IMPACT OF PRENATAL CARE ELIGIBILITY RESTRICTIONS ON HEALTH OUTCOMES: A GIS ANALYSIS OF IMMIGRANT COMPOSITION AND PROVIDER LOCATION IN URBAN TEXAS

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Abstract

The federal Personal Responsibility and Work Opportunity Reform Act of 1996 (PRWORA) ended Medicaid funding for prenatal care services for legal immigrants who entered the US after August 1996. Using confidential birth certificate data geo-coded to the census tract level between 1990-2001 in Texas, the policy impact is estimated by comparing low-income foreign-born Hispanic women, who are more likely to be affected by the Act, with US-born Hispanic women, controlling for proximity to prenatal care providers. Under the assumption that 70% of the foreign-born are legal immigrants (per the Immigration and Naturalization Service figures), PWRORA is estimated to cause about a 6% decline in the number of prenatal care visits for foreign-born women in urban Texas after the second year, and by 9%, 12% and 15% in the subsequent years. Foreign-born women living in areas with high ratios of recent immigrant experience a greater decline in visits.

JEL codes I-18, J-15, I-12

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1. INTRODUCTION

Impact of prenatal care eligibility restrictions on health outcomes

The impact of changes in eligibility for publicly funded prenatal care for low-income women on their utilization of such care and on their birth outcomes is of interest to public policy. Adequate prenatal care is widely seen as an effective way to prevent poor birth outcomes, such as low birth weight, and to reduce the costs associated with poor birth outcomes[1] (Harris, 1982). Unfortunately recent years have seen a rollback in the effort to ensure prenatal care utilization by low-income pregnant women. Medicaid eligibility for prenatal care has been severely restricted. The federal Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) is the most important legislative change influencing immigrants' access to publicly funded health care (Ku and Freilich, 2001; Acevedo-Garcia et al, 2002; Korenbrot et al, 2000; Joyce et al, 2001). PRWORA ended the ability of legal immigrants who entered the US on and after August 23, 1996 to obtain federally funded Medicaid non-emergency care, including prenatal care, for at least five years.[2] This period is known as the 5-year bar. Prior to the passage of PRWORA, legal immigrants were eligible for prenatal care if they qualified for Medicaid on the basis of their low incomes and assets. Legal immigrants entering after this date are referred to as 'post-enactment' legal immigrants. Between 1997 and 1999, Medicaid enrollment in Texas, a state with a large number of foreign-born residents, fell by 7.8% (Ellis, et al, 2000).[3]

The 1996 law serves as a policy experiment to examine the impact of changes in eligibility for public funding for low-income women on their utilization of prenatal care and their birth outcomes. To the extent that low-income immigrant women and US-born women are similar in their responses to restrictions or cuts in publicly funded prenatal care, this 1996 policy experiment on immigrant women provides some indication of the

[1] Nevertheless, the link between prenatal care and infant quality in empirical non-clinical studies is weak, possibly due to the selection bias in the decision to seek prenatal care among mothers who anticipate problematic pregnancies and to the poor quality of prenatal care.

[2] Medicaid is a federal-state matching entitlement program that provides medical insurance for the poor (Currie and Gruber, 1998).

potential impact of current cuts to public funding of prenatal care for US-born low-income women. Budgetary crises in numerous states have led to restrictions in the eligibility of US-born low-income women for prenatal care.[4] The impact of this Act on immigrant women and their children is itself of public policy concern. First, restrictions to Medicaid-funded prenatal care may lead to poor birth outcomes. However, Medicaid continues to cover emergency care for these legal immigrants and their infants. Thus, while cost-cutting was one of the justifications for the legislation, the public burden of health costs may have simply shifted to the delivery and postnatal stages, and even raised the total costs of care. Second, these infants, who are at risk of poor birth quality and longer-term health problems, are US citizens. Third, the health of immigrant women is of concern for humanitarian reasons. Moreover, often immigrant women are important contributors to the US economy. Legal immigrants, advocates argue, contribute taxes to support the very programs from which they are excluded.[5] The results of this study can inform the debate on the proposed Immigrant Children Health Improvement Act that would reverse part of the PRWORA law by reinstating federally Medicaid funding for prenatal care for legal immigrants who entered the US post-1996.

I study the impact of this Act on the prenatal care and health outcomes for infants born to low-income foreign-born Hispanic women in Texas. Using a 'quasi-experimental' research design, I compare changes in the use of pre-natal care and health outcomes for infants born to low-income foreign-born Hispanic women, who are more likely to be affected by the Act, with the changes for infants born to low-income US-born Hispanic women, who are less likely to be affected by the Act, between the periods before and after the Act.[6] Observations are individual mothers and their infants in Texas between 1990-2001. This study improves upon previous studies in several ways. First, I

[3]Medicaid enrollment figures from the Texas Health and Human Service Commission (THHSC) does not distinguish between the US- and foreign-born.

[4] In Texas, for example, beginning in fiscal year 2004, the income cut-off for Medicaid eligibility of pregnant women who are US citizens has been reduced from 185% to 133% of the Federal Poverty Level. The cuts in Texas are estimated to reduce the access of 17,000 pregnant women to pre-natal care in fiscal year 2004-5 (Center for Public Policy Priorities, 2003).

[5] A National Academy of Sciences study (Smith and Edmonston, 1997) reports that, on average, an immigrant contributes $1800 more in taxes than she uses in services from every level of government.

provide estimates of potential program impact based on a series of assumptions on the share of post-enactment legal immigrants in the foreign-born population. The absence of information on the legal status of the foreign-born has made it impossible to have a clean program identification, but given the importance of this policy question, I describe the bounds for estimates of the program impacts, the assumptions and limitations. Second, I study Texas, which is more likely to experience adverse impacts from PWRORA because it, like selected states in the US, did not use state funds to close the gap in Federal Medicaid funding for post-enactment legal immigrants.[7] Third, I account for the longer-term affect of PWRORA. If the rates of entry of legal immigrants remains constant and their propensity to bear children remains constant, over time a larger proportion of the foreign-born women would be post-enactment legal immigrants who are excluded from Medicaid federally funded prenatal care. Fourth, by conducting a study over a long period before and after PWRORA, I am also able to distinguish PWRORA's impact from other underlying trends. Fifth, by using the census tract of mother's residence, I am able to control for distance to prenatal care providers, which influence the propensity to seek prenatal care. Sixth, by using geo-coded data, I am able to detect the spatial variation in PWRORA's impact and to identify adversely affected areas.

PWRORA and immigrants

This study examines two potential effects of PWRORA. The first channel is through the letter of the law. Legal immigrants who entered the US after the enactment of PRWORA (hereafter: *post-enactment immigrants*) were no longer eligible for federally funded Medicaid prenatal care. While states can opt to provide state funding for Medicaid prenatal care for these post-enactment immigrants after the five-year bar, Texas did not. The second channel is the result of a potential 'chilling effect' of the law. PRWORA's

[6] Women who are born inside the US and its protectorates (such as Puerto Rico) are US-born women.
[7]Other states that did not use state funds to buffer the impact of PRWORA are high-immigrant states like Arizona, New Mexico, District of Columbia and other states, including Alabama, Idaho, Indiana, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, West Virginia and Wyoming (Zimmerman and Tumlin, 1999).

implementation was accompanied by confusion about eligibility and by fears of negative repercussions from using Medicaid. Legal immigrants who entered the US prior to PRWORA (hereafter: *pre-enactment immigrants*) continued to be eligible for federally funded Medicaid.[8] However, some mistakenly believed they were no longer entitled. Focus groups in California, Texas and New York indicate the existence of significant confusion and misinformation (Perry et al, 1999 and Andrulis et al, 2000, cited in Joyce et al, 2001). "Anti-immigrant measures have heightened fears that the use of public services will lead immigrants to be considered public charges and thus jeopardize their right to stay in the US and to apply for citizenship" (Aizner and Currie, 2002). "Mixed immigrant status family experienced fear and uncertainty about the impact one family member's use of Medicaid might have on another family member's ability to obtain a green card and eventually naturalize" (Kegler and Harper, 2001). PWRORA did not change the access to prenatal care for illegal immigrants. Illegal immigrants have never been able to obtain federally funded prenatal care.[9]

Providers of prenatal care in Texas include hospitals, community health care centers and rural clinics. Prior to PRWORA, these providers were able to obtain Medicaid reimbursement for services provided to legal immigrants, but not for services provided to illegal immigrants. Post-PRWORA, providers were no longer able to receive Medicaid reimbursement for post-enactment legal immigrants. These providers therefore had to rely on the remaining federal programs that continued to be available for legal and illegal immigrants, including the federal Maternal and Child Health Block Grant (Title V) program. However, the Title V program has been flat-funded for several years and access has declined correspondingly (Eldridge, 2002).

The few studies to date have provided important early work on the impact of PWRORA. Nevertheless, the limitations in those studies, given data available at that time, have led to calls for further research (Acevedo-Garcia et al, 2002). Fix and Passel

[8] Another smaller section of foreign-born Hispanics remain legally entitled to non-emergency Medicaid, including those who have naturalized into US-citizens, servicewomen and spouses of those serving in the US military, refugees, and asylees.

