PROVIDER AVAILABILITY, RACE, AND ABORTION DEMAND

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ABSTRACT

Variations in the availability of abortion providers may impact the demand for abortions since greater provider availability reduces the travel cost associated with obtaining an abortion. This paper applies a fertility-control model to estimate the responsiveness of abortion demand to travel-cost variations using individual data from all births and abortions of women over age 20 in the state of Texas for 1993. The probability that a pregnant woman chooses an abortion appears to be sensitive to availability-induced variations in the travel cost of abortion services. Controlling for the endogeneity of travel distance, the results suggest that pregnant women who reside in counties with longer travel distances to the nearest abortion provider have lower probabilities of aborting their pregnancies than women in counties closer to abortion providers. Simulations show that changes in travel distance will have relatively large impacts on overall abortion rates and, furthermore, that these effects vary across race. Furthermore, these simulations show substantial differences by race in the effects of changes in other explanatory variables.

I. Introduction

In the 1973 case of *Roe v. Wade*, the U.S. Supreme Court ruled that states cannot prohibit a woman from having an abortion during the first trimester of pregnancy. However, states may regulate abortion services in the second trimester or prohibit abortions during the third trimester of pregnancy. The Court's decision does not mandate the provision of abortion services; therefore, it does allow for the availability of abortion providers to vary within a state. Since that landmark decision, which effectively broadened abortion availability in the U.S., there has been a great deal of debate on the degree to which abortion demand is sensitive to the legal availability of abortion services.

Variations in the availability of abortion providers impact the demand for abortions in several ways. For example, greater geographical availability of abortion providers reduces the travel cost associated with obtaining an abortion; if demand is sensitive to changes in the full cost of abortion services, then greater availability will increase the quantity of legal abortions demanded. In addition, the availability of abortion providers itself could signal social approval for the abortion decision, lowering the psychic cost of terminating an unwanted pregnancy. Finally, provider availability also creates a potential moral hazard problem in that knowing abortion services are available may produce an incentive for individuals to be less careful in using contraception to avoid unwanted pregnancies. In each of these cases, greater availability of abortion providers induces individuals to increase their consumption of abortion services.

Empirical research has attempted to assess the direct impact of variations in the local availability of abortion services on abortion demand. Deyak and Smith (1976) measure the economic benefits of *Roe v. Wade* by estimating a travel-cost demand function for abortions by women of all ages in New York, a state with liberal abortion statutes prior to *Roe v. Wade*. The national liberalization of abortion providers following *Roe v. Wade* eliminated the need for out-of-state women to obtain legal abortions in New York, reducing the necessary travel cost of having an abortion. Using their travel-cost demand estimates, the authors predict the gain in consumer surplus resulting from greater availability of providers in other states. Over a ten-year period prior to *Roe v. Wade*, the foregone benefits of liberalized abortion statues are estimated to be between $12 million and $30 million.

Medoff (1988) estimates the demand for abortions by women of childbearing age in the U.S. as a function of the dollar cost of abortion services and other socioeconomic factors impacting demand. Demand is shown to be responsive to changes in the dollar cost of provider services; however, these data do not allow for testing the effect of variations in provider availability on abortion demand. Joyce and Grossman (1990) use micro-level data from women in New York City to investigate the demand for prenatal care. The authors estimate an abortion equation to control for self-selection of birth outcome and find that provider availability significantly increases the probability that a pregnancy ends in abortion for their sample of White women. However, they also find that availability has a significantly negative effect on the likelihood of an abortion for Blacks and an insignificantly negative effect for Hispanics.[1]

Gohmann and Ohsfeldt (1992) estimate the demand for abortions using pooled data on U.S. states and include a state-level variable to index provider availability, which proves to be a statistically insignificant determinant of both abortion and pregnancy rates. Meier et al. (1996) examine 23 state-level restrictions and find no evidence of any impact on state-level abortion rates. As the authors point out, however, the variation in the number of providers is a potentially important determinant of abortion rates. Garbacz (1990) also uses state-level data and finds that the number of abortion providers in rural areas has a significantly positive effect on the abortion

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[1] Provider availability is measured as number of providers per 10,000 women in a New York City health area. Grossman and Joyce (1990) extend this approach to examine determinants of birth weight.

rate. Brown and Jewell (1996) use county-level data to show that local abortion availability can affect both abortion and pregnancy rates. The authors find that counties with abortion providers have higher abortion and pregnancy rates. Powell-Griner and Trent (1987) find that women residing in metropolitan areas tend to have more abortions; the authors attribute this finding to the greater availability of abortion services in metropolitan areas.

Some studies have concentrated on the abortion decision of younger women. Results from both Haas-Wilson (1996) and Lundberg and Plotnick (1995) suggest that teens who live in states with greater abortion availability are more likely to have an abortion. Ellertson (1997) finds that teens residing in states with parental consent laws are more likely to travel out of state to receive an abortion. Currie, Nixon, and Cole (1996) use data from the National Longitudinal Study of Youth and find that county-level abortion access has an insignificant effect on the outcome of a pregnancy. In a related study, Kane and Staiger (1996) use county-level data from U.S. states to show that local abortion availability affects the teen birthrate; however, the authors do not estimate the relationship between local abortion availability and the teen abortion rate.

None of these studies controls for the possible endogeneity of provider location. Specifically, abortion provider location, and therefore measures of access such as travel distance to a provider or provider density in a geographical area, may be determined by many of the same unobserved factors which also contribute to a woman's abortion decision. For example, a higher level of "Right to Life" group activity may not only have a negative effect on the demand for abortion services, but may also have a negative effect on the supply of abortion services. Under such a scenario, failing to control for such unobserved factors could seriously bias the estimation results.

