

# Early Non-Marital Childbearing and the "Culture of Despair"

Melissa S. Kearney  
Department of Economics  
University of Maryland  
and NBER  
[kearney@econ.bsos.umd.edu](mailto:kearney@econ.bsos.umd.edu)

Phillip B. Levine  
Department of Economics  
Wellesley College  
and NBER  
[plevine@wellesley.edu](mailto:plevine@wellesley.edu)

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## **ABSTRACT**

This paper borrows from the tradition of other social sciences in considering the impact that “culture” (broadly defined as the economic and social environment in which the poor live) plays in determining early, non-marital childbearing. We reinterpret the ethnographic literature that emphasizes the role of despair and hopelessness into a parsimonious economic framework that captures the concept of “despair” with an individual’s perception of economic success. We further propose that this perception is based in part on the level of income inequality where a woman lives. Using individual-level data from the United States and a number of other developed countries, we empirically investigate the role played by inequality across states in determining the early childbearing outcomes of low socioeconomic status (SES) women. We find low SES women are more likely to give birth at a young age and outside of marriage when they live in higher inequality locations, all else equal. Less frequent use of abortion is an important determinant of this behavior. We calculate that differences in the level of inequality are able to explain a sizeable share of the geographic variation in teen fertility rates both across U.S. states and across developed countries.

## I. INTRODUCTION

In this paper we propose an economic model of early non-marital childbearing in which young women with limited opportunities to advance socially and economically – either through human capital investments or the marriage market – will be relatively more likely to choose early non-marital childbearing, as compared to other women. This model motivates us to empirically consider the relationship between non-marital childbearing and various economic conditions that might influence a young woman’s perception of economic success. In particular, we focus on the extent of income inequality where she lives. Our empirical results are consistent with the view that being poor in a relatively more unequal society breeds a sense of “despair” that contributes to the decision to have a baby when young and unmarried.

Our model of early non-marital childbearing is heavily influenced by the ethnographic and sociological literature on the topic. Our reading of this literature – including the work of Clark (1965), Lewis (1969), Wilson (1987), and Edin and Kefalas (2005), among others -- is that despair and hopelessness play a key role in driving rates of non-marital childbearing among the poor. Our scholarly contribution is twofold. First, we incorporate these ideas into a parsimonious economics framework. We believe this economic model of “despair” constitutes an important contribution to the literature in economics that considers so-called risky behaviors. The economics literature to date has focused predominantly on the direct role of specific policies and, as such, has been largely divorced from the vast social science literature on this issue outside of economics. Furthermore, though this paper is focused entirely on early non-marital childbearing, we believe our model is applicable to a number of other contexts. Second, we conduct econometric analyses that are motivated by this model. Previous studies outside of economics have raised the idea of “despair” and supported it with ethnographic evidence, but

ours is the first to test this idea with standard econometric techniques, common measures of economic and social conditions, and large-scale datasets.

Over 40 percent of children born in the United States today are born to an unmarried mother; over 70 percent among African Americans and 50 percent among Hispanics (Martin, et al., 2010). In the United States, the issue of non-marital childbearing is closely linked to the issue of poverty. Having a child while single is three times more common among poor women as among affluent women (Ellwood and Jencks, 2004). As many scholars and numerous studies have pointed out, children who are born to unmarried mothers in the United States have worse outcomes on a number of dimensions as compared to children raised in two-parent families.<sup>1</sup> For example, 30 percent of all children with married parents live in low-income families compared to 68 percent of children living with a single parent (Chau, Thampi, and Wight, 2010). The issue of non-marital childbearing is also closely linked to the issue of teen childbearing in the United States. About half of non-marital first births are to teen mothers (Whitehead and Pearson, 2006). Seven out of eight teen births are non-marital (Martin, et al., 2010). For these reasons, the issue of non-marital childbearing, particularly at a young age, remains one of great scholarly interest and policy concern.

One important feature of teen childbearing is the significant degree of geographic variation in its rate of occurrence, both across state and international boundaries. As we document in Figure 1, the teen birth rate of 41.5 per 1,000 in the United States is a multiple of the level that exists in other developed countries. For example, the rate is 25.9 in the United Kingdom, 14.1 in Canada, and 4.3 in Switzerland. Figure 2 shows that tremendous variation

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<sup>1</sup> Various factors are believed to contribute to these differences, including lower parental resources, in terms of income and time, more family instability and stressful life events, worse neighborhoods and schools, among others. For a recent overview, see Waldfogel, Craigie, and Brooks-Gunn (2010). The extent to which these differential outcomes are causally related to family structure is not completely understood, but the differences are so stark, and the correlations so great, that the issue remains one of great concern.

exists across states as well, where some states have rates that are comparable to some other developed countries, but others having extremely high rates. For example, the rates in Texas, New Mexico, and Mississippi (over 60 per 1,000) are more than three times the rates in New Hampshire, Massachusetts, and Vermont.<sup>2</sup> We consider this geographic variation to pose both a challenge and potentially a clue in thinking about factors that may be important to understanding rates of early non-marital childbearing.

The causes and consequences of early non-marital childbearing have been a topic of serious scholarship and debate for nearly half a century. Daniel Patrick Moynihan's 1965 report drew attention to the issue of non-marital childbearing among black families in the U.S., when the rate was one in three.<sup>3</sup> The social theories of the psychologist Clark (1965), the anthropologist Lewis (1969) - who developed the theory of the "Culture of Poverty" - and sociologists Wilson (1987), and more recently, Edin and Kefalas (2005), have each contributed influential perspectives on the issue and find common ground in the notion that growing up in an environment where there is little chance of social and economic advancement leads young women to have babies outside of marriage.

Economic explanations have tended not to rest on notions of culture or hopelessness. Rather, the standard economics model of childbearing considers an individual who maximizes utility over children and other consumption subject to a budget constraint (cf. Becker and Lewis, 1973). Preferences are generally assumed to be given and stable, and explanations have focused

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<sup>2</sup> This cross-state variation in teen birth rates does not simply reflect cross-state variation in overall birth rates. The highest fertility rates to women age 15-44 are found in Alaska, Idaho, and Utah, which rank 35, 28, and 19, respectively, in terms of teen birth rates (Martin et al., 2010). In addition, this cross-section variation is substantially larger than recent time-series variation, which has garnered so much attention. Between 1991 and 2008, the national teen birth rate fell from a peak of 62 to 42.

<sup>3</sup> Moynihan (1965) argued that the deterioration of the nuclear family, and the rise of the female-headed households, was hindering the economic progress of blacks in the U.S. As a policy matter, he argued that it was crucial to improve the job prospects of black men in order to keep them engaged in the family and community as father figures, and thereby curb the steady increase in rates of out-of-wedlock childbearing and divorce that was contributing to increased rates of poverty among black communities.

on differences in constraints, often generated by particular policies and institutions. As we review subsequently, economists have tended to explore the relevance of factors such as the incentives of the welfare system, the role that abortion policy plays, the impact of labor market conditions, and the like. Other research has examined the impact of an individual's own economic disadvantage and her likelihood of having an early non-marital birth. Taken as a whole, however, this line of research has left unexplained the vast majority of variability in early, non-marital childbearing outcomes.

Our model is very much within the economics paradigm of a utility-maximizing framework, and it treats an early non-marital birth as being the result of individual decision-making. We focus on the idea that it is the perceived inability of poor women to improve their situation through work or marriage that leads them to choose motherhood when young and single, rather than delaying until a later period. We hypothesize that income inequality heightens any perceived sense of economic despair. When a poor young woman perceives that socioeconomic success is unachievable to her, she is more likely to embrace motherhood in her current position, as there is little option value to be gained by delaying the immediate gratification of having a baby. When there is relatively more hope of economic advancement – a perception that is more likely in a more equal or mobile society – it is relatively more desirable to delay motherhood and invest in human or social capital. To the extent that geographic diversity exists in the opportunity to significantly improve one's status in life, this hypothesis has the potential to explain at least some of the variability in the rates of early non-marital childbearing.<sup>4</sup>

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<sup>4</sup> Our conceptual model can also be applied to other decisions that involve current benefits and future economic costs, and are potentially affected by the economic conditions surrounding an individual. For example, the model might apply to the decision of a juvenile to drop out of school or engage in crime. We plan to empirically consider alternative applications of our model in future work.

We conduct econometric analyses on two large, individual-level datasets to determine the extent to which income inequality – and other economic and social conditions -- relates to rates of early non-marital childbearing among low-SES women. To examine cross-state variation in outcomes, we use five waves of data from the National Survey of Family Growth (NSFG). To examine cross-country variation in outcomes, we use data from the Fertility and Family Surveys (FFS). In both cases, we rely on retrospective reports of childbearing histories to create measures of childbearing at a young age for different birth cohorts of women in different states/countries of residence. We append these data with state/country level measures of inequality and other measures of economic and social characteristics, and examine whether women with different socioeconomic backgrounds have different childbearing histories as a function of the level of inequality (and other characteristics) they faced in their geographic location. Crucially, we move beyond a simple cross-sectional analysis of inequality rates and teen-childbearing rates. The positive cross-sectional relationship could simply reflect the fact that there are more low-SES girls in high inequality places. We look at the relationship between inequality and an individual's propensity to have an early, non-marital birth.

We find that women who grew up in low socioeconomic status households are substantially more likely to have an early birth (outside of marriage in the United States) when income is more unequally distributed in their location. Lower rates of abortion are an important mechanism for this result both in the United States and internationally. As the level of inequality increases, low socioeconomic status women are less likely to abort their pregnancies. We explore two sets of plausible alternative specifications. First, we empirically consider other aggregate-level variables that might affect an individual's perception of economic success, such as the absolute level of income at the bottom of the distribution or the college-high school wage

premium. Second, we consider aggregate-level variables that might be spuriously correlated with inequality and teen birth rates and thereby confound the interpretation of our primary results, such as the political leanings or religiosity of a place. The data do not support these alternative explanations.

Our empirical work is motivated by our model, and we interpret the results within that framework. We find the empirical support for the role of inequality striking. This makes sense within our model and when interpreted in that way, this finding is consistent with the ideas expressed in Clark (1965), Lewis (1969), Wilson (1987) and Edin and Kafalas (2005): among young, poor women, feelings of hopelessness and despair are an important driver of the decision to have a non-marital birth at an early age.

## **II. CONCEPTUAL EXPLANATIONS AND THE ROLE OF “CULTURE”**

This paper focuses on a particular set of arguments to explain geographic variation in early non-marital childbearing that we broadly label as "cultural" factors. In doing so, we are aggregating ideas that loosely relate to the social and economic environment in which we live. An individual's economic disadvantage is an element of the story here, but we focus on the connection between that disadvantage and the characteristics of the community in which one lives that influence fertility behaviors. Although other social science disciplines have been discussing these ideas for decades, the role that culture may play in explaining early, non-marital childbearing is one that the economics literature has given little attention. To provide further background, this section will provide more details regarding some of the literature that we acknowledged earlier in the introduction.



Before doing so, we first review some of the major economic explanations that have been explored. The political scientist Charles Murray (1986) wrote in his now-famous book, *Losing Ground*, that the welfare system provided incentives for couples to have a child outside of marriage by reducing the financial rewards of marriage and reducing the financial costs of out-of-wedlock childbearing. This hypothesis became politically popular among conservatives and helped usher in an era of welfare reform. It also spawned a vast empirical literature in economics investigating the issue. Moffitt (1998 and 2003) provides an overview of the large literature on the topic, concluding that more generous welfare benefits likely have a modest positive effect on rates of non-marital childbearing. With regard to the variation across countries, the lower rate of teen childbearing in Europe with its much more generous welfare system provides a prima facie case against the hypothesis that social support is largely to blame for high rates of teen childbearing in the United States.

Also within the scope of traditional economic models of fertility, economists have examined a host of other policy and institutional factors relevant to the costs of avoiding or not avoiding a non-marital or teen birth. A highly incomplete list of such studies includes previous work that we have conducted elsewhere on the effect of various policies and environmental conditions: restrictive abortion policies (Levine, Trainor, and Zimmerman, 1996; Levine, 2003); welfare reform (Kearney, 2004); labor market conditions (Levine, 2001) and access to affordable contraception (Kearney and Levine, 2009a). These empirical studies have generally found that changes in such “prices” do have impacts on teen and non-marital childbearing, but individually these factors can account for only very small shares of the total variation in non-marital childbearing.

Moving away from traditional economic models of fertility, Akerlof, Yellen, and Katz (1996) propose a “technology shock” hypothesis for the rise in non-marital childbearing in the U.S. in the later 20<sup>th</sup> century. They relate the erosion of the custom of “shotgun marriage” – the practice of getting married between conception and birth -- to the legalization of abortion and the increased availability of contraception to unmarried women in the United States. The story is one of decreased bargaining power on the part of women who do not adopt either birth control or abortion. This theory is an intriguing explanation for the decrease in shotgun marriages in the U.S. over the relevant decades, but it is unlikely to have much explanatory power for the geographic variation in outcomes since those technology shocks took place everywhere.

Another line of research considers the relationship between background disadvantage and rates of early childbearing (cf. Duncan and Hoffman, 1990; An, Haveman, and Wolfe, 1993; Lundberg and Plotnick, 1995; and Duncan, et al., 1998). It is well-known that growing up in disadvantaged circumstances, such as in poverty or to a single mother, is associated with much higher rates of early childbearing. In a previous examination of cohort rates of early childbearing, we find that the proportion of a female cohort born economically disadvantaged – as captured by being born to a teen mother, a single mother, or to a mother with a low level of education – is tightly linked to the subsequent rate of early childbearing in that cohort (Kearney and Levine, 2009b). But, strikingly, we find that state and year of birth fixed effects capture much of the variation. We interpret that finding as suggestive of the importance of some “cultural” dimension, otherwise un-modeled in that framework.

Behavioral economists O’Donohue and Rabin (1999) suggest that teens are “hyperbolic discounters,” who place disproportionate weight on present happiness as compared to future well-being. Other scholars suggest that teen childbearing is attributable to teens’ stage of

cognitive development, arguing that they are not quite ready to make the types of decisions that would prevent a pregnancy (for example, Brooks-Gunn and Furstenberg, 1989; Hardy and Zabin, 1991; Brooks-Gunn and Paikoff, 1997). While limited decision-making capacity surely is an issue for some set of teens, we note that these claims have an element of universality to them that cannot begin to explain the striking differences in rates of early non-marital childbearing across socioeconomic groups, over time, or across states or countries. In other words, we doubt that the particularly high rate of teen childbearing among U.S. teens as compared to their counterparts in Europe can be attributed to the more limited decision making capacity -- or more present-biased preferences -- of the teenage brain in America.

This brings us to the contributions made by other social scientists that focus much more directly on the concept of “culture” or, more broadly, the social environment in which the poor live. The contributors to this literature are largely found in the fields of Anthropology and Sociology. Edin and Kefalas (2005) represent a recent contribution. Based on the findings of their ethnographic research, they state:

*... the extreme loneliness, the struggles with parents and peers, the wild behavior, the depression and despair, the school failure, the drugs, and the general sense that life has spun completely out of control. Into this void comes a pregnancy and then a baby, bringing the purpose, the validation, the companionship, and the order that young women feel have been so sorely lacking. In some profound sense, these young women believe, a baby has the power to solve everything (p. 10).*

From this perspective, having a baby at a young age outside the scope of marriage is not the result of a constraint, but something that the woman values.

Related ideas are expressed by others as well. For instance, Wilson (1987) states:

*Thus, in a neighborhood with a paucity of regularly employed families and with the overwhelming majority of families having spells of long-term joblessness, people experience a social isolation that excludes them from the job network system that permeates other neighborhoods and that is so important in learning*

*about or being recommended for jobs that become available in various parts of the city ... Moreover, unlike the situation in earlier years, girls who become pregnant out of wedlock invariably give birth out of wedlock because of a shrinking pool of marriageable, that is, employed black men (p. 57).*

The relevant environmental factor for women in this argument is the weak marriage market that is attributable to the lack of jobs for men in the inner city. Wilson is clear to point out that his focus is on "social isolation" and not the "culture of poverty." That reference originates with Clark (1969), who wrote:

*The culture of poverty is both an adaptation and a reaction of the poor to their marginal position in a class-stratified, highly individuated, capitalistic society. It represents an effort to cope with the feelings of hopelessness and despair that develop from the realization of the improbability of achieving success in terms of the values and goals of the larger society ... [M]any will tell you that marriage by law, by the church, or by both is the idea form of marriage; but few marry ... Women often turn down offers of marriage because they feel that it ties them down to men who are immature, punishing, and generally unreliable (p. 189-190)*

The distinction between Wilson and Clark is largely the focus on the lack of jobs itself in Wilson, not the social attitude that results from the lack of jobs. Either way, the lack of opportunity is what is driving the childbearing outcomes in both viewpoints. This lack of opportunity was made explicit by Clark (1965):

*In the ghetto, the meaning of the illegitimate child is not ultimate disgrace. There is not the demand for abortion or for surrender of the child that one finds in more privileged communities. In the middle class, the disgrace of illegitimacy is tied to personal and family aspirations. In lower-class families, on the other hand, the girl loses only some of her already limited options by having an illegitimate child; she is not going to make a "better marriage" or improve her economic and social status either way. On the contrary, a child is a symbol of the fact that she is a woman, and she may gain from having something of her own. Nor is the boy who fathers an illegitimate child going to lose, for where is he going? The path to any higher status seems closed to him in any case (p. 72).*

What is clear in all of these arguments is that the problem women face which leads to early, non-marital childbearing is that they have so little chance for success in life because of

their own disadvantage and the environment in which they live. It is not just the disadvantage itself. They have no reason to postpone having a child and may even benefit from having one regardless of marriage.<sup>5</sup>

The model we propose below is based on the idea that young girls make decisions about their behaviors – sexual activity, contraceptive use, abortion – based in part on their own perceptions of their likelihood of future success. Crucially, we conceptually link these perceptions to their economic environment and make predictions that we then econometrically investigate. We reject the idea that these insights from other social scientists are inherently at odds with an economics framework. The sociologist Kristin Luker (1996) argues:

*It would be better to see early childbearing as a symptom, like infant mortality - not a cause but a marker of events, an indicator of the extent to which many young people have been excluded from the American dream ... The fact that birthrates among teens have stayed at high levels indicates how discouraged and disadvantaged many young women are - that they have to take the extraordinary step of bearing a child in order to feel they have a meaningful role and mission in society and can make claims on themselves and others (p. 182).*

Our model is completely consistent with Luker's view. But then she goes on to explicitly reject the rational-decision making framework of economics. She writes "teenage mothers often get pregnant because they *aren't* being rational actors who put themselves first" (page 5). One of the main contributions of this paper is to show how these ideas are easily captured in a fairly standard economics model of individual decision-making.

