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ABSTRACT

This paper examines if welfare programs reduce the probability that vulnerable household experience food deprivation because of financial constraints. Although the 1996 welfare reform legislation specifically limited the eligibility of immigrant households to receive assistance, many states chose to protect their immigrant populations by offering state-funded aid to these groups. I exploit these changes in eligibility rules to examine the link between food insecurity and public assistance. The evidence indicates that a 10 percentage point cut in the fraction of the population that receives public assistance increases the fraction of food-insecure households by about 5 percentage points.

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Food Insecurity and Public Assistance

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I. Introduction

The rapid growth of the welfare state spawned a large literature examining the factors that determine whether households participate in particular programs, and investigating the programs' impact on various social and economic outcomes, such as labor supply, household income, and family structure.[1] To a large extent, this literature identifies the behavioral distortions caused by these programs, and then calculates various measures of the costs of the distortions, such as reduced work activity or an increased rate of marriage dissolution.

In contrast, relatively few studies attempt to measure the benefits from these programs. Presumably, the social goal of enacting programs that provide housing assistance is to upgrade housing conditions among disadvantaged households. The objective of Medicaid is to improve health outcomes in vulnerable populations. And the purpose of food stamps is to reduce the vulnerability of needy households to bouts of food insecurity and hunger. Remarkably, after a half century of experimentation with welfare programs and after thousands of empirical studies that examine many aspects of these programs, the answers to these questions remain elusive.

In recent years, there has been a growing awareness of the skewed nature of the questions that dominate research on the economics of welfare programs. Such studies as Hamermesh (1982), Gruber (1997), and Crossley and Browning (2001) have estimated the consumption-smoothing effects of the unemployment insurance program, while Gruber (2000) and Meyer and

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Sullivan (2001) examine the link between consumption and welfare benefits. Similarly, Currie and Thomas (1995) document that Head Start, a program designed to improve the skills and health outcomes of disadvantaged preschool children, improves test scores in the targeted population, and Currie and Yelowitz (2000) suggest that public housing relieves overcrowding and may even improve the educational outcomes of the affected children.

This paper addresses a simple question: Do welfare programs reduce the probability that vulnerable households are food insecure? If the primary objective of public assistance is to guarantee that households do not experience severe spells of various types of hardships and deprivation, ensuring the food security of vulnerable households must then surely be one of the central goals of the welfare state.[2]

The link between public assistance and food insecurity is difficult to measure because a built-in spurious correlation precludes researchers from drawing credible inferences: the households that are most likely to be food insecure are also the households that are most likely to qualify for and participate in welfare programs. The impact of public assistance on food insecurity could be identified through a randomized experiment wherein the government provides aid to some households and denies aid to a control group. Although such an idealized experiment does not exist, the huge changes in eligibility introduced by the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) provide a great deal of exogenous variation that could, in principle, help address this important question.[3]

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[1] Moffitt (1992) gives a comprehensive review of the literature.

[2] Rossi (1998) presents a detailed evaluation of the effectiveness of the Food Stamp Program. The key conclusion is that we do not know if the program actually helps to "feed the poor."

[3] In a related study, Gundersen and Oliveira (2001) use the Survey of Income and Program Participation to examine if the Food Stamp Program helps targeted households reach a level of food sufficiency.

Although PRWORA changed eligibility rules for almost all households, some key changes were specifically targeted at immigrants. It is well known that immigrant participation in welfare programs rose rapidly in recent decades (Borjas and Hilton, 1996). This steep rise in immigrant welfare use motivated Congress to include a number of eligibility restrictions in the 1996 legislation. It turns out, however, that these restrictions could potentially affect only a subset of the immigrant population, depending on the household's state of residence, on whether the household entered the country as refugees, and on whether the foreign-born person was naturalized or not. As a result, the idiosyncratic changes in immigrant eligibility present a unique opportunity to examine if public assistance programs alleviate the adverse social outcomes, such as food insecurity, that justify the existence of these programs in the first place.

Remarkably little is known about the extent of food insecurity in the United States.[4] Not surprisingly, there is more food insecurity among immigrants than among natives. Moreover, food insecurity increased most during the 1994-98 period among the immigrants most adversely affected by the eligibility restrictions in welfare reform. The evidence suggests that a 10 percentage point cut in the fraction of the population that receives public assistance increases the fraction of the population that is food insecure by around 5 percentage points. The study, therefore, provides evidence of a causal link between the receipt of public assistance and food insecurity in targeted households.

II. Welfare Reform

The welfare reform legislation made fundamental changes in the federal system of public assistance. In addition to granting state governments a great deal of authority to set their own

[4] Andrews et al (2000) summarize the available evidence.

eligibility and benefit rules, the legislation mandates that most welfare recipients go to work after two years and imposes a five-year lifetime limit for receiving assistance. The legislation also specifically limits the extent to which immigrant households can receive welfare. As signed by President Clinton, PRWORA contained two key provisions applying to legal immigrants who did not enter the country as refugees:

1. Most non-citizens who arrived in the country before August 22, 1996, the "pre-enactment" immigrants, were to be kicked off from the SSI and food stamp rolls within a year. This provision of the legislation was never fully enforced.
2. Immigrants who entered the United States after August 22, 1996, the "post-enactment" immigrants, are prohibited from receiving most types of public assistance. The ban is lifted when the immigrant becomes an American citizen.

In contrast to these restrictions on the (legal) non-refugee, non-citizen population, PRWORA did not restrict refugee participation in the various public assistance programs. In addition, the legislation continued to prohibit illegal immigrants from receiving most types of aid.

One can loosely interpret the restrictions on post-enactment immigrants as setting up a five-year "waiting period" before they can qualify for public assistance. After five years in the United States, the immigrant can become a naturalized citizen and the ban on welfare use is lifted.

The restrictions on immigrant welfare use brought together a number of powerful interest groups after the 1996 presidential election—all of which lobbied hard for their repeal. The balanced budget agreement reached in 1997 between President Clinton and the Republican-controlled Congress repealed some of the most draconian aspects of the legislation. The partial restoration of federal aid, combined with actions taken by individual states (discussed below), implies that few of the pre-enactment immigrants ended up being kicked out of the SSI and Food

Stamp Programs.[5] The mandated waiting period for post-enactment immigrants, however, remained on the books.

Table 1 presents a more detailed summary of the restrictions that the welfare reform legislation (as subsequently amended) now imposes on immigrant welfare use. Since most of the restrictions on the pre-enactment immigrants were never enforced, and since only a relatively small fraction of the immigrant population in the United States arrived after 1996, it would seem that PRWORA could *not* have had a large impact on welfare participation rates in the immigrant population. However, even though the welfare participation rate declined in both immigrant and native households between 1994 and 1998, the decline was much steeper among immigrants. This finding led Fix and Passel (1999) to conclude that welfare reform had a "chilling effect" on the propensity of immigrants to apply for benefits they are legally entitled to (see also Borjas, 2001).