This paper applies a model of fertility control to directly estimate the responsiveness of abortion demand to variations in the travel-cost component of the full cost of abortion services.

We utilize a two-stage estimation method to control for the potential endogeneity of abortion availability. Data on the availability of abortion providers in the 254 counties in Texas, 235 of which were without an abortion provider as of 1992, provide a unique opportunity to approximate the travel cost of abortion services for Texas residents.[2] This information is supplemented with individual data on pregnancy outcomes for 1993. Unlike most previous literature, these Texas data allow for comparing the fertility-control decisions among large samples of Black, Hispanic, and White women. The estimates suggest that a woman's decision to abort a pregnancy is sensitive to availability-induced variations in travel cost. We find that women residing in Texas counties with longer travel distances to the nearest abortion provider have lower probabilities of aborting a pregnancy; in addition, the magnitude of the travel-cost effect differs substantially across race.[3]

II. Methodology and Data

Michael (1973) models fertility control as a household decision made on the basis of the cost and benefit associated with having an additional child over time. A household's net benefit from an additional child reflects the effective excess demand for children at given prices, wealth constraints, time constraints, preferences, and household production of substitutes and

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2 As of 1992, the average Texas county had a population of 69,616, an area of 1,031 square miles, and a population density of 68 persons per square mile.

3 We present the following information as a basis for comparing the results from our Texas data to the U.S. as a whole. In 1992, the abortion rate in Texas was 23.1 per 1,000 pregnancies as compared to 25.9 per 1,000 in the entire U.S. [Henshaw and Van Vort (1994)]. In 1988, the birth rate in Texas was 18.2 per 1,000 population as compared to 16.0 per 1,000 in the entire U.S. [U.S. Bureau of the Census (1994)]. In 1992, 92 percent of Texas counties were without an abortion provider, as compared to 84 percent for all counties in the U.S. [Henshaw and Van Vort (1994)]. In 1976, the U.S. Congress passed the Hyde Amendment which prohibited federal funding of abortions through Medicaid; however, states were still able to fund abortions. As of 1994, 30 states did not provide Medicaid funding for abortions unless the pregnant woman’s life was in danger [Haas-Wilson (1996)]. In Texas, Medicaid funds abortions only in cases of incest or risk to the pregnant woman’s life. Conway and Butler (1992) predict that if *Roe v. Wade* is overturned, then Texas and 19 other states would prohibit abortions, while only eight states will have unrestricted abortion access.

complements for children. If the net benefit of an additional child is negative, then it is predicted that a household will practice fertility control in order to reduce the probability of birth. In this context, abortion is considered as a means of fertility control. Accordingly, the abortion decision is a function of household income, preferences, the opportunity cost of an additional child, and the full cost of abortion services, including the dollar cost plus the travel cost and any psychic cost. Within this framework, we focus on the impact that variations in the travel cost of abortion services have on the individual demand for abortions in Texas. Expanded availability of abortion services lowers the travel-cost component of the full cost of abortion services. The fertility model predicts that these travel-cost reductions will increase individuals' demand for abortion services.

We use a probit specification to estimate the likelihood that a pregnancy will be aborted as a function of the travel costs, controlling for county-level variables that also influence the decision. The Texas Department of Health provided the individual data on all births and abortions in the state for 1993. The data on live births come directly from birth certificates that contain information on the child and the pregnant woman's marital status, race, county of residence, age, and education. The Texas Abortion Facility Reporting and Licensing Act requires that all abortion provider facilities submit annual data on each abortion performed to the Texas Department of Health. Collection of these data began in 1990 and includes the patient's age, marital status, county of residence, and race. Using data from a single state could be problematic if a substantial number of women cross state lines to obtain an abortion. This does not seem to be a problem with Texas data. Henshaw and Van Vort (1992) report that Texas facilities performed 99 percent of all abortions obtained by Texas residents in 1987.

There were approximately 320,000 births, 90,000 abortions, and 2,000 fetal deaths in Texas during 1993. We concentrate on the decision whether to give birth or to abort a given pregnancy, so fetal deaths are excluded from the sample. Following previous literature, women under 20 years old are excluded from the sample in order to minimize any simultaneity problems associated with fertility, education, and marital status. Furthermore, evidence indicates that teens view the fertility and abortion decision differently than older women. Leibowitz et al. (1986) and King et al. (1992) suggest that younger women view the world in a fundamentally different way than older women; therefore, teens may judge the costs and benefits of an abortion differently than older women. The estimates presented here are generated for each of the three largest racial groups in the state--Whites, Blacks, and Hispanics. The data set contains information on 146,524 White women, 102,185 Hispanic women, and 42,763 Black women; this represents approximately 70 percent of all pregnancies in Texas during 1993.

Data on the location of abortion providers in Texas are provided by The Alan Guttmacher Institute (AGI). The data were gleaned from questionnaires sent out by AGI in February, 1993, to all hospitals, clinics, and physician offices that provided abortions during 1991 and 1992. This survey reports the number and type of abortion clinics in Texas.[4] Questionnaires were sent to a comprehensive list of 3,156 possible providers, whose names came from either previous AGI mailings, Planned Parenthood, the National Abortion Rights Action League, the National Abortion Federation, major-city phone books, newspaper articles, or a commercial mailing list. This survey is the most complete source of abortion providers in the U.S. The data available on provider facilities are for 1992 and, therefore, marginal changes in the number and location of abortion providers could have occurred during 1993. The travel cost of abortion services is measured as the road miles traveled from the center of each woman's county of residence to the nearest city with a provider of abortion services.

