Food Insecurity and SNAP Participation in Mexican Immigrant Families: The Impact of the Outreach Initiative

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Abstract

We study the factors associated with food insecurity and participation in the Supplemental Nutrition Assistance Program in Mexican immigrant families in the US. Estimates from analyses that control for a rich set of economic, demographic, and geographic variables show that children in Mexican immigrant families are more likely to be food insecure than children in native families, but are less likely to participate in SNAP. Further, more vulnerable groups that are at a higher risk of food insecurity are the least likely to participate in SNAP. Our analysis suggests that the US Department of Agriculture outreach initiative and SNAP expansion under the American Recovery and Reinvestment Act increased SNAP participation of the mixed status Mexican families, but there was no corresponding decline in food insecurity among children in these families.

Introduction

Children in Mexican immigrant families in the US experience more than twice the risk of food insecurity compared to children in other immigrant or native families.[1] At the height of the Great Recession, in 2009, 27% of all children in Mexican immigrant families faced food insecurity. The corresponding figures were 11% in families where both parents were US born and 13% in other immigrant families.[2] Food insecurity has a range of negative consequences on children's health and developmental outcomes.[3] A vast body of research has investigated the factors associated with food insecurity and the role social policy can play in reducing its prevalence, but little attention has been paid to food insecurity in Mexican immigrant families, a highly vulnerable and fast growing segment of the US population.

Risk of food insecurity in Mexican immigrant families emanates from a range of factors: some are common to those encountered by other poor families; some may be specific to the Mexican migration experience in the US. The families of Mexican immigrants are on average poorer and less educated than the other immigrant groups or the native population (Borjas and Katz 2007, Cho et al. 2004, Duncan et al. 2006, Kaushal 2008, Ramirez 2004, Rumbaut 2006). Mexican immigrants also face certain other disadvantages that make them more vulnerable to material hardship: a vast proportion is undocumented, and often, isolated from the mainstream society.[4] They encounter high levels of job insecurity and risk deportation. The undocumented are also ineligible for safety net programs, such as the Supplemental Nutrition Assistance Program (SNAP), designed to reduce food insecurity in poor families. Moreover, most Mexican families have mixed immigration status: US born children living with undocumented parents[5], or US citizens or legal residents living with undocumented siblings, aunts, uncles, or

[1] Throughout the paper we use the term immigrant families to denote families with at least one parent born in a foreign country. We use the term native families to denote families with both parents born in the U.S.

[2] Authors' computation based parents' reports of food insecurity among children in the Current Population Survey.

[3] See for example: Alaimo et al. (2001), Casey et al. (2005), Dunifon and Kowaleski-Jones (2003), Hernandez and Jacknowitz (2009), Howard (2011), Huang et al. (2010), Jyoti et al. (2005), Rose-Jacobs et al. (2008), Weinreb et al. (2002), Winicki and Jemison (2003), Whitaker et al. (2006).

[4] According to Passel (2005) and Hoefer et al. (2006), over 80 percent of non-citizens from Mexico are undocumented.

[5] Passel and Cohn (2011) estimate that in 2010 there were approximately 11 million undocumented immigrants in the US, of which over 6.5 million were from Mexico. Further, they estimate that in 2010, there were 1 million unauthorized immigrants under age 18 in the U.S. and 4.5 million U.S.-born children whose parents were unauthorized. They do not provide estimates of undocumented children by country of origin.

grandparents.[6] Fear of deportation of the undocumented family members may exert a "chilling effect" resulting in families not applying for SNAP even for the members who are eligible (Fix and Passel 1999; Kaushal and Kaestner 2005). In addition, limited awareness or understanding of the detailed SNAP guidelines, often aggravated by poor English proficiency, may result in low participation. Partly on account of these factors, in 2006, almost half the households with a Hispanic head who were eligible for SNAP did not participate in it (USDA 2007).

In view of these bottlenecks and the high incidence of food insecurity among Mexican immigrant families, in 2004, the US Department of Agriculture with the help of 50 Mexican consulate offices, located in 25 states across the US, started an outreach campaign in Spanish to inform Mexican immigrants of their SNAP eligibility (USDA 2012). The outreach initiative received a major boost with the American Recovery and Reinvestment Act that allocated $45.2 billion in additional funds to SNAP. While there is no systematic research on the effect of this program, speculation is rife that the undocumented Mexicans have received food stamps via the outreach program (Schoffstall, 2013). In 2012, during a Senate inquiry of the outreach initiative, a number of U.S. Senators demanded that funding for the initiative be withdrawn (Sessions 2012). Lack of systematic research on the causes of food insecurity among Mexican immigrant families in general, and on the impact of the USDA outreach initiative on SNAP participation and food insecurity, in particular, makes it difficult to address the growing concerns about the outreach initiative. In this paper, we study the factors associated with food insecurity and SNAP participation among Mexican immigrant families and investigate the impact of the outreach initiative and ARRA expansion on SNAP participation and food insecurity. In the latter analysis, we stratify Mexican immigrant samples into groups that are eligible for SNAP versus those with low probability of eligibility to test the validity of the speculation that the outreach initiative and ARRA expansion channeled benefits to populations ineligible under the law.