We posit that one's sense of despair may be greater the more unequally income is distributed. When a poor young woman looks up the income ladder, sees how far those above her really are and how unattainable that position is, she may seek the security of parenthood.

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<sup>5</sup> Many of these arguments, and particularly the earlier ones, focus directly on the issues of race. The Moynihan Report (1965) which first broadly publicized the issue of rising non-marital fertility, also focused on race. At the time, one in three births to black women was outside of marriage whereas the rate for whites was much lower. Now that rates of early, non-marital childbearing are high for all women (albeit still higher for black women), our view is that this is less an issue of race today than it used to be.

When there is a more realistic chance at economic advancement, alternatives to early parenthood may be more desirable. To the extent that geographic diversity exists in the opportunity to significantly improve one's status in life – as captured by inequality – this hypothesis has the potential to explain at least some of the variability in the rates of early, non-marital childbearing. Although previous researchers have introduced related conceptual points and supported them with ethnographic evidence, to our knowledge we are the first to: (a) capture these ideas in a parsimonious economic model of “despair,” and (b) conduct a large scale empirical investigation to consider these ideas in a broader sense.

### **III. A MODEL OF TEEN CHILDBEARING**

In this section, we present a highly stylized, theoretical model that characterizes a woman's "decision" to have a baby while young and unmarried. We recognize that treating childbirth as a decision does not adequately represent the complexities of the behavior being modeled, but it enables us to focus specifically on the relevant contribution that income inequality, and other factors contributing to a sense of economic despair, may play in determining childbearing outcomes. A more fully specified model that includes sexual activity, contraceptive intensity, miscarriage, abortion, and shotgun marriage, along with their associated probabilities, would merely add complexity without additional insight for the present purposes. We discuss these antecedent behaviors at the end of the section, and we consider each of them in our empirical analyses.

In this model, a young, unmarried woman's decision to have a baby is based on a comparison of her expected lifetime utility if she has a baby in the current period compared to expected lifetime utility if she delays childbearing. An individual chooses to have a baby in the

current period if the following condition is met:

$$u_o^b + E(V^b) > u_o^d + E(V^d) \quad [1]$$

where  $u_o^b$  is current period utility if she has a baby and  $u_o^d$  is current period utility if she delays childbearing.  $V$  is the present discounted sum of future period utility.

For young, unmarried women, childbearing has a direct effect on current period utility and an indirect effect on future period utility. We propose that for young, unmarried women of low socioeconomic status (SES) having a baby is utility-enhancing in the current period, such that  $u^b > u^d$ . This proposition reflects the description from Edin and Kefalas (2005) above, whereby a baby is seen as bringing “purpose, the validation, the companionship, and the order” otherwise missing from many of these women’s lives. If  $u^b < u^d$ , it is never optimal to have a baby in the current period and the model trivially predicts “delay” to the optimizing choice. We propose that for the majority of high-SES young women,  $u^b < u^d$ . We thus consider the model to be more relevant for young, unmarried women of low SES.

For unmarried young women, having a baby in the current period negatively affects expected future utility by leading to lower levels of consumption in the future. For simplicity, we characterize utility in future periods as taking high and low values,  $U^{\text{high}}$  and  $U^{\text{low}}$ , respectively. We assume that childbearing at an early age reduces the likelihood of achieving  $U^{\text{high}}$ . There are two likely mechanisms, the first through the labor market and the second through the marriage market. With regard to the first, we posit that having a baby makes it more difficult for women to acquire human capital, decreasing the future stream of own earnings, and thereby lowering subsequent income and consumption. Having a baby while young and unmarried is also likely to be a hindrance in the marriage market, and would thereby reduce the likelihood of improving one’s economic condition through a successful marriage. We define  $U^{\text{low}}$  to be the level achieved

by a young woman who does not delay childbearing. The present discounted value of the young mother's future utility stream is thus deterministic and captured by  $V^{low}$ . If the young woman delays childbearing, there is some positive probability  $p$  that she will achieve the "high" utility position in future periods. As we have defined things, a young woman who has a baby in the current period is necessarily assigned to a low position in the income distribution. Our model assumes that if she delays childbearing, she has some probability of achieving the high income/consumption level.<sup>6</sup>

We can therefore write the condition to have a baby in the current period as follows:

$$u_o^b + V^{low} > u_o^d + pV^{high} + (1-p)V^{low}. \quad [2]$$

This condition makes it clear that the change in lifetime utility from delayed childbearing comes from two opposite-signed sources: (1) the loss of current period enjoyment of a baby and (2) a positive probability of achieving the high- utility state in the future. We have implicitly assumed that the delay in childbearing causes no first-order change in the future lifetime enjoyment of the child itself (say, by making childlessness a more likely outcome). In other words, the decision we are modeling is to have a baby in the current period versus having a baby in the subsequent period. So the direct utility loss from not having a child in the current period is limited to the loss in current period utility.

Rearranging terms, we see that a young woman will choose to delay childbearing in the current period if and only if:

$$pV^{high} + (1-p)V^{low} > V^{low} + \left( u_o^b - u_o^d \right) \quad [3]$$

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<sup>6</sup> Alternatively, we could define "low" and "high" utility as relative constructs that need not correspond to low and high levels in the unconditional income distribution. Defining the positions in the simplest case as corresponding to "low" and "high" positions in the overall income distribution leads the model to have an ambiguous prediction on the relationship between inequality and early non-marital childbearing, as we show below. It is thus a conservative modeling approach, given our main hypothesis.



Of course, the young woman does not perfectly observe  $p$ . Instead, she bases her decision on her *perception* of  $p$ . Let us call this subjective probability  $q$ , and rewrite the condition for delaying childbearing:

$$qV^{high} + (1-q)V^{low} > V^{low} + \left(u_o^b - u_o^d\right) \quad [4]$$

If a young woman *perceives* that she has a sizable chance at achieving economic success -- and thereby capturing  $V^{high}$  -- by delaying childbearing, the comparison is more likely to favor the choice “delay.” On the other hand, if the young woman *perceives* that even if she delays childbearing her chances of economic success are sufficiently unlikely -- in other words, if  $q$  is very low -- then the comparison is more likely to favor having a baby in the current period.<sup>7</sup>

Rearranging expression [4], we can define a reservation subjective probability  $q^r$  such that a young woman will choose to delay childbearing if and only if:

$$q \geq q^r = \left(\frac{u_o^b - u_o^d}{V^{high} - V^{low}}\right). \quad [5]$$

We propose that one's perception of the likelihood of economic success,  $q$ , depends on her position in the income distribution, as proxied by SES status, such that  $\frac{dq}{d(SES)} > 0$ .

This supposition finds empirical support in tabulations of data from the 1979 National Longitudinal Survey of Youth (NLSY79). That survey includes questions about expectations of future success and perceived control over one's life, as captured by the Rotter Scale Index. We tabulate these variables by maternal education, which we use as our proxy for SES status (as described below). Among young women whose mothers attended college, 32 percent report a

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<sup>7</sup> We are not the first to hypothesize that a notion of opportunity costs is an important determinant of the decision to have a teen birth (for example, this general idea is contained in Lundberg and Plotnick (1995). However, we are not aware of previous work focused on the perception of future economic success and how inequality potentially shapes that perception.

high likelihood of achieving her occupational aspirations; this compares to only 18 percent of young women whose mothers are high school dropouts were optimistic. Similarly, on the Rotter Scale of control over one's life (which ranges from 0 for total control to 16 for no control), the average values for daughters of mothers who attended college was 8.01 compared to 9.24 for daughters of high school dropouts.

We additionally propose that one's perceived probability of success is a function of the interaction of being low SES and inequality, such that  $\frac{dq}{d(ineq)}|_{(SES = low)} < 0$ . The further down in the income distribution one finds herself and the more inequality that exists, the lower is the perception of economic success  $q$ . Note that if income inequality and mobility were inversely related, inequality would likely not have such an impact on individual's perceptions. We do not have sufficient data on mobility differences across states or countries to include mobility in our models directly, but we offer some evidence in Figure 3 indicating that mobility and inequality are positively related empirically. This figure plots the intergenerational earnings elasticity – which is inversely related to intergenerational mobility – against the Gini coefficient for a set of nine countries.<sup>8</sup> The two variables are strongly positively related, which indicates a strong *negative* correlation between mobility and inequality. To the extent that individuals at the bottom of the income distribution perceive a sizeable degree of income inequality and a low degree of mobility, they are likely to have a lower subjective  $q_s$  and a higher likelihood of early childbearing.

The prediction with regard to inequality is not unambiguously signed within the model. Expression [5] shows that  $q^r$  varies inversely with the distance between current period utility from having a baby and from delaying childbearing, which in the most simple case, equates with

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<sup>8</sup> A similar figure appears in Wilkinson and Pickett (2009).

inequality. This raises the possibility that more inequality increases the distance between  $V^{\text{high}}$  and  $V^{\text{low}}$ , which lowers reservation  $q$ , and might thereby lead to less early childbearing.<sup>9</sup> This need not be the case if we define  $V^{\text{high}}$  to be the “high” level of income/consumption available to the young woman making the choice to delay childbearing, and allow for that upper bound to be distinct from a high position in the unconditional income distribution. Nonetheless, this role of inequality in the model works against our hypothesis that the dominant effect of inequality on the childbearing decisions of low SES women is to decrease the likelihood of delay. The theoretical prediction of the model regarding inequality is, therefore, ambiguous, and we consider the relationship as an empirical question.<sup>10</sup>

Our primary empirical analysis tests the relationship between inequality, as captured by the ratio of income at the 50<sup>th</sup> and 10<sup>th</sup> percentiles of the income distribution, and early non-marital childbearing.<sup>11</sup> Although we acknowledge the ambiguous prediction of our model, our prior expectation is that greater inequality will increase the likelihood of early non-marital births among low SES women. We recognize the correlational nature of this evidence, but Figures 4 and 5 support our intuition, showing that the cross-sectional relationship between inequality and teen childbearing is quite strongly positive, both across states and countries (similar figures

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<sup>9</sup> One interpretation of this gap between  $V^{\text{high}}$  and  $V^{\text{low}}$  is a greater return to effort, which one might expect would lower the likelihood of early childbearing. We loosely test this proposition later in the paper by exploring the impact of changes in the college/high school wage premium.

<sup>10</sup> One important element in this model is that future utility is appropriately discounted. The model does not require any present-biased decision making, also known as quasi-hyperbolic discounting, to explain the choice that favors current period utility. If we add present-biased decision making to the model, it would simply amplify the effect of a lower  $q$  and make the decision lean even more heavily in favor of having a baby in the current period.

<sup>11</sup> In subsequent analyses we consider additional characteristics of the socioeconomic environment that might be correlated with inequality and also directly related to non-marital early childbearing propensities. To take one example, we consider the 10<sup>th</sup> percentile of the income distribution as a measure of the absolute level of destitution.

We propose that else equal,  $\frac{dq}{d(\ln p_{10})} < 0$ . This says that the higher is the level of income at the bottom of the

distribution, the more likely a young low-SES girl will be to have a non-marital birth in the current period. This is an alternative story to the inequality mechanism we posit in our model.

appear in Wilkinson and Pickett, 2009)<sup>12</sup>. Ultimately, however, the causal relationship between inequality among low income women and early non-marital childbearing is an empirical question that we seek to address in the remainder of this paper. It will also be crucial to determine whether any observed relationship at the individual level is driven by other factors related to income inequality. We consider the possibility of such omitted variables in subsequent analyses.

Let us now consider the multiple channels through which a difference in birth rates could be realized. First, an individual can take actions with regard to sexual behavior and contraceptive practices; low SES women in more unequal places may be more likely to get pregnant. Second, a non-marital childbirth could be avoided through the choice to end a pregnancy; low SES women in more unequal places may be relatively less likely to choose an abortion to end her pregnancy. And finally, non-marital births depend upon the parents choosing to remain unmarried after a pregnancy occurs; low SES women in more unequal places may be relatively less likely to get married before the birth through a so-called “shot-gun” marriage.

This last pathway explicitly raises the possibility that a woman’s decision is influenced not only by her perceived likelihood of her own economic advancement, but also the likelihood that marrying her partner will bring economic success through his economic achievements. Assuming assortative mating, it is easy to see that conditions that lead a young woman to adjust downward her subjective probability of her own economic success will also lead her to have a relatively low subjective probability associated with the likelihood that her male partner will achieve economic success. So, the greater the inequality (and lower the mobility), the lower would be the perceived likelihood that a male partner will bring economic advantages. Our hypotheses regarding the

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<sup>12</sup> Wilkinson and Pickett’s 2009 book focuses on the negative correlation between inequality and “social ills”, including increased crime, drug use, mortality, and teen childbearing, among others. Their book presents correlational relationships, which are merely the starting point of our empirical investigation. Furthermore, the robustness of their correlational relationships has been called into question in other contexts, for example, see Deaton and Lubotsky (2003) on the relationship between inequality and mortality.

impact of high inequality for low SES women on shotgun marriage follows from this. We examine all of these predictions in our empirical analysis.

#### **IV. ECONOMETRIC MODEL**

The preceding discussion suggests that we are looking to explore the relationship between income inequality on fertility outcomes with a particular emphasis on low SES women. Since higher SES women are more likely to view their future opportunities with optimism, our model will predict lower rates of early non-marital childbearing for these women. This means that our empirical test is based on determining whether low SES women in high inequality locations are more likely to have an early, non-marital birth compared to high SES women in those locations.

One observation that is relevant at this stage is the nature of the geographic variation that exists in early childbearing outcomes over time. Year-to-year, and even decade-to-decade variability, within a location is very limited. For instance, the correlation in teen birth rates within states between 1980 and 2008 is 0.92. This suggests that longstanding differences across states are critical here; statistically the state fixed effect is what matters. What we are trying to accomplish in this research is to see whether we can get inside the black box of that fixed effect and determine whether one particular set of explanations, lack of economic opportunity, is a viable contributing factor. We therefore focus on the role of long-term averages in state and national measures of economic opportunity, as operationalized by measures of income inequality.<sup>13</sup>

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<sup>13</sup> We make this choice for conceptual reasons as well. As we discussed earlier in our theoretical model, what is likely to matter in a woman's childbearing decisions is the woman's perception of inequality in her location and that more likely is driven by long-run average inequality and not short-run fluctuations.

Our identification strategy is focused on determining whether persistence in the level of opportunity available to young women is an important component of those fixed state differences. Do long-term measures of opportunity across locations affect outcomes for those women who one would anticipate might be affected: those with low socioeconomic status. This means that our primary focus rests on the interaction between long-term measures of inequality and an indicator of a woman's low socioeconomic status.

To implement this strategy, we estimate regression models for a series of fertility outcomes (birth, conception, etc.) controlling for year-of-birth fixed effects and state fixed effects. (Time-invariant inequality measures will be econometrically captured by the inclusion of state fixed effects; we focus on the interaction of inequality and individual-level SES status.) We also control for individual level demographics, public policy variables and labor market conditions in these models. The key variable in our models is the interaction between our long-term measures of inequality and a woman's socioeconomic status. These long-term inequality measures cannot also be included in the model because they are perfectly correlated with the state fixed effects.