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[4] For the state of Texas in 1992, 12 abortion providers were reported as hospitals, 37 as abortion clinics, 16 as other clinics, and 14 as physicians' offices [Henshaw and Van Vort (1994)].

Travel distance will be endogenous to the abortion decision to the extent that unobserved factors, such as local attitudes on abortion and local medical use patterns affect the supply and demand of abortion services.[5] We use an estimation method analogous to two-stage least squares to control for this endogeneity. In the first-stage, we estimate an OLS regression to predict travel distance using all county-level exogenous variables and identification variables as right-hand-side variables. Since travel distance measures abortion availability and abortion availability should be related to the overall supply of medical services, we can identify the first-stage distance equation using indicators of the availability of medical services. The identification restrictions are the following county-level variables: the number of prenatal clinics per 1,000 women age 20 to 44 and the number of doctors per 1,000 residents.[6] We then include predicted distance from the first-stage estimation in a second-stage probit estimation.[7]

The availability of family planning services in each county is an important component of the full cost of contraception and, therefore, is expected to influence the probability of birth. Greater availability of family planning services lowers the full cost associated with preventing an unwanted pregnancy. The Texas Department of Health, Bureau of Women and Children, released the number of publicly-contracted clinics providing family planning in each Texas county for 1993. County-level variations in these services were notably less than for abortion services. Nearly all pregnant women in the sample resided in counties with family planning clinics. As of

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[5] The Hausman test described in Bollen et al. (1995) is used to test for the endogeneity of travel distance. The null-hypothesis that travel distance is exogenous is rejected for all three races. The test results are available from the authors.

[6] Results from the first-stage OLS estimation are reported in Appendix A. Single-stage estimates, i.e., those not correcting for endogeneity, are included in Appendix B. The validity of the exclusion restrictions is tested using a procedure outlined in Bollen et al. (1995). The exclusion restrictions are found to be valid in the White and Black equations but not in the Hispanic equation. Thus, the results from the Hispanic equation should be viewed with caution. The test results are available from the authors.

[7] Standard errors for the coefficents of the second-stage probit equation are incorrect because the equation contains the predicted dependent variable from the first (distance) equation. To generate correct standard errors, we could

1993, there was an average of 2.2 family planning clinics in each Texas county. For White women, 64 percent resided in counties with abortion providers and 98 percent resided in counties with family planning; for minority women, 80 percent resided in counties with abortion providers and 99 percent resided in counties with family planning services. Therefore, actual county-level travel distances for family planning services could not be calculated in the same manner as for abortion services. Instead, the ratio of the number of family planning clinics per 1,000 women ages 20 to 44 in each county is used to measure the availability of family planning.

Abortion demand is a function of the full cost of obtaining an abortion, i.e., the dollar cost plus any travel cost and psychic cost. Texas county-level data on the dollar cost of abortion services are unavailable and, in any case, would be unobservable in counties without an abortion provider. We assume that the dollar cost of abortion services is constant among counties with equivalent provider availability, so that variations in travel cost (i.e., provider availability) effectively capture variations in the full cost of abortion services. In this sense, the travel-cost component of the full cost of abortion services captures the observable component of cost variation across counties. This treatment of availability-induced cost variations follows Deyak and Smith (1976) who assume the dollar cost of abortion services is constant across states with equivalent abortion availability, so that travel distance acts as a surrogate price of abortion services. However, the absence of dollar cost data is potentially problematic. Henshaw and Van Vort (1992) report that the average price of abortion services is 6.7 percent lower at Texas facilities performing over 40 abortions per year. In addition, residents in counties with relatively few providers may face a higher dollar cost than residents in counties with a large number of

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use a bootstrapping technique. However, Bollen et al. (1995) report that bootstrapping offers no advantages over the simple standard errors from the second-stage estimation.

providers. To the extent that the dollar cost is positively correlated with travel distance, estimates from the Texas data tend to overestimate the actual impact of travel cost on abortion demand.

The fertility-control model predicts that the decision to give birth or abort a pregnancy will also be affected by factors such as marital status, age, education, and income. Marital status is measured with a dummy variable equal to one if the woman is married and zero otherwise. It should be noted that marital status information is observed at the time of the pregnancy outcome; a woman's marital status may have changed over the course of the pregnancy. The birth certificates report the pregnant woman's education level, but this information is unavailable for women who aborted their pregnancies. Therefore, the percent of county residents who graduated from high school is used as a proxy for education. No information is available on the income levels of the women in our sample. Two variables are included to account for the effect of income on the pregnancy outcome decision: (1) county-level median household income and (2) race-specific county-level rates of households in poverty.

Past studies have also included measures of Medicaid funding for abortions as a determinant of abortion demand. For example, Medoff (1988) finds that abortion demand among women age 15 to 44 is greater in states with Medicaid funding of abortions. County-level data on Medicaid-funded abortions in Texas is unavailable, and no information is given on the abortion certificate regarding Medicaid funding. In any case, Texas Medicaid only funds abortions in cases of incest or risk to the pregnant woman's life. In addition, eligibility rules and payment levels for income assistance programs, such as Aid to Families with Dependent Children, were invariant across Texas counties in 1993.