We begin the analysis by investigating the extent to which observed demographic and economic factors predict the differences in food insecurity among children in Mexican immigrant and native families. In a parallel analysis, using similar models, we study the extent to which the observed demographic and economic characteristics predict the difference in SNAP participation among these families. We then use a short panel of longitudinal data to study the factors that lead to food insecurity among children in Mexican immigrant families, using child fixed effects models, and investigate whether the effect of demographic and economic factors differ in any substantial manner across Mexican immigrant and

[6] During 2001-2011, 76 % children in Mexican immigrant families lived in mixed citizenship status families – i.e. families with at least one U.S. citizen and one non-citizen member (Authors' estimates based on Current Population Surveys – Food Security Supplement 2001-2011).

native families. We repeat the longitudinal analysis with SNAP participation as the outcome. Finally, we test if the USDA outreach and ARRA expansion lowered the "chilling effect" by raising SNAP participation, and whether there was any corresponding decline in food insecurity among children in families most likely to have benefited from the outreach.

Previous Literature

A large and growing literature finds low income to be a primary driver of food insecurity among children (Coleman-Jensen et al. 2011, Alaimo et al. 1998; Connell et al. 2001; Dunifon and Kowaleski-Jones 2003; Gundersen et al. 2011; Rose et al. 1998; Wight et al. 2013). Research on whether social policy, including access to means-tested programs, lowers food insecurity has yielded mixed results. Studies using longitudinal data on transitions to and from food insecurity do not find any association between SNAP participation and food insecurity (Ribar and Hamrick 2003; Wilde and Nord 2005). Other research that addressed the endogeneity of SNAP participation (and other means-tested programs) using instrumental variable models, however, has found SNAP participation to be associated with lower food insecurity (Bartfeld and Duniform 2006; Borjas 2004; DePolt, Moffitt, and Ribar 2009; Yen et al. 2008; Radcliffe 2011; Mykerezi and Mills 2010; also see Radcliffe et al. 2011 for a review of the earlier literature).

A related issue is: why do many low-income families, who are eligible for SNAP, not participate in it? Blank and Ruggles (1996) find a dynamic pattern of eligibility and participation in that many families do not participate in the program because they have short spells of eligibility and many exit the program before their eligibility ends. Daponte et al. (1999) argue that while ignorance about SNAP leads to nonparticipation, knowledge about the program is endogenous: households avail themselves of information about the program when the benefits of participation are large. In general, researchers who have studied the effect of informational outreach programs have concluded that these activities are effective in communicating eligibility to nonparticipating households (Bartlett et al. 2004, Leveldahl 1995, Schanzenbach 2009). Aizer (2003, 2007) finds that advertising (in both English and Spanish) and bilingual assistance had a substantial impact on the Medicaid enrollment of Hispanic and Asian children.[7]

There is no comparable study focusing on the causes of food insecurity and SNAP participation among children in Mexican immigrant families. A number of localized studies document high levels of food insecurity and hunger among certain vulnerable groups of Mexican immigrants – e.g. seasonal farm workers, immigrants living along the Texas-Mexico Border, low-income Mexican

[7] Information bottlenecks affect participation in other programs as well. For instance, Neidell and Waldfogel (2009) show that immigrant families are more likely to use Head Start if the program is located in their neighborhood.

immigrant families in a clinical setting (Weigel et al. 2007; Sharkey et al. 2011, Kersey et al. 2005).[8] While these studies provide useful data on the material hardship that Mexican immigrant families experience, they do not provide much insight into the causes of food insecurity that can be applied to inform policy. In this paper, we address some of these gaps in knowledge about food insecurity in Mexican immigrant families.

Immigrant Eligibility to SNAP

Immigrant eligibility to participate in the SNAP program has undergone several changes over the past two decades. Before August 1996, all legal low-income immigrants were eligible for food stamps (as the SNAP program was then known). The 1996 welfare reform denied foreign-born non-citizens access to food stamps. However, a number of states initiated substitute programs to provide food stamps to immigrants who were ineligible under the Federal law (Carmody and Dean 1998; Zimmerman and Tumlin 1999, Gigliotti 2004).[9] The 1997 Balanced Budget Act restored eligibility to some vulnerable groups, who were in the country when the 1996 law was enacted. These groups consisted of the elderly, children under 18, persons with disabilities, and refugees and asylees. Finally, in July 2002, the Farm Security and Rural Investment Act (FSRIA) restored food stamp eligibility to all immigrant children, immigrants with disabilities, as well as all those in the country for at least five years. To sum up, while the SNAP eligibility of adult immigrants varies across states depending on their duration of residency in the US, since July 2002 all children under 18 who are legal residents are eligible to participate in SNAP.