(2002), using the Current Population Survey (CPS), find a decline in Medicaid enrollment for citizens relative to non-citizens between 1994 and 1997.[10] However, (Korenbrot et al, 2000; Joyce et al, 2001) report no adverse affects from the Act on foreign-born mothers' use of pre-natal care and their birth outcomes. California and New York, the focus of these studies (Korenbrot et al, 2000; Joyce et al 2001), however had used state funds to continue Medicaid coverage for post-1996 legal immigrants during the five-year bar (Zimmerman and Tumlin, 1999). However, adverse effects would be more likely in states like Texas that did not use state funds to make up for the restrictions in federal funds for these post-1996 legal immigrants.[11] Previous studies also compare the use of prenatal care for US-born and foreign-born women living anywhere in California, Texas, and New York (Korenbrot et al, 2000; Joyce et al, 2001), and thus may fail to reveal potential adverse effects in specific geographical areas. The studies extend only for short period post-PWRORA. A more recent study, Kaestner and Lee (2004) the reduction in the welfare case load in the 1990s led to negligible declines in prenatal care use and a small increase in birthweight.

The proportion of foreign-born Hispanic pregnant women who are legal post-enactment immigrants, legal pre-enactment immigrants, naturalized US-citizens and illegal immigrants are not known precisely. These proportions would mirror that of the general population of foreign-born in Texas who are predominantly Hispanic, under the assumption that pregnancy rates are similar across populations with varying immigration status. While the figures for illegal immigrants are notoriously difficult to compute, researchers at the Census and the Immigration and Naturalization Service (INS) (citation), working under different assumptions, have provided figures that are similar in magnitude. Based on the INS figures in Table 1, the ratio of legal immigrants to foreign-

[9] Illegal immigrants may suffer from the congestion effect if providers that previously serviced mainly illegal immigrants suffer cuts in funding and enlargement in prenatal care demand from legal immigrants.
[10]This decline however could be due to shifts in rates of naturalization (Van Hook, 2003).
[11] Nevertheless, Korenbrot et al (2000) report that the foreign-born did not make the same improvements in prenatal care use in 1996-7 as the US-born. It is unclear whether this result signals an effect of the law (Acevedo-Garcia et al, 2002). Joyce et al (2001) also studied Texas.

born is between 64.1% (in 2000) and 71.3% (in 1990).[12] The ratio of foreign-born entering between mid-1996-2000 to total foreign-born is about 15%.

2. METHOD

Identification strategy

To focus the analysis on low-income women who are likely to rely on Medicaid for prenatal care, I restrict my analysis to infants born in Texas to women who have less than high school education. The infants are singleton births between 1991 and 2001.[13] I focus on Hispanic women are the largest group of foreign-born mothers in Texas. Immigration-relevant information in birth certificates is limited to the country of birth of the mother. As in previous studies, I define two groups – those who are more likely to be affected by the Act and those not likely to be unaffected by the Act – using the mother's country of birth. The 'treatment' group is infants born to Hispanic mothers who were born in a Central or South American country. As the post-enactment legal immigrants who are truly affected by the program make up only a subset of this 'treatment' group. I provide a series of estimates based on varying assumptions of the proportion of the foreign-born who are truly affected by the program.

The comparison group is infants born to Hispanic mothers who were born in the US. US-born women are US citizens and therefore entitled to non-emergency Medicaid pre- and post-PRWORA. I assume that a US-born Hispanic woman is less likely to fear that, as a result of PRWORA, her use of prenatal care services would endanger the immigration status of non-citizen family members, and is thus less likely to reduce her use of prenatal service in response to PRWORA. For the US-born to serve as a comparison group, it is essential that US-born mothers did not suffer a decline in prenatal care use relative to foreign-born mothers due to an event that only affected the former. The repeal of the Assistance of Families with Dependent Children (AFDC) affected only

[12] A small fraction of these are naturalized US-citizens or refugees or asylees who continue to receive federal funding for Medicaid. Nationally, about 50,000 legal immigrants naturalize per year (citation).

[13] I focus on singleton births because multiple births are likely to be of lower birth weight for reasons other than the receipt of prenatal care (Currie and Grogger, 2000).

US-born mothers, but this event is not likely to severely reduce their Medicaid prenatal care coverage. According to the Center of Budget and Policy Priorities (1996), "the new welfare law includes provisions designed to assure that children, pregnant women and low-income families do *not* lose Medicaid coverage as a result of the welfare changes. New restrictions on welfare will not cause families to lose eligibility for Medicaid. The new law essentially maintains Medicaid eligibility for all families that would have qualified under a state's AFDC rules." Nevertheless, it is worth noting that the repeal of AFDC may have increased administrative barriers for Medicaid uptake by the US-born (Currie and Grogger, 2000).

Empirical model

To estimate the program impact, I use a "difference in difference" (DD) estimator, allowing for group specific trends (Francesconi and van der Klaauw, 2004). The DD estimator controls for any pre-program differences between treatment and control groups. Foreign-born mothers have systematically better birth outcomes than US-born mothers (Abraido-Lanza et al, 1999) but often have less frequent prenatal care visits by foreign-born women, even if they shared similarities in eligibility of US-born women. As a result of more severe linguistic barriers, foreign-born women face greater transaction costs in obtaining Medicaid funded prenatal care (Currie, 2000). This estimator also controls for changes between the pre and post-PWRORA periods that are common to both infants of US-born women and infants of foreign-born women. PWRORA's restrictions on post-enactment legal immigrants *(hereafter, the program event)* coincided with a larger overall welfare reform that program affected both US-born and foreign-born mothers *(hereafter, the non-program event).* The different positive trend in the utilization of prenatal care for US- and foreign-born mothers, that can be seen in the Chart below, suggest the need to account for group specific trends. Because welfare reform may have changed the composition of women who bear children, I control for observable mother's and father's characteristics.

The estimation model in regression form is:

$$Y_i = a_2 W_i \times P_t + b_2 F_i + c_2 W_i \times P_t \times F_i + d_2 tr_t + e_2 tr_t \times Fi + f_2 tr_t \times W_i \times P_t + g_2 tr_t \times W_i \times P_t \times F_i + h_2 X$$

- Equation I

where observations are for mothers i in time t, P takes the value 1 for mothers who give birth in the program period and 0 otherwise, F takes the value 1 for foreign-born mothers and 0 otherwise, W takes the value 1 for native born mothers, and W takes the value W_L for the foreign-born mothers where W_L is the share of legal immigrants among the foreign-born, The variable tr is a trend number (that starts from zero on date Jan 1, 1990, adding one by the day) and the interaction variables tr x P is trend number (starts from zero on date Aug 22 1996, adding one by the day). The coefficient a_2 measures the level changes common to the share of legal immigrants among the foreign-born and US born in the program period. The coefficient c_2 measures the additional level changes for the legal immigrants relative to the US-born in the program period. The coefficient d_2 measured the trend common to both US-born and the share of the legal immigrants among the foreign-born pre-PWRORA. The coefficient e_2 measures additional component of the trend specific to the foreign-born pre-PRWORA. The coefficient f_2 measures changes in the trend between common to the US-born and the W share of the foreign-born between the pre and post-PWRORA periods. The coefficient g_2 measures the change in the trend that is specific to the W share of the foreign-born. The effect of PWRORA on the foreign-born relative to US-born at any given time is calculated from $c_2 +$ (g_2 x number of days post-PWRORA). X are control variables such as father's education, dummy for 4 categories of distances (intermediate value of distance is the omitted category), teen mother and older mother status dummies (intermediate ages are the omitted category).

The estimation model above has been modified from the standard DD model to account for the fact that only a subset of the 'treatment' group is truly affected by PWRORA. The rationale for the changes in trends is analogous to that described below for changes in levels. To simplify this discussion, for the moment, I assume that the

coefficients on the trend variables are zero, and there is only a level effect from PWRORA's immigrant-specific restrictions (the *program event*) and the PWRORA's non-immigrant specific policy changes (the *non-program event*). First, I consider the simplified case in which foreign-born consists of only two groups, one group affected by the program and non-program events, i.e., foreign-born who are legal immigrants and one group unaffected by both the program and non-program events, i.e., foreign-born who are illegal immigrants. The proportion of legal foreign-born is $W_{L.}$

The prenatal care use of the US-born and foreign-born legal/illegal entrants

	Before	After	Change
US-born	0	a_0	a_0
Legal	b_0	$a_0+b_0+c_0$	a_0+c_0
Illegal	b_0	b_0	0

Two estimation equations of interest are as follows:

$Y = a_1 P + b_1 F + c_1 P \times F$ - Equation II

$Y = a_2 W \times P + b_2 F + c_2 W \times P \times F$ - Equation III

Because foreign-born mothers consists of legal and illegal immigrants, Equation I would lead to biased estimates of the impact of the program on legal immigrants. First, I consider the coefficient c_1 that measures level changes for foreign-born mothers relative to US-born mothers due to the program event. The true change is $c_{0.}$ However, the estimated c_1 is a weighted average of the level changes for legal immigrants relative to the US-born and of that for illegal immigrants relative to the US-born, i.e. $c_0W_L + 0\ (1-W_L)$ i.e. c_0W_L. Next, I consider the coefficient, a_1, which measures the level changes that is common to both foreign-born and US-born mothers due to the non-program event. The true level-change for US-born mothers is a_0. However, the estimated level-change for the foreign-born relative to US-born is again the weighted average of that for first, the legal foreign-born relative to the US-born and second, the illegal foreign-born relative to the US-born. Therefore, the estimated level-effect common to both US-born and foreign-born

is only a_0W_L. Equation III allows the direct measurement of the program effect by scaling up the coefficients of interest by the share of legal immigrants. The program-related level-effect for foreign-born relative to US born is c_2W_L, which is equivalent to c_1 or c_0W_L. Therefore, the coefficient c_2 provides a direct estimate of c_0. The non-program level-effect common to both foreign-born and US born is a_2W_L that is equivalent to a_1 or a_0W_L. Therefore the coefficient a_2 provides a direct estimate of a_0.