The percentage of a county's population that lives in a census-defined urban area is included to represent characteristic differences among individuals who choose to live in urban versus rural areas. For instance, immigrants tend to reside in urban areas; if immigrants have different preferences toward fertility-control behavior than non-immigrants, then there may be differences in abortion and pregnancy rates between urban and rural counties. Female employment conditions, as measured by the percent of females employed in a county, reflect the opportunity cost of having an additional child. Better employment opportunities for women residents should increase the opportunity cost of giving birth, thereby lowering the probability that any pregnancy results in birth.[8]

Religious affiliation characterizes important preferences toward abortion and fertility control. In particular, the Catholic Church and conservative Protestant denominations strongly disapprove of abortion, so that a woman who is affiliated with one of these denominations would presumably be less likely to have an abortion than women who have no religious affiliation. However, the Catholic Church also encourages practicing less effective fertility-control methods that might lead to an increase in the demand for abortion services as a result of higher probabilities of pregnancy. Unfortunately, no information is included on the birth and abortion certificates about the religious affiliation of women in our sample. The largest religious denominations in Texas are the Catholic Church and the Southern Baptist Church, which is generally thought of as a conservative Protestant denomination. To partially control for any effect of religious affiliation, the percent of each county's population affiliated with these groups is included. While these variables cannot directly measure religious affiliation, they may serve as a proxy for the psychic cost associated with having an abortion in a highly religious county.

III. Results and Discussion

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8 County-level variables are from Bradley et al. (1990), Murdock (1992), and the U.S. Bureau of Census (1994).

Tables 1A and 1B report descriptive statistics for the Texas sample. Table 1A compares the variables in our sample across racial groups. Table 1B separates the sample by race as well as birth outcome, comparing women who chose to abort their pregnancy to those who chose to give birth. Our 70 percent sample of pregnancies shows that 20.2 percent of pregnancies among White women were aborted, 17.2 percent of pregnancies among Hispanic women were aborted, and 32.5 percent of pregnancies among Black women were aborted. The sample is representative of all pregnancy outcomes in Texas during 1993; approximately 21 percent of all pregnancies resulted in abortions--20 percent among Whites, 17 percent among Hispanics, and 33 percent among Blacks.

{INSERT TABLES 1A and 1B ABOUT HERE}

Table 1A shows that the mean travel distance to the nearest abortion provider is highest among Whites. In addition, Whites are on average more likely to live in rural counties where distances to abortion providers are greater. Table 1B shows that women of all three races who give birth are located farther from abortion providers and live in more rural counties. Blacks live in counties with relatively fewer family planning clinics, and women of all three races who give birth reside in counties with more family planning clinics. Blacks are the least likely to be married, and married women of all races are more likely to give birth. Whites are likely to be older, and older women of each race are slightly more likely to give birth. County percentages of female employment are highest for Blacks, but this percentage does not vary a great deal by race. Table 1B shows that women across races who give birth reside in counties with lower female employment rates.

Table 1A shows that White women are more likely to live in counties with proportionately more Baptists, and Hispanics are more likely to live in highly Catholic counties. Table 1B reveals that religious affiliation does not show a consistent pattern across race and pregnancy outcomes.

Median household income is lowest, and poverty is highest, among Hispanics. In general, county-level poverty rates for minority women are over three times the poverty rates for White women. With respect to pregnancy outcomes, women of all races who give birth reside in counties with lower incomes and higher poverty rates. The percent of county residents who graduated from high school is lowest among Hispanics and slightly lower for women of all three races who gave birth. This information should be analyzed with caution since the county-level graduation rate does not account for the average age in the county. Individual education level is not available on the abortion certificates. However, for those women who give birth in our sample, Whites and Blacks tend to complete at least a high school education (12 years), while Hispanics average 10 years of school.

Table 2 presents probit estimation results showing the effects of travel distance and the exogenous variables on birth outcomes.[9] Since we observe women in this data set only after they become pregnant, any results are effectively conditional on being pregnant. Because of the difficulty in interpreting the relative magnitudes of the effects of variables from probit coefficients, we perform a series of simulations. The simulations are reported in Table 3. The simulations measure the predicted change in the probability that a woman will choose to obtain an abortion given a change in an independent variable. Simulated changes in exogenous variables appear in both stages of the estimation and will affect the predicted probability of abortion in two ways. First, the simulated change indirectly affects the predicted probability that a woman seeks an abortion by affecting the predicted distance to a provider; that change, in turn, affects the predicted probability of abortion. Second, the change in an exogenous variable directly affects the predicted probability that a woman seeks an abortion. Because of these two effects, the signs of the coefficients on the exogenous variables in Tables 2 and 3 may be inconsistent. Therefore, with the exception of travel distance, we concentrate on the results of our simulations presented in Table 3.

{INSERT TABLE 2 ABOUT HERE}

Travel Distance

From Table 2, pregnant women of all three races who reside in counties with longer travel distances to an abortion provider are less likely to have an abortion, other factors constant. To compare the responsiveness of abortion demand across race, we calculate elasticities of demand for abortion services with respect to travel cost for each sample. The estimates suggest limited differences in the elasticities across race -- for Whites, -0.353; for Hispanics, -0.635; for Blacks, -0.360.[10] Although demand appears to be inelastic with respect to travel cost for all races, it appears that Hispanics are more sensitive to travel cost than Whites or Blacks.[11] However, if we recall that the included variable is travel *distance* and not cost, an alternative interpretation could be proposed. Specifically, travel may be costlier for Hispanics (in terms of psychic or dollar costs), and any change in distance will have a larger effect on Hispanic women relative to women of other races.

To provide added insight into the magnitude of the effect of a change in distance, we simulate two changes in the distance to the nearest abortion provider. Both simulated changes lead to significant changes in predicted abortion rates. While we realize that distance is modeled

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[9] We perform a likelihood ratio test to determine whether the data sets for the three races should be pooled. The null hypothesis that there is no difference between the races is strongly rejected. The test results are available from the authors.