The Current Population Surveys (CPS) collects information on the immigration status of survey participants since 1994. The Annual Demographic Files (i.e., the March Supplement) of the CPS provide detailed information on participation in various types of public assistance programs during the calendar year prior to the survey. I use the 1995-99 March Supplements in the empirical analysis reported below.[6] Throughout the paper, the household is the unit of analysis. I restrict the study to households that do not reside in group quarters. A household will be classified as an immigrant household if the household head was born outside the United States

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[5] See US General Accounting Office (1998) for a discussion of the various policy changes that occurred after the enactment of PRWORA at both the federal and state levels.

[6] I do not use the 1994 Current Population Survey because that survey provided limited information on the national origin of immigrants. There also seem to be some problems with the foreign-born sample in the 1994 and 1995 surveys. In particular, the "official" person weights provided in these surveys do not yield an accurate enumeration of the immigrant population. Passel (1996) gives a detailed discussion of this problem, and uses a complex algorithm to calculate revised weights for each person in both the 1994 and 1995 surveys. I use the "Passel weights" in all calculations that involve the 1995 survey.

and is either an alien or a naturalized citizen. All other households are classified as native households. In addition, an immigrant household will be classified as a citizen household or a non-citizen household based on the naturalization status of the household head.[7]

Table 2 summarizes some of the key trends for the 1994-98 period. As suggested by earlier research, the decline in welfare use was indeed steeper among immigrant households. For example, the fraction of native households that received some type of assistance (defined as receiving cash benefits, food stamps, or Medicaid) fell from 15.6 to 13.4 percent (or 2.2 percentage points) between 1994 and 1998. In contrast, the fraction of immigrant households receiving some type of assistance declined by 3.4 percentage points over the period. Moreover, the decline was even steeper among non-citizen households—precisely the group targeted by welfare reform. Their participation rate fell by 6.5 percentage points (from 29.4 to 22.9 percent).

The trends are equally striking for the Food Stamp Program: the proportion of natives receiving food stamps fell by 2.7 percentage points, but the drop was 7.4 percentage points for non-citizens. The evidence, therefore, suggests that welfare reform—at least at the national level—may have had a sizable chilling effect on immigrant participation in welfare programs.

Since 1995, the Food Security Supplements of the CPS report food security at the household level.[8] The food security variable comes from the household's response to an 18-item array of questions (see the appendix for the full set of questions). These questions determine if

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[7] I also used the nativity and citizenship status of other household members to construct alternative definitions of what constitutes a native or an immigrant household. For example, one can categorize the household as "exclusively citizen" if all members are native-born or naturalized citizens, and as "exclusively non-citizen" if all members are non-citizens. The conclusions reported below are not sensitive to these alternative definitions.

[8] The variables summarizing participation in welfare programs in the March CPS refer to participation in these programs in the previous calendar year. In contrast, the food insecurity information refers to the 12-month period prior to the survey. To avoid confusion, I will report the data obtained from the Food Security Supplement *as if* it referred to the prior calendar year (i.e., the April 1995 survey is used to obtain data for the 1994 calendar year; the September 1996 survey gives the data for the 1995 calendar year, and so on). I use the supplement weights in all of the calculations reported in this paper.

the household skipped meals or was "hungry but did not eat" because it could not afford to buy food. The US Department of Agriculture calculates various summary measures of food security from these responses. Bickel et al (2000) define four key classifications:

a. Food secure: the "household shows no or minimal evidence of food insecurity."
b. Food insecure without hunger: there are concerns "about adequacy of the household food supply."
c. Food insecure with hunger (moderate): "Adults have repeatedly experienced the physical sensation of hunger."
d. Food insecure with hunger (severe): "Children have experienced hunger," or adults "have repeatedly experienced more extensive reductions in food intake."

My summary measure of the household's food insecurity during the 12-month period prior to the survey is given by the joint set of classifications *b*, *c*, and *d*.[9] The food insecurity variable used in this study, therefore, is probably best interpreted not as a measure of severe deprivation, but rather as a correlate of consumption effects.

One potential problem is that the CPS measure of food insecurity is subjective. However, the available evidence indicates that the food insecurity measure is related to the household's nutritional intake, particularly for adults (Lee and Frongillo, 2001; and Battacharya, Currie, and Haider, 2002). Furthermore, there is a significant correlation between my food insecurity variable and the rough data on food expenditures available in the Food Security Supplements: households that are food insecure spend 20 percent less on food than households that are not. And this correlation persists even after controlling for an extensive set of socioeconomic

[9] Stricter definitions of food insecurity would capture much rarer events. For example, only 2.9 percent of native households and 3.9 percent of immigrant households were food insecure with hunger (either moderate or severe) in 1999. Similarly, only .5 percent of native households and .6 percent of immigrant households were food insecure with severe hunger.

characteristics, including the household's composition and state of residence, as well as the age, race, gender, and educational attainment of the household head.[10]

Table 2 shows that there is a sizable gap in food insecurity rates between immigrant and native households. In 1994, for instance, 11.3 percent of native and 17.9 percent of immigrant households were food insecure. The relatively worse performance of immigrant households is not surprising since the typical immigrant is relatively less skilled than the typical native.

The fraction of natives who are food insecure fell from 11.3 to 9.5 percent (or 1.8 percentage points) between 1994 and 1998, while the respective decline among immigrants was *larger*, from 17.9 to 14.9 percent. The economic boom of the late 1990s probably accounts for the decline in food insecurity among all types of households, but it is difficult to explain why the contraction of the welfare state did not have a particularly adverse effect on food security in immigrant households. Moreover, the differential trends between citizen and non-citizen households only deepen the puzzle. Food insecurity actually rose slightly for citizen households and declined by 4.3 percentage points for non-citizen households, precisely the opposite of what one would have expected since welfare reform targeted mainly non-citizen households.[11]

In sum, the aggregate trends indicate that the period of welfare reform was marked by a relatively steep decline in welfare participation among immigrant households, but that this

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[10] The US Department of Agriculture defines a market basket that specifies the foods that people could consume to obtain a nutritious diet at a minimal cost (U.S Department of Agriculture, 1999). This "Thrifty Food Plan" is used as the basis for food stamp allotments. I combined the information on the household's food expenditures with the cost of the thrifty food plan to determine if the household's expenditures are below those required to purchase the Thrifty Food Plan. The probability of spending below the minimum required to purchase the Thrifty Food Plan is 19.6 percentage points higher for food-insecure households.

[11] The Food Security Supplements also provide some information on participation in the Food Stamp Program, but these data are not very useful. The definition of program participation is not consistent over time and the screen used to determine which households were asked the participation questions varies across surveys. As a result, the supplements miss the steep downward trend in welfare participation revealed by other sources (Figlio, Gundersen, and Ziliak, 2000). For example, the proportion of households that received food stamps in the Food Security Supplements fell only from 6.1 to 5.6 percent between 1995 and 1998, as compared to the 2.3 percentage point drop documented in the March CPS.

decline did not seem to increase food insecurity in this vulnerable population. I will show below, however, that these nationwide trends mask disparities within the immigrant population, mainly because they ignore the fact that different states responded differently to the federal restrictions on immigrant welfare use.