Recent immigrants

Next, I consider the additional complication that the legal foreign-born in fact consists of two groups. The first group, i.e. legal post-enactment immigrants, is affected by the letter of the law of PWRORA The second group, i.e. legal pre-enactment immigrants, is not affected by the letter of the law of PWRORA, but it has been described that they may have been confused about their continued eligibility. If in fact the confusion did not occur and only legal post-enactment immigrants are affected by the program and non-program events, while other foreign-born are affected by the non-program event only, my inability to code the foreign-born who are truly affected by the program event, would lead to attenuation bias.

The prenatal care use of US-born and foreign-born.

	Before	After	Change
US-born	0	a_0	a_0
Foreign-born: Pre-enactment Legal	b_0	a_0+b_0+c	a_0+c
Foreign-born: Post-enactment Legal	b_0	a_0+b_0	a_0
Foreign-born: US citizen	b_0	a_0+b_0	a_0

The variable $W_{post.}$ indicates the proportion of legal foreign-born who are post-enactment legal immigrants. Because legal foreign-born consists of pre-enactment and post-enactment legal immigrants, the coefficient c_2 that provides an estimate of c_0 would in fact provide an underestimate of the magnitude of c. The coefficient c_2 provides an estimate of the weighted average of the change for post-enactment legal immigrants and that for pre-enactment legal immigrants i.e. $W_{post}(c) + (1-W_{post})\ 0 = W_{post}\ c$.

One imperfect way to see if there are differential impacts for pre-enactment legal immigrants and post-enactment legal immigrants is to compare the post-PWRORA outcomes for the foreign-born who live in Public Use Microdata Area (PUMA) that have a high ratio of immigrant women entering after the enactment date with the foreign-born who live in areas with a low ratio. The assumption is that in areas with high ratios, it is likely that the foreign-born mother is more likely to be a post-enactment immigrant. The measure is the ratio of Hispanic foreign-born women of child-bearing age who report being outside the US in 1995,[14] when asked in the 1999 census, to Hispanic foreign-born women of child-bearing age, hereafter the intensity of recent women immigrants. The assumption is that these indicators measured for 1999 are accurate the next two years 2000 and 2001. The post-PWRORA years are 1999, 2000 and 2001. Nevertheless, there is a limitation to such an interpretation of the results. It is possible that women who live high recent immigrant areas may be more likely to be illegal immigrants, who are not affected by PWRORA, but the lack of data on the spatial distribution of illegal immigrants make it difficult to judge this possibility. If latter scenario were to dominate, I would not find foreign women living in high intensity recent immigrant areas to have stronger declines in prenatal care relative to those living in lower intensity areas.[15]

The estimation model is presented below:

$$Y_i = a_4 W_i \times P_t + b_4 F_i + c_4 W_i \times P_t \times F_i + d_4 tr_t + e_4 tr_t \times Fi + f_4 tr_t \times W_i \times P_t$$
$$+ g_4 tr_t \times W_i \times P_t \times F_i + h_4 X$$
$$+ i_4 Q_c + j_4 Q_c \times F_i \times P_t + k_4 tr_t \times P_t \times Q_c \times F_i$$
$$+ l_4 Q_c \times F_i + m_4 Q_c \times P_t + n_4 tr_t \times Q_c + o_4 tr_t \times F_i \times Q_c + p_4 tr_t \times P \times Q_c$$

- Equation IV

[14] Unfortunately, due to the questionaire change, foreign-born Hispanic women who had a child in 1999 can no longer be identified from the Decennial Census, a sample that would reflect most closely my population of births in Texas.

[15] Recent immigrants are not more likely to be illegal immigrants as immigrants may enter legally but become illegal after overstaying their visas. Nevertheless, immigrants who entered before 1986 may be more likely to be legal immigrants as the 1986 Immigration Reform and Control granted amnesty and permanent residency to illegal immigrants.

where Q_c is a measure of the intensity of recent immigrants in the PUMA c. Other variables are as defined above. Observations are from all PWRORA years and the 3 post-PWRORA years (1999, 2000, 2001). Robust standard errors clustered on PUMA are estimated. The effect of PWRORA on the foreign-born relative to US-born at any given time is calculated from $j_4 + (k_4$ x number of days post-PWRORA). The result $l_4 < 0$ would indicate foreign-born women living in high immigrant area have fewer prenatal care visits than their counterparts living in low recent immigrant areas. The additional effect of PWRORA on women living in high recent immigrant area compared to those living in low immigrant area is calculated from $j_4 + (k_4$ x number of days post-PWRORA).

3. DATA

I use confidential on the population of birth certificates issued in Texas. The birth certificate data has been geocoded to the mother's census tract of residence. I link the mother's census tract of residence to her PUMA location by conducting a spatial join of the census tract and PUMA maps. Using tract and puma codes assigned each infant in the birth data, I am able to link each infant to variables from the 2000 Decennial Census tract level data and the 2000 Decennial Census 5% Public Use Microdata Survey sample (PUMS). I assemble a database on prenatal care providers from the Texas Department of Health and Human Services. Using their street address, I geocode them to their latitude and longitude coordinates. I then calculate the linear distance from the centroid of census tract to the nearest prenatal care provider.[16] Therefore mothers residing in the same census tract would be assigned the same distance to the nearest prenatal care provider. As historical data is unavailable, the location of prenatal care providers reflects that in 2003. Discussions with staff at government and non-government agencies in Texas suggest no major expansion or contraction occurred in community health clinics, rural clinics or hospitals, the main providers of prenatal care in Texas, during the study period.

[16] Currie and Raegan (date) also use linear distances to provider.

I do not expect significant selection bias from the failure of foreign-born mothers to record the birth of their US-born citizen children, as obtaining citizenship is an important motivator for foreign-born women to give birth in the US (Guendelman et al, 1992).[17] Nevertheless, there is a possibility of selection bias in the conceptions that resulted in live births. Birth certificates are completed only for infants who are born alive. The sample of pregnancies that result in live births may be affected by the change in the access to prenatal care. For example, as a result of cuts to prenatal care access, a pregnancy that would have ended in low birth weight ended up as a stillborn. This pregnancy outcome is not included as a recorded birth. Unfortunately, at present, confidential fetal death data that could potentially be used to analyze the possibility of this selection issue has not been released to researchers. As in other studies that use birth certificate data, self-reported information on prenatal care is subject to measurement error.

Variables

Outcome variables are (1) the adequacy of prenatal care use, measured by the number of prenatal visits and an indicator for early prenatal care (before the 4th month of pregnancy), and (2) the 'quality' of infants measured rather coarsely by their birth weight and by whether they are preterm. Birth weight serves as an indicator of the underlying health of the newborn (Currie and Grogger, 2000). Low birth weight is defined as birth weight less than 2500g (Currie and Grogger, 2000). The infant is *preterm* if its gestation lasts less than 37 weeks. Control variables are mother's age, education, child gender, father's education, Distance from prenatal care provider. The analysis is run separately for urban and rural areas. Education indicates income variation. Indicators for the use of alcohol and tobacco are not included as control variables as prenatal care visits would influence this behavior. Distance from prenatal care provider, urban/rural dummy, OLS is used for continuous dependent variable. Logit is used for discrete dependent variable.

[17]This assumption is made in other studies (Spaetz et al, 2000).

Program dates

I run the analysis with two program dates, the actual PWRORA date of August 1996 and a lagged program date of May 1997. Women who were fully exposed to the PWRORA regime are those who were pregnant about August 1996 and would be observed in my data around May 1997. Moreover, a delay between the announcement and the implementation of a new policy is common in most policy adoption.

4. DATA DESCRIPTION

Prenatal care visits and early prenatal care in urban areas[18]

The observations are those of Hispanic women with high school education or less residing in urban areas or their infants.[19] Charts 1-3 show the comparison of foreign-born mothers with US-born mothers in their prenatal care regime and infant quality. While PRWORA's impact cannot be inferred from the raw means, it would be useful to describe the broad patterns in the data. For prenatal care visits, foreign-born women show a stronger pattern of improvement relative to US-born in the pre-PWRORA period, and a more pronounced dampening of the improvement after PWRORA.