More formally, we estimate regression models for multiple outcomes by age 20 of the form:

$$Outcome_{isc} = \beta_0 + \beta_1(I_s \cdot LS_{isc}) + \beta_2 LS_{isc} + \beta_3 X_{isc} + \beta_4 E_{sc} + \gamma_s + \gamma_c + \varepsilon_{isc} \quad [6]$$

where  $I$  is our measure of inequality,  $LS$  is an indicator of low socioeconomic status, and the interaction term is the regressor of primary interest. The subscript  $i$  indexes individuals,  $s$  indexes states (or countries), and  $c$  indexes birth cohorts. The terms  $\gamma_s$  and  $\gamma_c$  represent state (or country) and birth cohort fixed effects, respectively. The vector  $X$  consists of additional personal demographic characteristics – age, age squared, race/ethnicity, and an indicator for living with a

single parent at age 14. (Note that the effects of age and birth year are separately identified in our empirical model.) The vector  $E$  captures environmental factors reflected by public policy and labor market conditions in the state-year: the unemployment rate, an indicator for a welfare family cap, the maximum welfare benefit for a family of three, an indicator for SCHIP implementation, an indicator for whether the state Medicaid program covers abortion, an indicator for whether state abortion regulations include parental notification or mandatory delay periods, and whether the state Medicaid program includes expansion policies for family planning services (see Kearney and Levine, 2009a for a discussion of these policies).

Our hypothesis regarding non-marital births is that  $\beta_1$  is positive, such that low-socioeconomic status women in high inequality states are relatively more likely to have a non-marital birth by age 20. We estimate comparable models for conceptions and pregnancy failures (discussed subsequently) along with shotgun marriages to investigate potential mechanisms for a difference in birth rates.

We subsequently estimate this equation including additional potential determinants of teen fertility to investigate whether we are properly interpreting our results. In these specification checks, the equation becomes the following:

$$Outcome_{isc} = \beta_0 + \beta_1(I_s \cdot LS_{isc}) + \beta_2 LS_{isc} + \beta_4(A_s \cdot LS_{isc}) + \beta_4 X_{isc} + \beta_5 E_{sc} + \gamma_s + \gamma_c + \varepsilon_{isc} \quad [7]$$

This specification is largely the same as that in equation [6] except that we now include alternative factors ( $A$ ) that are fixed within states (not countries, as we describe subsequently) and we interact them with an indicator for low SES. We consider two categories of alternatives. The first represents economic characteristics of states that could be viewed within the framework of our economic model, like the 10<sup>th</sup> percentile of the income distribution. The second represents other social measures that are more directly focused on identifying omitted variables, like the

political composition in the state. We describe all of the alternatives we consider in more detail when we report the results of our analysis.

## **V. DATA DESCRIPTION**

Our empirical analysis takes advantage of cross-state variation in outcomes using five waves of data from the National Survey of Family Growth (NSFG) and cross-national variation in outcomes using data from the Fertility and Family Surveys (FFS).

### *A. NSFG Data*

The NSFG has evolved considerably since its inception in 1973. Initially, it focused exclusively on married women between the ages of 15 and 44. Beginning with the 1982 survey, all women in this age range were included regardless of marital status; we restrict our attention to the surveys since then. The 2002 survey was also the first to include men in this age range, but with just two waves of men available and a relatively small sample size for state level analyses, these data are insufficient to study their childbearing outcomes for this project. Also, beginning in 2006, the survey changed its design from one that was conducted every six or seven years to one that is conducted annually, but with smaller samples in each year. In the end, we use data from the 1982, 1988, 1995, 2002, and 2006-2008 surveys. These surveys provide observations for over 42,000 women between the ages of 15 and 44.

In all of our subsequent analysis, we restrict our attention to women who have turned age 20 (or 25 where appropriate) in 1976 or afterwards. The age restriction follows naturally from our outcome measures that are measured at age 20 or 25. We impose the year restriction to avoid much of the social and behavioral changes that were associated with the introduction and



diffusion of the birth control pill in the 1960s and abortion legalization in the early 1970s. After imposing these sample restrictions, we still have nearly 27,000 observations in these data.

Each survey contains complete pregnancy histories, which we can use to generate measures of pregnancies and pregnancy resolution (including childbearing) by age 20 (that is, through age 19). One potential problem with these data is the reporting of abortions. A woman who has had an abortion may report it accurately, report it as a miscarriage, or not report the pregnancy at all. For our purposes, we focus on the incidence of “pregnancy failure,” which includes either a miscarriage or an abortion. This measure should capture behavioral changes in abortion regardless of how they are reported as long as the pregnancy itself is reported. Although miscarriages may not be purely biologically determined (Ashcraft and Lang, 2010), we believe it is reasonable to assume that the vast majority of movements in this pregnancy failure measure are generated from changes in abortion decisions (particularly since fetal deaths are so rare).

Data on age at first marriage is also available so that we can ascertain whether the observed pregnancies occurred before marriage. We can also approximate whether the pregnancy led to a marriage that occurred before the birth of the child. We define these so-called “shotgun marriages” as a birth that follows a marriage by six months or less.

The importance of using microdata for this exercise is that we are able to link fertility histories to personal characteristics. In particular, the hypothesis we test is about the impact of inequality on the fertility decisions of those with low socioeconomic status. It is critical to be able to provide an operational definition of low socioeconomic status and identify women who satisfy it. Although ideally we would have access to family income when women were growing up, the retrospective nature of the data prohibits that. Instead, we categorize women according to

their mother's level of education, focusing on the children of high school dropouts as the ones who should be affected the most when they grow up in locations with greater inequality. Another important feature of these data is the availability of state identifiers, which enable us to make the link to the level of income inequality where the women grew up.<sup>14</sup>

We attach to these outcome measures a set of environmental factors that existed in the respondent's state of residence and the year in which she turned age 19; when we analyze birth outcomes by age 25, we attach state-level factors for the year in which a woman turned age 24. These factors include policy variables, including the level of welfare generosity and the status of welfare reform, SCHIP implementation, and the types of abortion restrictions (mandatory delay, Medicaid funding restrictions, and parental involvement laws) that were in place. In addition, we attach the state-level unemployment rate in that year. Our sources for these variables can be found in the data appendix.

The last piece of data that we attach to the NSFG microdata is a set of measures of income inequality in the respondent's state of residence.<sup>15</sup> We created these measures using microdata from the 1980, 1990, and 2000 Censuses along with the 2006-2008 American

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<sup>14</sup> State identifiers are available in the NSFG for researchers with special permission from the National Center for Health Research. We accessed these data on-site at the NCHS Research Data Center in Hyattsville, MD. These state identifiers focus on the respondent's state of residence at the time of the survey, which may be different from their state of residence during their teenage years. We have no alternative other to assume that interstate migration during the intervening period is small and unrelated to the interaction of inequality and socioeconomic status.

<sup>15</sup> We have considered whether the state is the right level of aggregation for this analysis. On the one hand, teens may have a better perspective on the economic well-being of those more immediately around her. On the other, the broader environment may better capture for her what her available opportunities are. Data issues also hinder our ability to conduct an analysis at local levels. First, our geographic identifier in the NSFG is the location of current residence and mobility is a much greater concern at the local level than at a broader level. Second, the only substate identifier available even in restricted NSFG data is the county of residence. This limits the sample size available for our analysis because public use census data only identifies county of residence for 40 percent of the population. Nevertheless, we have conducted a county-level analysis identical in form to that reported here using the subset of NSFG respondents who live in counties for which Census income data are available. The results are qualitatively similar than those reported here, but smaller in size. Rather than a coefficient of 0.053 (0.015) in Column 1 of Table 3, the comparable coefficient with county data is 0.031 (0.012). This is consistent with the attenuation bias that would result from cross-county migration.

Community Surveys. These data are available from IPUMS-USA (Ruggles, 2010). Using these data, we estimated income cut-offs at the 10<sup>th</sup> and 50<sup>th</sup> percentiles for each state and survey year and then generate ratios of these measures (i.e. 50/10 ratio) as our indicator of inequality. We use these data to estimate long-run averages in measured inequality within states. These data show a large amount of cross-state variation in inequality, as shown in Table 1. Interestingly, the fifth highest inequality state by this measure is Massachusetts with a 50/10 ratio of 4.6 and the fifth lowest inequality state is its neighbor, Vermont, with a 50/10 ratio of 3.6. This suggests that as a rough gauge, moving from a low inequality state to a high inequality state increases the 50/10 ratio by around 1. We will use this figure in interpreting our results.

Figures 6 and 7 present some descriptive statistics from the NSFG data that provide some useful background for interpreting our subsequent analysis. In Figure 6, we present trends in rates of childbearing by age 20 for all women and by marital status at the time of first birth. This figure shows that the rate of early childbearing has fluctuated around a level of about 20 percent since the mid 1970s. The most recent trend is downward; of those who turned age 20 in 2006 around 17 percent had already given birth. This relative stability masks dramatic differences in marital versus non-marital early childbearing. The percentage of women who had a marital birth by age 20 fell from 14 percent to 3 percent over this period. The comparable statistic for non-marital births rose from 8 percent to 14 percent. Understanding these patterns (including a discussion of whether a decline in shotgun marriages is responsible) is clearly important in understanding the trends in early childbearing.

In Figure 7, we focus on the outcomes for unmarried women who were pregnant before the age of 20. The most notable feature of this figure is the dramatic increase in the percentage of women who go on to carry their pregnancy to term. Although this outcome occurred only

about 40 percent of the time in the mid 1970s, it now occurs nearly two-thirds of the time. This increase can be attributed partly to a reduction in the fraction of non-marital conceptions that result in a marital birth (i.e. shotgun marriage). Since around 1980, however, another important contributing factor has been a reduction in the percentage of pregnancy failures, which is likely the result of less frequent use of abortion. In the most recent statistics, a woman who gets pregnant outside of marriage has a 62 percent probability of having a non-marital birth, a 10 percent probability of getting married before the birth, and a 28 percent probability of aborting or having a miscarriage.

### *B. FFS Data*

The Family and Fertility Survey is a dataset that combines survey data from 23 countries mainly in western and eastern Europe (along with a few other developed countries) conducted largely during the early and mid 1990s. A standard questionnaire was prepared that asked respondents to report characteristics of their household, parents, partnerships, and children, among other things. Importantly each survey also contains complete fertility histories for each respondent. The survey was given to national representative samples of women (and men in many countries) of childbearing age. Although a standard questionnaire existed, modifications were imposed in many countries so that the data available is not necessarily uniform.

For our purposes, we restricted our attention to those countries outside of Eastern Europe. Women's fertility histories are the focus of our analysis and childbearing outcomes for women in these FFS countries mostly took place prior to the collapse of the Soviet Union. Because of the vastly different economic environment that existed in those countries during that period, we did not include them in our analysis. The remaining countries include Austria, Belgium, Canada, Finland, France, Germany, Greece, Italy, New Zealand, Norway, Portugal, Spain, and the United

States.<sup>16</sup> The United States data actually is the 1995 National Survey of Family Growth. In much of our reported results, we exclude the United States because it is such an outlier among this group of countries in terms of both its level of inequality and the level of early childbearing. As in the NSFG, and for similar reasons, we restrict our attention to those women who were older than 20 or 25 (depending on the age at which outcomes are measured) on the survey date and who turned those ages no earlier than 1976. That date pushes most childbearing outcomes beyond the introduction and diffusion of the birth control pill and, in many (but not all) countries past the legalization of abortion.<sup>17</sup>

Unlike our analysis of NSFG data, we do not distinguish fertility outcomes between those that take place within and outside the scope of marriage. The reason for this is that the relationship between marriage and fertility in many European countries is considerably weaker than it is in the United States; it is not uncommon for committed partners to have children before marriage and then marry sometime later (cf. Kiernan, 2004). As such, the link between subsequent well-being and whether marriage preceded a birth is weaker, so we do not use marriage to distinguish between outcomes.

To measure a women's socioeconomic status, we rely on a variable that indicates whether a women grew up in a household ("most of the time") with both of her parents as opposed to a single parent or no parent household. This variable is not available in each country and further restricts the data available to us. In the end, we are left with Austria, Belgium, Finland, Germany, Greece, Italy, Portugal, and Spain as the countries available for our analysis of fertility. When we focus on conception and pregnancy failure, we are further restricted because

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<sup>16</sup> Obtaining data from the Netherlands requires a separate application procedure, which we have yet to complete.

<sup>17</sup> In our regression models using these data we also include measures of the legal status of abortion in each country in each year. The data necessary to code this variable are available in Levine (2004).

they surveys in Austria and Germany do not ask about these outcomes, so that we are left with data for six countries.

The main additional variable that we attach to these data is the Gini coefficient as our inequality measure that we also calculate as the long-term average within each country. We use the Gini coefficient here rather than the 50/10 ratio because its use in international inequality statistics is more prevalent. We take advantage of the data collection efforts conducted by the United Nations World Institute for Development Economics Research (UN-WIDER), which has cataloged an expansive collection of Gini coefficient estimates for a large number of countries in its World Income Inequality Database.<sup>18</sup> We restrict our attention to all available estimates between 1976 and 2000, focusing on those that are: (a) obtained from nationally representative data sources; (b) deemed to be of high quality; (c) cover the entire population of the country; (d) use individuals as the unit of analysis, and; (e) focus on disposable income. Imposing these restrictions still leaves at least six estimates of the Gini coefficient within each country.<sup>19</sup> We take the simple average of these within-country estimates to obtain our desired long-term measure of inequality. Along with the Gini coefficient, we also attach national unemployment rates for each country and year along with indicators for the legal status of abortion.

Figure 8 displays trends in conceptions, births, and pregnancy failures in the countries with complete data on all of these outcomes over time. It shows that the percentage of women giving birth by age 20 fell in these countries from about 14 percent to 10 or 11 percent for birth cohorts hitting age 20 in 1976 through 1989 (using this cut-off to maintain the same countries in the panel throughout the period). These rates are at least 50 percent lower than that observed in

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<sup>18</sup> We obtained these data from [http://www.wider.unu.edu/research/Database/en\\_GB/database/](http://www.wider.unu.edu/research/Database/en_GB/database/) (accessed June 7, 2011)

<sup>19</sup> For Finland, we have 40 estimates of the Gini coefficient over the 25 years because multiple data sources are available for the same year.

the United States, as reported in Figure 6. Rates of conception have fallen as well, particularly throughout the 1980s, which is consistent with the drop off in the rate of pregnancy failure during this period. Since changes over time in pregnancy failures are largely attributable to changes in the rate of abortion, the declining occurrence of abortion during this period in Europe matches that occurring in the United States at that time.

Table 2 characterizes the degree of income inequality in all of the FFS countries used in this analysis (including those with missing pregnancy resolution data). It shows a great deal of dispersion in inequality, as captured by the Gini coefficient. As a rough characterization, low inequality countries have a Gini coefficient around .25, middle inequality is characterized by a Gini of around .3 and high inequality is captured by a Gini of around .35. Although not listed here, the estimate of .38 in the United States is higher than any of these other countries. The spread of around .1 is a useful reference point for subsequent interpretation of the magnitude of our regression results later in the paper.

## **VI. RESULTS**

### *A. Analysis of NSFG Data*

Before presenting our formal econometric results, we begin by presenting a descriptive analysis of the NSFG data that is comparable in spirit to our regression models and that can illustrate the findings to come. To do so, we distinguish states that differ by their long-term level of income inequality (50/10 ratio). Table 1 splits up these states into the top and bottom quartiles of states along with the states within the interquartile range for each of these income measures, respectively. Then we distinguish women by their mother's level of education and estimate different outcomes for women in different groups of states that vary according to the

socioeconomic status. A comparison of outcomes across states and income groups represents a stylized version of the interaction of SES and state income measures, simulating the regressions to follow.

Figures 9A through 9D present the results of this exercise. Figure 9A focuses on non-marital childbearing by age 20. It shows that high SES women (with college-educated mothers) exhibit little variation in early non-marital childbearing across states that differ in their level of income inequality. Low SES women (with mothers who have dropped out of high school) are more likely to give birth to a child at a young age outside of marriage if they live in a high inequality state. Moving from a low inequality state to a high inequality state (which represents roughly a one point increase in the 50/10 ratio) appears to increase the rate of non-marital childbearing by age 20 by around 5 percentage points.

Figures 9B through 9D are designed to determine the antecedent behavior that leads to this outcome. In Figure 9B we see little evidence that high inequality changes rates of non-marital conceptions differentially for women who differ by SES. Figure 9C displays rates of pregnancy failure that does show a pattern of behavior across states and groups of women that is consistent with the pattern in non-marital childbearing. Middle and high SES women have no clear pattern in their rates of pregnancy failure, but the pattern for low SES women is clear. Rates of pregnancy failure are a little over 4 percentage points lower for these women when they reside in high inequality states compared to low inequality states. This means that the differences in early non-marital childbearing can almost entirely be attributed to differences in the rate of pregnancy failure, which is likely attributable to differences in the use of abortion. Figure 9D focuses on rates of shotgun marriage; no apparent pattern is observed across groups here.



These charts represent a stylized version of the regressions reported in Table 3, which reports estimates from our econometric model described earlier. The first column in the upper panel of this table explores non-marital births by age 20 as the outcome. The interaction between the 50/10 ratio and having a high school dropout mother represents  $\beta_1$  in our econometric model. It indicates that low SES mothers in a high inequality state are more likely to have a non-marital birth by age 20. As we saw earlier, a one point change in the 50/10 ratio roughly captures the movement from a low inequality state to a high inequality state. In this case, that movement is predicted to increase early, non-marital childbearing by 5.3 percentage points for those women whose mothers were high school dropouts. This point estimate is very similar to what we observed in Figure 9A, suggesting that the other covariates in the model have very little correlation with inequality and/or early non-marital childbearing.