III. Welfare Participation

To better assess the role played by PRWORA, it is instructive to conduct an analysis that takes into account three unrelated facts that influence how welfare reform differentially affected various types of immigrants. First, the restrictions in PRWORA are targeted to immigrants who are not naturalized and who did not enter the country as refugees. Second, the post-enactment immigrants face more severe restrictions on welfare eligibility than do the pre-enactment immigrants, so that welfare reform may have had a more dramatic impact among newer arrivals. Finally, a key provision of PRWORA allows states to offer state-funded assistance programs to their immigrant populations if they wish to attenuate the adverse impact of federal welfare reform on the foreign-born.

Some states chose to provide state-funded assistance to immigrants, while others did not. Zimmermann and Tumlin (1999) document the various programs that states extended to immigrants in the wake of welfare reform. These programs included offering Temporary Assistance for Needy Families (TANF), Medicaid, food assistance, and Supplemental Security Income (SSI) to pre-enactment and/or post-enactment immigrants. As Table 3 shows, practically every state extended both TANF and Medicaid to pre-enactment immigrants. A few states went beyond this "minimal" level of generosity and offered other programs to their immigrant populations. It is worth noting that many of the states with large concentrations of immigrants exceeded the minimal level of generosity. In fact, California, the state with a third of the

immigrant population, was one of only two states that offered all eight possible programs to immigrants (the other such state was Maine).

To show how the chilling effect of welfare reform depended on the decisions made by individual states, I pool the 1994-95 calendar years of the March CPS to calculate the welfare participation rates prior to welfare reform, and the 1997-98 calendar years to calculate those rates after welfare reform.[12] Initially, I use an aggregate measure of welfare participation: the probability that the household receives some type of assistance (defined as receipt of cash benefits, food stamps, or Medicaid).

I then group states into two categories. I define a "more generous" state to be one that went beyond the minimal level of generosity and offered either an additional cash or food assistance program to its immigrant population; all other states will be defined as "less generous."[13]

Finally, I calculate the welfare participation rates in four mutually exclusive population groups, depending on the birthplace, citizenship status, and year of arrival of the household head. These groups are: (1) native households; (2) citizen households that have been in the country at least 5 years; (3) non-citizen households that have been in the country at least 5 years; and (4) immigrant households that have been in the country fewer than 5 years. The definition of the newly arrived immigrant cohort is particularly useful because it helps to partly identify the impact of welfare reform on post-enactment immigrant households.[14]

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[12] I exclude the 1996 calendar year data from the calculations. This helps to isolate the break in the time series that can presumably be attributed to PRWORA.

[13] Specifically, the state is more generous if it offered food assistance or SSI to pre-enactment immigrants, or TANF, food assistance, or SSI to post-enactment immigrants. By this definition, 27 states are "more generous."

[14] In the 1994-95 pooled sample, there are 94,814 native households, 4,449 citizen households that have been in the country at least 5 years; 5,573 non-citizen households that have been in the country at least 5 years; and

The top panel of Table 4 summarizes the evidence. The table shows that the decisions made by some states to offer a state-funded safety net to their immigrant populations did not affect the welfare participation of natives, but these decisions had a substantial impact on the welfare participation of immigrants. Before proceeding to discussing the trends for the various groups composing the immigrant population, note that the aggregate welfare participation rate of immigrants declined much faster in the less generous states. In particular, the participation rate of immigrants living in the less generous states fell by almost 8 percentage points (from 21.3 to 13.4 percent), while that of immigrants residing in the more generous states fell by only 2.8 percentage points (from 23.9 to 21.1 percent).

As the remaining rows of the table show, welfare reform had a differential impact on the various immigrant groups. For example, the welfare participation rate of non-citizen households who have been in the United States for more than 5 years declined by 12.0 percentage points (from 30.3 to 18.3 percent) in the less generous states, but by only 4.9 percentage points in the more generous states (from 30.4 to 25.5 percent). In contrast, the participation rate of citizen households declined by 3.0 percentage points in the less generous states and rose by 2.3 percentage points in the more generous states. As a result, non-citizen households experienced a somewhat larger relative decline in welfare participation than citizen households, who in turn experienced a larger relative decline than native households.

The data also indicate that the decline in welfare use experienced by newly arrived immigrants was roughly similar to that experienced by non-citizens who had arrived earlier. For example, the participation rate of new immigrants declined by almost 12 percentage points in the

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1,787 newly arrived households. In the 1997-98 pooled sample, there are 89,235 native households, 4,937 citizen households, 5,204 non-citizen households, and 1,762 newly arrived households.

less generous states, but by only 7 percentage points in the more generous states. Because of this similarity, I will often pool all non-citizen households in what follows.

The differential trends for non-citizen households between the less generous and more generous states remain when the sample is restricted to the non-refugee population.[15] The non-refugee, non-citizen households residing in the less generous states experienced a 12 percentage point decline in their welfare participation rate, as compared to a 4 percentage point decline for the non-refugee, non-citizen households residing in the more generous states.[16]

The other panels of Table 4 replicate the analysis for two specific programs: food stamps and cash benefits. The state-funded assistance clearly had a differential impact on the probability that immigrant households participate in these programs. Although the probability that a native household received food stamps declined by 2 percentage points in both types of states, food stamp participation declined by 8 percentage points for non-citizens in the less generous states and by 5 percentage points for non-citizens in the more generous states. The restrictions had a particularly powerful effect in the sample of newly arrived non-refugees: their participation rates in the food stamp program dropped from 9.2 to 6.9 percent in the more generous states, and from 9.4 to 0.1 percent in the less generous states. In the absence of any attenuating effects provided by state-funded assistance, the PRWORA restrictions effectively removed the newly arrived immigrant population from the food stamp rolls.

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[15] The CPS does not report the type of visa used by a particular immigrant to enter the country. I approximate the refugee population by using information on the national origin of the foreign-born. The main refugee-sending countries over the 1970-95 period were: Afghanistan, Bulgaria, Cambodia, Cuba, Czechoslovakia, Ethiopia, Hungary, Laos, Poland, Romania, Thailand, the former U.S.S.R., and Vietnam. I classified all households where the household head originated in one of these countries as refugee households.

[16] Because a third of the immigrant population lives in California, it could be the case that California-specific events could drive the national trend. However, the conclusions are unchanged if households residing in California are excluded from the analysis. Borjas (2001) presents a detailed discussion of the differences in welfare participation between California and other states.