Foreign-born mothers have fewer mean prenatal care visits than US-born mothers and this difference persists throughout the study period. While starting off at fewer mean prenatal visits, foreign-born mothers shows a stronger upward trend in the mean number of prenatal care visits relative to US-born mothers in the pre-PWRORA years. While both US-born and foreign-born mothers experience a flattening in the trend of the increase in prenatal care visits in the 1996, the dampening of these improvements in the post-PWRORA period relative to the pre-PWRORA period is more pronounced for foreign-born mothers. Between the 1990 and 1995, the mean number of prenatal care visits for foreign-born mothers increases rapidly from 7.3 to 9.3 visits. However, between 1996 to

[18] *Urban, inside of urbanized areas*: a place and the adjacent densely settled surrounding territory that combined have a minimum population of 50,000. *Urban, outside of urbanized areas*: an incorporated or unincorporated place outside of urbanized areas with a minimum population of 2,500, with the exception of rural portions of extended cities. *Rural*: an area that is not classified as urban, either inside or outside of urbanized areas

[19] Census tracts where 99% or more of its residents are recorded as living in urban areas in the 2000 Decennial Census are designated as urban.

2001, the number of prenatal care visits remains around 9.5 visits on average. Between 1990 and 1995, the number of visits for US born mothers rise from 9.1 to 10.2 visits and remains around 10.7 visits on average.

For the proportion of women with early prenatal care, foreign-born women again start off at a lower level and show a stronger trend of improvement in the pre-PWRORA period compared to US born women. While both show a dampening in the improvement, the oscillation in this proportion is greater for foreign-born women. The proportion of foreign-born women with early prenatal care is 59% only compared to that for US-born women in 1990 and this gap persists in the study period except for last quarter of 1998 and first two quarters of 1999. The foreign-born women show a stronger improvement between 1996 and 1998, and even exceeding the proportion of US-born women with early prenatal care, before worsening more drastically after the last quarter of 1998. After the third quarter of 1999, the proportion of foreign-born women with early prenatal care trails that of US-born women.

In contrast to the patterns for prenatal care, no strong patterns are detected for birth-weight. Mean birthweight for the infants of foreign-born women exceed that for US-born women throughout the study period by an average of about 50 grams. The mean birthweight oscillates within a band of 60 grams, which is about 1.8% of the mean infant birth.

Summary statistics

The summary statistics for urban low-income Hispanic women are tabulated in Table 2. The table indicates, as do the charts, that foreign-born women have fewer prenatal care visits and a lower probability of early prenatal care than US-born women in both the pre and post-PWRORA periods. However, foreign-born women have a smaller probability of low-birthweight and pre-term infants than US-born women. The probability for low-birthweight infants is about 0.048 for foreign-born women and 0.063 for US-born women in the pre and post-PWRORA periods. The probability for pre-term infants is about 0.061 for foreign-born women and 0.078 for US-born women in the pre-

PWRORA period and about 0.069 and 0.092 in the post-PWRORA periods. While the marginally better birth outcomes of low-income women are congruent with studies in the literature (Abraido-Lanza et al, 1999), the magnitude of this difference is, in fact, very small.

Foreign-born women are twice more likely than US-born women to be older mothers and three times less likely than US-born women to be teen-mothers. Older motherhood as indicated by the regression results below, are correlated with higher probability of early prenatal care and visits, and teen motherhood with the opposite relationship. Fathers of infants with foreign-born mothers are 1.5 times more likely to have less than high school education, a characteristic correlated negatively with infant early prenatal care. Looking at their spatial characteristics, foreign-born women live in areas with marginally higher ratios of recent immigrant women intensities and they are slightly more likely to live inside urbanized areas. Foreign-born and US-born mothers are fairly similar in their physical access to prenatal care measured by linear distances.

5. REGRESSION RESULTS

Prenatal care visits in urban areas

The results for Equation I, with W set to 1 for the foreign-born and US-born, is shown in Table 3. Under the assumption that the share of legal immigrants is 100%, PWRORA is estimated to cause a decline in prenatal care visits for foreign-born women relative to US-born Hispanics post-PWRORA, but the size of the impact is small. Foreign-born women start with 1.7 fewer prenatal care visits than US-born women, a sizable gap given the mean prenatal care visits of only 7.6 visits for foreign-born women in 1990. In the pre-PWRORA period, while US-born and foreign-born women experience upward trend in their number of prenatal care visits, the positive trend is larger for foreign-born women. Post-PWRORA both US-born and foreign-born experience a shift downward in the prenatal visits as well as a weakening of the trend of improvement in the number of prenatal visits. Even though foreign-born experience a relatively smaller shift downwards relative to the US-born, PWRORA caused a stronger

decline in the trend of improvement for the foreign-born relative to the US born. All in all, PWRORA caused a decline in the number of prenatal care visits for the foreign-born relative to US born. This effect appears to be statistically significant at conventional levels (5% or 10% significance levels) a year after PWRORA's implementation date and the size of the impact appears small. The decline is about 0.97% of the mean number of 9.3 visits for the foreign-born in 1996. The decline persists in the next 4 years, though the size of the decline remains small amounting to 2.9%, 4.8%, 6.7% and 8.6% after two, three, four and five years post-PWRORA, respectively. Allowing for a lagged effect of the program, with May 1997 as the program date, the size of the decline is still fairly small, 1.9% after one year and 9.8% after 5 years.

Next, results for the model under a series of assumptions of the share of legal immigrants among the foreign-born is tabulated in Table 4. The regression results, under these assumptions, suggest that PWRORA caused a sizable decline in the number of prenatal care visits for foreign-born women relative to US-born women. To recall, INS figures suggest that legal immigrants comprise 60% to 70% of the foreign-born. Under the assumption that 70% of the foreign-born women are legal immigrants, PWRORA caused about a 6% decline in the number of prenatal care visits for foreign-born women relative to US-born women by the second year post-PWRORA. The decline is measured as a percentage of the foreign-born's mean number of visits in 1996. The size of the decline grows to 9%, 12% and 15% in the third, fourth and fifth year post-PWRORA. Under the assumption 60% of the foreign-born are legal immigrants, PWRORA is estimated to cause about a 4% decline in the number of prenatal care visits for foreign-born women after the first year. The size of the decline grows to 8%, 11%, 15% and 19% in the subsequent years. The estimated effects are comparable for both the August 1996 and May 1997 program dates.

REDO: Results for the comparison of program impacts in areas with different intensities of recent immigrants are shown in table 5.

Early prenatal care in urban areas

The results for PWRORA's impact on early prenatal care largely mirrors that for the number of prenatal care visits. As seen in Table 3, without accounting for the fraction of legal immigrants among the foreign-born, PWRORA's impact appears to be statistically significant at conventional levels a year after the implementation date and the size of the impact appears small. The decline is about 1.6% of the mean probability of early prenatal care of .70 visits for the foreign-born mothers in 1996. The decline persists in the next 4 years, though the size of the decline remains small amounting to 3.0%, 4.5%, 6.0% and 7.5% after two, three, four and five years post-PWRORA, respectively. Allowing for a lagged effect of the program, with May 1997 as the program date, the size of the decline is still small and the estimate is statistically significant at conventional levels only after the third year.

Next, the results for the model under a series of assumptions of the share of legal immigrants among the foreign-born is tabulated in Table 6. The regression results, under these assumptions, suggest that PWRORA caused a sizable decline in the probability of early prenatal care visits for foreign-born women relative to US-born women. Under the assumption that 70% of the foreign-born women are legal immigrants, PWRORA caused about a 5.4% decline in the probability of early prenatal care visits for foreign-born women relative to US-born women by the second year post-PWRORA. The decline is measured as a percentage of the foreign-born's mean probability of prenatal care visits in 1996. The size of the decline grows to 7.9%, 10.5% and 12.8% in the third, fourth and fifth year post-PWRORA. Under the assumption 60% of the foreign-born are legal immigrants, PWRORA is estimated to cause about a 3.8% decline in the probability of prenatal care visits for foreign-born women after the first year. The size of the decline grows to 7.0%, 10.2%, 13.4% and 16.7% in the subsequent years. The estimated effects are comparable for both the August 1996 and May 1997 program dates.

REDO: Results for the comparison of program impacts in areas with different intensities of recent immigrants are shown in table 7.

Birthweight and pre-term indicator in urban areas

In contrast to its impact on prenatal care visits, PWRORA does not appear to have worsened the indicators of infants, i.e. significantly and sizably reduced birthweight or increased the probability of low-birthweight infants or pre-term births, as evident in Table 8. In the post-PWRORA period, relative to US-born mothers, foreign-born mothers show a very small improvement in infant birthweight, a very small decline in probability of having low birthweight infants and in a very small increase in the probability of having pre-term infants. However, none of these changes, even as long as 5 year post-PWRORA, exceed 1% of the levels for foreign born mothers in the year preceding the program date.