[10] Likelihood ratio tests indicate that the travel distance coefficients in the Black and White equations are not significantly different from each other. However, the travel distance coefficient for Hispanics is significantly different from both the Black and White coefficients. The test results are available from the authors.

[11] Our estimates can be compared to other studies. Deyak and Smith (1976) estimates the travel cost elasticity of abortion demand to be between -1.04 and -1.44. Garbacz (1990) estimates a price elasticity of abortion demand of

as being endogenous, we also recognize that there are many potential exogenous shocks that could directly affect the distance to the nearest abortion provider. For example, approval of a new drug therapy that effectively makes it possible for any doctor to provide an abortion, or a Supreme Court ruling overturning *Roe v. Wade*, would exogenously affect travel distance.

{INSERT TABLE 3 ABOUT HERE}

The simulations presented in Table 3 are carried out as follows. First, we use our two-stage estimation results to compute a predicted probability of abortion for each woman in the sample. Second, we compute the average predicted probability (i.e., the abortion rate) for each racial group. The predicted abortion rates are the following: for Whites, 0.2025 (203 abortions per 1,000 pregnancies); for Hispanics, 0.1718 (172 abortions per 1,000 pregnancies); for Blacks 0.3256 (326 abortions per 1,000 pregnancies); and for the entire sample, 0.2098 (210 abortions per 1,000 pregnancies).[12] Third, after modifying the data to simulate a change in an explanatory variable, we compute a new predicted probability for each woman and compute a new abortion rate for each group. Finally, the new abortion rate is compared to the original abortion rate to determine the effect of the change in the explanatory variable on the predicted abortion rate.[13]

-0.68. Gohmann and Ohsfeldt (1993) estimate an abortion price elasticity of between -0.75 and -1.5. Medoff (1988) estimates an abortion price elasticity of -0.80.

[12] From the raw data, the abortion rates are the following: for Whites, 0.2020; for Hispanics, 0.1718; for Blacks, 0.3252; and for the entire sample, 0.2095.

[13] We do not directly test that the simulated effects in Table 3 are statistically different across races. In order to do so, we would need to bootstrap the standard errors for the simulations. Due to our two-stage estimation, as well as the size of the data set, bootstrapping would be computationally prohibitive. Instead, we indirectly test that our simulations are different across races by comparing the slope coefficients of the second-stage estimates. Please note that this procedure will test for race-based differences in the effect of a *one-unit change* in the explanatory variable *in the abortion equation only*, ignoring the possible simultaneous effect on travel distance. The results of the tests on the abortion equation slope coefficients indicate that the coefficients for all explanatory variables included in Table 3 are statistically different across races (at a 5 percent level of significance) except for the following: the coefficients on travel distance for Blacks and Whites are not different; none of the coefficients on high school attendance are different; the coefficients on poverty for Hispanics and Blacks are not different; the coefficients on income for Whites and Blacks are not different; the coefficients on female employment for Whites and Blacks are not different; and the coefficients on Baptist for Blacks and Whites are not different. These results should be viewed with caution since they do not take both stages of the estimation into account and since our simulations generally result from explanatory variable changes larger than one unit.

To simulate exogenous changes in travel distance, we first decrease the distance to the nearest provider for each woman in the data set by 10 percent; this simulates the effect of an increase in abortion provider availability. As reported in Table 3, we find that such a decrease in distance would increase the predicted probability of abortion by 2.37 percent, 5.36 percent, and 2.80 percent for Whites, Hispanics, and Blacks, respectively. In 1993 in Texas, this change would have translated into 2,033 more abortions. Second, we increase the distance to the closest provider by 10 percent and find that the probabilities of aborting a pregnancy fall by 2.32 percent, 5.01 percent, and 2.70 percent for the Whites, Hispanics, and Blacks, respectively. We predict that such a change would have resulted in 1,944 fewer abortions in 1993. These simulations demonstrate the quantitative importance of travel cost in determining the demand for abortion services in Texas.

Family Planning

Table 3 shows the effect of a simulated change in access to family planning clinics. An increase of 10 percent in the number of family planning clinics per 1,000 women would lead to a less than one percent increase in the abortion rate for each racial group. We predict that such a change in Texas in 1993 would have increased the number of abortions by only 179. The simulated effect, however, is apparently inconsistent with the view that the availability of family planning reflects the full cost of contraception. That is, greater availability of family planning services lowers the full cost of contraception as a means of avoiding an unwanted pregnancy and, therefore, should raise the probability that any given pregnancy results in a birth. Alternatively, if lower costs of contraception encourage households to substitute away from abstinence, rather than abortion services, as a means to avoid unwanted births, then the probabilities of unwanted pregnancies and abortions per pregnancy may increase. Gohmann and Ohsfeldt (1993) find that increased access to family planning significantly reduces state-level abortion rates. Joyce and

Grossman (1990) find that access to family planning significantly reduces the likelihood that a pregnancy would result in an abortion only for their Hispanic group.

High School Graduation

The simulation results from Table 3 indicate that a 10 percent increase in the high school graduation rate would have the following effects: a negative impact on White and Hispanic abortion rates (3.90 percent and 3.08 percent, respectively) and a positive effect on the Black abortion rate (1.41 percent). Overall, a 10 percent increase in graduation rates would have decreased the number of abortions in 1993 by 1,502. Within the fertility-control model, education is assumed to reduce demand for abortions by increasing knowledge of other contraceptive techniques. However, education may also increase the demand for abortions due to an increased opportunity cost of time and, therefore, increased cost of children versus other goods.