The remainder of the top panel of the table focuses on other non-marital outcomes and all marital outcomes by age 20. In Column 3, we see that much of the reason why non-marital childbearing among low SES women rises with inequality is that abortion rates, as captured by pregnancy failures, fall. The magnitude of this estimate indicates that moving from a low inequality state to a high inequality state reduces the likelihood of a pregnancy failure by 4.2 percentage points. We cannot statistically distinguish this estimate from the 5.3 percentage point increase in early non-marital childbearing. This suggests that fewer abortions are at least a large component of the rise in early non-marital births that are associated with more inequality. Column 2 provides no evidence that the likelihood of contraception is affected. These estimates also provide little support for an impact of inequality on marital fertility. In Column 7, we focus on shotgun marriage as an outcome and find no statistically significant impact of inequality there for low SES women.

Interestingly, when we focus on moderate SES women as captured by daughters of high school graduates, we find that the point estimate for the increase in non-marital births is attenuated, and now there is a statistically significant reduction in marital births, of nearly the same (opposite-signed) magnitude. Presumably these women are at some, albeit reduced, risk of poor economic outcomes that may be exaggerated in high inequality states. For them, greater inequality is associated with fewer marital births. This suggests that a reduced prevalence of shotgun marriage is the pathway, as confirmed in Column 7. These results are similar to the results for women in their young 20s, described below.

The lower panel of Table 3 replicates this analysis, focusing on childbearing/marital outcomes by age 25 rather than age 20. Including somewhat older young adults increases the relevance of shotgun marriages in these findings. We continue to find that non-marital childbearing increases for low SES women when they live in high inequality states, but we find a similar drop in marital childbearing (although the latter is not quite significant). Changes in the likelihood of a shotgun marriage explain the divergent pattern.<sup>20</sup>

### *B. Analysis of FFS Data*

Our conceptual approach in analyzing the FFS data is very similar to that using the NSFG with a few minor distinctions. First, our measure of socioeconomic status is household composition during childhood rather than maternal education. Low SES is determined by whether a woman grew up in a household headed by a single or no parent. Second, we also rely

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<sup>20</sup> We have estimated these models separately for blacks and Hispanics, but sample sizes drop substantially and statistical power falls as a result. For the outcomes by age 20, among the sample of Hispanic women (n=4,086), the estimated coefficient (standard error) on the interaction term of interest is 0.060 (.047) for non-marital births, 0.020 (0.050) for non-marital pregnancy failure, and -0.065 (.024) for shot-gun married. These results suggest that low-SES Hispanic teens living in more unequal places are less likely to get married conditional on getting pregnant. For the outcomes by age 20, among the sample of black women (n=6,117), the estimated coefficient (standard error) on the interaction term of interest is 0.025 (.033) for non-marital births, -0.085 (.025) for non-marital pregnancy failure, and 0.018 (.014) for shot-gun married. These results suggest that low-SES black teens living in more unequal places are less likely to terminate a pregnancy, conditional on getting pregnant. The pattern of results is qualitatively similar for these racial/ethnic groups for outcomes by age 25.

on a country's long-term average Gini coefficient rather than the 50/10 ratio. Third, we no longer make distinctions between marital and non-marital outcomes because this difference has less significance in the European context.

As in our discussion of the NSFG results, we begin by presenting in Figure 10 a graphical depiction of the difference in the likelihood of giving birth by age 20 by socioeconomic status in countries that differ by their level of inequality. Countries are distinguished into inequality categories consistent with the statistics reported in Table 2. Among women who grew up in higher SES households (i.e. with both parents), we see perhaps a trivially small increase in rates of early childbearing among women growing up in higher inequality countries. For women from low SES households, however, a clear pattern is evident that women from high inequality countries are considerably more likely to give birth by age 20. Moving from a low inequality country to a high inequality country increases the odds of having an early birth by around 5 percentage points. Notably, the magnitude of this effect is very similar to that obtained in the U.S. in moving between a low inequality and high inequality state.

These stylized results are replicated in a more formal econometric analysis, which is reported in Table 4. It reports the results of our econometric model, specified earlier, where  $\beta_1$  is captured by the interaction between the Gini coefficient and whether a woman was not raised in a two parent household. The top panel considers fertility outcomes by age 20 and the bottom panel by age 25. In interpreting our findings, we focus on the impact of a 0.1 point increase in the Gini coefficient, which roughly reflects a movement from a low inequality country to a high inequality country, as described earlier.

Consistent with Figure 10, the results in the top panel indicate a strong relationship between inequality and early childbearing among low SES women. In Column 1, we present

regression results in models that include the United States. In that model, we see that a 0.1 point increase in the Gini coefficient increases the rate of childbearing among low SES women by age 20 by 5.9 percentage points.<sup>21</sup> In Column 2 we drop the United States from the analysis and this estimated impact falls to 3 percentage points. Again, this is consistent with the U.S. being a positive outlier in both inequality and early childbearing along with low rates of two parent families. This estimate falls again, to 2 percentage points, when we restrict our sample in Column 3 to the remaining countries that also report data on other pregnancy outcomes. When we focus on conceptions and pregnancy failures in Columns 4 and 5, respectively, we see that higher inequality generates both more conceptions and fewer pregnancy failures among low SES women by age 20. The importance of conceptions is somewhat different than in the United States, where abortion was the primary determinant.

The bottom panel of the table focuses on outcomes by age 25. The impact on births is similar to that by age 20, albeit somewhat less precisely estimated. On the other hand, the point estimates in models of conception and pregnancy failure suggest that abortion is a less common mechanism than it is for younger women. The precision of these results, however, is weak enough to prevent us from drawing strong conclusions here.

### *C. An Investigation of Alternative Mechanisms*

Our approach to statistical identification focuses on the interaction between socioeconomic status and a measure of income inequality. That inequality measure is estimated as a long-term average and fixed within states/countries over time. As such, any state/country

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<sup>21</sup> Standard errors reported in Table 4 are clustered at the country level. As reported in Cameron, Miller, and Gelbach (2008), even these adjusted standard errors may be understated with so few countries used in the analysis (9, 8, and 6, respectively, in columns 1, 2, and 3 through 5). A simple solution to help address the problem that they describe, which has been implemented in Cohen and Dupas (2010), is to adjust the critical values using a t-distribution with  $G-2$  degrees of freedom, where  $G$  is the number of countries. Implementing this approach would change the standard critical value of 1.96 at the 5 percent level of significance from a normal distribution to 2.262, 2.306, and 2.447, respectively, from t-distributions.

fixed factor that is highly correlated with the measure of inequality that we use will generate results that are similar in spirit to those reported here. Low SES women in states or countries with that characteristic will be found to have a higher propensity to give birth at an early age. In other words, our interpretation of the role played by inequality may not be warranted if there is some other important state/country fixed factor that is omitted, but strongly correlated with inequality and directly related to childbearing outcomes for low SES women.

Although we do not have a solution that will completely rule out the existence of such a factor, we are able to examine the impact of including other plausible alternatives into our model. If including interactions between SES and these other factors reduces the magnitude of the inequality interaction, then this would indicate the presence of omitted variable bias. If not, it would bolster our argument that the relationship between inequality and early childbearing is causal.

In our analysis, we focus on data from the NSFG and the relationship between early (by age 20) non-marital childbearing and other state characteristics interacted with low socioeconomic status. Our emphasis on the NSFG data, as opposed to the FFS, and alternative state characteristics is more a function of data availability and our ability to generate plausible alternatives than any other substantive consideration.

We consider two sets of alternative factors. The first consists of other state characteristics that might reasonably be thought to fit within the economic model of despair we presented above. There are things that might also affect an individual perceived probability of success --  $q$  in our model. In Table 5, we report the results of estimating equation [7] with six alternative state characteristics. Column (1) reports the main coefficients of interest from equation [6] -- namely, a point estimate of 0.053 (.015) on the interaction of the 50/10 ratio and our maternal education

measure of low-SES status. We move on to include the 90/50 ratio from the income distribution, calculated in the same way we described earlier regarding the 50/10 ratio. Since that measure identifies inequality at the top of the distribution rather than the bottom, we would not expect it to have a very strong impact on early childbearing among low SES women. As shown in Column (2), the coefficient on this variable is not statistically significant and the inclusion of this variable does not attenuate the coefficient on our main variable of interest.

We next consider the absolute level of income at the bottom and middle of the income distribution, as opposed to the relative distance between these measures. Perhaps it is not inequality that matters for a young woman's decision, but rather how low the 10<sup>th</sup> percentile of the income distribution is, or where the 50<sup>th</sup> percentile is. Columns (3) and (4) report the results when the model includes the log of the 10<sup>th</sup> percentile of the income distribution or the log of the 50<sup>th</sup> percentile of the income distribution, which we calculated as described earlier. The point estimate on these alternative measures is insignificant and the main coefficient of interest remains large and statistically significant.

The last two state factors we consider in Table 5 are the average wage ratio for high school graduates relative to high school dropouts (Column 5) and for college graduates relative to high school graduates (Column 6). These outcomes provide a measure of the returns to education in the state and provide a way to examine the alternative interpretation presented in the model section that a higher return to moving up the ladder can actually reduce the likelihood of early, non-marital childbearing among low SES women.<sup>22</sup> Neither of these variables enters the model with statistical significance, and the main coefficient of interest is basically unchanged.

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<sup>22</sup> We calculated these wage ratios using data the 1980, 1990, and 2000 Censuses along with the 2006-2008 ACS, estimating hourly wages for full-time workers (greater than 1,500 hours in the year) by level of educational attainment.

We next consider a set of alternative state characteristics that do not directly fall within the framework of our model. If these variables are found to be statistically significant and important, it would provide evidence in favor of a different model. Table 6 reports these results. Again, the first column replicates the first column of Table 3 for the purposes of comparison. Beyond that, we first consider the political culture of a state, which we capture by including the average percentage of voters favoring Democratic candidates averaged within state between the 1972 and 2008 Presidential elections.<sup>23</sup> Religious beliefs in a state may also be a contributing factor; we experiment with including an index of religiosity as well.<sup>24</sup> We also explore the role played by differences in states' percentage of the population that is minority (defined as individuals who are not white, non-Hispanic). Next we include the incarceration rate and the poverty rate in the state.<sup>25</sup> In general, these individual state characteristics do not enter the model with statistical significance and the coefficient of interest is qualitatively unchanged, remaining in the range of 0.047 and 0.060 for the "by age 20" results compared to 0.053 in Column 1 of Table 3. One possible exception to this general finding is that including our political measure has a somewhat more substantial downward impact on the key interaction between the 50/10 ratio and our measure of low-SES in the model for non-marital childbearing by age 25.

The final alternative state characteristic we consider is Putnam's measure of social capital. Putnam (2000) argues that the loss of social capital has contributed to the high teen birth rate. The channel of inequality leading to a loss of social capital and sense of community and thereby generating worse social outcomes is a different story that the one inherent to our

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<sup>23</sup> The source of these data is David Leip's Atlas of Presidential Elections, available at <http://uselectionatlas.org/>.

<sup>24</sup> The source of these data is Gallup Poll, *State of the States: Importance of Religion*. January 28<sup>th</sup>, 2009. Available at: <http://www.gallup.com/poll/114022/state-states-importance-religion.aspx>.

<sup>25</sup> The incarceration data are compiled by the U.S. Bureau of Justice Statistics, Office of Justice programs, downloaded from [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov) (accessed April, 2011). Poverty rate data comes from the United States Census Bureau and were obtained from <http://www.census.gov/hhes/www/poverty/data/historical/people.html> (accessed June 7, 2011). In our analysis, we follow the Census Bureau recommendation to use data beginning in 1980 to maintain the consistency of the data over the time period.

conceptual model. The results of this analysis are reported in Table 6, Column 7. The data provide no evidence that this measure of a state's social capital has an effect on early non-marital childbearing rates among low-SES women. Nor does the inclusion of this variable alter our conclusion about the role of inequality.

The bulk of the evidence in Tables 5 and 6 is strongly suggestive that inequality has a causal impact on early non-marital childbearing in the United States. We concede that it is possible that we could identify some other factor that would have more of an impact on our estimated relationship between inequality and early childbearing among low SES women. If so, this would call our interpretation into question. We would never be able to completely rule out this possibility. But we have included a number of plausible alternatives that could intervene and we found that our main findings are quite robust to these alternative specifications.

#### *D. Evaluating the Magnitude of the Effects*

An important motivation for this current project is the inability of past research to explain much of the geographic variation that exists in teen childbearing. Our analysis suggests that the lack of economic opportunity as measured by income inequality may be an important component. Although we can by no means explain all of the variability or even the majority of it, our results are able to explain a sizeable share of the problem. In the United States, according to our estimates 13.6 percent of women experienced a teen, non-marital childbirth in high inequality states compared to 10.1 percent of women in low inequality states over the post-1976 sample window we consider. In those high inequality states, roughly 34 percent of teens were daughters of high school dropout mothers (per our tabulations of the NSFG data). Based on our estimates in Table 3, low SES women in high inequality states were 5.3 percentage points more likely to have a non-marital teen birth compared to low SES women in low inequality states. If



the level of inequality in the high inequality states decreased to the level of the low inequality states, we would expect teen, non-marital childbearing to decline by  $.053 \times .34 \times 1 = .018$  or 1.8 percentage points. This represents  $1.8 / (13.7 - 10.2) = .51$  or 51 percent of the gap in the likelihood of non-marital childbearing by teens between high and low inequality states. In other words, equalizing rates of income inequality across states would eliminate around half of the difference in rates of early, non-marital childbearing between high and low inequality states.

We also conduct a similar simulation exercise using the results of our analysis of FFS data, but this time our goal is to apply international estimates to explain the gap in teen fertility between the United States and Europe. Focusing exclusively on the data in the FFS, we estimate that 20.1 percent of women give birth before the age of 20 in the United States and 9.2 percent of women in non-Eastern Bloc countries had a teen birth, generating a 10.9 percentage point difference between the U.S. and the other countries. In the United States, 15 percent of women grew up in households headed by a single or no parent. Our estimates in Table 4 that include the U.S. (Column 1) indicate that a one point increase in the Gini coefficient would reduce the likelihood of a birth by age 20 among low SES women by 0.589 percentage points. This means that if those 15 percent of women grew up in two parent families and with the level of inequality observed in a low inequality country with a Gini coefficient of 0.25 instead of the 0.38 value that exists in the U.S., teen fertility in the U.S. would decline by  $0.15 \times (0.25 - 0.38) \times 0.589 = -0.011$ . This represents  $-0.011 / 0.109 = -0.101$ , or a 10.1 percent reduction in the gap in teen fertility between the United States and the other countries.

We suspect that our estimated figure for the cross-state variation is an overestimate and the figure for cross-country variation is an underestimate of the role played by inequality. First, our measure of low-SES status in the cross-country FFS data captures only 15 percent of the

population, as compared to our measure of low-SES in the U.S. context, which captures 35 percent of the population. In the FFS, we are probably applying our estimated effect to too small a percent, thereby leading to an artificially low estimate of 10 percent of the gap being explainable by inequality. In addition, the difference in teen birth rates between high and low inequality states is 3 percentage points, as compared to a 10 percentage point difference between high and low inequality countries. In other words, as a mechanical matter, the denominator of the difference is substantially lower in the cross-state context. Recall from Figures 3 and 4 that the cross-sectional link between inequality and early childbearing is much stronger internationally than across states. The set of high inequality states are a much more diverse set of states than are the set of high inequality countries. This likely suggests that our 50 percent estimate overstates the amount of cross-state variation that can be explained by inequality. We thus conclude that inequality can explain between 10 and 50 percent of the geographic variation in teen fertility.

## **VII. DISCUSSION AND INTERPRETATION**

We began our paper by referencing a broader social science literature suggesting that despair among the less advantaged who face little hope for economic improvement leads to high levels of early, non-marital childbearing. Our goal in this paper has been to use an economists' toolkit to address this hypothesis. We introduced an economic model that captures ethnographic and anthropological insights into a parsimonious economics framework of decision-making. Key to that model is that economic "despair" leads a young, poor unmarried girl to choose to have a non-marital birth. We acknowledge – and empirically investigate – the various possible margins that could affect the realization of that decision. Namely, a non-marital birth could be avoided through the avoidance of pregnancy, the use of abortion, or by making the birth "marital" though

a so-called shotgun marriage. The key feature of the model is that for young, low-SES women, the perception of limited opportunity reduces the perceived opportunity cost of early, non-marital childbearing and thereby increases its occurrence.

We have used large-scale, national and international data sets to investigate the relationship between income inequality, and other contextual variables, and cross-state and cross-country variability in early, non-marital childbearing among low SES women. Our empirical analysis and our findings complement previous ethnographic work on the topic. The results of our empirical analysis suggest two main specific conclusions. First, we find that low SES women who live in locations characterized by a high degree of income inequality are more likely to have a child at a young age and, in the United States, outside of marriage. Second, an important factor in explaining this high level of early, non-marital childbearing is the lower frequency with which these women abort their pregnancies.