As in the literature, I find that infants of foreign-born mothers have better mean health indicators at birth than infants of US-born mothers. However, the size of any 'advantage' of better infant quality for foreign-born mothers is in fact very small. At the start of the study, foreign-born mothers have a lower probability of low birthweight infants, but this amounts to only 0.04 percentage points or 0.8% of foreign-born mother's mean probability of having a low birthweight infant in 1990. Similarly, foreign-born mothers have a lower probability of pre-term infants, but again this amounts to only 0.03 percentage points or 0.4% of foreign-born mother's mean probability of having pre-term infants in 1990. Infants of foreign-born mothers exceed the birthweight of infants of US-born by about 41 grams or a mere 1.2% of their mean birthweight.

Variation between urban and rural areas

Results for rural areas is tabulated Table X. Foreign-born women have comparable mean number of prenatal visits in urban and rural areas for a given time period, as do US-born women. In contrast to its adverse impacts in urban areas, PWRORA has not reduced prenatal care visits for foreign-born women in rural areas relative to US-born women. In fact, their prenatal care visits appear to grow relative to US-born women. (Add table)

One possible explanation for the lack of impact on the foreign-born in rural area is that, relative to their urban counterparts, rural prenatal care providers have more alternative sources for reimbursement for the services they provide to immigrants, other than their past reliance on Federal Medicaid funding. The Migrant Health Act had been

enacted in September 1962 by Public Law 87-692, which added section 310 to the Public Health Service Act. The Health Resources and Services Administration (HRSA) provides grants to community nonprofit organizations for a broad array of culturally and linguistically competent medical and support services to migrant and seasonal farm-workers and their families.[20] Nevertheless, discussions with researchers and health workers in Texas have not yielded budgetary data that would provide empirical evidence in support for this possible explanation.

Distance to prenatal care providers

The relationship between prenatal visits and distance differs between urban and rural areas. In urban areas, the number of visits is higher for those women living further from prenatal care providers. In contrast, in rural areas, the number of visits are higher for women living further from providers to a limit at which number of visits start to decline. The result that number of visits are higher for women living further from prenatal care providers is likely to reflect the systematic placement of community health clinics that service poorer women, who generally have lower prenatal care utilization, closer to their residences. Indeed, descriptions of the choice of location for community health care centers indicate their purposeful placement in areas where prenatal care utilization is perceived to be low (citation). The decline in visits for women living furthest from prenatal providers in rural areas but not in urban areas is probably due to the greater distances for those women living in rural areas. Among the 10% of rural women who face the longest distance to a prenatal care provider, the mean such distance is 22km (approx. 14 miles). Among women in urban areas, by contrast, even those 10% who live furthest from a prenatal care provider only face a mean distance of 8km (5 miles).

Other variables Estimates of other coefficients correspond to patterns reported in the literature. Teen mother status is associated with fewer prenatal care visits and a lower probability of early prenatal care. Older mother status is associated with more prenatal

[20] http://bphc.hrsa.gov/migrant/Default.htm

care visits and a higher probability of early prenatal care. Infants whose fathers have high school education or more experience greater number of prenatal care visits and a higher probability of prenatal care.

6. DISCUSSION AND POLICY IMPLICATIONS

My findings in support of a PWRORA-induced decline in prenatal care visits among foreign-born women in urban Texas stand in contrast to the results Korenbrot et al (2000) and Joyce et al (2001). This contrast is likely due to my focus on Texas, that did not use state funds to fill in federal gaps in funding, my spatially-oriented study that identifies high impact areas within Texas and my documentation of PWRORA's longer-term impact. Without accounting for the share of legal immigrants among the foreign-born, PWRORA-induced decline in urban areas is fairly small. However, using an estimation model to account for the INS figures that about 60-70% of the foreign-born are legal immigrants affected by the Act, the PWRORA-induced decline in urban areas is found to be sizable. Under the assumption 60% of the foreign-born are legal immigrants, PWRORA is estimated to cause about a 6% decline in the number of prenatal care visits for foreign-born women after the second year. The size of the decline grows to 9%, 12% and 15% in the subsequent years. In addition, PWRORA caused a larger decline in prenatal visits for foreign-born women who lived in urban areas with higher ratios of recent immigrant women.

These results yield implications for two current policy debates. First, the proposed Immigrant Children Health Improvement Act (ICHIA) would reverse part of the PRWORA law by allowing states the option of providing Medicaid prenatal care assistance and 60-day post-natal care for pregnant women who entered the US legally post-1996.[21] At present, PWRORA bars states from providing Medicaid prenatal care assistance to pregnant legal immigrant women entering after 1996 for their first five years in the US and states that defy this ban do not obtain Medicaid reimbursement for such

[21] ICHIA provisions previously in the 2003 Medicare Bill were removed prior to Congress vote of approval of that Bill. In 2004, the ICHIA provisions were referred to the Senate Finance Committee.

services. Second, to the extent that foreign-born women's response to prenatal care funding cuts is comparable to US-born women's, these results suggest that tighter eligibility restrictions for prenatal care for US-born women, currently under way in several states facing budget crises, are likely to lead to adverse effects on prenatal care use. Nevertheless, these cuts, for example in Texas, for women between 133% and 185% of the FPL, may not have as severe an effect as did PWRORA that affected all post-1996 immigrant women, including those below 133% of the FPL.

Despite the reduction in prenatal care visits, no corresponding decline is detected in the birth outcomes. The lack of detection of adverse health impacts must however be tempered by the following caveats. The outcome variables available from birth certificate data do not capture the entire range of birth complications that can be averted with proper prenatal care (Korenbrot et al, 2000). The weak statistical relationship between prenatal care visits and birth outcomes, despite strong relationship in well-controlled clinical studies, has been interpreted in the literature to suggest that high quality prenatal care contributes to infants and mothers' health but prenatal care in practise may not be of sufficient quality to induce good birth outcomes.

Methodologically, this study contributes to the growing number of health-services study that apply spatial techniques in order to explore the spatial variation in program impact and the role of distance to providers as barriers to care. I detect a PWRORA-induced decline in urban areas, but not in rural areas. One possible explanation is that rural providers have more alternative funding sources than their urban counterparts as a result of funding specific for migrant and seasonal farmworkers in rural Texas. However, a review of providers' budget data would be warranted to support or negate this possible explanation. I find that physical distances for urban and most rural women do not appear to be the important barrier to obtaining prenatal care. However, for the 10% of rural women who live furthest from prenatal care providers, physical distances do serve as a discouragement.

Finally, I do find that infants of foreign-born mothers on average have better birth outcomes than infants of US-born mothers, as reported generally in the literature, but the

size of this difference is extremely small. The systematically better birth outcome expected for infants of the foreign-born has often been perceived as a 'natural' buttress against their lack of access to health care. However, this very small advantage at birth of the citizen infants of foreign-born mothers would quickly lost as a result of their continued lack of access to healthcare during infancy and childhood (citation, Urban Institute). These children's lack of uptake of Medicaid and State Children's Health Insurance Program (SCHIP), despite their eligibility as citizens, is an important policy concern.

Two interesting extensions to the study, when the data is released to researchers, are as follows. First, the impact of PWRORA on foreign-born mothers' fetal death is of interest, because if PWRORA had a negative impact at this stage of pregnancies, studies using birth data would be biased against finding an adverse impact on infant outcome. Second, the patterns of prenatal care among vulnerable populations in areas of high public health concern within Texas such as its colonias, where housing, water and sanitation infrastructure and public services is poor, should be explored. Maps of colonias and census tracts can be spatially-joined, albeit with some inaccuracy, to identify those mothers living in colonias.

Table 1: Immigration status of the foreign-born in Texas

		As a proportion of the foreign-born
All population (Census 1990)	16986510	
All population (Census 2000)	20851820	
Foreign born (Census 1990)	1524436	
Foreign born (Census 2000)	2899642	
Unauthorized immigrants (INS FY 2000)	1041000	35.9%
Unauthorized immigrants (INS FY 1990)	438000	28.7%
Unauthorized immigrants (Census Bureau Working Paper 1994)	300,000-427,000	
Foreign-born by year of entry (1995-2000) (March 2000 CPS)	544000	
Foreign-born by year of entry (1990-1994) (March 2000 CPS)	512000	
Foreign-born by year of entry (1985-1989) (March 2000 CPS)	285000	
Total foreign-born (March 2000 CPS)	2443000	
Foreign born that came between mid 1996-2000*	380800	15.6%

*I assume similar numbers of immigrants for each year of entry between 1995 2000

Chart 1: No. of prenatal care visits for foreign-born and US-born Hispanic mothers in urban Texas

