. Even controlling for demographics, blacks are significantly more likely to choose the flat payment scheme in these two cases.

Black subjects did not always prefer the flatter payment scheme, so they were probably less confident in their abilities to do well on this trivia task than white subjects were. Recall that subjects chose a payment scheme before they saw the trivia quiz. This particular result cannot be extrapolated outside this setting because the trivia quiz task was very specific. Black subjects may have felt less confident about the task because they believed their cultural knowledge was less likely to overlap that of the white experimenter who wrote the questions.

A more generally relevant result is that even though black subjects were substantially more likely to choose the flat individual payment scheme than white subjects, they were not always more likely than white subjects to vote for equivalent flat redistribution plans. In two cases, more whites than blacks voted for the flat redistribution plan for the ability task.

Even when they were more likely to vote for these plans than whites, black subjects' support for these plans fell considerably. Only 36.2 percent of black subjects voted to take \$4 from top performers and give \$3 to poor performers, compared to 63 percent of black subjects who chose this plan for themselves (24.7 percent of whites voted for the redistribution plan and 42.4 percent chose the flat individual plan).

Despite clear racial differences in confidence about performance on the ability task, preferences for redistribution plans did not systematically differ between

black and white subjects. This result implies that even if on average blacks were less confident about their ability to succeed in a real world setting, they might not systematically prefer more redistribution because of their lower level of confidence.

### **2.5.5 Race and Beliefs about the Drivers of Success**

Another hypothesis for racial differences in preferences for redistribution programs is that blacks and whites have different beliefs about the drivers of success. If, for example, whites believe success is largely a matter of effort and blacks believe success is largely a matter of luck, then blacks might prefer more redistribution even if both groups were equally risk averse, inequity averse, and confident.

The data would provide support for this hypothesis if black and whites were equally likely to support redistribution programs under all four tasks but preferred different levels of redistribution for different tasks. Being able to rule out other hypotheses also provides more support for this one.

Race is never a statistically significant ( $p < .05$ ) predictor of voting for the flatter payment scheme in any specifications including demographic controls, both for the tasks in Table 2.6 and for the other two tasks not included in the table. Because of the small sample size, however, it is difficult to argue conclusively that blacks and whites prefer exactly the same level of redistribution in all cases. The overall pattern of results does not imply that black subjects prefer more redistribution than whites, however. If anything, black subjects are somewhat less likely than white subjects to vote for redistribution programs, particularly when money is earned by

chance.

Under a given payment scheme, then, white subjects tend to be equally or more likely to vote for redistribution programs than black subjects. Controlling for the fact that Bostonian subjects prefer more redistribution and are largely white does not reverse this result. In this way, the data in this experiment seems to contradict the real world result that blacks prefer more redistribution than whites. If black subjects believed money was earned by random chance and white subjects believed it was earned by effort, however, more black subjects than white subjects would vote for four of the five redistribution plans, which does match real world observations.

This data is not at all sufficient to conclude that racial differences in preferences for redistribution is driven by different beliefs about the drivers of success. Of all of the totally structural hypotheses for racial differences in preferences for redistribution, however, this one has the strongest support in the data collected here.

As discussed in Section 2.4, however, I did also include questions from the GSS about the drivers of success in society in the survey. The responses to these questions did not strongly support this hypothesis. White subjects were only slightly more likely than black subjects to say that work was more important for getting ahead than luck or help from others. When the question was asked a different way, whites were more likely than blacks to say effort was very important for success, but they were also more likely to say society was more important for success. Controlling for demographics, blacks were only 0.2 percent more likely than whites to say luck was more important than effort for success, and this difference was

nowhere near statistically significant.

Differing beliefs about the drivers of success could explain racial differences in preferences for redistribution given the data collected from the various tasks. It is not a good explanation, however, if there is no evidence that blacks and whites actually have different beliefs about the drivers of success. Although such a finding would be understandable given the vastly different historical experiences of black and white Americans, neither this survey nor evidence from the GSS supports the argument that blacks believe success is driven by luck and whites believe success is driven by effort. Perhaps a more in-depth survey could establish this result, but such a survey has not yet been conducted.

### **2.5.6 Non-Economic Explanations for Racial Differences**

The results from the redistribution tasks largely contradict the link between race and preferences for redistribution found in surveys. As shown in Section 2.4, this sample did replicate the GSS result that blacks are more likely than whites to think the government does not spend enough money on the poor. In the controlled setting with clearly defined tasks, however, black subjects were if anything less likely to vote for redistribution plans than white subjects.

The results gathered here seem to rule out the hypotheses that the racial differences found in surveys are driven by different levels of risk aversion, inequity aversion, or confidence. Combining these results with survey questions seems to rule out the idea that blacks and whites have different beliefs about the drivers of success. Another possibility is that people do not think about the answer to a sur-

vey question about redistribution in the same way that they think about a direct vote for or against a redistribution task.

A key difference between a survey question and the tasks in this study is that answers to survey questions have no economic consequences. Stating a dislike for welfare in a survey is costless for poor people. The rhetoric around welfare in America is very racially charged, and in a setting with no economic consequences, racial tensions could be a major factor in people's stated opinions about government support for the poor.

The data collected in this study cannot directly test whether racism (or any other political motivation) drives racial differences in beliefs about government redistribution. However, I can examine whether beliefs about government support for the poor relates to preferences for redistribution in the tasks in the study. Finding that preferences in the survey do not relate to preferences in tasks with economic consequences would not imply that stated beliefs about welfare are driven by racism specifically. It could imply, however, that people think about questions about redistribution differently when the answers have economic consequences than when they don't.

Table 2.8 replicates Table 2.5 for subjects who said the government spends too little or too much on the poor. Subjects who think the government spends too little on the poor do tend to prefer more redistribution than subjects who think the government spends too much on the poor. Subjects who think the government spends too much on the poor were less likely to vote for redistribution in all twenty differ-

Table 2.8: Plan Choice by Opinion about Government Spending on the Poor

	Redistribution Plans – Too Little Spending			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.627	.618	.779	.765
Take 3, Give 2	.412	.441	.522	.515
Take 3, Give 3	.603	.588	.676	.750
Take 3, Give 4	.515	.500	.574	.603
Take 4, Give 3	.338	.338	.426	.485
	Redistribution Plans – Too Much Spending			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.364	.318	.409	.591
Take 3, Give 2	.182	.091	.409	.273
Take 3, Give 3	.364	.318	.500	.545
Take 3, Give 4	.227	.182	.364	.364
Take 4, Give 3	.136	.091	.273	.381
	Individual Payment Plans – Too Little Spending			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.721	.706	.824	.750
Take 3, Give 2	.574	.515	.632	.691
Take 3, Give 3	.618	.647	.779	.765
Take 3, Give 4	.691	.676	.691	.809
Take 4, Give 3	.485	.544	.544	.588
	Individual Payment Plans – Too Much Spending			
	Effort	Ability	2/3 Chance	Random Chance
Take 2, Give 3	.455	.381	.591	.571
Take 3, Give 2	.364	.238	.591	.286
Take 3, Give 3	.409	.333	.591	.524
Take 3, Give 4	.364	.286	.591	.571
Take 4, Give 3	.182	.238	.455	.238

Each plan starts from a base of receiving \$10 for performing well on the task and \$0 for performing poorly. Thus a subject voting for “Take 2, Give 3” would be choosing to receive \$8 if he performs well and \$3 if he performs poorly. The numbers in the table give the percent of subjects choosing that redistribution or individual payment plan for each task.

ent scenarios.<sup>8</sup> They were, however, also more likely to choose flatter individual payment schemes.

This result implies that people are consistent in their preferences for redistribution, regardless of whether their choice has economic consequences. It does not, however, rule out racism as an explanation for racial differences in preferences for redistribution. To actually test this hypothesis, I would have to rerun the study in racially homogenous groups and see if subjects were more likely to vote for redistribution in that case.<sup>9</sup>

## 2.6 Conclusion

The primary focus of this analysis was understanding why blacks and whites of similar income levels tended to express different preferences for the amount of government spending on the poor. In general, black Americans, including wealthier black Americans, are more likely to say that the government does not spend enough money on the poor, whereas white Americans, including poorer white Americans, are more likely to say the government spends too much money on the poor. Some people must therefore be stating preferences that go against their apparent economic best interest.