We offer the following two caveats to the interpretation of our empirical results vis a vis the model. First, our empirical work was motivated by our model, and we interpreted the results within that framework. However, we do not purport to have rigorously tested our model directly or estimated any underlying structural parameters. Indeed, it is not clear to us how we could ever directly “prove” the role of despair. That said, we find the empirical support for the role of inequality striking, and certainly one interpretation of this finding is the one laid out by our model.

Second, though the empirical evidence supports the predictions of our model, we cannot say that our model describes the decision-making process of every individual. In particular, some of the relationship between inequality and childbearing among low-SES women might reflect peer effects. This could be the case if some critical mass of low-SES individuals responds to

inequality in the way posed by our model. Others in that same place might then behave similarly in response to this established social norm. In such a scenario, our model would be relevant to explaining the geographic patterns we observe in early non-marital childbearing, even though it would not describe the decision-making process of every individual directly.

That said, our results are consistent with the model we have proposed whereby young low-income girls make decisions about childbearing (and marriage) based on their perceived likelihood of achieving economic success. Economic and societal conditions that generate a sense of “despair” among these girls will lead them to more often choose early, non-marital childbearing. Our results suggest that inequality itself, as opposed to other correlated geographic factors, is a primary driver of this relationship. Our results further suggest that this can be an important part of the explanation for why high-inequality states and countries see much higher rates of early, non-marital childbearing than their more equal counterparts.

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Table 1: Household Inequality Measures across States, 1980-2008

Highest Inequality		Middle Inequality		Lowest Inequality	
State	Ratio 50/10	State	Ratio 50/10	State	Ratio 50/10
DC	5.88	NJ	4.24	AZ	3.81
LA	4.92	NM	4.19	ME	3.79
NY	4.74	MI	4.18	AK	3.78
AL	4.65	WV	4.18	MT	3.78
MA	4.61	NC	4.16	IA	3.74
MS	4.52	CT	4.14	NE	3.72
GA	4.51	AR	4.13	WI	3.72
KY	4.49	OH	4.10	WY	3.71
SC	4.39	CA	4.09	VT	3.61
RI	4.39	OK	4.08	ID	3.60
TN	4.32	VA	4.05	NH	3.58
IL	4.32	PA	4.03	NV	3.57
TX	4.30	MO	4.00	UT	3.41
		MD	3.95		
		CO	3.89		
		WA	3.89		
		DE	3.87		
		MN	3.86		
		HI	3.86		
		FL	3.85		
		KS	3.84		
		ND	3.84		
		SD	3.84		
		OR	3.83		
		IN	3.81		

*Notes:* The highest and lowest inequality groups are the top and bottom quartiles of states, respectively. The middle inequality group is the middle two quartiles of states. These values are calculated from 1970-2008, using U.S. census and ACS data.

Table 2: Household Inequality Measures across FFS Countries, 1976-2000

<i>Low Inequality</i>		<i>Middle Inequality</i>		<i>High Inequality</i>	
Countries	Gini Coeff.	Countries	Gini Coeff.	Countries	Gini Coeff.
Finland	0.230	Germany*	0.296	Spain	0.325
Austria*	0.246			Italy	0.328
Belgium	0.275			Greece	0.346
				Portugal	0.367

*Notes:* Countries are divided by apparent breaks in the levels of the Gini coefficients (0.28 and 0.32). The sample is restricted to non-Eastern bloc FFS countries with data on household composition in childhood and it also excludes the United States (whose Gini coefficient in these data is 0.380). Gini coefficients for each country represent the average values of all reported Gini coefficients available from UNU-WIDER for each country, restricting the years considered to those between 1976 and 2000 that are considered to be of high quality, and that cover the full population of households. Countries marked with an asterisk only have data on births, not other pregnancy outcomes.

Table 3: Impact of Long-Term Inequality on  
 Marital and Non-Marital Fertility Outcomes by Ages 20 and 25, by Socioeconomic Status  
 (standard errors in parentheses)

	<u>Non-Marital Outcomes</u>			<u>Marital Outcomes</u>			"Shotgun Marriage"
	Birth (1)	Conception (2)	Pregnancy Failure (3)	Birth (4)	Conception (5)	Pregnancy Failure (6)	
by Age 20							
50/10 Ratio* Mom HS Dropout	0.053 (0.015)	-0.006 (0.018)	-0.042 (0.015)	-0.026 (0.017)	-0.006 (0.016)	0.003 (0.004)	-0.018 (0.009)
50/10 Ratio* Mom HS Graduate	0.021 (0.012)	-0.013 (0.018)	-0.013 (0.015)	-0.027 (0.010)	-0.004 (0.006)	0.002 (0.003)	-0.013 (0.007)
by Age 25							
50/10 Ratio* Mom HS Dropout	0.040 (0.013)	-0.039 (0.026)	-0.022 (0.025)	-0.041 (0.025)	0.008 (0.029)	-0.010 (0.006)	-0.050 (0.014)
50/10 Ratio* Mom HS Graduate	0.003 (0.014)	-0.049 (0.018)	-0.020 (0.017)	-0.026 (0.012)	0.002 (0.016)	-0.003 (0.004)	-0.021 (0.010)

Notes: reported standard errors are clustered at the state level. Additional explanatory variables in each regression include maternal educational attainment, current age and age squared, race/ethnicity, an indicator variable for living with a single parent at age 14, the state unemployment rate at age 19, state welfare policies (family cap and maximum AFDC/TANF benefit for a family of 3), state abortion policies (Medicaid funding, parental notification/consent, and mandatory delay laws), and an indicator variable for SCHIP implementation, along with state and cohort fixed effects. The sample sizes are 24,720 and 23,037 in the models by age 20 and age 25, respectively.

Table 4: Impact of Long-Term Inequality on Fertility Outcomes by Ages 20 and 25,  
by Socioeconomic Status  
(standard errors in parentheses)

	Birth (Full Sample including US) (1)	Birth (Full Sample excluding US) (2)	Birth (restricted sample) (3)	Conception (4)	Pregnancy Failure (5)
by Age 20					
Gini coefficient*	0.589	0.301	0.192	0.180	-0.111
Not Raised in Two Parent HH	(0.157)	(0.116)	(0.048)	(0.059)	(0.015)
Sample Size	29,671	23,042	15,546	15,546	15,546
by Age 25					
Gini coefficient*	0.545	0.161	0.249	0.292	-0.010
Not Raised in Two Parent HH	(0.181)	(0.172)	(0.138)	(0.163)	(0.112)
Sample Size	29,846	22,686	15,509	15,509	15,509

Notes: The full sample includes those women in the FFS outside of the Eastern bloc (with or without the United States, as indicated). The restricted sample includes data from just the subset of non-US countries that also include information about conceptions and pregnancy failures. Standard errors are clustered at the country level (see the text for a discussion of this).

Table 5: Impact of Alternative State Economic Conditions on Non-Marital Fertility by Ages 20 and 25, by Socioeconomic Status (standard errors in parentheses)

	50/10 ratio (1)	90/50 ratio (2)	10 <sup>th</sup> Percentile of Income (3)	50 <sup>th</sup> Percentile of Income (4)	HS Grad to HS Dropout Wage Premium (5)	College Grad to HS Grad Wage Premium (6)
Correlation between 50/10 ratio and characteristic:	---	0.709	-0.615	-0.168	0.127	0.347
by Age 20						
50/10 Ratio*	0.053	0.069	0.062	0.056	0.052	0.054
Mom HS Dropout	(0.015)	(0.021)	(0.019)	(0.015)	(0.015)	(0.014)
50/10 Ratio*	0.021	0.000	0.022	0.022	0.017	0.012
Mom HS Graduate	(0.012)	(0.016)	(0.017)	(0.012)	(0.011)	(0.011)
State Characteristic*	---	-0.065	0.028	0.028	0.049	-0.035
Mom HS Dropout	---	(0.066)	(0.049)	(0.049)	(0.093)	(0.072)
State Characteristic*	---	0.076	0.003	0.005	0.128	0.097
Mom HS Graduate	---	(0.044)	(0.037)	(0.037)	(0.058)	(0.060)
by Age 25						
50/10 Ratio*	0.040	0.057	0.034	0.039	0.042	0.045
Mom HS Dropout	(0.013)	(0.018)	(0.019)	(0.014)	(0.013)	(0.013)
50/10 Ratio*	0.003	-0.006	0.003	0.003	0.003	-0.006
Mom HS Graduate	(0.014)	(0.018)	(0.019)	(0.014)	(0.014)	(0.013)
State Characteristic*	---	-0.064	-0.020	-0.021	-0.106	-0.089
Mom HS Dropout	---	(0.055)	(0.049)	(0.048)	(0.074)	(0.083)
State Characteristic*	---	0.030	0.001	0.001	-0.003	0.092
Mom HS Graduate	---	(0.047)	(0.047)	(0.046)	(0.059)	(0.064)

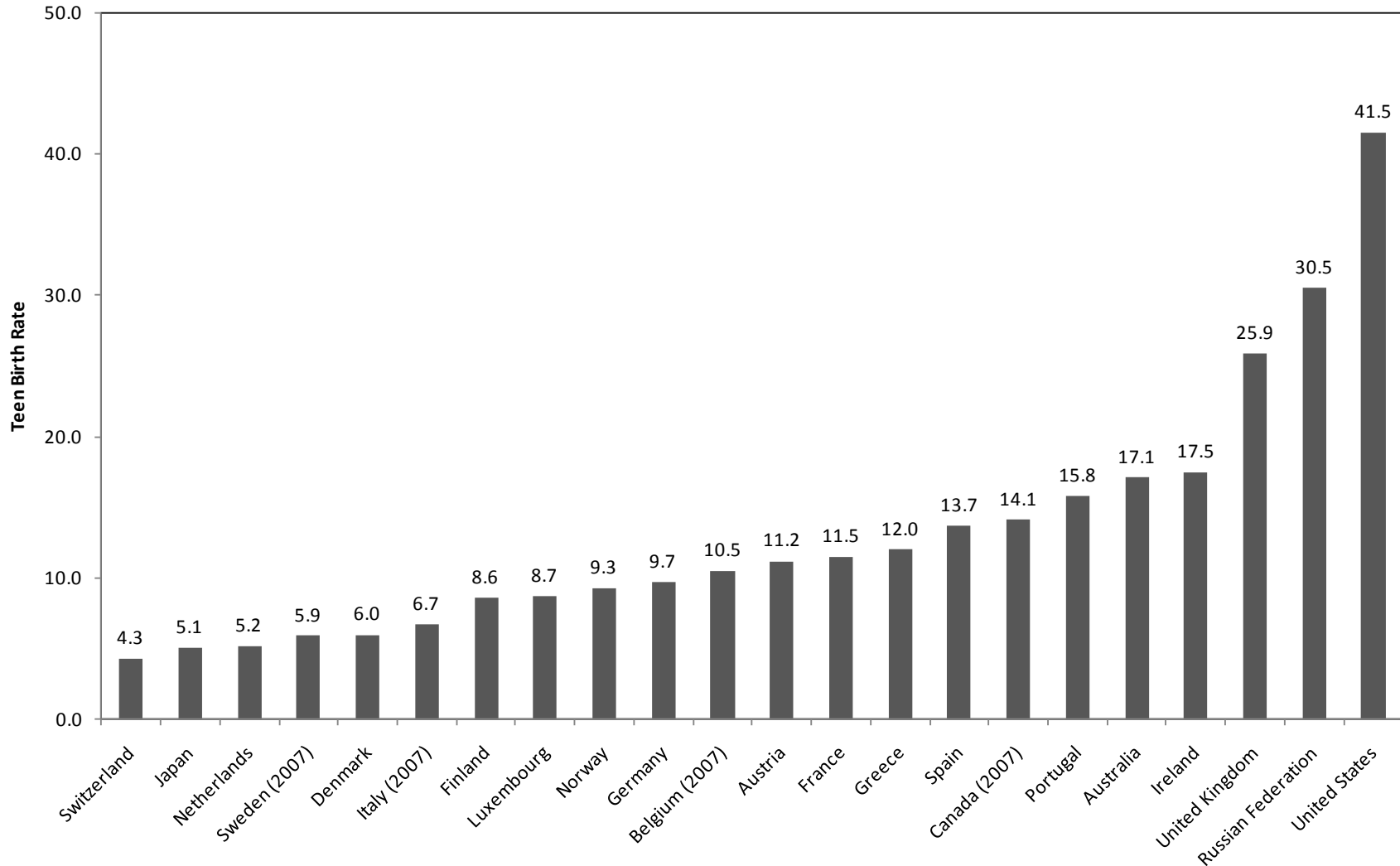
Notes: reported standard errors are clustered at the state level. Additional explanatory variables in each regression include maternal educational attainment, current age and age squared, race/ethnicity, an indicator variable for living with a single parent at age 14, the state unemployment rate at age 19 or 24, state welfare policies (family cap, waiver/TANF implementation, and maximum AFDC/TANF benefit for a family of 3), state abortion policies (Medicaid funding, parental notification/consent, and mandatory delay laws), and an indicator variable for SCHIP implementation, along with state and cohort fixed effects. The specifications for non-marital fertility have a sample size of 24,720 and 23,037 by ages 20 and 25, respectively.

Table 6: Impact of Alternative State Characteristics on Non-Marital Fertility by Ages 20 and 25, by Socioeconomic Status (standard errors in parentheses)

	50/10 ratio (1)	Percentage of Votes to Democrats (2)	Index of Religiosity (3)	Percentage of Population that is Minority (4)	Incarceration Rate (5)	Poverty Rate (6)	Social Capital Index (7)
Correlation between 50/10 ratio and characteristic:	---	0.358	0.249	0.368	0.414	0.499	-0.598
by age 20							
50/10 Ratio*	0.053	0.047	0.057	0.053	0.058	0.060	0.049
Mom HS Dropout	(0.015)	(0.019)	(0.016)	(0.016)	(0.018)	(0.024)	(0.016)
50/10 Ratio*	0.021	0.019	0.019	0.010	0.012	0.021	0.015
Mom HS Graduate	(0.012)	(0.015)	(0.010)	(0.011)	(0.012)	(0.021)	(0.016)
State Characteristic*	---	0.131	-0.047	0.000	-0.004	0.001	-0.003
Mom HS Dropout	---	(0.121)	(0.079)	(0.001)	(0.006)	(0.002)	(0.012)
State Characteristic*	---	0.038	0.043	0.001	0.009	0.001	-0.007
Mom HS Graduate	---	(0.095)	(0.061)	(0.001)	(0.005)	(0.002)	(0.013)
by Age 25							
50/10 Ratio*	0.040	0.027	0.047	0.048	0.046	0.030	0.049
Mom HS Dropout	(0.013)	(0.015)	(0.011)	(0.013)	(0.012)	(0.021)	(0.011)
50/10 Ratio*	0.003	-0.008	0.002	-0.004	-0.004	0.001	-0.016
Mom HS Graduate	(0.014)	(0.014)	(0.015)	(0.014)	(0.017)	(0.021)	(0.020)
State Characteristic*	---	0.230	-0.089	-0.001	-0.009	0.001	0.019
Mom HS Dropout	---	(0.123)	(0.074)	(0.001)	(0.007)	(0.003)	(0.015)
State Characteristic*	---	0.163	0.008	0.000	0.003	0.000	-0.013
Mom HS Graduate	---	(0.097)	(0.062)	(0.001)	(0.006)	(0.002)	(0.013)

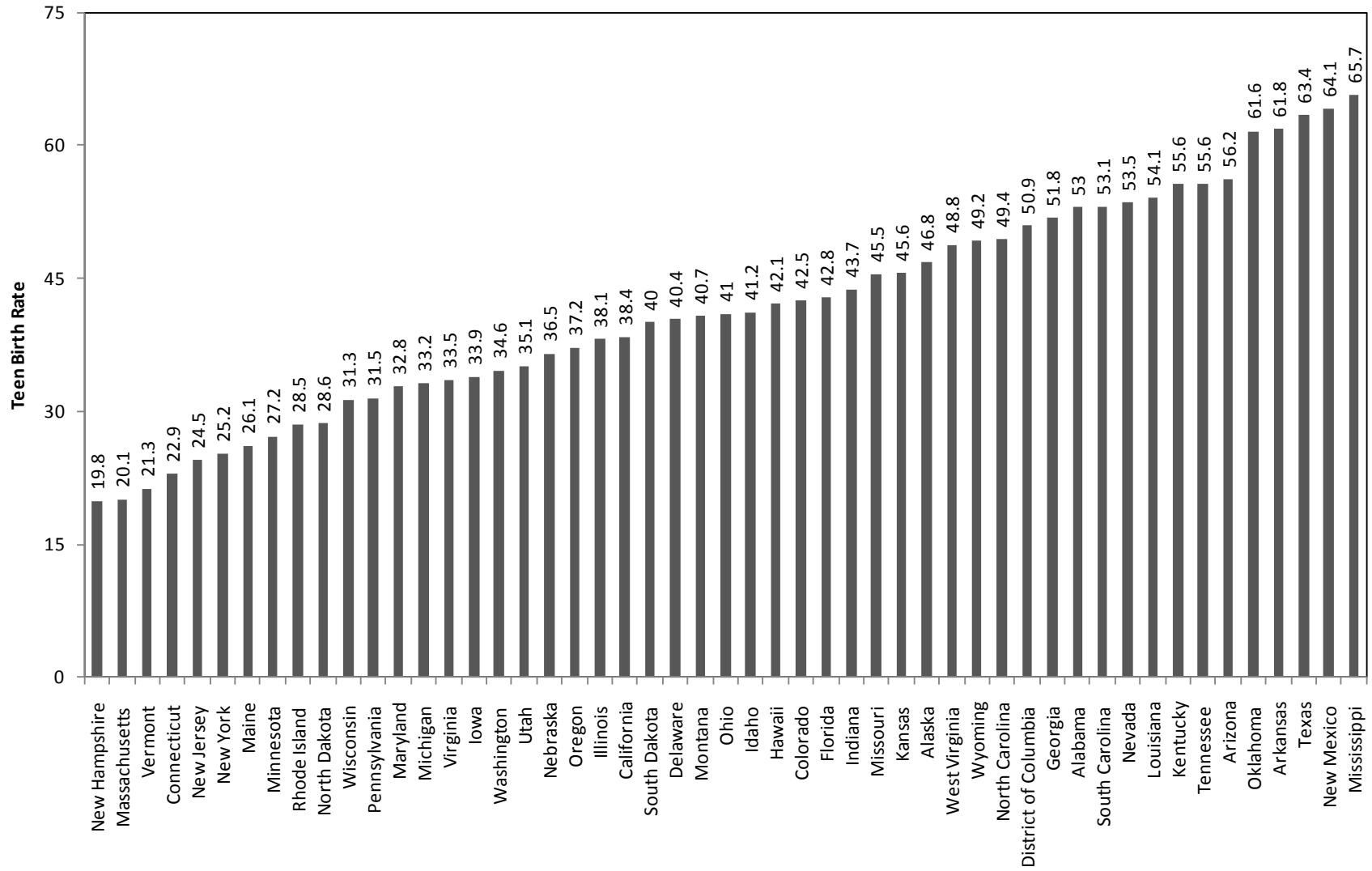
Notes: reported standard errors are clustered at the state level. Additional explanatory variables in each regression include maternal educational attainment, current age and age squared, race/ethnicity, an indicator variable for living with a single parent at age 14, the state unemployment rate at age 19 or 24, state welfare policies (family cap, waiver/TANF implementation, and maximum AFDC/TANF benefit for a family of 3), state abortion policies (Medicaid funding, parental notification/consent, and mandatory delay laws), and an indicator variable for SCHIP implementation, along with state and cohort fixed effects. The specifications for non-marital fertility have a sample size of 24,720 and 23,037 by ages 20 and 25, respectively (and 19,797 and 18,940 for the poverty rate models).