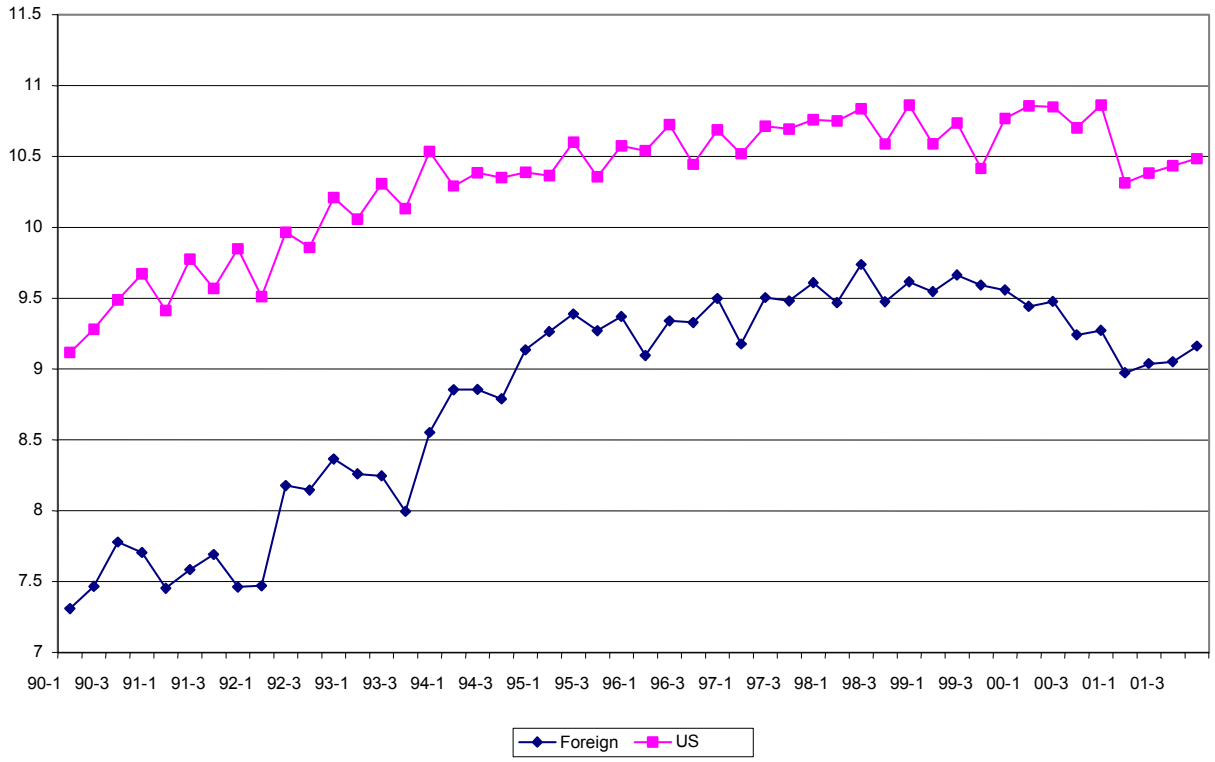

Chart 2: Proportion of foreign-born & US-born women who had early prenatal care in urban Texas

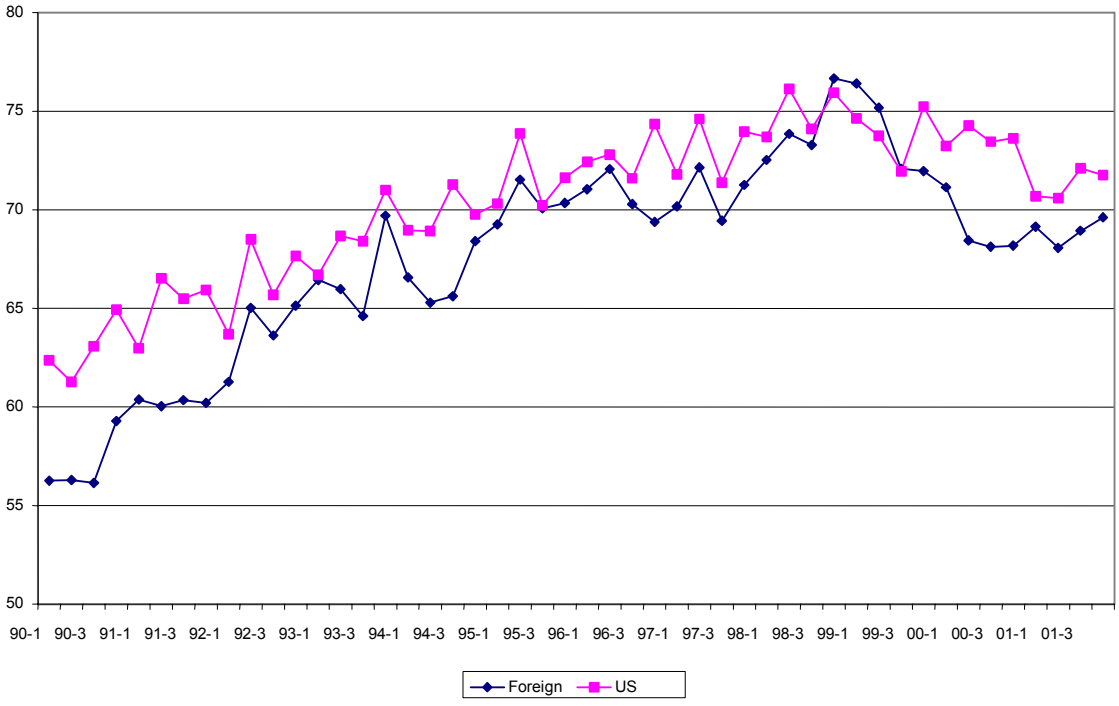

Chart 3: Birthweight for infants of foreign-born & US-born women in urban Texas

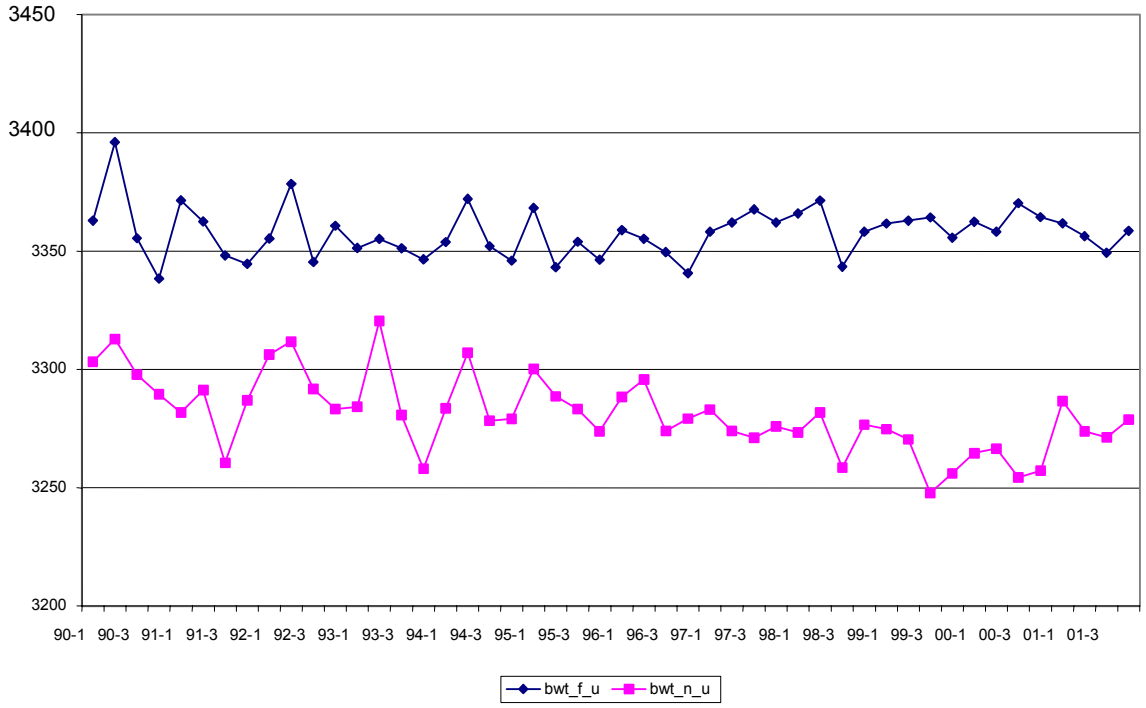

Table 2 : Mean and std deviation for low income women and their infants in urban Texas

	Pre-PWRORA			Post-PWRORA		
	Foreign -born	US -born	Diff†	Foreign -born	US -born	Diff†
No prenatal care visits	8.462 *4.652*	10.086 *4.509*	**	9.562 *4.437*	10.724 *4.335*	**
Early prenatal care dummy	0.654 *0.476*	0.681 *0.466*	**	0.720 *0.449*	0.744 *0.436*	**
Birthweight						
Low birthweight dummy	0.048 *0.213*	0.063 *0.242*	**	0.049 *0.216*	0.067 *0.249*	**
Pre-term dummy	0.061 *0.240*	0.078 *0.268*	**	0.069 *0.254*	0.092 *0.288*	**
male child dummy	0.509 *0.500*	0.510 *0.500*		0.510 *0.500*	0.511 *0.500*	
older mother dummy	0.013 *0.114*	0.007 *0.081*	**	0.015 *0.121*	0.007 *0.081*	**
teen mother dummy	0.054 *0.227*	0.148 *0.355*	**	0.051 *0.219*	0.152 *0.359*	**
father's high school educ or more dummy	0.428 *0.495*	0.653 *0.476*	**	0.424 *0.494*	0.645 *0.478*	**
recent immigrant intensity (Q)	0.196 *0.070*	0.172 *0.062*	**	0.209 *0.074*	0.175 *0.064*	**
distance to providers	2940 *2276*	3027 *2346*	**	3175 *2319*	3160 *2411*	**
inside urbanized area dummy	0.950 *0.228*	0.908 *0.288*	**	0.950 *0.218*	0.914 *0.281*	**
No obs.	241111	227283		234255	196102	