To understand why this might be the case, I recruited black and white subjects

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<sup>8</sup>Subjects did the tasks before taking the survey, so they were not primed to think about the task in terms of their beliefs about welfare.

<sup>9</sup>In the Boston sessions, in which the overwhelming majority of subjects were white, subjects were much more inclined to vote for redistribution than in the more racially heterogeneous Chicago sessions. There were other important differences between the two sessions as well, however.

to play redistribution games in a controlled environment. In this setting, I was able to test several hypotheses that could explain the observed racial differences in redistribution preferences and that could fit into a rational economic framework. I also was able to make some general observations about the nature of preferences for redistribution.

Subjects on the whole tended to prefer more redistribution when money was earned by luck than when it was earned by effort or ability, although they also tended to prefer flatter individual payment schemes. Individuals tended to make similar choices for the effort task and the ability task, implying that people associate tasks requiring innate talents more with effort than with luck even though in some cases possessing talents is more a matter of chance than of hard work.

Subjects were also less likely to vote for a flat payment scheme than they were to choose it for themselves. This result means that they were willing to actually give up some utility in order to maintain a certain level of inequality in the group. Typically, people tend to be inequity averse, so this result is surprising and would be worth investigating further

Looking at the hypotheses for racial differences in preferences for redistribution, I found that black subjects did not appear to be more risk averse, more inequity averse, or less confident than white subjects. Black subjects did appear to be less confident when money was earned based on performance on a trivia quiz, but they did not prefer more redistribution as a result of being less confident.

The data from the redistribution games could not rule out the hypothesis that blacks prefer more redistribution than whites because the two groups have dif-



ferent beliefs about the drivers of success. If black subjects thought money was earned by luck and white subjects thought it was earned by effort, more blacks than whites would have voted for most of the redistribution plans. In a survey administered to subjects, however, I found little self-reported evidence suggesting that blacks and whites actually do hold different beliefs about whether luck or effort drives success. Since the premise of this hypothesis seems to be false, it is not a good explanation for the data even though it would generate racial differences in preferences for redistribution if it were true.

Instead, a better explanation of racial differences in preferences for redistribution could be more political in nature. Because the rhetoric around welfare is so racially charged, poor whites may be inclined to vote against it even if they might benefit from it because they dislike blacks. I cannot test this hypothesis using the data I collected in this study. Further research would be needed to test whether preferences for redistribution change depending on the racial makeup of the group. I did find that subjects' preferences for redistribution appeared to be largely consistent between survey questions with no economic consequences and redistribution tasks with economic consequences.

I also found in the survey that this subject pool did replicate the general result that whites prefer less government spending on the poor than blacks. Although the subject pool does reflect the general population in this way, it is not in any way meant to be representative of the US population as a whole but rather reflects the best sample I could procure as a student researcher.

These results therefore need to be interpreted with caution. Although the tests

conducted in this chapter can be used to draw conclusions about this sample, these conclusions do not necessarily reflect the population as whole. More broadly representative data would be more useful in understanding the entire population, and at best this chapter can give some idea of what hypotheses are most plausible and what data would be most helpful to collect.

## Chapter 3

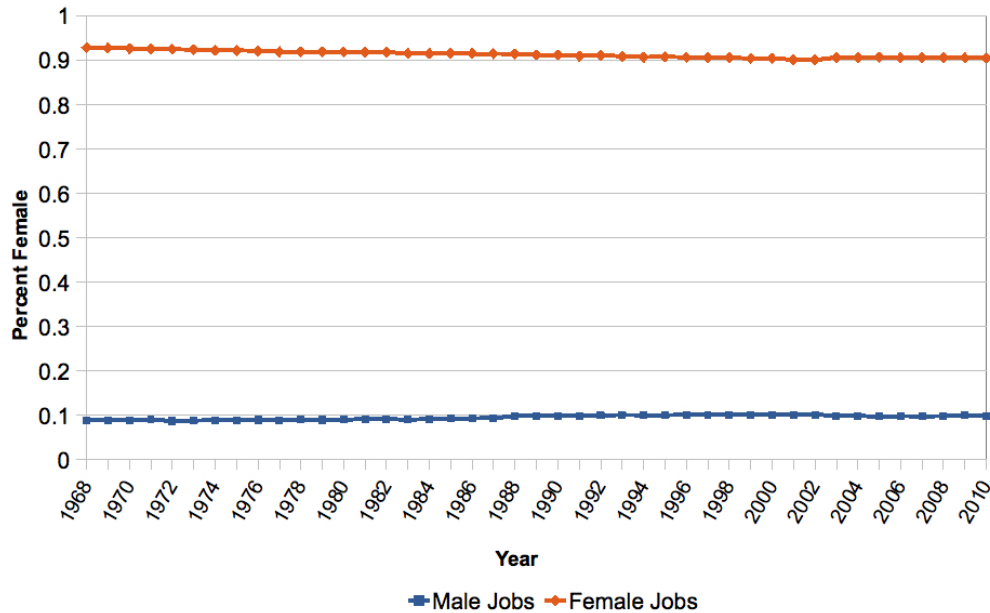
# Occupational Segregation by Gender and Recent US Labor Market Trends

### 3.1 Introduction

Men and women tend to do different jobs. Based on data from the Current Population Survey (CPS), individuals in heavily male occupations include engineers, mechanics, and laborers, whereas individuals in heavily female occupations include attendants, nurses, housekeepers, and secretaries.

Occupational segregation by gender within the set of heavily male or female jobs has remained remarkably persistent even as more women have entered the labor force. Figure 3.1 shows the percent of female workers in predominantly male and female jobs over time based on CPS data. Predominantly male and female jobs are defined as jobs in which 90 percent or more of the employees were male or female, respectively, in the years from 1968 to 1980.

Figure 3.1: Percent Female in Predominantly Male and Female Jobs

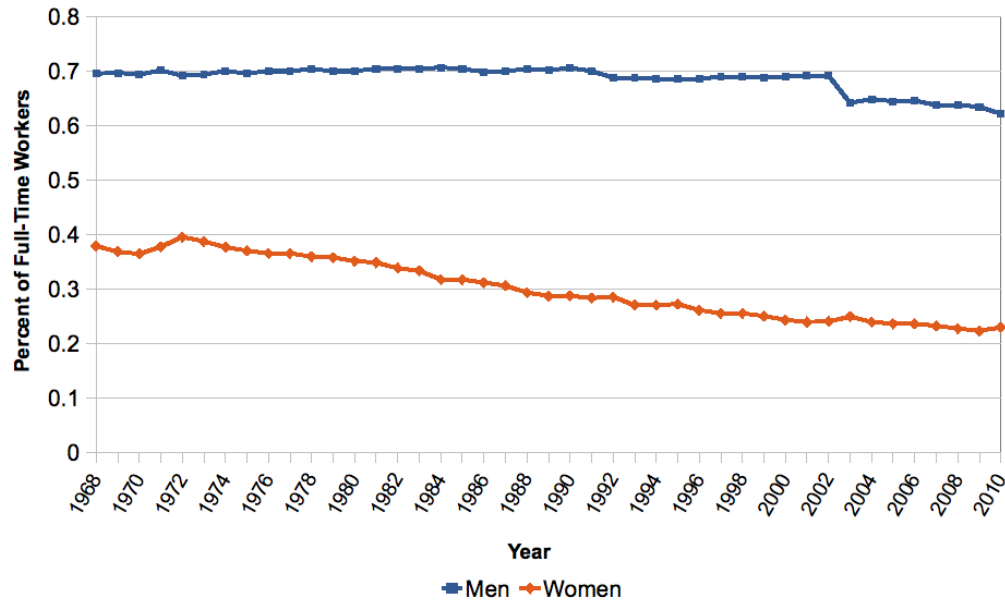


Data from CPS. Predominantly male (female) jobs are defined as being 90 percent male (female) or more on average from 1968-1980.