Female Employment

Table 3 shows that an increase in the female employment rate is predicted to increase the likelihood of abortion for women of all races, which implies that women with better employment opportunities are more likely to abort; this result is consistent with Medoff (1988). A simulated 10 percent increase in female employment is predicted to increase the abortion rate for Whites (8.35 percent), for Hispanics (5.94 percent) and for Blacks (6.97 percent). The overall effect of a 10 percent increase in the number of working women would have been 4,489 more abortions in 1993. This result is due to the combination of the effect of employment on travel distance and the direct effect of employment on abortion decisions. It should be noted that the magnitude of this effect is more than twice as large as a 10 percent change in travel distance. Such a comparison illustrates the importance of studying the relationship between a woman’s employment and fertility decisions.

Religious Affiliation

There are two main pathways through which the religious variables could affect the likelihood of abortion. First, in counties with higher rates of Catholic and Baptist church membership, there is a higher likelihood that a pregnant woman belongs to one of these churches. If church membership reflects an individual's anti-abortion preferences, then we expect that an increase in religious affiliation will negatively affect the likelihood of aborting the pregnancy. Second, the psychic costs of having an abortion in a highly-religious county are likely to be higher since friends, neighbors, and coworkers are more likely to have stronger anti-abortion preferences. Currie, Nixon, and Cole (1996) find a similar pattern across races; however, their results are statistically insignificant. They also include a variable measuring church attendance and find that increases in church attendance significantly reduce the likelihood of abortion. Their results suggest that the correlation between religious beliefs and abortion choice may be due more to the correlation between church attendance and abortion preferences rather than with the effect of society's abortion preferences on the psychic cost of abortion.

From Table 3, for all three races, a simulated increase in the percentage of households that belong to either the Catholic or Baptist churches has negative effects on abortion demand. The relative importance of increased membership in the Baptist and Catholic churches do, however, vary by race. A simulated 10 percent increase in Catholic church membership is predicted to decrease the likelihood that a pregnancy will end in abortion by 0.10, 1.51, and 0.15 percent for Whites, Hispanics, and Blacks, respectively. As for Baptist church membership, a similar 10 percent increase is simulated to lead to a 1.28, 1.86 and 2.95 percent decrease in the likelihood that a pregnancy will end in abortion for Whites, Hispanics, and Blacks, respectively. It is not surprising that the effect of an increase in Catholic church membership has the largest effect on Hispanics and an increase in Baptist church membership has the largest effect on Blacks.

However, Hispanics are more affected by Baptist church membership than by Catholic church membership. Overall, a 10 percent increase in the membership of both churches would have decreased the number of abortions by 1,434 in 1993.

Urbanization

From Table 3, a 10 percent increase in urbanization has a positive effect on the demand for abortions for Whites (0.99 percent) and Blacks (0.18 percent) and a negative effect for Hispanics (-0.81 percent). The combined effect of a 10 percent increase in urbanization in 1993 would have been an increase of 176 abortions. There are several explanations for the positive correlation for Whites and Blacks. First, it may be that for any given travel distance, abortion providers are more accessible for individuals in urban areas due to reduced information and transportation costs. Second, the urbanization variable may measure unobserved differences in abortion preferences that are correlated with the household location decision. Third, if there is a psychic cost associated with society’s awareness of an aborted pregnancy, the likelihood of friends, neighbors, and coworkers learning of one’s abortion may be lower in urban areas. Currie, Nixon, and Cole (1996) find that urbanization has a significantly positive effect on the likelihood of abortion for low-income women and a statistically insignificant effect for others.

Income and Poverty

As reported in Table 3, the direction of the effect of income changes varies across racial groups in Texas. A simulated 10 percent increase in median household income leads to an increase in the abortion rate for Whites and Blacks (0.84 and 0.61 percent, respectively) and leads to a decrease in the abortion rate for Hispanics (-0.23 percent). The results for Whites and Blacks are consistent with previous research indicating that abortion is a normal good [Gohmann and Ohsfeldt (1993); Medoff (1988); Garbacz (1990)]. Overall, a 10 percent increase in household income is predicted to have increased the number of abortions in 1993 by 294. Another indicator of income level is the poverty rate. According to our simulation results, a 10 percent decrease in the county poverty rate decreases the abortion rate of White woman by 0.89 percent and increases the abortion rate of Hispanic and Black woman by 1.63 and 0.98 percent, respectively. Overall, a 10 percent decrease in county poverty rates would have reduced the number of abortions in 1993 by 159.

IV. Conclusion

The fertility-control model predicts that availability-induced increases in the travel-cost component of abortion services will decrease the consumption of abortion services, other factors constant. Estimates presented in this paper underscore the sensitivity of the fertility-control decision to variations in these travel costs: a woman residing in a Texas county with longer travel distances to the nearest provider has a significantly lower probability of aborting a pregnancy than a woman who lives closer to a provider. Furthermore, the availability of large samples of Hispanic, Black, and White women in these Texas data allow us to observe any travel-cost differences across race. The estimates suggest that the fertility-control decisions of Hispanic women are more sensitive to changes in the travel cost of abortion services than those of White or Black women.

Moreover, we find sizable differences across race with respect to other determinants of abortion rates such as education, employment, and religion, urbanization, and income. The variables which seem to have the largest overall impact are abortion availability, education, female employment, and religious affiliation, especially affiliation with the Baptist church. Interestingly, the availability of family planning clinics has only a small effect relative to other variables. There is little, if anything, policy makers can do to increase religious affiliation; however, the results from this paper suggest that changing economic conditions for women, as well as changing the availability of abortion services, may allow policy makers to have an impact on abortion rates for all races. Since the abortion decision is imbedded within a woman's decision to conceive and give birth, policies which affect abortion access or economic conditions for women may indirectly impact fertility rates as well.