It is instructive to formalize the descriptive evidence in terms of a simple regression model. By controlling for various characteristics, the regression allows one to determine if the differential trends observed in the more and less generous states arise because different types of immigrants tend to live in different states, or because state-specific trends in economic activity may be correlated with the state's welfare generosity. I pool the CPS data available for the calendar years 1994, 1995, 1997, and 1998, and estimate the triple-difference linear probability model:

$$(1) \qquad p_{ij} = X_{ij}\beta + \alpha_0 t_{ij} + \alpha_1 I_{ij} + \alpha_2 G_{ij} + \gamma_0 (I_{ij} \times t_{ij}) + \gamma_1 (I_{ij} \times G_{ij}) + \gamma_2 (G_{ij} \times t_{ij}) + \theta_p (I_{ij} \times G_{ij} \times t_{ij}) + \varepsilon_{ij},$$

where p_{ij} is a dummy variable indicating if household i in state j receives public assistance; X_{ij} is a vector of socioeconomic characteristics defined below; t_{ij} is a dummy variable set to unity if the observation refers to the post-PRWORA period; I_{ij} is a vector of two dummy variables indicating if the head of the household is a non-citizen or a naturalized citizen (the omitted variable indicates if the head is native-born); and G_{ij} is a dummy variable indicating if the household resides in a "more generous" state. The parameters of interest are the two elements of the vector θ_p, which measure the impact of the state-provided safety net on the *relative* trend in the welfare use of non-citizens and citizens, respectively.

The first two rows of Table 5 reports the estimated triple-difference coefficients from a number of alternative specifications of the model. The first column of the table includes only a constant term in the vector X, so that δ is the unadjusted difference-in-difference-in-difference that could be calculated from a descriptive cross-tabulation. The second column adds a vector of socioeconomic characteristics including the age, race, gender, and educational attainment of the

household head; the number of persons, children, elderly persons, and disabled persons in the household; and the year of the immigrant's arrival in the United States (set to zero for native households).[17] The third column adds a vector of state fixed effects (s_j), as well as the interaction between these fixed effects and the time dummy variable ($s_j \times t_{ij}$) and the interaction between the fixed effects and the variable indicating if the household is citizen or non-citizen ($s_j \times I_{ij}$). The state-time interactions capture state-specific differences in the level *and* trend of participation rates, and the state-group interactions capture state-specific differences between non-citizens, citizens, and natives. The last column adds country-of-birth fixed effects to control for potential differences in participation propensities across national origin groups.[18]

In the most general specification, the estimated triple-difference coefficient for non-citizen households is .077 (with a standard error of .019), while the coefficient for citizen households is .053 (.021). Although the impact of welfare reform on non-citizens is somewhat larger than the impact on citizens, the difference between the two groups is not significantly different. Overall, the evidence suggests that the state-funded programs helped attenuate the potential chilling effect of federal welfare reform for all immigrants.

The rough similarity between the trends for citizens and non-citizens is somewhat surprising since the welfare reform legislation targeted only non-citizens. This similarity, however, could arise for a number of reasons. For instance, there may have been a great deal of misinformation about the legislative changes in the immigrant population, particularly because the federal government and many states altered the eligibility restrictions soon after the reforms

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[17] Age is defined as a vector of dummy variables indicating if the head is 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, or over 75 years old. The educational attainment variable is defined as a vector of dummy variables indicating if the head is a high school dropout (less than 12 years), a high school graduate (12 years), has some college (13-15 years), or is a college graduate (at least 16 years). The year of arrival dummy variables indicate if the household arrived before 1950, in 1950-59, 1960-64, 1965-69, 1970-74, 1975-79, 1980-84, 1985-89, 1990-94, or after 1995.

were enacted. Similarly, there is some evidence that citizenship status is systematically misreported by immigrants, many of whom may be not be fully familiar with the difference between a permanent residence visa (the "green card" that entitles a foreign-born person to reside permanently in the United States) and U.S. citizenship.[19]

Perhaps most important, the comparison between citizens and non-citizens may be contaminated by the potential endogeneity of the citizenship classification. After all, the immigrants most affected by welfare reform could neutralize many of the restrictions by simply becoming naturalized. In fact, there was a rapid rise in the number of naturalization applications during the period (Wasem, 1998). In 1995, the INS received 960 thousand such petitions; in 1997, the INS received 1.4 million petitions (US Immigration and Naturalization Service, 1999, p. 172). This increase in the number of naturalization applications generated a huge backlog at the INS, further delaying the time it takes to become a naturalized citizen.

A simple solution to the endogeneity problem is to compare immigrant households that differ in terms of how long they have resided in the United States, rather than in terms of their citizenship status. Immigrants have to live in the United States for five years before they can apply for naturalization, but the lags in the application process imply that it may take 8 years or more before an immigrant can become a naturalized citizen. In fact, only 10.3 percent of the immigrants who have been in the country fewer than 10 years and 35.3 percent of those who have been in the country between 10 and 20 years are naturalized citizens. In contrast, the naturalization rate for those who have been in the country at least 20 years is 67.5 percent. The second panel of Table 5 re-estimates equation (1) by defining the immigrant groups in terms of

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[18] This vector contains 102 dummy variables indicating the birthplace of the household head.

[19] As an example, the 1999 March CPS reports that 6.4 percent of the immigrants who have been in the United States fewer than 5 years are naturalized citizens. A foreign-born person must reside in the United States a minimum of five years before he can file a naturalization petition.

how long the household has resided in the United States, so that the vector I_{ij} is now composed of two dummy variables indicating if the household has been in the United States less than 10 years or more than 10 years (the omitted group being native households). There is a sizable (although not statistically significant) difference in the triple-difference coefficient between these two groups. The coefficient is .081 for the recent immigrants, and only .043 for the earlier immigrants.

The endogeneity issue is also avoided by simply comparing the immigrant and native populations, so that the vector *I* in equation (1) contains a single variable indicating if the household is headed by an immigrant. As reported in row 5 of Table 5, the triple-difference coefficient is .064, and statistically significant.

Finally, I examine if the generosity variable is isolating programs that specifically benefit immigrants or simply provides a general measure of the state's assistance to disadvantaged populations. The bottom panel of Table 5 conducts comparisons *within* the population of native households. In particular, row 6 compares black and white households; row 7 compares less-educated households (where the head has at most 12 years of schooling) and more educated households; row 8 compares single mothers (with children under 18) and two-parent households; and row 9 compares younger households (where the head is 40 years or younger) with older households. The triple-difference coefficients in these sensitivity tests are usually numerically small or insignificantly different from zero. The contrast with the coefficient in the sample of non-citizen households (or even better, in the sample of recently arrived immigrants) is striking. The state-funded programs clearly affected the participation of targeted immigrants, but had little impact on other disadvantaged groups. Therefore, the differential effect of welfare reform on the various immigrant groups can be used to define the "treatment" that would help identify if the cutback in public assistance programs increased food insecurity.

IV. Food Insecurity

The previous section showed that state-level decisions to offer alternative programs to immigrants in the aftermath of PRWORA had a substantial impact on the probability that certain types of immigrant households received public aid. I now examine if these state choices also influenced food insecurity in the affected households.

The top panel of Table 6 summarizes some of the key trends in food insecurity before and after PRWORA. As before, these trends are presented separately by the level of the state's generosity, and by the citizenship status of the household. Consider the trends in food insecurity rates experienced by native households. The proportion of native households that is food insecure declined by about 1 percentage point in both the less generous and more generous states. In contrast, the proportion of immigrant households that is food insecure rose in the less generous states from 12.8 to 14.2 percent, but fell in the more generous states from 16.9 to 16.0 percent.