As the graph shows, the average percent female in a predominantly male or female job before 1980 stayed roughly the same through 2010. In predominantly male jobs, percent female increases from just under 10 percent to just over 10 percent, and in predominantly female jobs it drops from just over 90 percent to 90 percent. The finding of persistent occupational segregation is robust to the exact percentage female used to define predominantly male and female jobs.

Another way of thinking about occupational segregation, however, is to consider the percent of all male and female full-time workers in predominantly male and female jobs. Using the same definitions of predominantly male and female jobs as above, Figure 3.2 shows how the percents of men and women in these jobs have changed over time based on CPS data. The percent of men in predominantly

Figure 3.2: Percent of Men and Women in Predominantly Own-Gender Jobs



Data from CPS. Predominantly male (female) jobs are defined as being 90 percent male (female) or more on average from 1968-1980.

male occupations stayed constant around 70 percent until a sharp drop in 2002, which may reflect changes in CPS job categorizations rather than a one-time shock to men's employment patterns. Following this drop, the percent of men in male occupations again stays constant around 63 percent.

The percent of women in predominantly female jobs does decline from 1968 to 2010. In the early 1970s, 40 percent of women worked in predominantly female occupations, whereas by 2010 only 22 percent of women worked in these jobs. This finding is not surprising because so many women entered the labor force in this time period. Predominantly female occupations would have had to grow substantially over that time period to absorb such a large influx of workers. Thus new female entrants to the labor market would have had to find jobs in less female

occupations, although as Figure 3.1 shows, they did not tend to find work in predominantly male occupations.

Figure 3.2 also demonstrates that a much larger percent of men than women work in predominately own-gender occupations. This finding is partly mechanical because predominantly female jobs are defined based on pre-1980 gender compositions, when fewer women were employed full time. Even before 1980, however, there was a substantial gap between the percent of men in male jobs and the percent of women in female jobs. Thus, men do seem to work in male occupations at a higher rate than women work in female occupations.

Many explanations for occupational segregation by gender have been suggested. One possibility is that discrimination prevents members of one gender from breaking into occupations dominated by the other gender. Gender discrimination in the workforce is unlikely to be strictly taste-based because men and women do not typically avoid interaction in other contexts. Instead, theories of gender discrimination in the workforce tend to include at least some element of statistical discrimination.

Goldin (2002) develops a pollution theory of discrimination whereby men limit the entry of qualified women into certain occupations in order to maintain that occupation's prestige. Even if the standards for doing a particular job did not change, if people assume women are less qualified than men on average in a particular dimension, they may conclude from observing an influx of women to that profession that the standards have diminished. This theory assumes that casual observers are not familiar with the particular qualifications of the new female entrants and in-

stead assume they are as qualified as the average woman.

Lang (1986) suggests that occupational segregation persists because men and women have different ways of communicating and that learning to speak the “language” of the other gender in the workplace is costly. In such a setting, employees from the minority group bear the costs of learning the language of the majority.

Looking at the dynamics of occupational segregation in the mid-twentieth century, Pan (2011) finds a pattern of tipping points where men quickly leave occupations when the percent of women reaches a certain threshold. She argues that this finding could be driven by men’s aversion to working with a large quantity of women because tipping points are lower in more sexist regions. This result could also be consistent with a pollution or other statistical discrimination theory as well.

A second category of explanations for occupational segregation by gender assumes that men and women have different skill sets and thus select into different occupations. Pitt et al. (2011) develop a model to explain why women have higher returns to schooling than men. They assume that different labor market activities have different returns to both skill and brawn and that individuals optimally choose an occupation and an amount of investment in these two attributes. Because women are on average less brawny than men and obtain smaller returns in brawn for a given nutritional investment, they tend not to choose occupations with high returns to brawn.

Although Pitt et al. created their model to explain gender differences in human capital investment in developing countries, this model can also apply in developed countries like the United States. Rendall (2010) looks at how a shift from

brawn-intensive to brain-intensive jobs over the latter half of the twentieth century impacted women's labor force participation and wages. She argues that this shift in the type of labor demanded can explain substantial percentages of the increase in female labor force participation and the closing of the gender wage gap over this time period.

Women's participation is therefore sensitive to the skills required in the labor market, and women may be unable to perform well in occupations requiring substantial amounts of strength. Very physical jobs, then, would tend to skew predominantly male. This hypothesis is bolstered by the observation that women tend to obtain more education than men, since very physical jobs tend to require less education.

Discrimination and different skill sets are two major hypotheses for occupational segregation by gender in the literature, but they are certainly not the only possible explanations for this observation. Another hypothesis similar to that of different skill sets is that men and women like to do different things. If women enjoy a particular activity more than men (or vice versa), they will accept a lower wage for it, possibly pulling the equilibrium wage low enough that few men are willing to take that job. A very specific taste-based explanation is that women prefer jobs that are compatible with childcare responsibilities, whereas men are indifferent.

This chapter primarily focuses on skill-based explanations for occupational segregation. The skills demanded by the labor market in the United States have changed rapidly in the past few decades. Skill-biased technical change, described



by Autor et al. (2003), has meant fewer jobs that require rote cognitive skills, as these can be performed by a computer. These jobs tend to fall in the middle of the skill distribution, leaving very low-skilled and very high-skilled jobs.

More recently, the collapse of the housing bubble and offshoring of manufacturing have both destroyed jobs in stereotypically male industries. At the same time, the health care sector and service industries, both of which include many stereotypically female jobs, have experienced growth. As the demand for physical strength in the workforce decreases, either the proportion of men in the labor force or the extent of occupational segregation may change as fewer men can specialize in brawn-intensive jobs.

Starting from an assumption that occupational segregation by gender is at least partly driven by differences in skills, this chapter offers a preliminary discussion of how recent changes in the US labor market could impact men's labor market decisions. In Section 3.2, I develop a basic model of the choice to specialize in a brain-intensive or brawn-intensive profession and examine how different types of labor market shifts could affect men and women differently under this regime.

Section 3.3 examines whether recent trends seem to support these predictions. With very few years of data following the recession, these results are only meant to be suggestive and would need to be developed further as more years of data become available. Section 3.4 concludes and provides some discussion of how these conclusions might differ under discrimination-based models of occupational segregation.

## 3.2 Framework

In this section I present a basic framework describing how men and women might segregate into different types of occupations and then discuss how certain shocks to the economy might affect men and women differently.

I start by assuming there are two occupations. One is a skill-intensive occupation, and one is a brawn-intensive occupation. Income in each occupation is a non-decreasing function of skill  $S$  and brawn  $B$ , so that they can be written as  $I_s(S, B)$  and  $I_b(S, B)$ .

By definition, the returns to skill are larger in the skill-intensive occupation and the returns to brawn are larger in the brawn intensive occupation, so that

$$\frac{\partial I_s}{\partial S} > \frac{\partial I_b}{\partial S}$$

and

$$\frac{\partial I_b}{\partial B} > \frac{\partial I_s}{\partial B}$$

I also assume individuals are endowed with ability  $A$  and brawn  $B$ .<sup>1</sup> I assume no correlation between an individual's endowment of ability and his endowment of brawn. Brawn is a natural endowment, but skills are obtained through years of schooling. For simplicity, quantity of skills can simply be defined as years of schooling and thus both can be denoted by  $S$ .

I assume the cost of schooling  $C(A, S)$  is a function of one's endowed ability

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<sup>1</sup>The model could be extended so that individuals are endowed with a capacity for brawn but have to make nutritional investments to achieve this capacity. In this case, the marginal brawn return to nutrition would be greater for men than for women on average. Such an extension is more relevant in a developing country where nutrition is scarce; in the United States, I assume there are no barriers to reaching a reasonable amount of brawn.

and the amount of schooling one has already obtained.