TABLE 1A
Means by Race
(standard deviations in parenthesis)

	Whites n = 146,524	**Hispanics** n = 102,185	**Blacks** n = 42,763
Pregnancy Outcome (Abortion = 1)	0.202 (0.401)	0.172 (0.377)	0.325 (0.468)
Travel Distance	34.94 (38.19)	27.77 (32.02)	26.40 (33.72)
Marital Status (Married = 1)	0.822 (0.398)	0.764 (0.425)	0.491 (0.500)
Pregnant Woman's Age	28.17 (5.341)	26.80 (5.197)	26.57 (5.210)
Family Planning Clinics Per 1000 Women Age 20-44	0.929 (1.969)	1.016 (1.877)	0.642 (1.323)
Percent High School	74.76 (6.991)	66.99 (12.28)	75.10 (4.846)
Percent Female Employment	58.22 (7.038)	54.72 (7.661)	59.53 (5.777)
Percent Catholic	15.22 (12.99)	37.36 (27.32)	15.74 (9.740)
Percent Baptist	20.13 (9.634)	13.33 (8.950)	17.92 (7.411)
Percent Urbanized Residents	81.04 (23.79)	86.39 (17.10)	88.47 (18.96)
Median Household Income	28.87	25.29	29.26

(in Thousands)	(5.670)	(6.213)	(4.434)
Percent in Poverty	9.281	32.64	29.89
(Race Specific)	(3.581)	(8.925)	(6.904)

TABLE 1B
Means by Race and Pregnancy Outcome
(standard deviations in parenthesis)

	Whites		**Hispanics**		**Blacks**	
	Abort n=29,595	**Birth** n=116,929	**Abort** n=17,559	**Birth** n=84,626	**Abort** n=13,906	**Birth** n=28,857
Travel Distance	27.50 (31.05)	36.83 (39.58)	21.56 (22.70)	29.05 (33.49)	19.11 (23.18)	29.92 (37.26)
Marital Status (Married = 1)	0.27 (0.44)	0.94 (0.24)	0.30 (0.46)	0.86 (0.35)	0.21 (0.40)	0.63 (0.48)
Pregnant Woman's Age	27.12 (5.78)	28.43 (5.19)	26.57 (5.45)	26.85 (5.14)	26.43 (5.20)	26.64 (5.21)
Family Planning per 1,000 Women	0.82 (2.17)	0.96 (1.91)	0.88 (2.23)	1.04 (1.79)	0.56 (1.31)	0.68 (1.33)
Percent High School	75.51 (6.14)	74.57 (7.18)	69.96 (10.48)	66.37 (12.53)	75.62 (4.05)	74.86 (5.17)
Percent Female Employment	59.55 (6.15)	57.89 (7.21)	56.72 (6.80)	54.30 (7.76)	60.60 (4.62)	59.01 (6.19)
Percent Catholic	15.91 (11.87)	15.05 (13.25)	32.60 (23.73)	38.35 (27.91)	16.67 (8.46)	15.29 (10.27)
Percent Baptist	18.38 (8.13)	20.57 (9.93)	13.25 (6.96)	13.34 (9.31)	16.26 (5.70)	18.72 (7.99)
Percent Urbanized Residents	86.06 (20.83)	79.77 (24.32)	89.78 (14.43)	85.69 (17.52)	91.97 (14.68)	86.78 (20.50)
Median Household Income (1,000's)	29.32 (5.00)	28.76 (5.93)	26.71 (5.48)	24.99 (6.31)	29.97 (3.66)	28.92 (4.72)
Percent in Poverty (Race Specific)	8.88 (3.35)	9.38 (3.63)	30.60 (7.40)	33.06 (9.15)	28.83 (5.68)	30.40 (7.37)

TABLE 2
Probit Regression: Second-Stage Estimates
(standard errors in parenthesis)
Dependent Variable = Pregnancy Outcome (Abortion = 1)

	Whites n = 146,524	**Hispanics** n = 102,185	**Blacks** n = 42,763
Constant	0.8351**	4.0595**	-0.3651
	(0.1796)	(0.3506)	(0.3747)
Travel Distance	-0.0092**	-0.0194**	-0.0129**
	(0.0013)	(0.0011)	(0.0029)
Marital Status	-2.1724**	-1.4924**	-1.1557**
(Married = 1)	(0.0105)	(0.0110)	(0.0146)
Pregnant Woman's Age	0.0105**	0.0148**	0.0166**
	(0.0009)	(0.0010)	(0.0013)
Family Planning Clinics Per	0.0199**	0.0390**	-0.0070
1000 Women Age 20-44	(0.0027)	(0.0034)	(0.0085)
Percent High School	0.0013	0.0013	0.0087*
	(0.0020)	(0.0017)	(0.0036)
Percent Female Employment	-0.0024	-0.0399**	0.0014
	(0.0032)	(0.0040)	(0.0043)
Percent Catholic	-0.0049**	-0.0245**	-0.0010
	(0.0008)	(0.0014)	(0.0014)
Percent Baptist	-0.0043**	-0.0174**	-0.0098**
	(0.0012)	(0.0013)	(0.0031)
Percent Urbanized Residents	0.0010*	-0.0014*	-0.0082**
	(0.0005)	(0.0006)	(0.0025)
Median Household Income	-0.0080**	-0.0298**	-0.0111**
(in Thousands)	(0.0025)	(0.0031)	(0.0037)
Percent in Poverty	0.0200**	0.0042*	0.0019
(Race Specific)	(0.0030)	(0.0020)	(0.0020)
pseudo R^2	0.3935	0.2465	0.1567