**Figure 1: International Comparison of Teen Birth Rates, 2008**



source: United Nations Economic Commission for Europe (2011) and UN Demographic Yearbook, 2008.

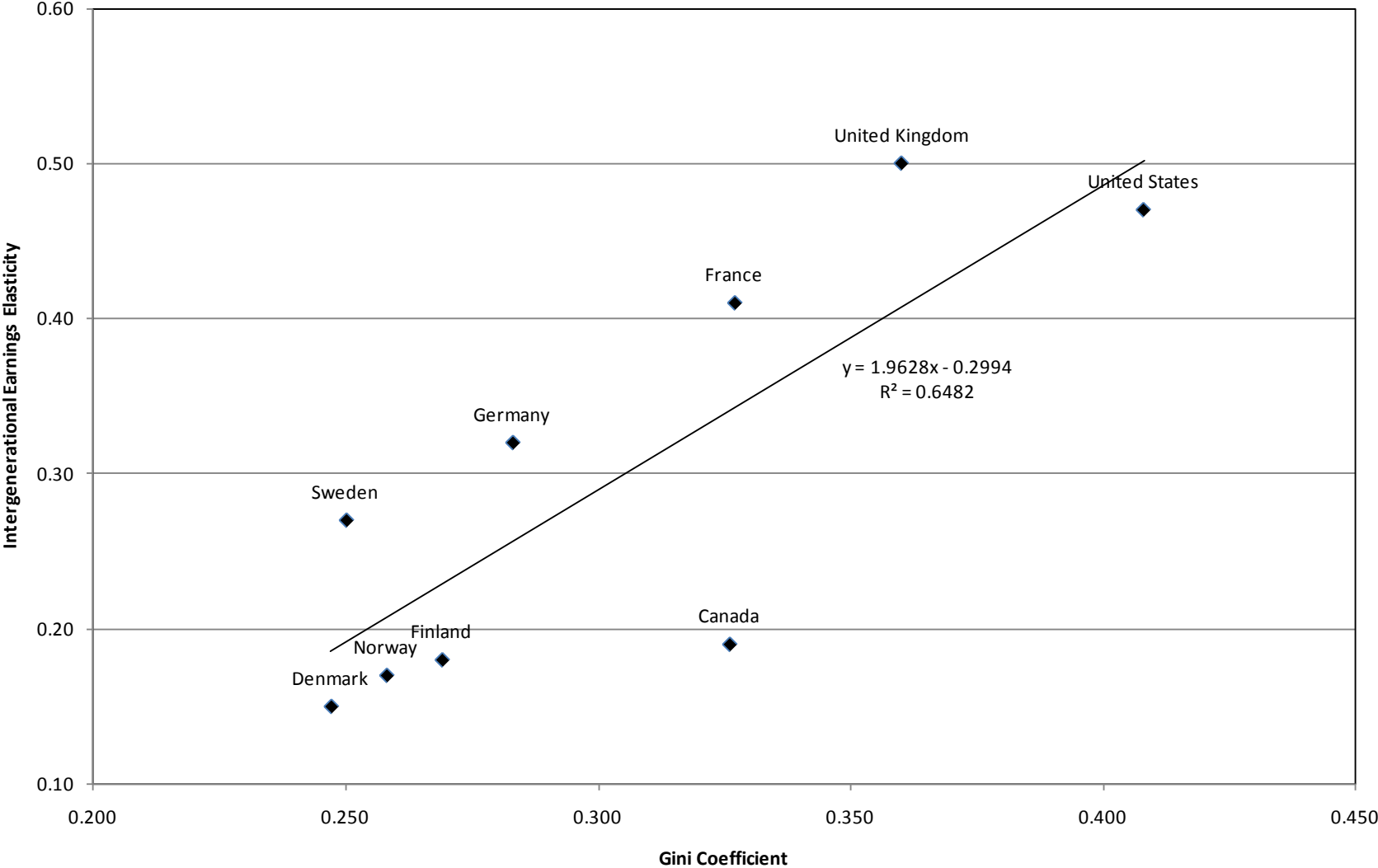
**Figure 2: Variation in Teen Birth Rates across States, 2008**



source: Martin, et al. (2010)

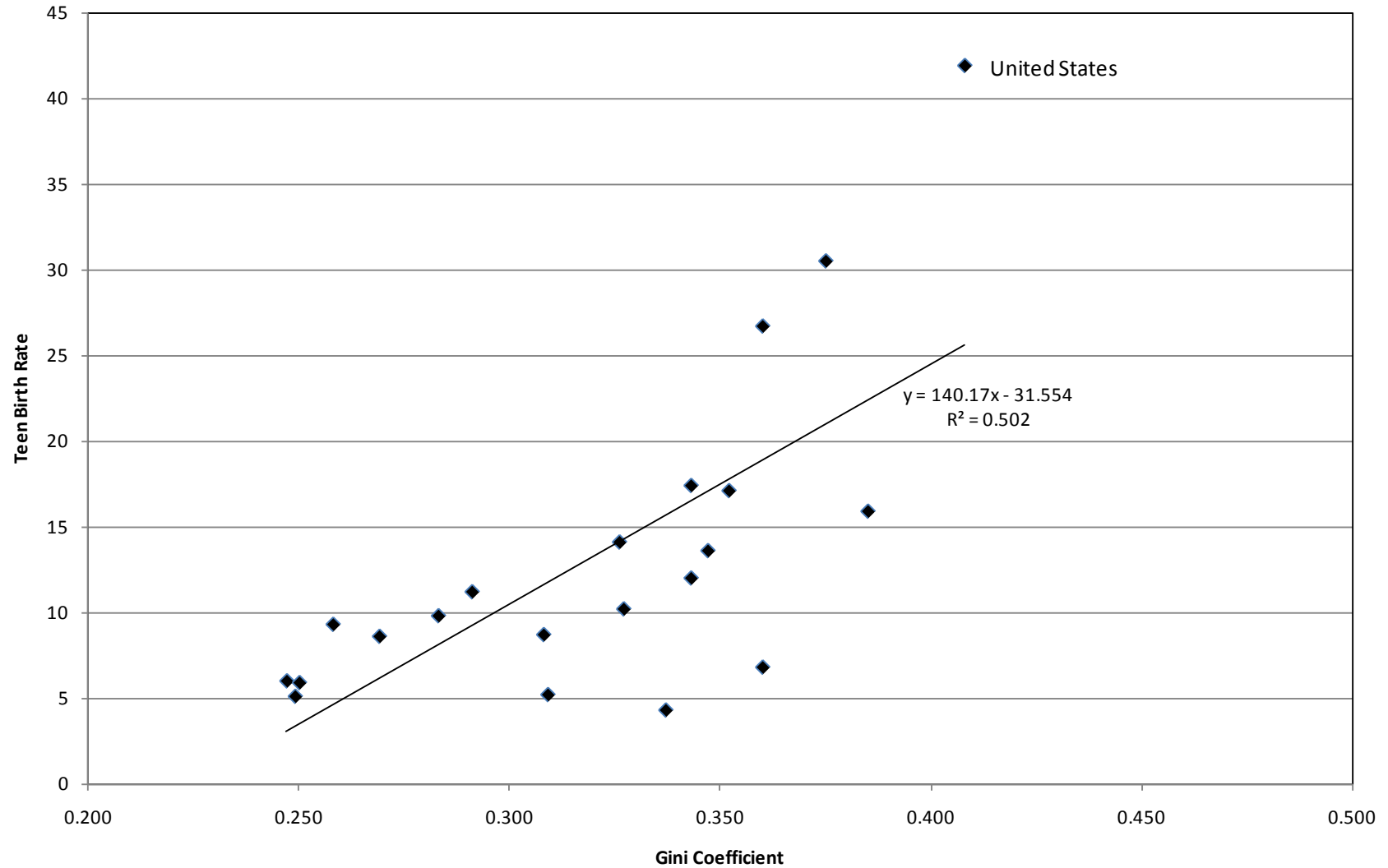


**Figure 3: Relationship between Income Inequality and Income Mobility**



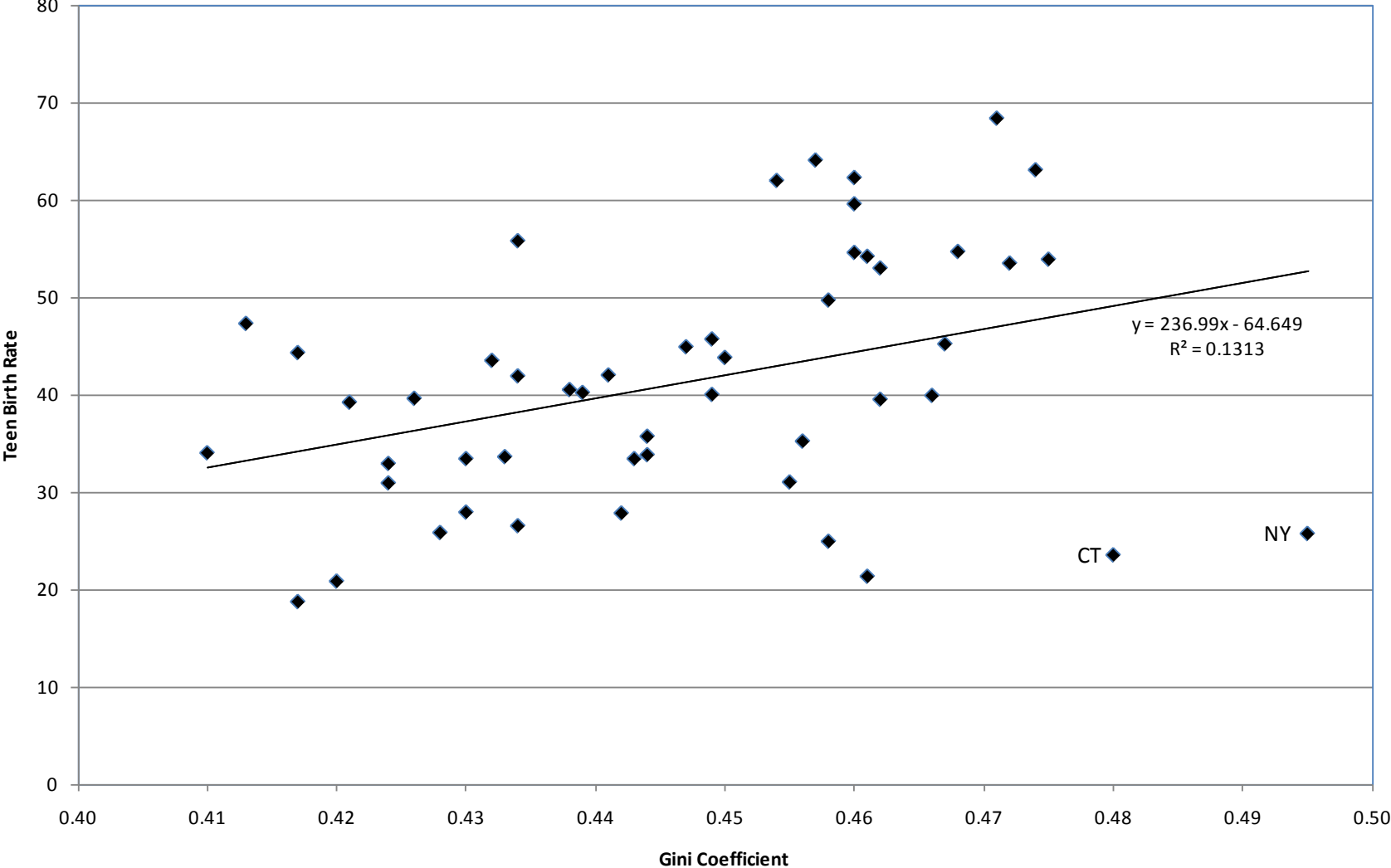
Sources: Gini Coefficient - United Nations (2009). Intergenerational earnings elasticity - Corak (2006).

**Figure 4: Income Inequality and Teen Birth Rates across Countries**



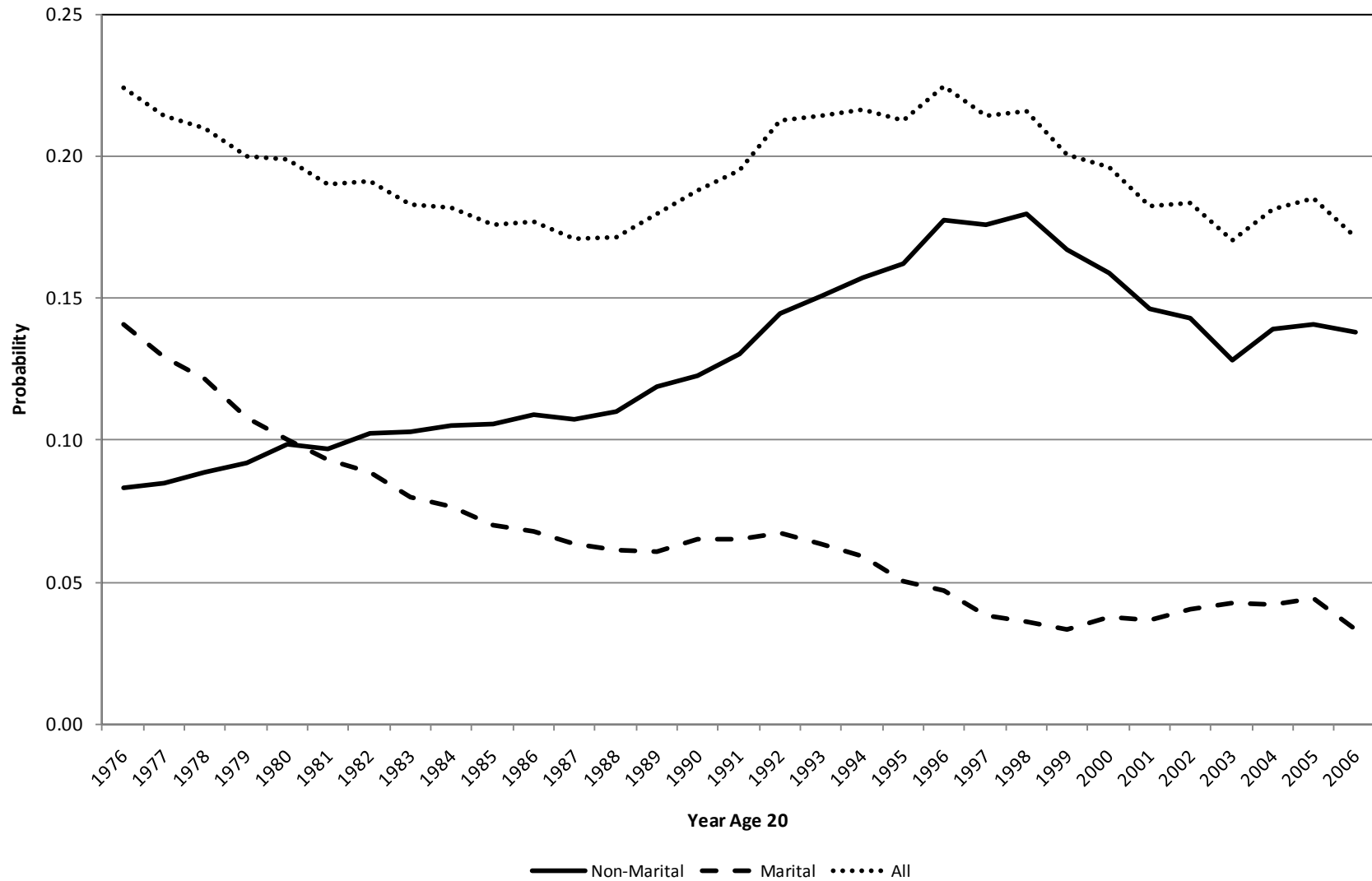
sources: Gini Coefficient - United Nations (2009). Teen Birth Rate - United Nations (2008)