There are increasing marginal costs to schooling

$$\frac{\partial^2 C}{\partial S^2} > 0$$

but the cost of schooling at a given level of schooling is decreasing in ability

$$\frac{\partial^2 C}{\partial S \partial A} < 0$$

Individuals thus determine the optimal amount of schooling for each occupation, which is given by the point where the marginal cost to an additional year of schooling equals the marginal benefit in terms of income,

$$\frac{\partial C}{\partial S} = \frac{\partial I_s}{\partial S}$$

and

$$\frac{\partial C}{\partial S} = \frac{\partial I_b}{\partial S}$$

The corresponding optimal levels of schooling can be denoted as  $S_s^*$  and  $S_b^*$  respectively. Note that  $S_s^* > S_b^*$  because  $\frac{\partial I_s}{\partial S} > \frac{\partial I_b}{\partial S}$ .

Once an individual has determined the optimal level of schooling he would need to obtain for each occupation, he determines his income for each occupation given that he obtains the optimal level of schooling and chooses the occupation that maximizes his income.

$$I = \max\{I_s(S_s^*, B), I_b(S_b^*, B)\}$$

This framework implies that for every level of ability, there is a threshold amount of brawn above which individuals choose to specialize in the brawn-intensive task.

This threshold is increasing in ability. Similarly, for every level of brawn, there is a threshold level of ability above which individuals choose to specialize in the skill-intensive task. These thresholds form a frontier in the brain-brawn space.

A final assumption of the model is that ability is distributed equally across men and women but that men are brawnier than women. Specifically, for any value of  $B$ , an equal or larger percent of men than of women has a brawn endowment that is greater than  $B$ . Under this assumption, at each level of ability, men will be more likely to specialize in the brawn-intensive occupation because more of them have more than the threshold amount of brawn. Thus, in equilibrium, the brawn-intensive occupation will contain a greater fraction of men, and the skill-intensive occupation will contain a greater fraction of women. Although this equilibrium does not necessarily imply the strong levels of segregation demonstrated in the introduction, such results could obtain for certain values of the parameters.

I now consider the effects of two different shocks to this model based on recent changes to the US economy. First, declines in the manufacturing and construction sectors due to outsourcing and the collapse of the housing bubble have tended to destroy brawn-intensive jobs. If this trend continues, one would expect  $I_b$  to fall on average because even if wages do not fall at all, the probability of being out of work increases.

Some individuals near the brain-brawn frontier might find it optimal to switch to the skill-intensive occupation even though they did not obtain  $S_s^*$ . Depending on the marginal cost of obtaining a year of schooling mid-career, some could find it optimal to go back to school. If the marginal cost of additional schooling mid-

career is larger than at the beginning of a career, some people who stay in the brawn-intensive occupation would have chosen to specialize in the skill-intensive occupation if they had observed the current brawn-intensive income function at the start of their career.

Thus this change reduces (or at least does not increase) welfare for individuals in the brawn-intensive occupation, a larger percentage of whom are men. The skill-intensive task tends to become more masculine, since the concentration of men in the pool of switchers is greater than the concentration of men in the current pool of employees. Similarly, the brawn-intensive task becomes more masculine because the pool of individuals on the margin is contains more women than the overall pool of workers in that task.

Second, skill-biased technical change has tended to increase the returns to schooling, which in turn increases  $S_s^*$  and thus the amount of income individuals expect to earn in the skill-intensive task. New individuals entering the labor market with endowments near the previous brain-brawn frontier will instead choose to specialize in the skill-intensive occupation and obtain more schooling.

Some individuals in the brawn-intensive occupation would instead have chosen the skill-intensive occupation if they had been faced with the current parameters when choosing an occupation. As before, depending on the marginal cost to obtaining an additional year of schooling mid-career, some individuals might find it optimal to go back to school and enter the skill-intensive task whereas others might stay in the brawn-intensive occupation..

This framework has assumed that the gender composition of the labor force

is constant. In that case, both of these changes to the economy would tend to shift marginal workers from the brawn-intensive occupation to the skill-intensive occupation, integrating the skill-intensive occupation and further segregating the brawn-intensive occupation.

An alternative possibility is that increasing returns to skill could induce more women to enter the workforce in the skill-intensive occupation, as described by Rendall (2010). In this case, the overall effect on the gender composition of the skill-intensive job would be ambiguous, since men would switch from the brawn-intensive task but new women would enter.

At the same time, as income falls in the brawn-intensive occupation, some individuals in that occupation may choose to drop out of the work force entirely. If women are less attached to the workforce than men, this group could be more heavily female than the pool of brawn-intensive workers in general. As long as men do not drop out at a greater rate than women, however, the gender composition of the brawn-intensive task would still be more masculine than before.

### **3.3 Recent Trends**

In this section, I examine whether national employment data supports the hypotheses and predictions of the model using time-series trends. I combined data on employment from the 1968-2010 CPS with data on occupational characteristics from the 1977 Dictionary on Occupational Titles (DOT). The two datasets classify occupational titles differently, so I used a crosswalk between 1971 CPS occupational and industry titles and DOT occupational and industry titles. Because the

DOT only provides a snapshot of occupational characteristics, these results do not take into account whether the requirements for particular jobs changed substantially between 1977 and 2010.

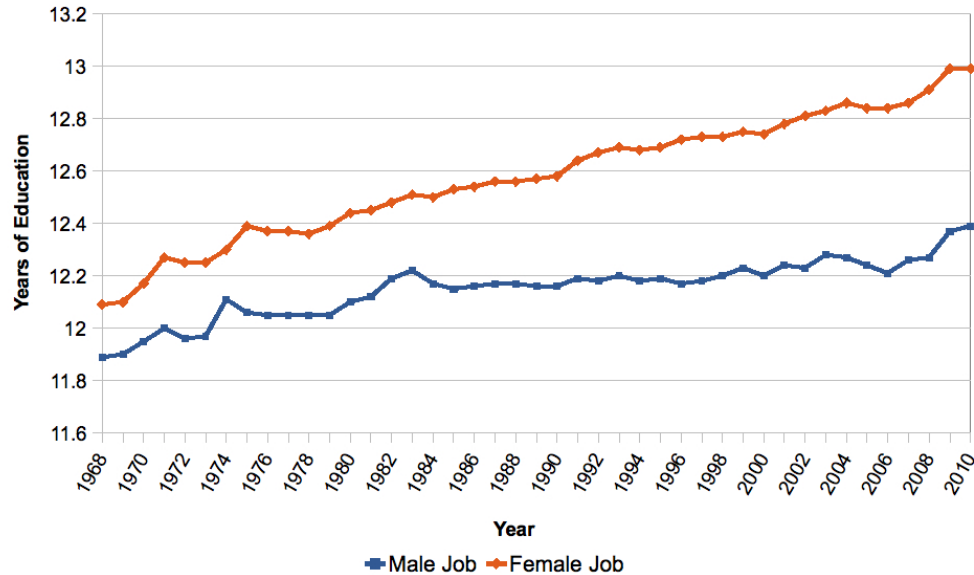
Since I averaged the DOT scores of the occupations of all men and women in the sample, these figures need to be viewed with two caveats in mind. First, these do not control at all for selection, which is especially important among women, so that, for example, these graphs cannot distinguish between already working women moving to jobs that require more intelligence or women entering the labor force and taking these jobs.

Second, the scoring system means that the magnitudes on these graphs are not easy to interpret. Moving from two to one on the intelligence scale is different from moving from three to two, for example, so these graphs are only informative about general trends.

I first look at whether men and women do tend to sort into skill-intensive and brawn-intensive occupations. Figure 3.3 shows the years of education required for the average male and female job. A data point on this graph represents the average years of education required according to the DOT for the occupations reported by all full-time employed men and women in the CPS in that year.