Means in normal fonts. Standard deviation in italics

†Means for foreign born are statistically different at the 5% level ** or the 10% level *

Table 3: PWRORA's impact on prenatal care visits and early prenatal care in urban T

	(1)	(2)	(3)	(4)
Estimation	OLS	OLS	Logit	Logit
Dep var	No of prenatal care visits		Early prenatal care dummy	
Date	Aug-96	July-97	Aug-96	July-97
male child	0.03502**	-0.03499**	-0.00252**	-0.00252**
dummy	(0.00923)	(0.00923)	(0.00098)	(0.00098)
older mother	0.23673**	0.23613**	-0.00009	-0.00011
dummy	(0.04521)	(0.04521)	(0.00482)	(0.00482)
teen mother	0.89961**	-0.89896**	-0.09431**	-0.09426**
dummy	(0.01573)	(0.01574)	(0.00159)	(0.00159)
father high sch	0.09243**	0.09227**	0.01496**	0.01490**
grad or more	(0.00958)	(0.00958)	(0.00101)	(0.00101)
inside urbanized	0.34280**	0.34429**	0.03364**	0.03370**
area dummy	(0.04848)	(0.04848)	(0.00501)	(0.00501)
Closest distance	0.14081**	-0.14082**	-0.00839**	-0.00838**
dummy	(0.01369)	(0.01369)	(0.00145)	(0.00145)
Closer distance	-0.00541	-0.00541	-0.00396**	-0.00397**
dummy	(0.01335)	(0.01335)	(0.00142)	(0.00142)
Further distance	0.12434**	0.12399**	0.00799**	0.00797**
dummy	(0.01527)	(0.01527)	(0.00163)	(0.00163)
Furthest distance	0.23067**	0.23025**	0.01688**	0.01686**
dummy	(0.01780)	(0.01780)	(0.00192)	(0.00192)
Post-PWRORA	0.21004**	-0.20636**	-0.00468	-0.01444**
dummy (P)	(0.02708)	(0.02742)	(0.00295)	(0.00300)
Foreign-born	1.73332**	-1.72078**	-0.04149**	-0.03732**
dummy (F)	(0.02664)	(0.02521)	(0.00270)	(0.00256)
P x F	0.07022*	0.00876	-0.00083	0.01569**
	(0.03710)	(0.03761)	(0.00400)	(0.00408)
trend (tr)	0.00062**	0.00055**	0.00005**	0.00005**
	(0.00001)	(0.00001)	(0.00000)	(0.00000)
tr x F	0.00033**	0.00032**	0.00001**	0.00001**
	(0.00002)	(0.00002)	(0.00000)	(0.00000)
tr x P	0.00050**	-0.00046**	-0.00004**	-0.00003**
	(0.00002)	(0.00002)	(0.00000)	(0.00000)
tr x P x F	0.00040**	-0.00041**	-0.00002**	-0.00003**
	(0.00003)	(0.00003)	(0.00000)	(0.00000)
County	incl	incl	incl	incl
Observations	898751	898751	888639	888639
R-squared	0.08	0.08		

Standard errors in parentheses ** significant at 5%; ** significant at 1%

Table 3: continued

	(1)		(2)		(3)		(4)	
Estimation	OLS		OLS		Logit		Logit	
Dep var	No of prenatal care visits				Early prenatal care dummy			
Date	Aug-96		July-97		Aug-96		July-97	
Coefficient on PF + no of days post-PWRORA * Coefficient on tr x P x F								
and the standard errors in italics								
3 months	0.034		-0.029		-0.003		0.013	**
	0.037		*0.037*		*0.004*		*0.004*	
6 months	-0.002		-0.066	*	-0.005		0.010	**
	0.037		*0.036*		*0.004*		*0.004*	
9 months	-0.038		-0.104	**	-0.007	*	0.007	*
	0.037		*0.036*		*0.004*		*0.004*	
1 year	-0.074	**	-0.142	**	-0.009	**	0.004	
	0.037		*0.035*		*0.004*		*0.004*	
2 years	-0.218	**	-0.292	**	-0.018	**	-0.007	*
	0.040		*0.037*		*0.004*		*0.004*	
3 years	-0.363	**	-0.442	**	-0.026	**	-0.019	**
	0.046		*0.043*		*0.005*		*0.005*	
4 years	-0.507	**	-0.593	**	-0.035	**	-0.030	**
	0.053		*0.051*		*0.006*		*0.005*	
5 years	-0.651	**	0.743	**	-0.043	**	-0.042	**
	0.062		*0.060*		*0.007*		*0.006*	
F=1 1990	7.599		7.599		0.579		0.579	
	4.845		*4.845*		*0.494*		*0.494*	
F=1 1996/7	9.303		9.404		0.707		0.714	
	4.217		*4.187*		*0.455*		*0.452*	
F=0 1990	9.429		9.429		0.633		0.633	
	4.611		*4.611*		*0.482*		*0.482*	
F=0 1996/7	10.542		10.620		0.726		0.736	
	4.305		*4.346*		*0.446*		*0.441*	
Change as % of levels for the foreign born in the year preceding the program date								
1 year	-0.80	**	-1.51	**	-1.32	**	0.60	
2 year	-2.35	**	-3.11	**	-2.52	**	-1.01	*
3 year	-3.90	**	-4.71	**	-3.72	**	-2.61	**
4 year	-5.45	**	-6.30	**	-4.92	**	-4.21	**
5 year	-7.00	**	7.90	**	-6.12	**	-5.81	**

Table 4: PWRORA's impact on prenatal care visits under various assumptions of the share of legal immigrants

	(1)	(2)	(3)	(4)	(5)
Date	Aug-96	Aug-96	Aug-96	Aug-96	Aug-96
Share of legal immigrants (W)	100	90	80	70	60
Post-PWRORA dummy (P) x W	-0.21004**	-0.21004**	-0.21004**	-0.21004**	-0.21004**
	(0.02708)	(0.02708)	(0.02708)	(0.02708)	(0.02708)
Foreign-born dummy (F)	-1.73332**	-1.73332**	-1.73332**	-1.73332**	-1.73332**
	(0.02664)	(0.02664)	(0.02664)	(0.02664)	(0.02664)
P X F X W	0.07022*	0.05468	0.03526	0.01029	-0.02300
	(0.03710)	(0.03908)	(0.04169)	(0.04523)	(0.05020)
trend (tr)	0.00062**	0.00062**	0.00062**	0.00062**	0.00062**
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00001)
tr x F	0.00033**	0.00033**	0.00033**	0.00033**	0.00033**
	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
tr X P x W	-0.00050**	-0.00050**	-0.00050**	-0.00050**	-0.00050**
	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
tr x P x W x F	-0.00040**	-0.00049**	-0.00062**	-0.00078**	-0.00099**
	(0.00003)	(0.00003)	(0.00003)	(0.00004)	(0.00004)
county dummies	incl	incl	incl	incl	incl
Observations	898751	898751	898751	898751	898751
R-squared	0.08	0.08	0.08	0.08	0.08
Coefficient for P x F x W + coeff for tr x P x F x W					
Standard error for the expression is in italics					
3 months	0.034	0.010	-0.021	-0.061	-0.114 **
	0.037	*0.039*	*0.041*	*0.045*	*0.050*
6 months	-0.002	-0.036	-0.078	-0.132 **	-0.204 **
	0.037	*0.039*	*0.041*	*0.045*	*0.050*
9 months	-0.038	-0.081 **	-0.134 **	-0.203 **	-0.295 **
	0.037	*0.039*	*0.041*	*0.045*	*0.050*
1 year	-0.074	-0.126 **	-0.191 **	-0.274 **	-0.385 **
	0.037	*0.039*	*0.042*	*0.045*	*0.050*
2 years	-0.218	-0.306 **	-0.417 **	-0.558 **	-0.747 **
	0.040	*0.043*	*0.046*	*0.049*	*0.055*
3 years	-0.363	-0.487 **	-0.643 **	-0.843 **	-1.109 **
	0.046	*0.049*	*0.052*	*0.056*	*0.063*
4 years	-0.507	-0.668 **	-0.868 **	-1.127 **	-1.471 **
	0.053	*0.056*	*0.060*	*0.065*	*0.073*
5 years	-0.651	-0.848 **	-1.094 **	-1.411 **	-1.833 **
	0.062	*0.065*	*0.069*	*0.075*	*0.084*

Table (continued)