These differential trends in food insecurity between the two types of states are also found within the various immigrant groups. In particular, the proportion of non-citizen households that is food insecure rose in the less generous states (from 20.5 to 22.2 percent), but fell in the more generous states (from 23.3 to 21.5 percent). Similarly, the proportion of newly arrived immigrant households who are food insecure rose from 10.2 to 14.3 percent in the less generous states, but declined from 17.2 to 16.5 percent in the more generous states. In short, the states that extended public assistance to their non-citizen populations after 1996 were able to arrest and reverse the rise in food insecurity that would likely have occurred had no actions been taken—both in absolute terms and relative to the trends in food insecurity experienced by the native population.

Table 6 also shows a similar rise in food insecurity among the less generous states even when the analysis is restricted to non-refugee households. For example, the food insecurity rate for non-refugee, non-citizen households rose from 20.6 to 23.2 percent in the less generous states, but declined by about 2 percentage points (from 23.3 to 21.5 percent) in the more generous states.

To investigate the extent to which these trends can be explained by differences in socioeconomic characteristics among the groups or by state-specific trends in economic or social conditions, consider again the triple-difference regression model:

$$(2) \qquad f_{ij} = X_{ij}\beta + \alpha_0 t_{ij} + \alpha_1 I_{ij} + \alpha_2 G_{ij} + \gamma_0 (I_{ij} \times t_{ij}) + \gamma_1 (I_{ij} \times G_{ij}) + \gamma_2 (G_{ij} \times t_{ij}) + \theta_f (I_{ij} \times G_{ij} \times t_{ij}) + \varepsilon_{ij},$$

where f_{ij} is a dummy variable indicating if the household is food insecure. Note that the regression specification in (2) is identical to the one used in the previous section to quantify the impact of welfare reform on welfare participation rates. The coefficient vector θ_f now measures the impact of the state-provided safety net on the relative trend in immigrant food insecurity.

Table 7 reports the relevant regression coefficients from alternative specifications of the model in equation (2). The impact of generous state programs on the food insecurity of non-citizen households is negative and statistically significant in almost all of the specifications. The unadjusted estimate of θ_f is -.050 (with a standard error of .022). In other words, the pre- and post-PRWORA *relative* growth in the fraction of non-citizen households that experienced food insecurity was almost 5 percentage points lower in the more generous states than in the less generous states. The remaining columns of the table show that θ_f remains negative even after controlling for socioeconomic characteristics, state fixed effects, and country-of-birth fixed

effects. In the most general specification, the coefficient is -.039 and marginally significant, indicating that the various statutory changes increased food insecurity for the targeted households even within national origin groups. In contrast, the second row of Table 7 shows that the food insecurity of citizen households was not responsive to changes in the state regulations.

There is also a striking difference in the impact of welfare reform on the food insecurity of newer and earlier immigrant arrivals. The unadjusted triple-difference coefficient is negative and significant (-.053, with a standard error of .024) for the newer immigrant arrivals, but much weaker for the earlier arrivals. Finally, the remaining rows of the table indicate that the state-funded programs offered to particular immigrants did not substantially affect the food insecurity status of various disadvantaged groups in the native population.[20]

V. Does Public Assistance Reduce Food Insecurity?

This section examines the causal link between food insecurity and public assistance. Consider the linear probability model:

$$(3) \qquad f_{ij} = W_{ij}\,\beta + \delta\, p_{ij} + \omega_{ij},$$

where f_{ij} is a dummy variable indicating the food insecurity status of household i in state j; W_{ij} is a vector of socioeconomic characteristics defined below; and p_{ij} is a dummy variable indicating if the household receives some type of public assistance.

[20] For simplicity, I aggregated various types of state-funded assistance into a single measure of the state's generosity. Food insecurity may be more closely related to some particular programs than to others. Because various types of assistance are often linked, there is relatively little independent variation in the data to measure the extent to which food insecurity reacts to specific types of assistance.

The correlation between f_{ij} and p_{ij} will likely be positive because those households that are most at risk of being food insecure are the ones that qualify for and receive public assistance. The welfare reform legislation and subsequent state responses introduced many (presumably) exogenous changes in eligibility rules for particular subgroups of the population. I use these eligibility changes to instrument for program participation in equation (3).

To illustrate, consider first a model that uses the citizenship status of the household to identify the parameter δ. I pool the three groups of native households, citizen households, and non-citizen households. The first-stage regression is then given by:

$$(4) \qquad p_{ij} = X_{ij}\,\beta + \lambda_1 R_{ij} Z_{ij} + \lambda_2 (1 - R_{ij}) Z_{ij} + v_{ij},$$

where R_{ij} is a dummy variable set to unity if the household is a refugee household; and the vector $Z_{ij} = (t_{ij}, I_{ij}, G_{ij}, I_{ij} \times t_{ij}, G_{ij} \times t_{ij}, I_{ij} \times G_{ij}, I_{ij} \times G_{ij} \times t_{ij})$, where I is the vector containing two dummy variables indicating if the head of household is a citizen or a non-citizen. Note that the vector Z_{ij} contains precisely the same set of variables used in the descriptive triple-difference regression models estimated in the previous sections. The vector W_{ij} in the second stage regression in equation (4) can then be defined as $W_{ij} = [X_{ij}, R_{ij} \widetilde{Z}_{ij}, (1 - R_{ij}) \widetilde{Z}_{ij}]$, where $\widetilde{Z}_{ij} = (t_{ij}, I_{ij}, G_{ij}, I_{ij} \times t_{ij}, G_{ij} \times t_{ij}, I_{ij} \times G_{ij})$. The identification of the coefficient δ then depends entirely on the exclusion of the triple-difference interaction terms from the second-stage regression. I estimate equation (4) using the linear probability model.

As noted earlier, the Food Security Supplements provide flawed information on program use by survey participants. Because the data required to estimate the system of equations in (3) and (4) is then contained in two separate data sets, I use the technique of Two Sample Instrumental Variables (TSIV) introduced by Angrist and Krueger (1992, 1995). This statistical

procedure is particularly useful whenever two data sets share a common set of instruments, but the endogenous regressors and the dependent variable are not jointly included in both data sets. In the current context, the first-stage regression on program participation is estimated using data from the March CPS. These regressions are then used to predict the probability that a particular household in the Food Security Supplements receives public assistance. The predicted probabilities form the regressor that stands in for p_{ij} in the second-stage regressions. The standard error of the structural coefficient δ is corrected for the fact that a predicted variable is used in the second stage.

For illustrative purposes, the first row of Table 8 reports the relevant coefficient from the OLS regression that can be estimated in the Food Security Supplements using the limited data available in those surveys on food stamp participation. It is evident that there is a strong positive spurious correlation between food insecurity and food stamp receipt.