In 1968, then, the average full-time employed woman had a job that required 12.1 years of schooling, whereas the average full-time employed man had a job that required 11.9 years of schooling. The gap in years of education required for men's and women's jobs has widened considerably since then. In 2010, the average woman had a job requiring 13 years of schooling and the average man had a

Figure 3.3: Education Required for Average Male and Female Full-Time Job



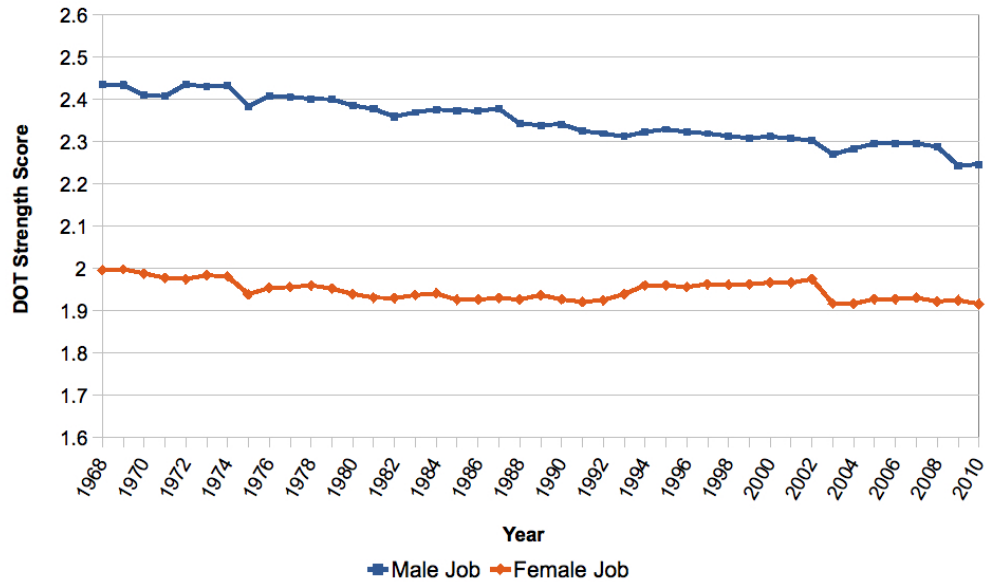
Data on years of education required by occupations from DOT. Time series data on male and female employment within occupations from CPS.

job requiring 12.4 years of schooling. Professions requiring more education have therefore grown relative to professions requiring less education, and women have entered these fields at a greater rate than men.

Figure 3.4 shows the average DOT strength score for men's and women's jobs. Jobs are assigned a strength score on a scale from 1 to 5, where a 1 implies the job is sedentary and a 5 implies the job requires very heavy lifting, carrying, or pushing or pulling. As hypothesized, men's jobs require more strength on average than women's jobs. In 1968, the average man had a job with a strength score of 2.4, and the average woman had a job with a strength score of 2.0. In 2010, the average man's job's strength score fell to just above 2.2, whereas the average woman's only fell to around 1.9.



Figure 3.4: Strength Required for Average Male and Female Full-Time Job

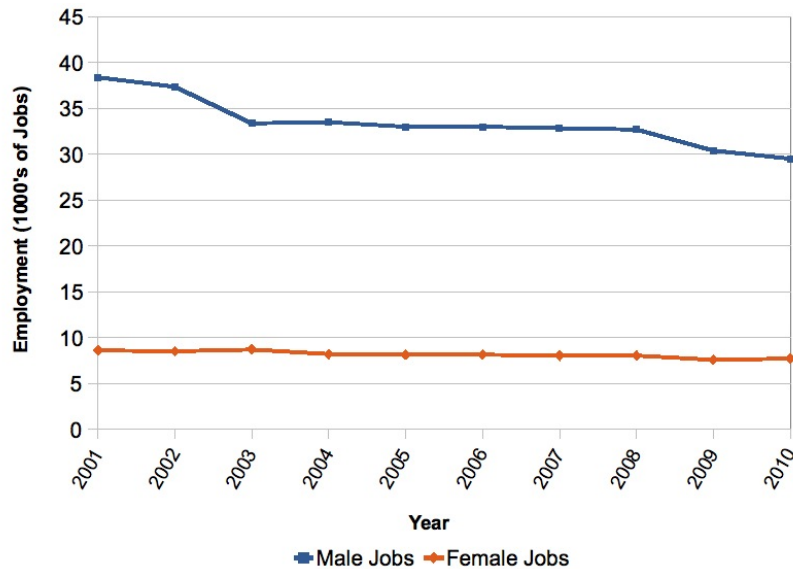


Data on strength required by occupations from DOT. Time series data on male and female employment within occupations from CPS.

This result could imply that men have been leaving brawn-intensive jobs, as the model predicts based on shifts in the US economy. Since we do not observe a corresponding increase in years of education required for men's jobs relative to years of education required for women's jobs, however, men do not seem to be switching into skill-intensive jobs at a significant rate. They could instead be in the process of going back to school, exiting the labor force, or simply switching into jobs that require the same amount of education but less strength.

Next, I examine the premise that employment has been falling in stereotypically male jobs, and specifically in jobs that require brawn, due to the recession in the latter part of the 2000s. Figure 3.5 gives full-time employment in predominantly male and female jobs as defined above for individuals in the CPS. Because

Figure 3.5: Full-Time Employment in Predominantly Male and Female Jobs

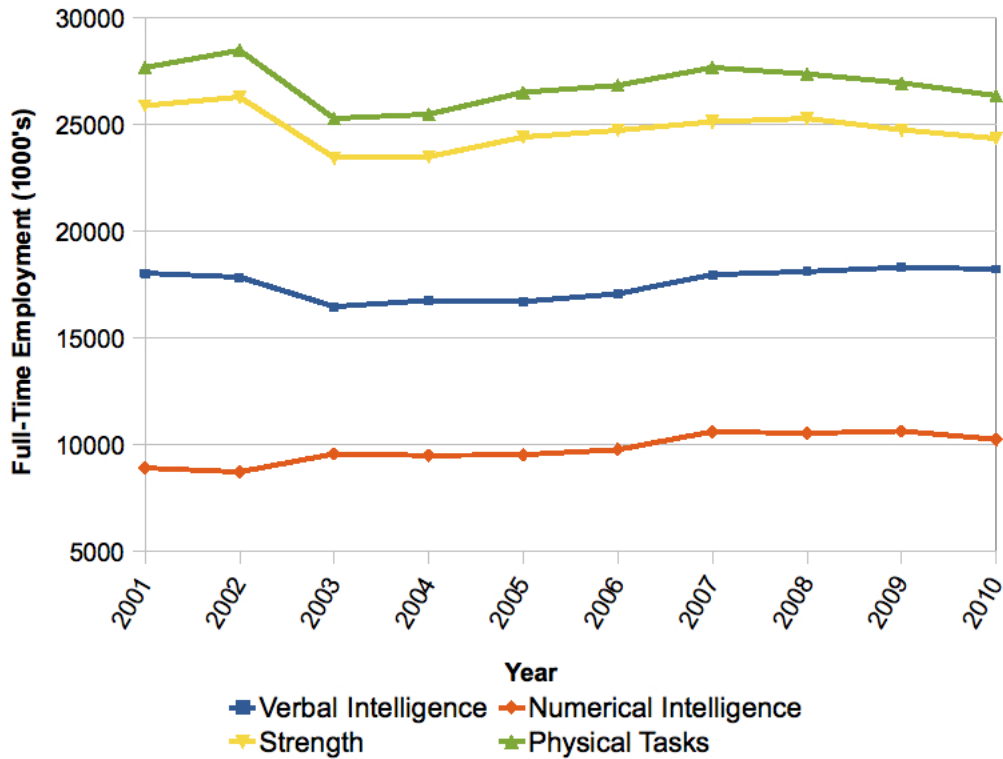


Data from CPS. Predominantly male (female) jobs are defined as being 90 percent male (female) or more on average from 1968-1980.

of a sharp break in the time series for men and women before 2001 that seems to indicate a change in job classification in the CPS, I present data from 2001-2010. Employment in predominantly female jobs remained relatively constant, whereas employment in predominantly male jobs fell from 2001 to 2003 and again from 2008 to 2010, a total drop of about 23 percent over the time period.

Figure 3.6 looks specifically at how full-time employment among people in the CPS has changed over the past decade in jobs requiring strength or physical effort. Jobs requiring verbal and numerical intelligence are included for comparison. I categorize jobs as requiring strength if they require medium levels of strength on average, and I categorize jobs as requiring physical effort if 2.5 or more of five physical demands are present on average. I categorize jobs as requiring a particular type of intelligence if, on average, workers in those jobs fall into the top third

Figure 3.6: Full-Time Employment in Jobs by Required Skill



Job requirement data from DOT. Strength jobs require medium levels of strength, physical jobs require workers to perform 2.5 or more physical demands, and intelligence jobs require workers fall in top third of the given intelligence distribution on average. Employment data from CPS.

of the distribution of that type of intelligence.