	(1)	(2)	(3)	(4)	(5)
Date	Aug-96	Aug-96	Aug-96	Aug-96	Aug-96
Share of legal immigrants (W)	100	90	80	70	60
Decline in prenatal care visits as a percentage of mean prenatal care for the foreign-born in the year preceding the program date					
3 months	0.367	0.103	-0.228	-0.653	-1.220 **
6 months	-0.021	-0.383	-0.835	-1.417 **	-2.193 **
9 months	-0.408	-0.868 **	-1.442 **	-2.181 **	-3.166 **
1 year	-0.796	-1.353 **	-2.050 **	-2.945 **	-4.139 **
2 years	-2.346	-3.294 **	-4.478 **	-6.001 **	-8.031 **
3 years	-3.897	-5.235 **	-6.907 **	-9.056 **	-11.923 **
4 years	-5.448	-7.176 **	-9.335 **	-12.112 **	-15.815 **
5 years	-6.998	-9.116 **	-11.764 **	-15.168 **	-19.706 **

Table 6: PWRORA's impact on prenatal care visits under various assumptions of the share of legal immigrants

	(1)	(2)	(3)	(4)	(5)
Date	Aug-96	Aug-96	Aug-96	Aug-96	Aug-96
Share of legal	100	90	80	70	60
Post-PWRORA	-0.00431	-0.00431	-0.00431	-0.00431	-0.00431
dummy (P) x W	(0.00294)	(0.00294)	(0.00294)	(0.00294)	(0.00294)
foreign born=1	-0.04980**	-0.04980**	-0.04980**	-0.04980**	-0.04980**
	(0.00266)	(0.00266)	(0.00266)	(0.00266)	(0.00266)
P x F x W	-0.00094	-0.00153	-0.00226	-0.00319	-0.00445
	(0.00399)	(0.00420)	(0.00447)	(0.00485)	(0.00537)
trend (tr)	0.00005**	0.00005**	0.00005**	0.00005**	0.00005**
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
tr x F	0.00001**	0.00001**	0.00001**	0.00001**	0.00001**
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
tr x P	-0.00004**	-0.00004**	-0.00004**	-0.00004**	-0.00004**
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
tr x P x F	-0.00002**	-0.00003**	-0.00004**	-0.00005**	-0.00006**
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
No obs.	888733	888733	888733	888733	888733

Standard errors in parentheses. ** significant at 5%; ** significant at 1%

Coefficient for PxFxW +
number of dates post-PWRORA x coefficient for tr x P x F x W
Standard errors for the expression are in italics

3 months	-0.003	-0.004	-0.006	-0.008	-0.010 *
	0.004	*0.004*	*0.004*	*0.005*	*0.005*
6 months	-0.005	-0.007 *	-0.009 **	-0.012 **	-0.016 **
	0.004	*0.004*	*0.004*	*0.005*	*0.005*
9 months	-0.007 *	-0.010 **	-0.013 **	-0.016 **	-0.021 **
	0.004	*0.004*	*0.004*	*0.005*	*0.005*
1 year	-0.009 **	-0.012 **	-0.016 **	-0.021 **	-0.027 **
	0.004	*0.004*	*0.004*	*0.005*	*0.005*
2 year	-0.018 **	-0.023 **	-0.030 **	-0.038 **	-0.050 **
	0.004	*0.005*	*0.005*	*0.005*	*0.006*
3 year	-0.026 **	-0.034 **	-0.044 **	-0.056 **	-0.072 **
	0.005	*0.005*	*0.005*	*0.006*	*0.007*
4 year	-0.035 **	-0.045 **	-0.057 **	-0.074 **	-0.095 **
	0.006	*0.006*	*0.006*	*0.007*	*0.008*
5 year	-0.043 **	-0.055 **	-0.071 **	-0.091 **	-0.118 **
	0.007	*0.007*	*0.007*	*0.008*	*0.009*

Table 6: continued

Decline in the probability of early prenatal care as a percentage of mean probability for the foreign born in the year preceding the program date					
3 months	-0.43 *	-0.60	-0.81	-1.07	-1.43 *
6 months	-0.73 **	-0.98 *	-1.29 **	-1.70 **	-2.23 **
9 months	-1.03 **	-1.36 **	-1.78 **	-2.32 **	-3.03 **
1 year	-1.32 **	-1.74 **	-2.27 **	-2.94 **	-3.84 **
2 year	-2.51 **	-3.27 **	-4.21 **	-5.43 **	-7.04 **
3 year	-3.70 **	-4.80 **	-6.16 **	-7.91 **	-10.25 **
4 year	-4.89 **	-6.32 **	-8.11 **	-10.40 **	-13.46 **
5 year	-6.08 **	-7.85 **	-10.05 **	-12.89 **	-16.67 **

Table 8: PWRORA's impact on birthweight, low birthweight and preterm birth in urban Texas

	(1)	(2)	(3)
Estimation	OLS	Logit	Logit
Dep var	birthweight (g)	low-birthweight dummy	pre-term dummy
Date	Aug-96	Aug-96	Aug-96
male child	96.63135**	-0.00015**	0.00025**
dummy	(1.13466)	(0.00002)	(0.00002)
older mother	1.76825	0.00091**	0.00104**
dummy	(5.56010)	(0.00007)	(0.00007)
teen mother	-123.62062**	0.00060**	0.00058**
dummy	(1.93500)	(0.00003)	(0.00003)
father high sch	-13.81795**	0.00006**	0.00008**
grad or more	(1.17809)	(0.00002)	(0.00002)
inside urbanized	15.55244**	-0.00002	0.00000
area dummy	(5.96236)	(0.00009)	(0.00009)
Closest distance	-5.08567**	0.00008**	0.00004*
dummy	(1.68407)	(0.00003)	(0.00003)
Closer distance	-2.44799	0.00006**	0.00002
dummy	(1.64147)	(0.00002)	(0.00002)
Further distance	5.60574**	-0.00002	0.00002
dummy	(1.87779)	(0.00003)	(0.00003)
Furthest distance	11.08504**	-0.00006*	-0.00001
dummy	(2.18919)	(0.00003)	(0.00003)
Post-PWRORA	1.09158	-0.00003	0.00005
dummy (P)	(3.33010)	(0.00005)	(0.00005)
Foreign-born	41.26308**	-0.00041**	-0.00027**
dummy (F)	(3.27603)	(0.00005)	(0.00005)
P x F	4.24481	0.00002	-0.00009
	(4.56250)	(0.00007)	(0.00007)
trend (tr)	-0.00497**	0.00000	0.00000**
	(0.00162)	(0.00000)	(0.00000)
tr x F	0.00138	0.00000	-0.00000**
	(0.00227)	(0.00000)	(0.00000)
tr x P	-0.01488**	0.00000**	0.00000**
	(0.00269)	(0.00000)	(0.00000)
tr x P x F	0.01537**	-0.00000*	0.00000**
	(0.00368)	(0.00000)	(0.00000)
County dummies	incl	incl	incl
Observations	898329	898157	883106
R-squared	0.02		

Standard errors in parentheses. ** significant at 5%; ** significant at 1%

Table 8 continued

	(1)	(2)	(3)	
Estimation	OLS	Logit	Logit	
Dep var	birthweight (g)	low-birthweight dummy	pre-term dummy	
Date	Aug-96	Aug-96	Aug-96	
Coefficient on PF + no of days post-PWRORA * Coefficient on tr x P x F				
and the standard errors in italics				
3 months	5.65	0.000013	-0.000067	
	4.53	0.000068	0.000069	
6 months	7.05	0.000004	-0.000047	
	4.52	0.000068	0.000069	
9 months	8.45	-0.000006	-0.000027	
	4.54	0.000068	0.000070	
1 year	9.86 **	-0.000015	-0.000007	
	4.58	0.000069	0.000071	
2 years	15.47 **	-0.000052	0.000073	
	4.97	0.000075	0.000077	
3 years	21.08 **	-0.000089	0.000153	*
	5.66	0.000085	0.000088	
4 years	26.69 **	-0.000126	0.000233	**
	6.56	0.000099	0.000101	
5 years	32.30 **	-0.000163	0.000312	**
	7.59	0.000114	0.000117	
F=1 1990	3356.87	0.046224	0.061034	
	531.47	0.209973	0.239397	
F=1 1996/1997	3353.55	0.049177	0.063638	
	535.49	0.216242	0.244112	
F=0 1990	3295.54	0.060462	0.073412	
	547.95	0.238345	0.260815	
F=0 1996/1997	3278.43	0.065171	0.085095	
	554.26	0.246833	0.279030	
Change as a % of the levels for the foreign-born in the year preceding the program date				
1 year	0.29 **	-0.03	-0.01	
2 years	0.46 **	-0.11	0.11	
3 years	0.63 **	-0.18	0.24	*
4 years	0.80 **	-0.26	0.37	**
5 years	0.96 **	-0.33	0.49	**

Table 10: Mean distance to prenatal care for categories of distances from prenatal care providers

Percentile	Urban (km)	Rural (km)
0-25	859.3599	1144.948
25-50	1926.779	3051.256
50-75	3181.309	6762.053
75-90	4952.358	12508.77
90-100	8380.343	22192.61