The second row of the table uses TSIV to estimate the structural coefficient, and uses the household's citizenship status to define the groups in the vector I_{ij}. In the most general specification, which controls for the household's socioeconomic background, state of residence, and country-of-birth fixed effects, the parameter δ is -.400, with a standard error of .271. An increase in the probability of receiving assistance of 10 percentage points reduces the probability of food insecurity by 4 percentage points.[21]

As noted above, one can avoid the potential endogeneity of the household's citizenship status by using information on year-of-arrival. In particular, I classify households as native,

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[21] It is easy to provide a back-of-the-envelope calculation to get a sense of the magnitude of the structural effect implied by the reduced-form evidence summarized in the previous sections. Suppose the population consists only of native and non-citizen households. The most general specification in Table 5 suggests that the reduced-form impact of welfare reform on program participation is approximately .077. Similarly, Table 7 reports that the analogous impact on food insecurity is –.039. The TSIV estimate of the structural coefficient, which in the exactly identified case is equivalent to the Wald estimator, is $\delta = \theta_f/\theta_p = -.039/.077 = -.506$.

newer arrivals (those who arrived in the country in the past 10 years), and earlier arrivals (those who have been in the country at least 10 years), and use these groups to define the vector I_{ij}. The third row of Table 8 shows that the results are similar when I use this alternative set of instrumental variables. In the most complete specification, the coefficient δ is -.486, with a standard error of .291. The similarity between the two sets of results arises because the household's citizenship status can be accurately predicted using information on socioeconomic characteristics, country of birth, and year of arrival.

Alternative, one can avoid the endogeneity issue by simply using information on the birthplace of the household head, so that the immigrant vector I in equation (4) contains a single variable indicating if the head is an immigrant. The results are quite similar to those obtained using different classifications of the immigrant population. In the most complete specification, the coefficient δ is -.455, with a standard error of .254. The weight of the evidence, therefore, suggests an important causal link between public assistance and food insecurity.

VI. Summary

The central objective of many of the programs that make up the welfare state is to help needy families attain a sufficient level of consumption in such necessities as housing, health care, and food. Although a large literature evaluates the social and economic costs of these programs, fewer studies examine if the programs are successful in terms of their stated goals—that is, do these programs help the targeted households avoid homelessness, chronic illnesses, and hunger? This paper evaluated the extent to which these programs help needy families escape the prospect of food insecurity.

The 1996 welfare reform legislation contained a number of crucial provisions that greatly limited the eligibility of immigrant households to receive many types of public assistance. In

response to the federal legislation, many states chose to protect their immigrant populations from the presumed adverse impact of PRWORA by offering state-funded assistance to these groups. The empirical analysis uses data drawn from the 1995-99 Annual Demographic Files and the Food Security Supplements of the CPS to determine if these changes in the eligibility rules had a substantial impact on food insecurity in the immigrant population.

The study yields two empirical findings. First, the immigrants most likely to be adversely affected by the welfare reform legislation—the non-refugee, non-citizen population living in states that did not extend assistance to immigrants—did, in fact, experience a significant relative decline in the likelihood of welfare receipt. At the same time, this population also experienced a significant relative increase in food insecurity. By combining data from the two samples, the evidence suggests that eligibility restrictions that reduced the proportion of welfare recipients by 10 percentage points increased the proportion of food-insecure households by about 5 percentage points. The data, therefore, provide some evidence to support the hypothesis that welfare programs achieve one of their key objectives, providing households with a minimal level of food sufficiency.

The findings of this paper have policy implications for two of the most contentious issues in the debate over social policy. The results clearly suggest that tightening welfare eligibility rules can have adverse outcomes. In other words, although the tighter rules reduce the cost of welfare expenditures, they also aggravate the social ills that the programs were designed to address. This tradeoff has been largely ignored by most social science research that attempts to quantify the costs and benefits of the welfare state.

The evidence also has implications for immigration policy. The earliest restrictions on immigration—dating back to the Colonial days—limited the potential migration of "public charges." There is little disagreement over the fact that immigrant use of public assistance grew

rapidly in the past three decades. Congress perceived an actual problem, and tried to do something about it by including a number of immigrant-related provisions in the welfare reform legislation. It seems, however, that there may be a significant social cost to limiting eligibility to public assistance programs in a disadvantaged population. The evidence, therefore, suggests that it may be easier and cheaper to address the problems raised by the immigration of public charges not by "ending welfare as we know it," but by reforming immigration policy instead.

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Appendix: Measurement of Food Insecurity

The Food Security Supplements of the CPS contain an 18-item array of questions that are combined to create the food insecurity index used in this paper. The questions are:

Now I'm going to read you several statements that people have made about their food situation. Please tell me whether the statement was often, sometimes, or never true in the last 12 months:

1. "I worried whether our food would run out before we got money to buy more."
2. "The food that we bought just didn't last, and we didn't have money to get more."
3. "We couldn't afford to eat balanced meals."
4. "We relied on only a few kinds of low-cost food to feed the children because we were running out of money to buy food."
5. "We couldn't feed the children a balanced meal because we couldn't afford that."
6. "The children were not eating enough because we just couldn't afford enough food."

Additional questions:

7. In the last 12 months, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?
   8. How often did this happen—almost every month, some months but not every month, or in only one or two months?

9. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?

10. In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?

11. Sometimes people lose weight because they don't have enough to eat. In the last 12 months, did you lose weight because there wasn't enough food?

12. In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?
    13. How often did this happen—almost every month, some months but not every month, or in only one or two months?

14. In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food?

15. In the last 12 months, did any of the children ever skip meals because there wasn't enough money for food?
    16. How often did this happen—almost every month, some months but not every month, or in only one or two months?

17. In the last 12 months, were the children ever hungry but you just couldn't afford more food?

18. In the last 12 months, did any of the children ever not eat for a whole day because there wasn't enough money for food?

Table 1. Alien Eligibility for Means-Tested Federal Programs

Category of alien:	Program			
	SSI	Food stamps	Medicaid	TANF
Non-citizen arrived before 8/22/96	Eligible, if receiving SSI on 8/22/96, or subsequently disabled	Eligible, if age 65 or over on 8/22/96, or under age 18, or subsequently disabled	Eligible, for SSI-derivative benefits; otherwise, eligibility is a state option	Eligibility is a state option
Non-citizen arrived after 8/22/96	Not eligible	Not eligible	Eligible for emergency services only	Not eligible
Refugees and asylees	Eligible	Eligible	Eligible	Eligible
Non-immigrants and illegal aliens	Not eligible	Not eligible	Eligible for emergency services only	Not eligible

Source and notes: Vialet and Eig (1998), Table 1. Non-immigrants include foreign-born persons who are in the United States on a temporary basis, such as foreign students and tourists. The information provided for non-citizens who arrived after 8/22/96 and for refugee and asylees refers to their eligibility status during the first five years after arrival.