Employment in jobs requiring strength and employment in jobs requiring physical effort have both followed similar patterns over the past ten years. Following a sharp drop in 2003, employment in both types of jobs rose through 2007-2008 before starting to fall again to about the same level as in 2001. Employment in jobs requiring verbal intelligence also fell in 2003, albeit not as sharply, and has risen since then. Employment in jobs requiring numerical intelligence, by contrast, has consistently risen or stayed the same.

This figure provides some evidence that brawn-intensive jobs may have disappeared relative to skill-intensive jobs since the beginning of the recession. Employment in these occupations has fallen only slightly, however, and it has not yet dipped below its 2001 levels. Thus the data actually provides stronger evidence that stereotypically male jobs have been lost than that particularly brawn-intensive jobs have been lost.

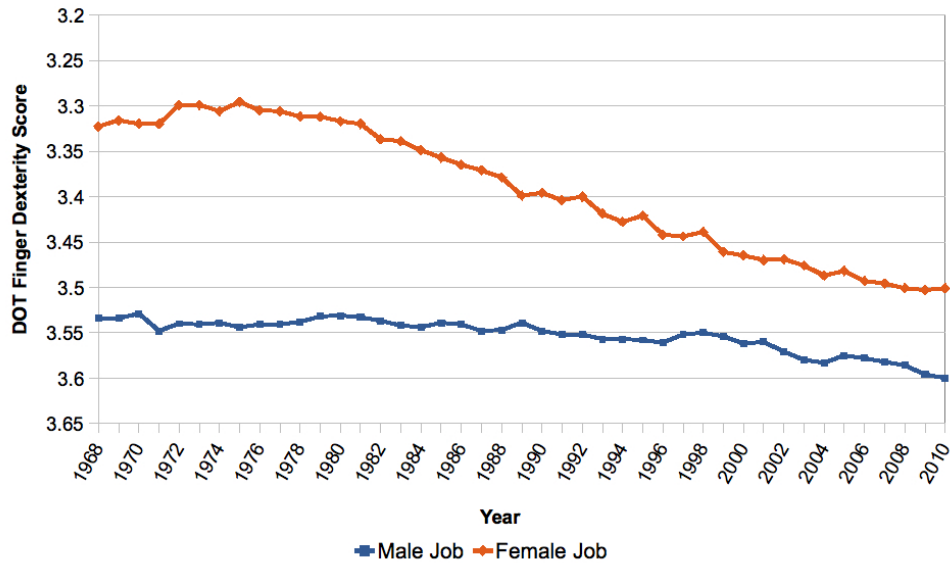
Finally, the following four graphs look at how men and women have responded differently to skill-biased technical change. Skill-biased technical change has generally resulted in the loss of medium-skill jobs that can be replaced by computers. Thus employment opportunities have shrunk in jobs that require routine tasks and have grown in jobs that require non-routine tasks.

I follow Autor et al. (2003) in classifying jobs requiring finger dexterity as routine manual, jobs requiring eye-hand-foot coordination as non-routine manual, jobs requiring attaining set limits or standards as routine cognitive, and jobs requiring direction, control, and planning as non-routine cognitive. The labor market has recently favored non-routine cognitive jobs over routine cognitive and routine manual jobs.

The average finger dexterity score for women's jobs, shown in Figure 3.7 has risen from around 3.3 to 3.5 over the past 40 years, implying that the average woman's job requires less finger dexterity now (a higher score means the job requires less of the skill). The average score for men, by contrast, has only risen from about 3.55 to 3.6.

The percent of women's jobs requiring the employee to attain set limits or stan-

Figure 3.7: Finger Dexterity Required for Average Full-Time Job by Gender



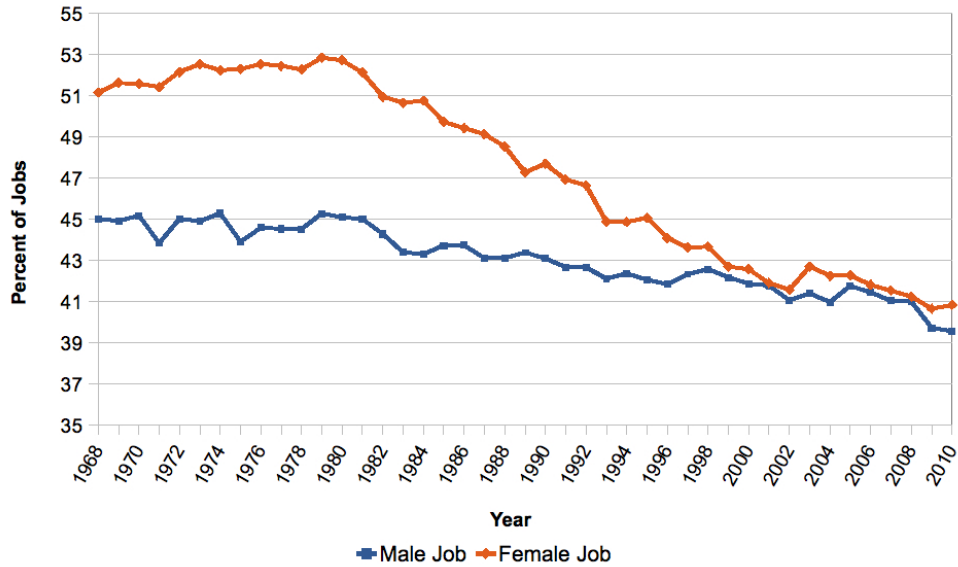
Data on finger dexterity required by occupations from DOT. Lower score means more dexterity is required. Time series data on male and female employment within occupations from CPS.

dards, shown in Figure 3.8, has fallen from a high of 52 percent to 40 percent in 2010, whereas the corresponding percentage for men has only fallen from 45 percent to 40 percent. Both of these figures imply that a smaller portion of women are performing routine tasks now than were a few decades ago and that women have experienced a greater drop than men.

Looking at non-routine tasks, Figure 3.9 shows that the average man’s job requires more eye-hand-foot coordination than the average women’s job and that the average eye-hand-foot coordination score for both men and women has not changed substantially over the time period.

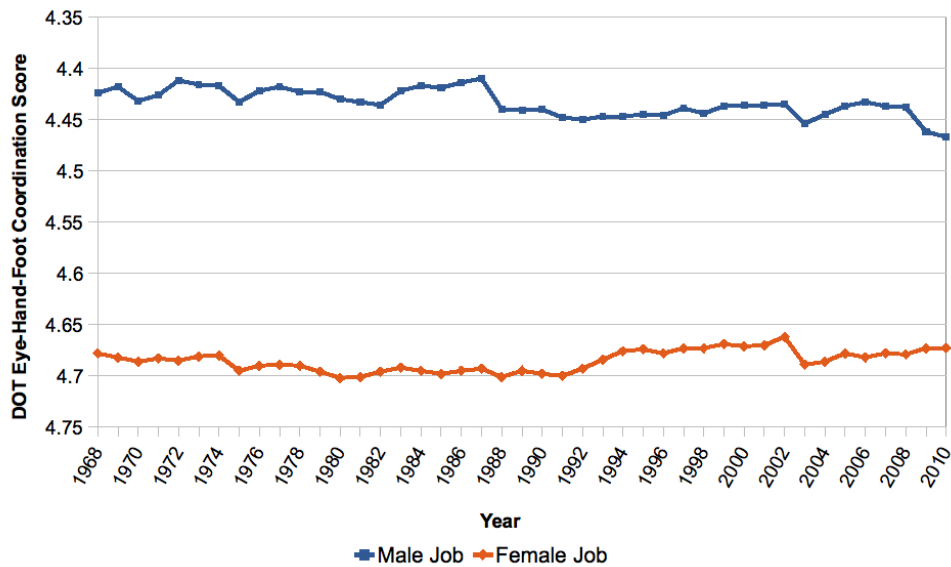
Figure 3.10, however, shows that the percent of women’s jobs requiring direction, control, and planning has doubled from about 15 percent to about 30 per-