Figure 5: Income Inequality and Teen Birth Rates across States



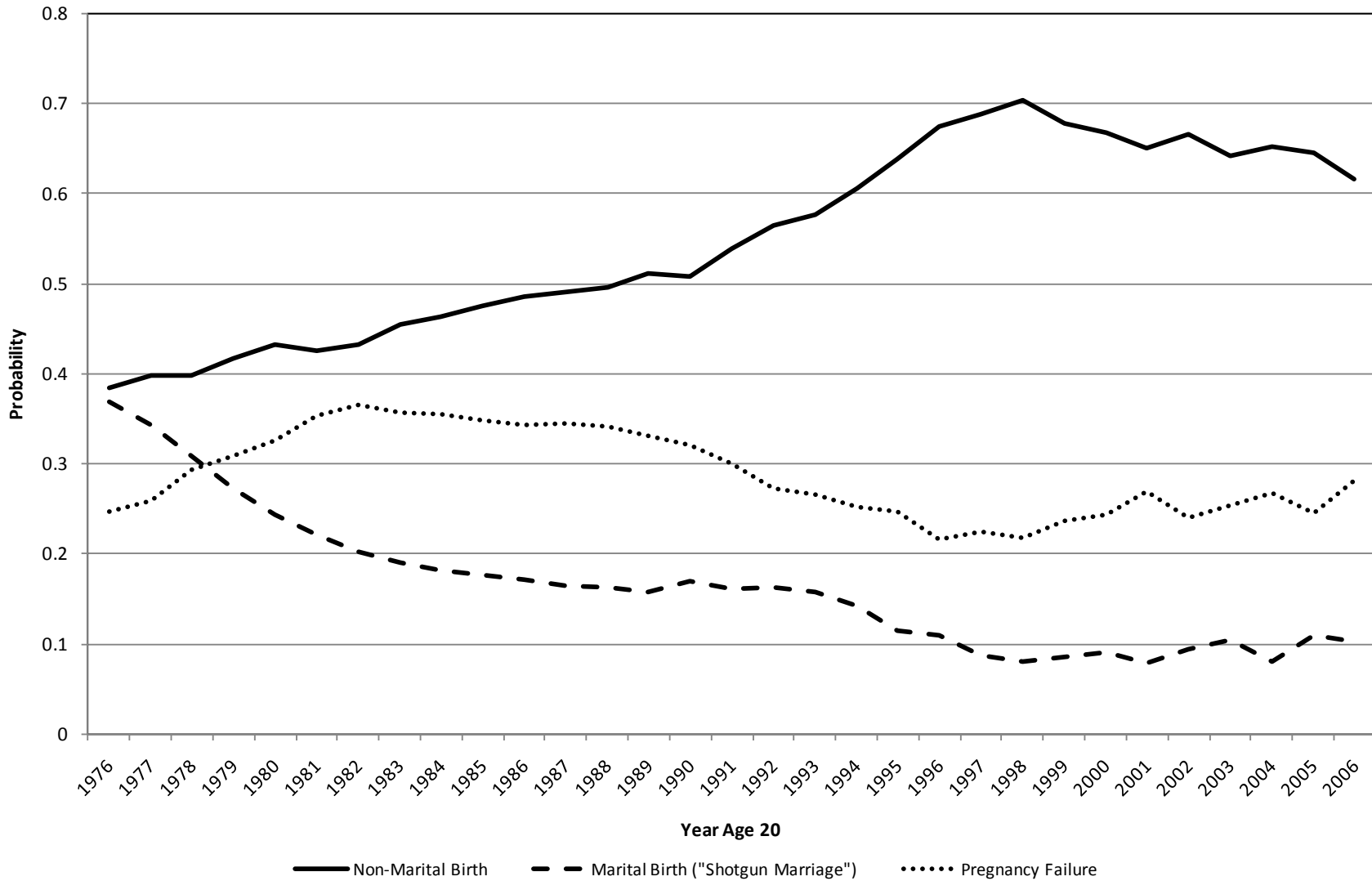
Source: Gini Coefficient - Webster (2007). Teen Birth Rate - Martin (2009)

**Figure 6: Probability of Giving Birth by Age 20, by Marital Status**



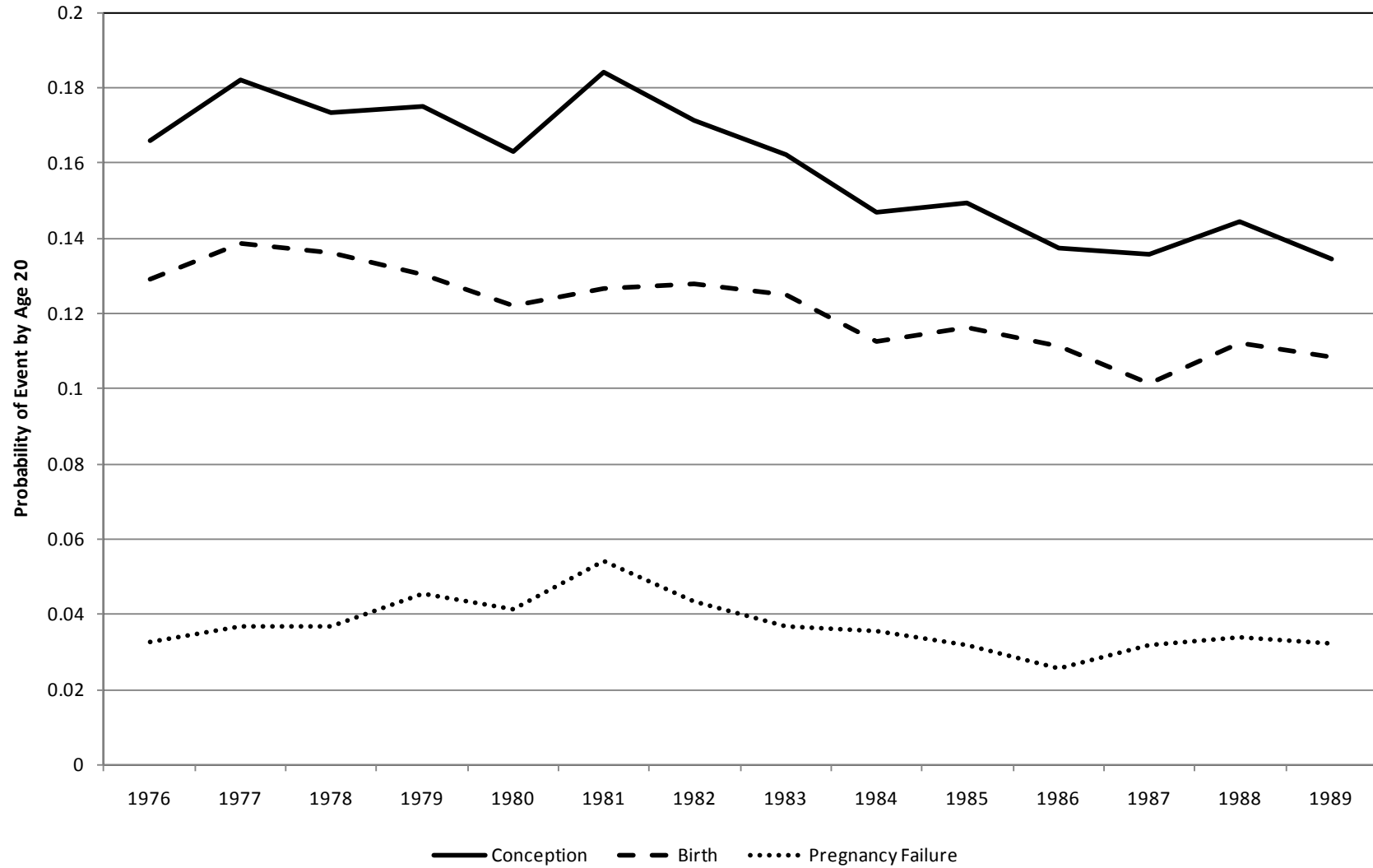
note: Statistics reflect the five year moving average centered on the reported year age 20, weighted by the number of observations.

**Figure 7: Pregnancy Resolution for Non-Marital Conceptions by Age 20**



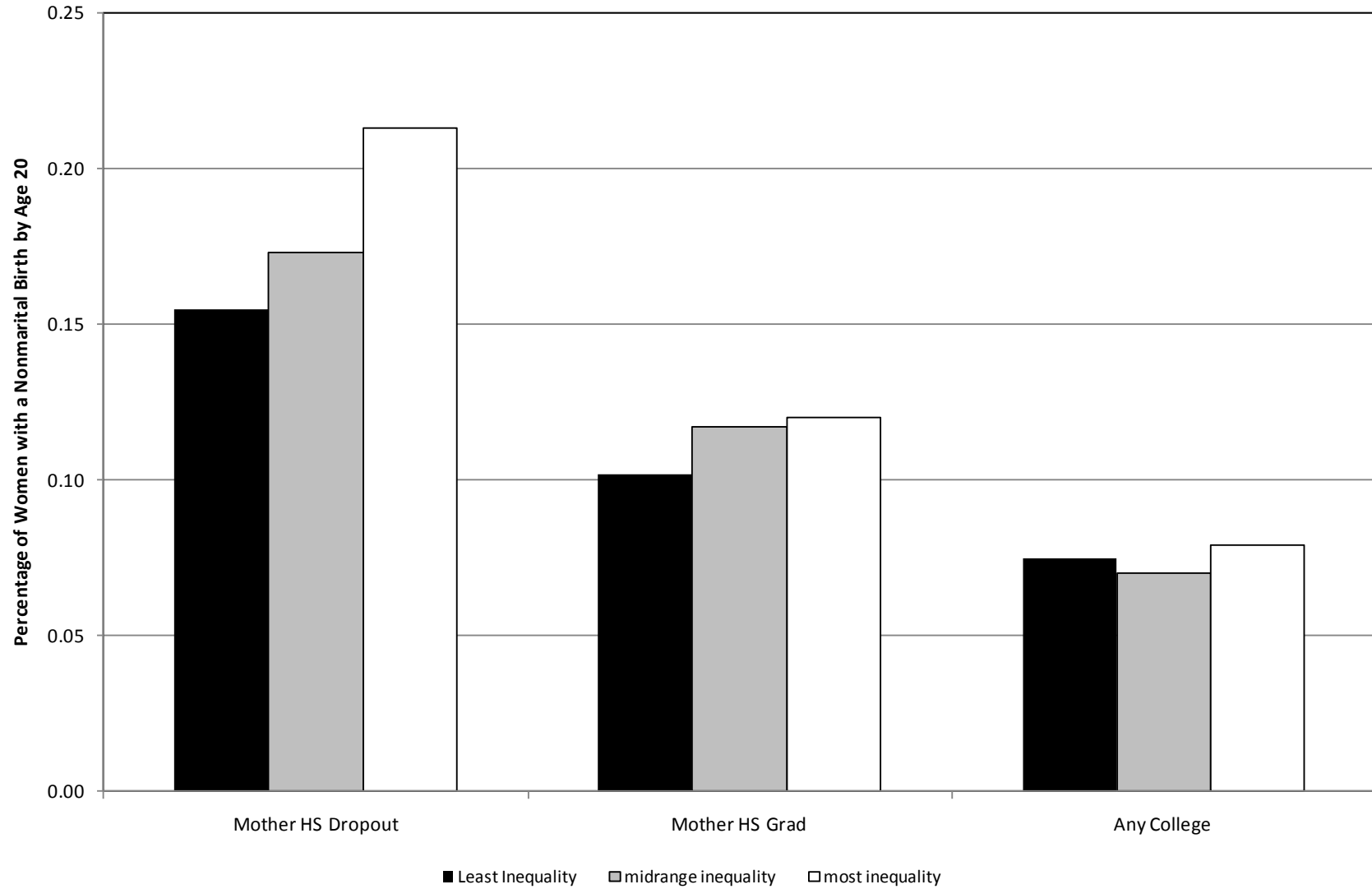
note: Statistics reflect the five year moving average centered on the reported year age 20, weighted by the number of observations.

**Figure 8: Fertility Outcomes by Age 20 in Selected FFS Countries**

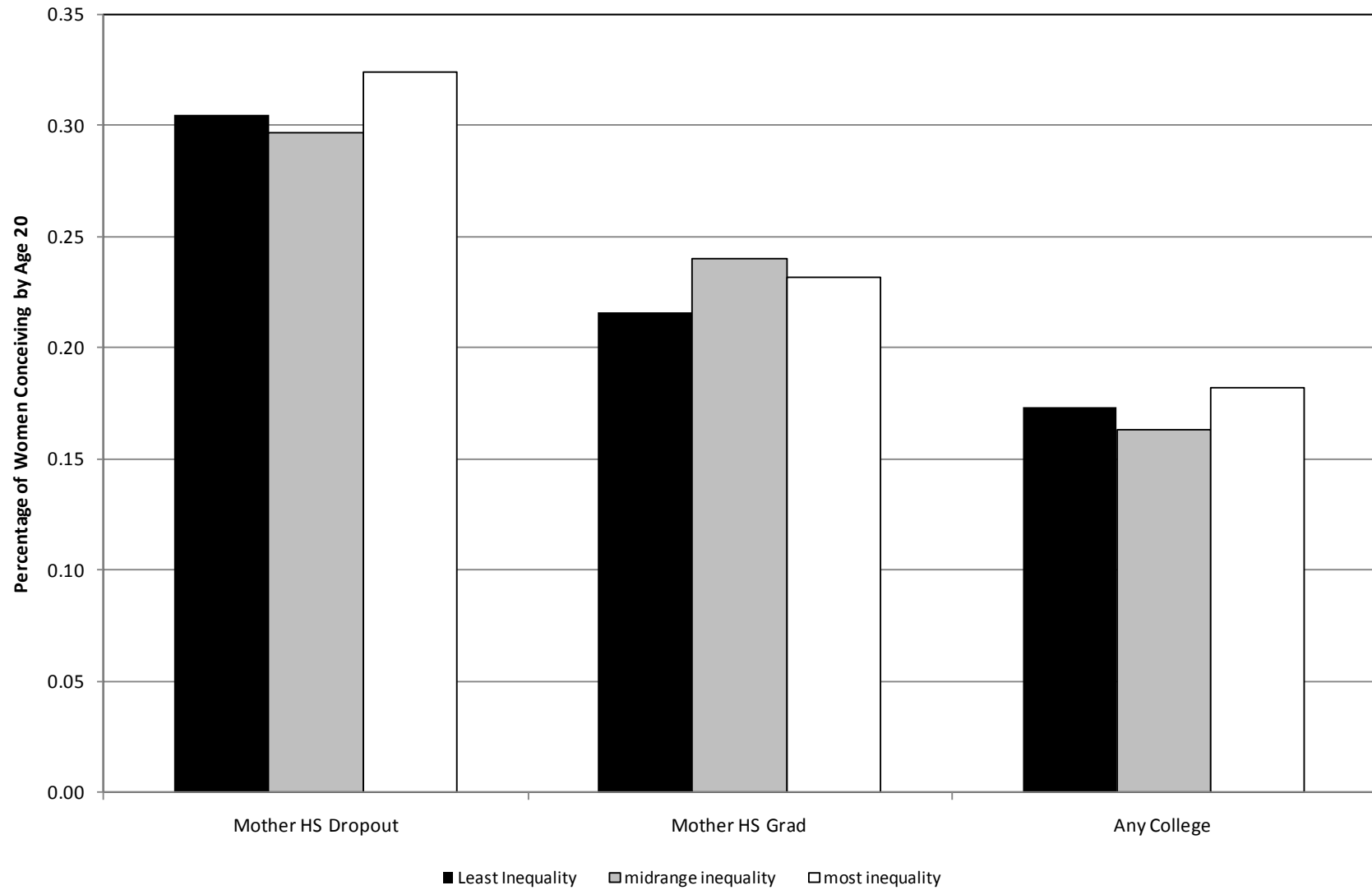


Note: Eastern bloc countries are excluded. Others are included based on the availability of data on all outcomes (see text).