Table 2. Trends in Program Participation and Food Insecurity

		Calendar Year				
		1994	1995	1996	1997	1998
March CPS:						
Percent receiving assistance	Natives	15.6	15.0	15.3	14.0	13.4
	Immigrants	23.4	23.9	21.9	20.2	20.0
	Citizens	14.3	15.8	16.1	16.5	16.3
	Non-citizens	29.4	29.3	26.6	23.2	22.9
Percent receiving food stamps	Natives	8.7	8.1	8.0	6.8	6.0
	Immigrants	12.5	11.7	10.1	9.3	7.5
	Citizens	6.0	6.9	6.1	6.3	5.4
	Non-citizens	16.7	14.9	13.2	11.6	9.3
Food Security Supplements:						
Percent food insecure	Natives	11.3	10.9	9.1	11.3	9.5
	Immigrants	17.9	15.2	13.3	16.8	14.9
	Citizens	9.6	9.5	8.4	11.7	10.0
	Non-citizens	23.4	19.4	17.4	21.2	19.1

Notes: The household receives assistance if it receives cash benefits, food stamps, or Medicaid. The timing of the data differs somewhat for the food insecurity rates. The Food Security Supplements of the CPS are the April 1995, September 1996, April 1997, August 1998, and April 1999 surveys. Although the food insecurity rates refer to the 12-month period prior to the survey, this table simplifies the exposition by reporting the food insecurity rates as if they referred to the calendar year prior to the survey.

Table 3. State-Funded Assistance to Immigrants After 1996

	Pre-enactment immigrants				Post-enactment immigrants			
State	TANF	Medicaid	Food Assistance	SSI	TANF	Medicaid	Food Assistance	SSI
Alabama	No	Yes	No	No	No	No	No	No
Alaska	Yes	Yes	No	No	No	No	No	No
Arizona	Yes	Yes	No	No	No	No	No	No
Arkansas	Yes	Yes	No	No	No	No	No	No
California	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Colorado	Yes	Yes	No	No	No	No	Yes	No
Connecticut	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Delaware	Yes	Yes	No	No	No	Yes	No	No
District of Columbia	Yes	Yes	No	No	No	No	No	No
Florida	Yes	Yes	Yes	No	No	No	No	No
Georgia	Yes	Yes	No	No	Yes	No	No	No
Hawaii	Yes	Yes	No	No	Yes	Yes	No	No
Idaho	Yes	Yes	No	No	No	No	No	No
Illinois	Yes	Yes	Yes	Yes	No	Yes	No	No
Indiana	Yes	Yes	No	No	No	No	No	No
Iowa	Yes	Yes	No	No	No	No	No	No
Kansas	Yes	Yes	No	No	No	No	No	No
Kentucky	Yes	Yes	No	No	No	No	No	No
Louisiana	Yes	Yes	No	No	No	No	No	No
Maine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maryland	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Massachusetts	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Michigan	Yes	Yes	No	No	No	No	No	No
Minnesota	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Mississippi	Yes	Yes	No	No	No	No	No	No
Missouri	Yes	Yes	Yes	No	Yes	No	No	No
Montana	Yes	Yes	No	No	No	No	No	No
Nebraska	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Nevada	Yes	Yes	No	No	No	No	No	No
New Hampshire	Yes	Yes	No	Yes	No	No	No	No
New Jersey	Yes	Yes	Yes	No	No	No	No	No
New Mexico	Yes	Yes	No	No	No	No	No	No
New York	Yes	Yes	Yes	No	No	No	No	No
North Carolina	Yes	Yes	No	No	No	No	No	No
North Dakota	Yes	Yes	No	No	No	No	No	No
Ohio	Yes	Yes	Yes	No	No	No	No	No
Oklahoma	Yes	Yes	No	No	No	No	No	No
Oregon	Yes	Yes	No	Yes	Yes	No	No	Yes
Pennsylvania	Yes	Yes	No	No	Yes	Yes	No	No
Rhode Island	Yes	Yes	Yes	No	Yes	Yes	No	No
South Carolina	Yes	Yes	No	No	No	No	No	No
South Dakota	Yes	Yes	No	No	No	No	No	No
Tennessee	Yes	Yes	No	No	Yes	No	No	No
Texas	Yes	Yes	Yes	No	No	No	No	No
Utah	Yes	Yes	No	No	Yes	No	No	No
Vermont	Yes	Yes	No	No	Yes	No	No	No
Virginia	Yes	Yes	No	No	No	Yes	No	No
Washington	Yes	Yes	Yes	No	Yes	Yes	Yes	No
West Virginia	Yes	Yes	No	No	No	No	No	No
Wisconsin	Yes	Yes	Yes	No	Yes	No	Yes	No
Wyoming	Yes	No	No	No	Yes	No	No	No
States offering program	50	50	17	5	19	14	10	3

Source: Zimmermann and Tumlin (1999, Table 5). The state-funded programs for post-enactment immigrants are offered during the (federal) five-year bar following the time of entry into the United States.

Table 4. Trends in Program Participation
(Percent of households receiving assistance)

Program/Group:	Households in less generous states				Households in more generous states			
	All households		Non-refugee households		All households		Non-refugee households	
	Pre-1996	Post-1996	Pre-1996	Post-1996	Pre-1996	Post-1996	Pre-1996	Post-1996
Some type of assistance								
Natives	16.4	14.3	16.4	14.3	14.8	13.5	14.8	13.5
Immigrants	21.3	13.4	21.4	13.2	23.9	21.1	22.7	19.9
Citizens	14.3	11.3	15.4	11.2	14.8	17.1	14.6	16.1
Non-citizens	30.3	18.3	30.4	18.8	30.4	25.5	29.3	24.9
New arrivals	21.2	9.4	18.3	7.9	27.4	20.1	21.6	15.9
Food stamps								
Natives	9.1	7.1	9.1	7.1	8.0	6.1	8.0	6.1
Immigrants	10.9	4.9	10.9	4.9	12.2	8.9	10.8	7.9
Citizens	5.7	2.7	5.8	2.6	6.2	6.2	5.9	5.3
Non-citizens	17.5	9.4	17.8	9.9	16.4	11.3	15.1	10.6
New arrivals	11.2	1.9	9.4	0.1	14.7	10.0	9.2	6.9
Cash benefits								
Natives	7.6	6.5	7.6	6.5	7.8	6.2	7.8	6.2
Immigrants	8.4	4.2	7.9	4.0	12.0	9.7	10.5	8.3
Citizens	6.7	3.6	7.2	3.5	6.8	8.5	6.8	7.6
Non-citizens	10.5	6.2	9.6	6.2	15.9	11.4	13.9	10.2
New arrivals	8.7	2.0	6.6	1.3	13.6	8.2	8.4	4.6

Notes: The household receives some type of assistance if it receives cash benefits, food stamps, or Medicaid. The samples of citizen and non-citizen households include households where the head has been in the United States at least 5 years. The sample of newly arrived immigrants includes households where the head has been in the United States fewer than 5 years.