Figure 3.8: Percent of Men’s and Women’s Jobs with Attaining Set Limits



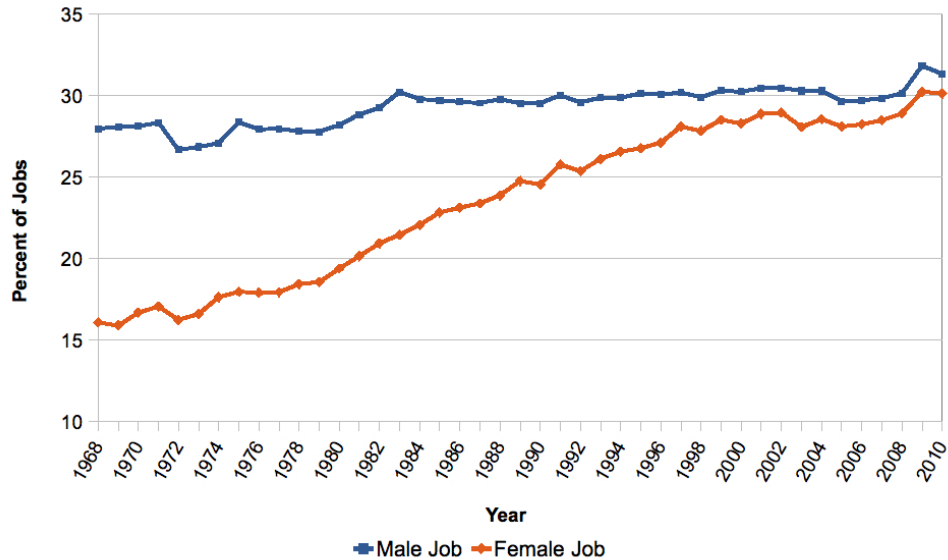
Data on occupational requirements from DOT. Time series data on male and female employment within occupations from CPS.

Figure 3.9: Eye-Hand-Foot Coord Required for Average Full-Time Job by Gender



Data on coordination required by occupations from DOT. Lower score means more coordination is required. Time series data on male and female employment within occupations from CPS.

Figure 3.10: Pct of Men’s and Women’s Jobs with Direction, Control, and Planning



Data on occupational requirements from DOT. Time series data on male and female employment within occupations from CPS.

cent, while the percent of men’s jobs with this requirement has only increased from about 28 percent to 30 percent.

These figures clearly show that the proportion of women doing routine jobs decreased and the proportion doing non-routine cognitive jobs increased over the time period when skill-biased technical change destroyed routine jobs in favor of non-routine cognitive jobs. Because the fraction of all women in the full-time workforce increased substantially over this time period, these figures do not imply anything about the total number of women employed in routine jobs. They also cannot distinguish between women switching between jobs or new female entrants to the workforce making different choices from previous entrants. As predicted by the model, however, it does appear that women may have benefitted from skill-biased

technical change more so than men because they tend to spend more time obtaining skills.

### **3.4 Conclusion**

Understanding how changes in the US economy will impact workers of all different types is increasingly important as forces like skill-biased technical change and globalization change the composition of available jobs. This chapter lays some groundwork for understanding one specific aspect of that larger question.

I start with a framework in which physical differences between men and women affect the types of jobs men and women choose to do and the amount of time they invest in education. From there, I examine how the destruction of medium-skilled jobs and declines in traditionally male sectors of the economy could impact men and women differently.

The short-term and long-term implications of these shifts in the economy are somewhat different. In the short run, men (and some women) who specialized in brawn-intensive occupations may find themselves unemployed or earning less than they might have if they had optimally invested in education for skill-intensive occupations. These workers are faced with a tough decision. Depending on the marginal return to additional education, they may retrain for a new career. Their other options are to accept lower wages or drop out of the labor force.

In the long-run, the labor market frictions will go away as new workers optimize given the new parameters of the job market. Men entering the workforce will be more inclined to specialize in skill-intensive careers than before. These careers



will become less segregated by gender. At the same time, brawn-intensive careers will become more segregated as the pool of workers still choosing these options will be the stronger individuals at their level of mental ability.

Looking at time series data from the last few decades, I find that, as hypothesized, women do tend to work in more skill-intensive fields whereas men tend to work in more brawn-intensive fields. I find some evidence of declines in employment in traditionally male jobs and in more physical jobs, although as of 2010 these declines are not especially large. A potential next step, then, would be to explore men's and women's actual responses to a decline in the brawn-intensive sector in a different time period or location.

Since skill-biased technical change has been observed in the United States for several decades, I also look at time series data on how the skill content of men's and women's jobs have changed over time. The proportion of women performing routine tasks has fallen substantially relative to that of men, whereas the proportion of women performing non-routine cognitive tasks has grown. This result is not surprising given that, with more education on average, female workers are better positioned to take advantage of growth in high-skilled occupations.

Although these time series trends do fit the predictions of the model, they should be interpreted cautiously because they do not control for any other changes that are happening concurrently. In particular, the influx of women to non-routine cognitive tasks is driven in part because so many new women entered the workforce over this time period. Since a greater percent of the female workforce is newer entrants, a greater percent was able to choose occupations after skill-biased

technical change had begun to occur.

Finally, one question for future research is whether reverse discrimination would impact men's career options following job losses in traditionally male sectors. Statistical discrimination could be a factor in fields like caregiving where women are seen as stereotypically better than men. Men could have trouble adapting to largely female workplaces, or largely female workplaces could have trouble accepting male employees. Occupations could experience reverse tipping points as they shift from largely female to largely male. If occupational segregation is strictly driven by physical or similar differences, however, it would fall significantly following a shift to a more skill-intensive labor market. With future data, if the economy continues to shift as predicted, the nature of occupational segregation by gender could be tested.

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# Appendix A

## Appendix to Chapter 1

Births data comes from the natality data files of the *Vital Statistics of the United States* from the National Center for Health Statistics. I use data from 1969-1988. After 1988, mother's county of residence is not available for counties with population under 100,000. I exclude 1968 because annual population data is not available.

I assign births to the mother's state and county of residence rather than state of occurrence. I define teen mothers as mothers between the ages of 10 and 19 and mothers under 18 as mothers between the ages of 10 and 17; 10 is the youngest age reported in the data. I take mother's race directly from the dataset. In the years before mother's marital status is given directly, I determine it based on the child's legitimacy status.

I exclude from the data fourteen states that do not report mother's marital status data in every year as well as Alaska and Hawaii.

College openings data was collected and generously provided by Janet Currie and Enrico Moretti; see Currie and Moretti (2003) for a detailed description of the

data collection. I define a college opening as an increase in the number of four- or two- year colleges in a county, regardless of the college's degree-granting status. Because I require five years of time-series data before and after a college opening, this analysis looks at colleges opened from 1974-1983. Every college in the sample of openings is the first and only college opened in that county from 1969-1988.

Population data was taken from the *Survey of Epidemiology and End Results*, which gives annual county-level population data broken down by age and race starting in 1969. I used the population of all women ages 10-19 in a county to create the teen birth rate and that of all women ages 10-17 in a county to create the under 18 birth rate.

For county characteristics, I used data from the *Survey of Epidemiology and End Results* to create an annual time series of percent black in each county. I took percent urban and percent low income from census data. I assigned the values from the 1970 census to years before 1975 and for the 1980 census for years after 1975.

# **Appendix B**

## **Appendix to Chapter 2**



Figure B.1: Risk Aversion Task

ID NUMBER \_\_\_\_\_

**Round 0**

Please choose which of the following lotteries you would prefer. One of these will be randomly chosen for payment, so please make each decision as though it involves actual money.