**Significant at the 1% level based on t-test
*Significant at the 5% level based on t-test

TABLE 3

Simulated Change in Average Predicted Probability of Abortion (absolute value of t-statistic from comparison of means in parentheses)							
	White		Hispanic		Black		
Simulated Change	Prob. abort	% change	Prob. Abort	% change	Prob. abort	% change	Predicted Change in the Number of Abortions (Based on 291,472 Pregnancies in Texas in 1993)
Distance – 10%	0.2073	2.37	0.1810	5.36	0.3347	2.79	2,033
Distance + 10%	0.1978	-2.32	0.1632	-5.01	0.3168	-2.70	-1,944
Family Planning Clinics + 10% [a]	0.2027	0.10	0.1731	0.75	0.3260	0.12	179
High School Grad Rate + 10% [a]	0.1946	-3.90	0.1665	-3.08	0.3302	1.41	-1,502
Female Employment Rate +10% [a]	0.2194	8.35	0.1820	5.94	0.3483	6.97	4,489
% Catholic +10% [a]	0.2022	-0.10	0.1692	-1.51	0.3251	-0.15	-316
% Baptist +10% [a]	0.1999	-1.28	0.1686	-1.86	0.3160	-2.95	-1,118
% Urban + 10% [a]	0.2045	0.99	0.1704	-0.81	0.3262	0.18	176
Income + 10% [a]	0.2042	0.84	0.1714	-0.23	0.3276	0.61	294
Poverty Rate -10% [a]	0.2007	-0.89	0.1746	1.63	0.3288	0.98	159

[a] The signs of the effects on the abortion rate for these variables may not be the same as the coefficients reported in Table 2 since they also include changes in the first-stage equation.

APPENDIX A
First-Stage OLS Regression

Dependent Variable = Travel Distance
(standard errors in parenthesis)

	Whites n = 146,524	**Hispanics** n = 102,185	**Blacks** n = 42,763
Constant	133.03**	227.22**	116.53**
	(1.9276)	(2.5431)	(3.9036)
Prenatal Clinics Per 1000	-6.8325**	44.190**	4.7119*
Women Age 20-44	(0.9583)	(1.1022)	(2.3959)
Doctors Per 1000 Residents	-0.0583**	-0.0689**	-0.0479**
	(0.0012)	(0.0014)	(0.0020)
Marital Status	1.5411**	1.2754**	-0.4958*
(Married = 1)	(0.1896)	(0.1740)	(0.2137)
Pregnant Woman's Age	-0.0302*	-0.0051	-0.0186
	(0.0143)	(0.0141)	(0.0205)
Family Planning Clinics Per	0.6531**	-1.8390**	-2.4625**
1000 Women Age 20-44	(0.0690)	(0.0840)	(0.2084)
Percent High School	0.8373**	0.2776**	0.5191**
	(0.0246)	(0.0227)	(0.0426)
Percent Female Employment	-2.0784**	-2.5446**	-0.8526**
	(0.0301)	(0.0314)	(0.0530)
Percent Catholic	-0.4450**	-1.0584**	-0.2586**
	(0.0101)	(0.0086)	(0.0199)
Percent Baptist	0.4402**	-0.2495**	0.7082**
	(0.0131)	(0.0148)	(0.0258)
Percent Urbanized Residents	-0.0483**	-0.0300**	-0.6503**
	(0.0066)	(0.0072)	(0.0134)
Median Household Income	-1.2524**	-1.4991**	-1.0284**
(in Thousands)	(0.0361)	(0.0365)	(0.0433)
Percent in Poverty	0.8703**	0.4594**	0.4277**
(Race Specific)	(0.0465)	(0.0249)	(0.0256)
adjusted R^2	0.4572	0.4706	0.5953

**Significant at the 1% level based on t-test
*Significant at the 5% level based on t-test

APPENDIX B
Probit Regression: Single-Stage Estimates
Dependent Variable = Pregnancy Outcome (Abortion = 1)
(standard errors in parenthesis)

	Whites n = 146,524	**Hispanics** n = 102,185	**Blacks** n = 42,763
Constant	0.0420 (0.1244)	-0.1351 (0.2063)	-0.4962 (0.2653)
Travel Distance	-0.0024** (0.0002)	-0.0034** (0.0003)	-0.0040** (0.0004)
Marital Status (Married = 1)	-2.1886** (0.0103)	-1.5206** (0.0109)	-1.1649** (0.0145)
Pregnant Woman's Age	0.0109** (0.0009)	0.0151** (0.0010)	0.0163** (0.0014)
Family Planning Clinics Per 1000 Women Age 20-44	0.0171** (0.0027)	0.0252** (0.0033)	0.0142* (0.0062)
Percent High School	-0.0059** (0.0016)	0.0010 (0.0017)	0.0022 (0.0028)
Percent Female Employment	0.0126** (0.0020)	0.0056* (0.0025)	0.0090* (0.0036)
Percent Catholic	-0.0025** (0.0007)	-0.0075** (0.0007)	0.0005 (0.0013)
Percent Baptist	-0.0082** (0.0009)	-0.0133** (0.0012)	-0.0182** (0.0018)
Percent Urbanized Residents	0.0025** (0.0004)	0.0014** (0.0005)	-0.0008 (0.0008)
Median Household Income (in Thousands)	-0.0010 (0.0023)	-0.0081** (0.0026)	0.0028 (0.0028)
Percent in Poverty (Race Specific)	0.0140** (0.0031)	-0.0010 (0.0020)	-0.0019 (0.0017)
psuedo R^2	0.3942	0.2451	0.1585

**Significant at the 1% level based on t-test
*Significant at the 5% level based on t-test

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