**Figure 9A: Rate of Nonmarital Childbearing by Age 20,  
by Mother's Level of Education and State Level of Income Inequality**

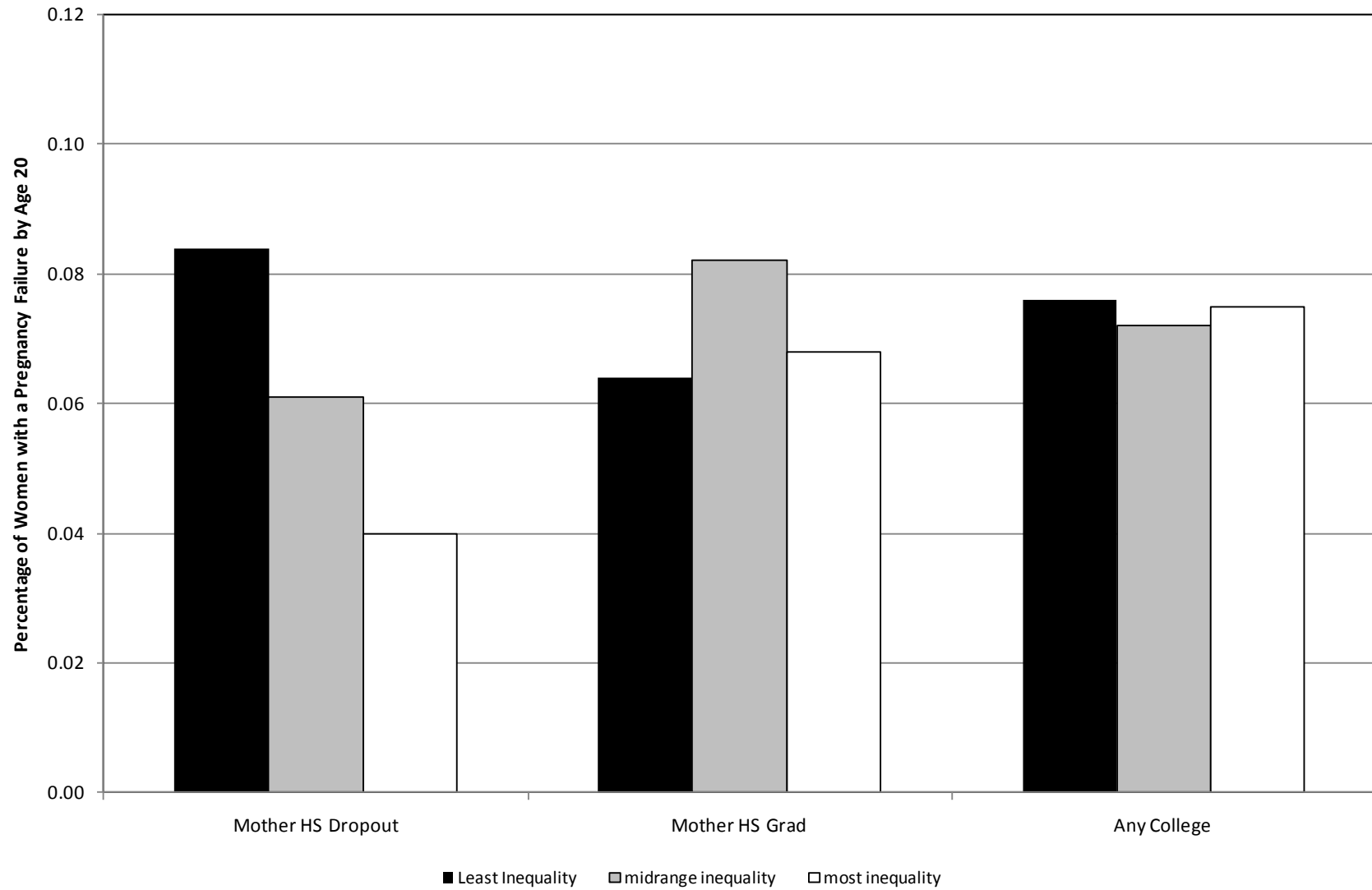


**Figure 9B: Rate of Nonmarital Conception by Age 20,  
by Mother's Level of Education and State Level of Income Inequality**

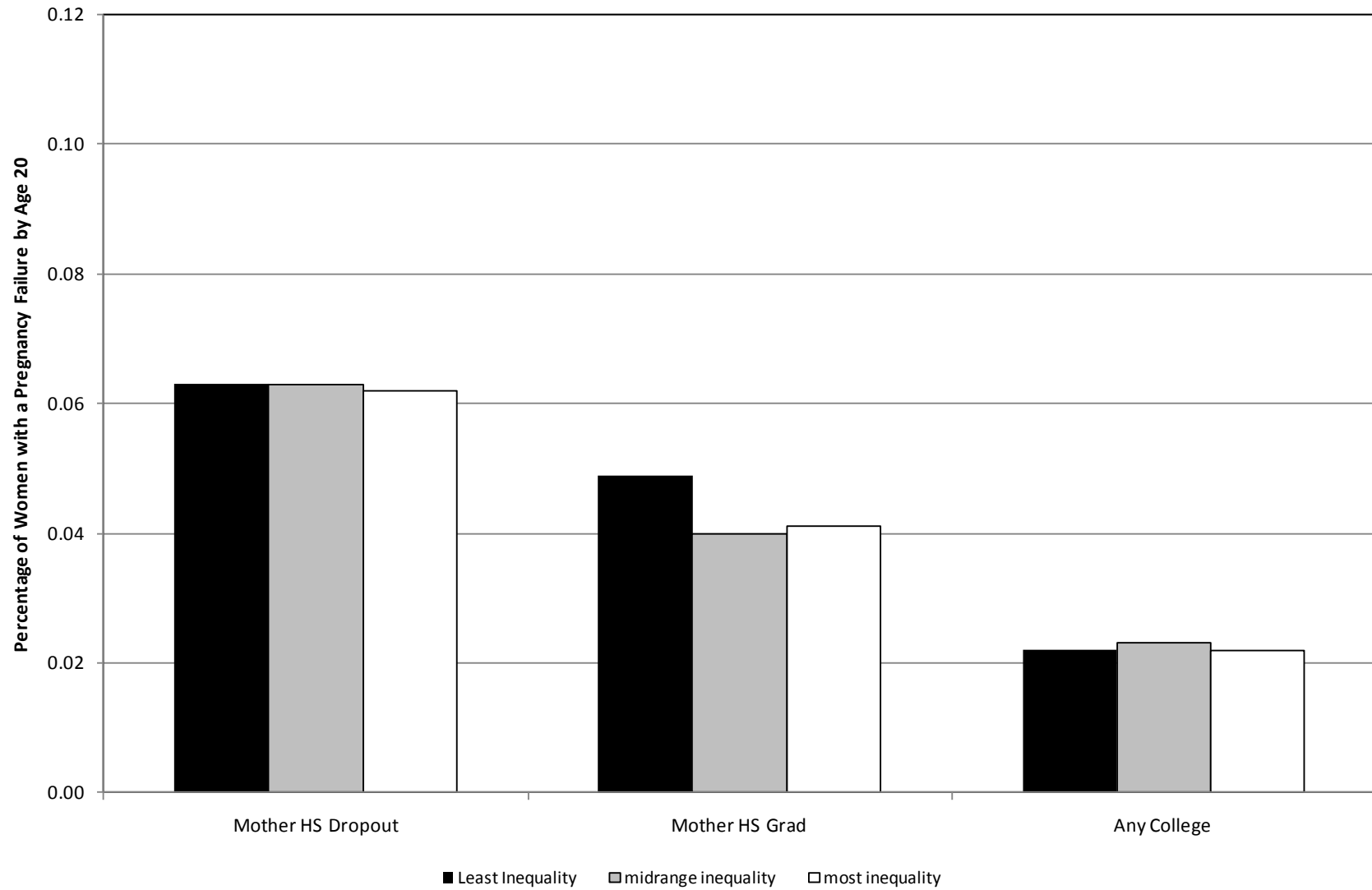




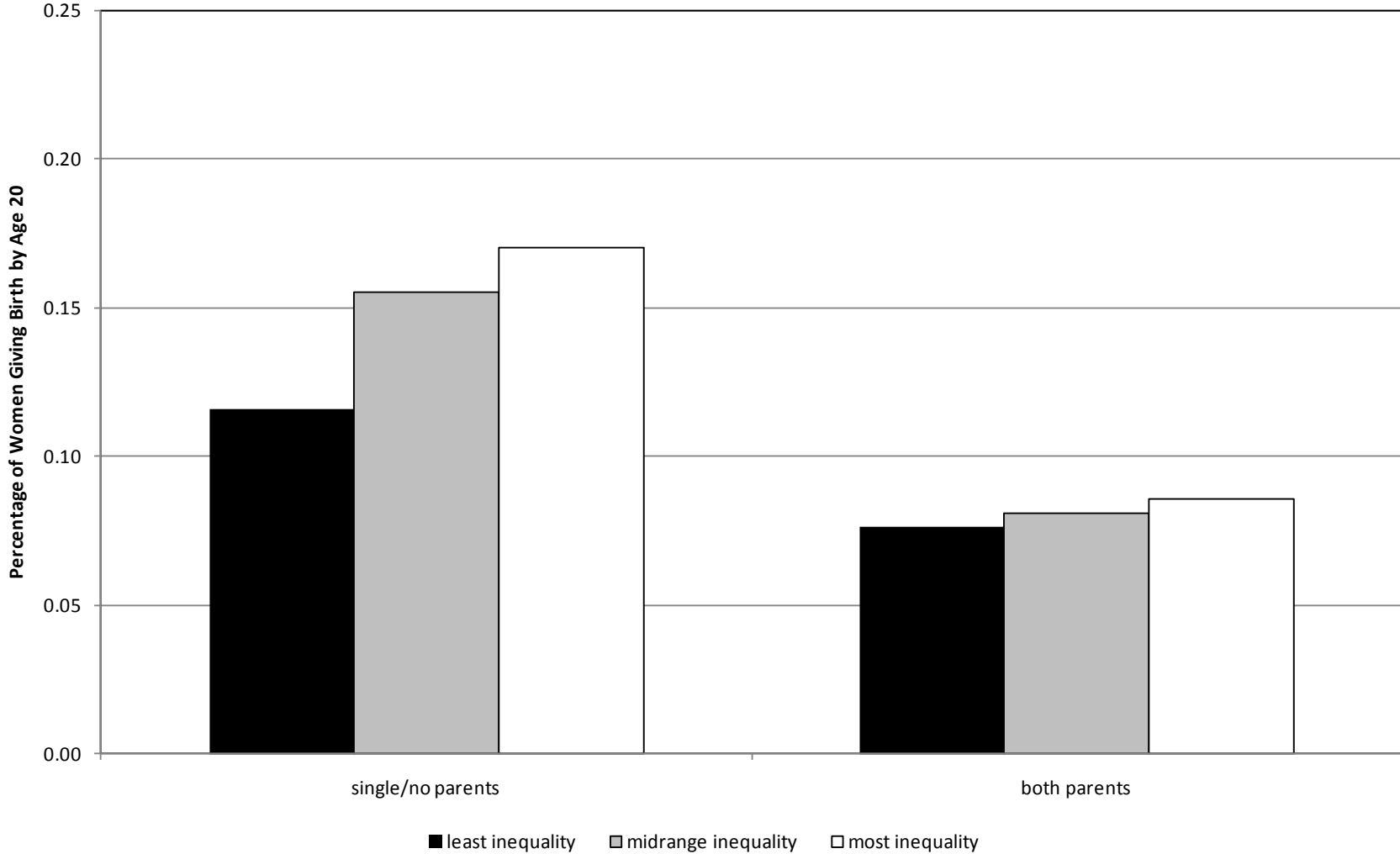
**Figure 9C: Rate of Nonmarital Pregnancy Failure by Age 20,  
by Mother's Level of Education and State Level of Income Inequality**



**Figure 9D: Rate of Shotgun Marriage by Age 20,  
by Mother's Level of Education and State Level of Income Inequality**



**Figure 10: Rate of Childbearing by Age 20,  
by Parental Presence as a Child and National Level of Income Inequality**



source: authors calculations using data from the Fertility and Family Surveys, excluding data from the United States.

## Data Appendix: State/Year Policy and Economic Condition Variables

This table lists the sources for the policy and economic condition variables included as control variables in our OLS regressions.

Family cap	<p>Information on this welfare waiver policy was obtained from three sources: (1) a technical report of the Council of Economic Advisers (1999); (2) an Urban Institute report written by Gallagher, et al. (1998); and (3) a report by Crouse (1999), prepared for the U.S. Department of Health and Human Services, which summarizes information contained in a report of the U.S. Department of Health and Human Services (1997).</p> <p>Full source citations: Council of Economic Advisers. 1999. "Technical Report: Economic Expansion, Welfare Reform, and the Decline in Welfare Caseloads: An Update." Washington, D.C.: Executive Office of the President of the United States;</p> <p>Crouse, Gil. 1999. "State Implementation of Major Changes to Welfare Policies, 1992-1998." Washington, D.C.: Office of Human Services Policy, Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services;</p> <p>Gallagher, L. Jerome, Megan Gallagher, Kevin Perese, Susan Schreiber, and Keith Watson. 1998. <i>One Year after Federal Welfare Reform: A Description of State Temporary Assistance for Needy Families (TANF) Decisions as of October 1997</i>. Washington D.C.: Urban Institute, Occasional Paper Number 6.</p>
SCHIP implementation	<p>Dates for state implementation of SCHIP were obtained from the Centers for Medicare and Medicaid Services (CMS) website: <a href="http://www.cms.hhs.gov/schip/enrollment/fy2000.pdf">http://www.cms.hhs.gov/schip/enrollment/fy2000.pdf</a>, accessed September 2005. (All states implemented SCHIP by 1998, so these series did not require updating.)</p>
AFDC/TANF Benefit for 3-person Family	<p>Data on welfare benefit levels were obtained from Council of Economic Advisers (1997) and Rowe, et al., (2004), Rowe and Russell (2004), and Rowe and Versteeg (2005). We update these series using data compiled by the University of Kentucky Center for Poverty Research, publically available on the Center's website. They list their sources as Urban Institute 2006-2009.</p> <p>Full source citations: Council of Economic Advisers. 1997. Technical Report: Explaining the Decline in Welfare Receipt, 1993-1996. Washington, D.C.: Executive Office of the President of the United States; Rowe, Gretchen, Kevin McManus, and Tracy Roberts. 2004. <i>The Welfare Rules Databook: State Policy as of July 2001</i>. Washington, D.C.: The Urban Institute; Rowe, Gretchen with Victoria Russell. 2004. <i>The Welfare Rules Databook: State Policy as of July 2002</i>. Washington, D.C.: The Urban Institute, October; Rowe, Gretchen with Jeffrey Versteeg. 2005. <i>The Welfare Rules Databook: State Policy as of July 2003</i>. Washington, D.C.: The Urban Institute.</p>

<p>Medicaid Family Planning Waiver, Income Based</p> <p>Medicaid Family Planning Waiver, Duration Based</p>	<p>See Table 1 of Kearney and Levine (2008) for details and descriptions of these policies through 2006. Sources for those codings: Jennifer J. Frost, Adam Sonfield, and Rebecca Benson Gold. 2006. "Estimating the Impact of Expanding Medicaid Eligibility for Family Planning Services," Occasional Report, New York: Guttmacher Institute, No. 28; and Guttmacher Institute. 2006. "State Medicaid family planning eligibility expansions," <i>State Policies in Brief</i>, New York: Guttmacher Institute.</p> <p>We update these series using information reported by recent Guttmacher state policies in brief factsheets, accessed through the website: <a href="http://www.guttmacher.org/statecenter/spibs/spib_SMFPE.pdf">http://www.guttmacher.org/statecenter/spibs/spib_SMFPE.pdf</a>. We verify this information using information posted on the Center for Medicaid and Medicare (CMS) website about Section 1115 state waivers: <a href="http://www.cms.gov/MedicaidStWaiivProgDemoPGI/MWDL/list.asp">http://www.cms.gov/MedicaidStWaiivProgDemoPGI/MWDL/list.asp</a>. (Accessed 10/14/10).</p>
<p>Abortion restriction - Parental consent</p> <p>Abortion restriction - mandatory delay</p>	<p>Levine (2004) includes a detailed description of these restrictions and how the variables are coded. We updated Levine's earlier series by comparing changes in legal status between 2004 and what is reported by Guttmacher as 2010 law. For the set of states with reported changes, we searched the state websites for information about dates of implementation: <a href="http://prochoiceamerica.org/government-and-you/state-governments/">http://prochoiceamerica.org/government-and-you/state-governments/</a>.</p>
<p>Medicaid Abortion State funding restriction</p>	<p>Levine (2004) includes a detailed description of these restrictions and how the variables are coded. We updated Levine's earlier series using information from NARAL, "Restrictions on Low Income Women's Access to Abortion", accessed 10/15/10: <a href="http://www.prochoiceamerica.org/what-is-choice/fast-facts/low-income-women.html">http://www.prochoiceamerica.org/what-is-choice/fast-facts/low-income-women.html</a></p>
<p>state unemployment rate</p>	<p>Bureau of Labor Statistics, Local Area Unemployment Statistics (LAUS) program.</p>