1.    \_\_\_ A 10% chance to win \$2 and a 90% chance to win \$1.60 **or**  
      \_\_\_ A 10% chance to win \$3.85 and a 90% chance to win 10 cents
2.    \_\_\_ A 20% chance to win \$2 and a 80% chance to win \$1.60 **or**  
      \_\_\_ A 20% chance to win \$3.85 and a 80% chance to win 10 cents
3.    \_\_\_ A 30% chance to win \$2 and a 70% chance to win \$1.60 **or**  
      \_\_\_ A 30% chance to win \$3.85 and a 70% chance to win 10 cents
4.    \_\_\_ A 40% chance to win \$2 and a 60% chance to win \$1.60 **or**  
      \_\_\_ A 40% chance to win \$3.85 and a 60% chance to win 10 cents
5.    \_\_\_ A 50% chance to win \$2 and a 50% chance to win \$1.60 **or**  
      \_\_\_ A 50% chance to win \$3.85 and a 50% chance to win 10 cents
6.    \_\_\_ A 60% chance to win \$2 and a 40% chance to win \$1.60 **or**  
      \_\_\_ A 60% chance to win \$3.85 and a 40% chance to win 10 cents
7.    \_\_\_ A 70% chance to win \$2 and a 30% chance to win \$1.60 **or**  
      \_\_\_ A 70% chance to win \$3.85 and a 30% chance to win 10 cents
8.    \_\_\_ A 80% chance to win \$2 and a 20% chance to win \$1.60 **or**  
      \_\_\_ A 80% chance to win \$3.85 and a 20% chance to win 10 cents
9.    \_\_\_ A 90% chance to win \$2 and a 10% chance to win \$1.60 **or**  
      \_\_\_ A 90% chance to win \$3.85 and a 10% chance to win 10 cents
10.   \_\_\_ A 100% chance to win \$2 and a 0% chance to win \$1.60 **or**  
      \_\_\_ A 100% chance to win \$3.85 and a 0% chance to win 10 cents

Figure B.2: *Ability Task*

**ID NUMBER** \_\_\_\_\_

**Trivia Quiz**

1. What is the capital of Connecticut?
2. How many sides does a hexagon have?
3. What was the highest grossing movie released in 2010?
4. What is H<sub>2</sub>O better known as?
5. Which Michael Jackson album had five chart-topping singles?
6. In what year did the Berlin Wall come down?
7. What is the longest river in the world?
8. What team won Superbowl XLI in 2007?
9. Who wrote the *Twilight* series?
10. What retailer was the largest US corporation in the Fortune 500 in 2010?
11. In what US city would you find the Willis Tower?
12. What kind of animal is a roadrunner?

Figure B.3: *Effort Task*

**ID NUMBER** \_\_\_\_\_

Fully color in as many of the circles below as you can in one minute.

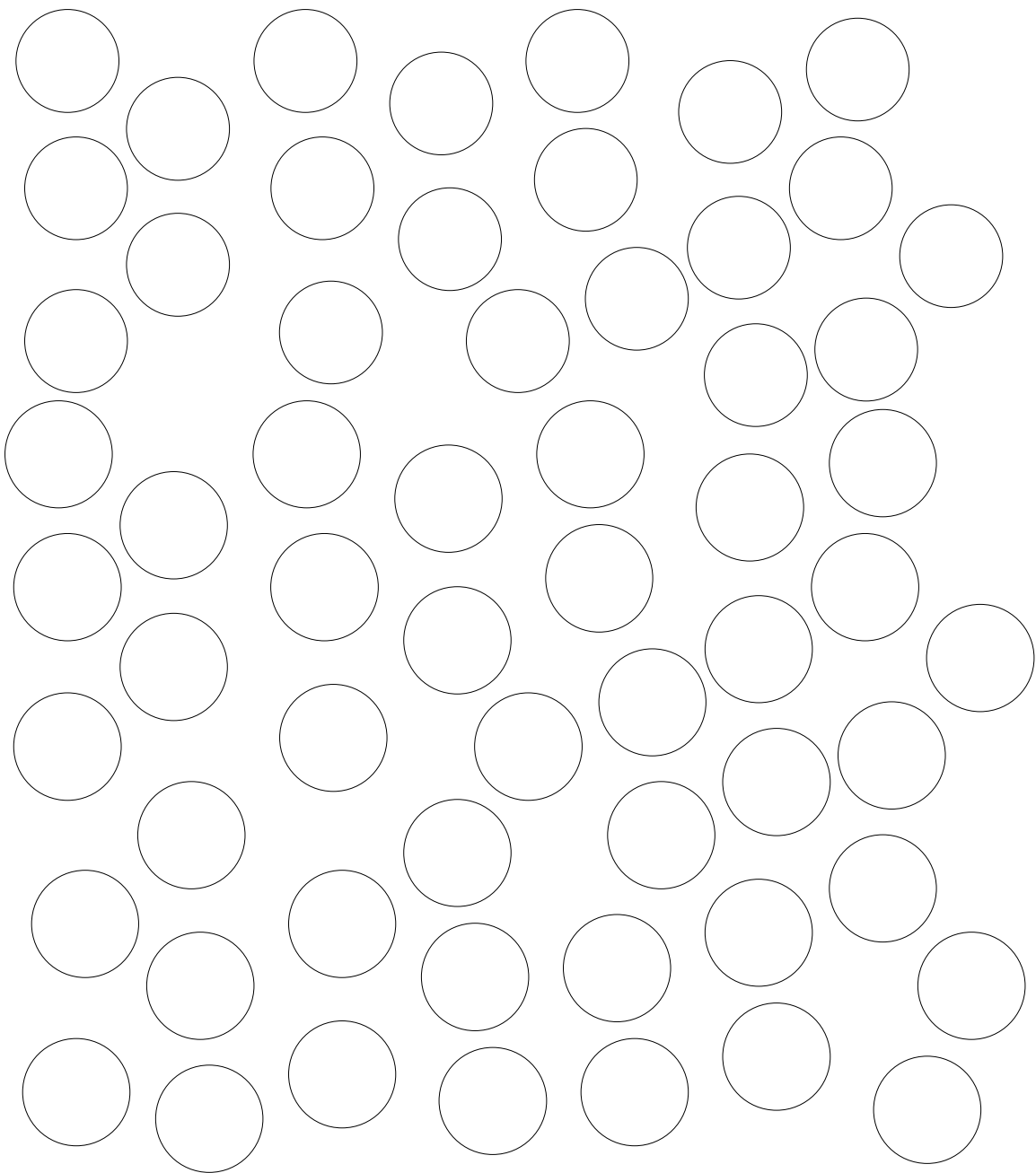


Figure B.4: *Redistribution Votes*

ID NUMBER \_\_\_\_\_

**Round E**

In this round, you will earn points by coloring in as many circles as you can in one minute.

The individuals who finish in the top two-thirds of this task will receive 10 points, and the individuals who finish in the bottom one-third will receive 0 points.

Please vote on the following group payment plans. If more than half of the people vote for a plan, it will be carried out if that decision is selected for payment.

Should we take 2 points from those who earn 10 points and give 3 points to those who earn 0 points?

**yes**            **no**

Should we take 3 points from those who earn 10 points and give 2 points to those who earn 0 points?

**yes**            **no**

Should we take 3 points from those who earn 10 points and give 3 points to those who earn 0 points?

**yes**            **no**

Should we take 3 points from those who earn 10 points and give 4 points to those who earn 0 points?

**yes**            **no**

Should we take 4 points from those who earn 10 points and give 3 points to those who earn 0 points?

**yes**            **no**

Figure B.5: *Individual Choices*

Now, please check which of the following you would prefer for yourself:

1.    \_\_\_ 10 points if you are in the top and 0 points if you are in the bottom **or**  
      \_\_\_ 8 points if you are in the top and 3 points if you are in the bottom?
2.    \_\_\_ 10 points if you are in the top and 0 points if you are in the bottom **or**  
      \_\_\_ 7 points if you are in the top and 2 points if you are in the bottom?
3.    \_\_\_ 10 points if you are in the top and 0 points if you are in the bottom **or**  
      \_\_\_ 7 points if you are in the top and 3 points if you are in the bottom?
4.    \_\_\_ 10 points if you are in the top and 0 points if you are in the bottom **or**  
      \_\_\_ 7 points if you are in the top and 4 points if you are in the bottom?
5.    \_\_\_ 10 points if you are in the top and 0 points if you are in the bottom **or**  
      \_\_\_ 6 points if you are in the top and 3 points if you are in the bottom?