Table 5. Impact of Welfare Reform on Receipt of Some Type of Assistance, Triple Difference Estimates

	Regression model			
Sample:	(1)	(2)	(3)	(4)
By citizenship status:				
1. Non-citizens relative to natives	.056	.068	.071	.077
	(.021)	(.019)	(.019)	(.019)
2. Citizens relative to natives	.048	.059	.059	.053
	(.023)	(.021)	(.021)	(.022)
By year of migration:				
3. Immigrants in US ≤ 10 years relative to natives	.057	.077	.076	.081
	(.024)	(.021)	(.022)	(.022)
4. Immigrants in US > 10 years relative to natives	.033	.044	.050	.043
	(.021)	(.019)	(.019)	(.019)
By birthplace:				
5. Immigrants relative to natives	.043	.061	.065	.064
	(.016)	(.014)	(.015)	(.015)
Within native population:				
6. Blacks relative to whites	.023	.018	.023	---
	(.010)	(.010)	(.010)	
7. Less-educated relative to more educated households	-.011	-.010	-.010	---
	(.007)	(.006)	(.006)	
8. Single mothers relative to two-parent households	.006	.001	.004	---
	(.015)	(.014)	(.014)	
9. Younger households relative to older households	-.003	.002	.003	---
	(.007)	(.007)	(.007)	
Controls for:				
Socioeconomic characteristics	No	Yes	Yes	Yes
State fixed effects, with interactions	No	No	Yes	Yes
Country-of-birth fixed effects	No	No	No	Yes

Notes: Standard errors are reported in parentheses. There are 207,752 observations in the regressions estimated in the first five rows of the table; row 6 has 179,746 observations; rows 7 and 9 have 184,040 observations; and row 8 has 62,615 observations. The "socioeconomic characteristics" include the age, race, gender, and educational attainment of the household head; the total number of persons, children, elderly persons, and disabled persons in the household; and a vector of dummy variables indicating the household's year of arrival in the United States. The "state fixed effects, with interactions" include a vector of state fixed effects interacted with the dummy variable indicating if the observation was drawn from the post-1996 period. The state fixed effects are also interacted with the dummy variables that indicate the household's classification (i.e., citizen or non-citizen; new arrival or earlier arrival, etc.). The country-of-birth fixed effects include 102 dummy variables indicating the birthplace of the household head.

Table 6. Trends in Food Insecurity
(Percent of households that are food insecure)

	Households in less generous states				Households in more generous states			
	All households		Non-refugee households		All households		Non-refugee households	
Group:	Pre-1996	Post-1996	Pre-1996	Post-1996	Pre-1996	Post-1996	Pre-1996	Post-1996
Natives	11.8	10.4	11.8	10.4	10.8	10.3	10.8	10.3
Immigrants	12.8	14.2	12.5	15.0	16.9	16.0	17.3	16.3
Citizens	7.2	7.5	6.9	8.1	9.8	11.0	10.0	11.6
Non-citizens	20.5	22.2	20.6	23.2	23.3	21.5	23.3	21.5
New arrivals	10.2	14.3	8.8	13.8	17.2	16.5	17.6	15.4

Notes: The sample of citizen and non-citizen households includes households where the head has been in the United States at least 5 years. The sample of newly arrived immigrants includes households where the head arrived in the 5-year period prior to the survey.

Table 7. Impact of Welfare Reform on Food Insecurity, Triple Difference Estimates

	Regression model			
Sample:	(1)	(2)	(3)	(4)
By citizenship status:				
1. Non-citizens relative to natives	-.050	-.042	-.040	-.039
	(.022)	(.021)	(.021)	(.021)
2. Citizens relative to natives	.002	.005	.011	.009
	(.024)	(.023)	(.023)	(.023)
By year of migration:				
3. Immigrants in US ≤ 10 years relative to natives	-.053	-.042	-.040	-.035
	(.024)	(.023)	(.023)	(.023)
4. Immigrants in US > 10 years relative to natives	-.015	-.010	-.006	-.009
	(.022)	(.020)	(.021)	(.021)
By birthplace:				
5. Immigrants relative to natives	-.032	-.023	-.021	-.019
	(.016)	(.015)	(.016)	(.016)
Within native population:				
6. Blacks relative to whites	.011	.018	.025	---
	(.010)	(.010)	(.010)	
7. Less-educated relative to more educated households	-.001	.001	.001	---
	(.006)	(.007)	(.007)	
8. Single mothers relative to two-parent households	.002	.003	.008	---
	(.016)	(.015)	(.015)	
9. Younger households relative to older households	.000	.005	.005	---
	(.007)	(.007)	(.007)	
Controls for:				
Socioeconomic characteristics	No	Yes	Yes	Yes
State fixed effects, with interactions	No	No	Yes	Yes
Country-of-birth fixed effects	No	No	No	Yes

Notes: Standard errors are reported in parentheses. There are 163,902 observations in the regressions estimated in the first five rows of the table; row 6 has 146,146 observations; rows 7 and 9 have 149,507 observations; and row 8 has 50,306 observations. The "socioeconomic characteristics" include the age, race, gender, and educational attainment of the household head; the total number of persons, children, elderly persons, and disabled persons in the household; and a vector of dummy variables indicating the household's year of arrival in the United States. The "state fixed effects, with interactions" include a vector of state fixed effects interacted with the dummy variable indicating if the observation was drawn from the post-1996 period. The state fixed effects are also interacted with the dummy variables that indicate the household's classification (i.e., citizen or non-citizen; new arrival or earlier arrival, etc.). The country-of-birth fixed effects include 102 dummy variables indicating the birthplace of the household head.

Table 8. The Impact of Public Assistance on Food Insecurity

	Specification			
Statistical procedure:	(1)	(2)	(3)	(4)
1. OLS	.411	.302	.301	.300
	(.003)	(.003)	(.003)	(.003)
2. TSIV: Using citizenship status	-.645	-.484	-.419	-.400
	(.354)	(.292)	(.274)	(.271)
3. TSIV: Using year of arrival	-.695	-.556	-.516	-.486
	(.388)	(.304)	(.291)	(.291)
4. TSIV: Using only immigration status	-.925	-.529	-.490	-.455
	(.373)	(.263)	(.252)	(.254)
Controls for:				
Socioeconomic characteristics	No	Yes	Yes	Yes
State fixed effects, with interactions	No	No	Yes	Yes
Country-of-birth fixed effects	No	No	No	Yes

Notes: Standard errors are reported in parentheses. The second-stage regressions have 163,902 observations. All of the variables included in the first-stage regression, except for the triple-difference interaction terms, are included in the second-stage regressions. The "socioeconomic characteristics" include the age, race, gender, and educational attainment of the household head; the total number of persons, children, elderly persons, and disabled persons in the household; and a vector of dummy variables indicating the household's year of arrival in the United States. The "state fixed effects, with interactions" include a vector of state fixed effects interacted with the dummy variable indicating if the observation was drawn from the post-1996 period. The state fixed effects are also interacted with the dummy variables that indicate the household's classification (i.e., citizen or non-citizen; new arrival or earlier arrival). The country-of-birth fixed effects include 102 dummy variables indicating the birthplace of the household head.