Note that like that of natives, immigrant participation in SNAP is subject to the income and asset limits. To be eligible for SNAP, the gross monthly income of a family should be less than 130% of the federal poverty line and its net

[8] Weigel et al. (2007) examine food insecurity in 100 migrant and seasonal farm worker households living in the U.S. Mexico border and find 82% of households experiencing food insecurity and 49% of them suffering from hunger. They also find that food insecure households were more likely to exhibit symptoms of depression, learning disorders, and symptoms suggestive of gastrointestinal infection; further presence of minor children and mother's low education were highly correlated with food insecurity. In a study of Mexican origin population along the Texas border with Mexico, Sharkey, Dean and Johnson (2011) find that 78% of participants experienced food insecurity at the household level and 62% reported child food insecurity. Kersey et al. (2007) compare a sample of young US-born children of Mexican immigrant parents with non-immigrant non-Latino children in a low-income clinic population and found that the children of Mexican immigrant parents were 13-times more likely to be hungry and 6-times more likely to be food insecure than non-immigrant non-Latino children. Chavez et al. (2007) find that only 30% of the low-income food insufficient families in a Chicago Latino community, predominantly Mexican, participated in SNAP.

[9] These eight states were: CT, ME, MA, MN, NE, RI, WA and WI. Seventeen states, including these eight, also started substitute programs for children and elderly among the pre-1996 arrivals.

monthly income should be less than the federal poverty threshold. Net income is defined as gross income minus a standard deduction (which is 20% of earned income), child care expenses, and any shelter and utility costs that exceed 50% of net income. In addition, most households are subject to a liquid asset (including cash and funds in checking and savings accounts) limit of $2000. Immigrants like natives are also subject to minimum work requirements as a condition for SNAP participation.

Data

The primary data source of our analysis is the Current Population Survey – Food Security Supplement (CPS-FSS). Starting in 2001, the CPS started fielding the FSS in December every year. In the earlier years, however, the month of the FSS varied. Our analysis uses data from 2001-2011 to ensure that seasonal variations in food insecurity do not influence the outcomes. Our focus is food insecurity among children, therefore, we restrict the sample of analysis to children under 18. Emancipated minors (i.e., children who are the household reference person living alone, living with others, or are married to the household reference person) and children whose household food security status is unknown are excluded. Observations with no income data are also dropped from the analysis (about 9 percent). We compared samples with and without those missing on income and they were relatively similar.

Measures of food insecurity are based on a set of 18 questions fielded in the CPS-FSS (See Appendix Table A.1). Using the USDA's guidelines, children's food security status in the household is based on responses to questions 11 through 18, which ask the main respondent in the household to report on the food security of children. Households reporting two or more indicators of food insecurity on the child questions are classified as having food insecurity among children. The CPS also asks respondents whether anyone in the household received SNAP (or food stamp) benefits in the past 12 months, which is used to create the dichotomous variable on SNAP participation.

The CPS provides detailed data on each child's and their parents' country of birth. We use this information to stratify Mexican immigrant families into two groups: families where both parents are foreign-born and families where one parent is US born. The CPS also includes a unique household id for all members of a household. We use this data along with the data on citizenship status of family members to classify families in three categories: all-citizen families, mixed status families with citizen and non-citizen family members; and all-non-citizen families.

The Annual Social and Economic (ASEC) Supplement (March CPS) 2002-2012 data are used to construct a set of income-to-needs ratio categories for each year. We use the official poverty thresholds published by the Census

Bureau[10] to construct an income-to-needs ratio for each family. Because family income in the December CPS-FSS is only available in categories, we impute a continuous measure of income into the December CPS using a regression based method that estimates continuous income, separately by year and family income band, in the March CPS.[11] We control for a wide range of child, parental, and household characteristics that are common to the March and December datasets. Coefficients from regression models using the March CPS data are applied to predict a value of income for each respondent in the December CPS-FSS by year and family income band. The controls include race/ethnicity, number of people in the household, presence of a child less than age 6, presence of an elderly person, child's nativity and citizenship status, parental nativity, marital status, education, employment status, and disability status, housing status, mother's age, SNAP receipt, and state of residence.

Data on the unemployment rate are taken from the Bureau of Labor Statistics, Local Area Unemployment Statistics (LAUS) program. Following previous research, in some regressions, we control for the current and lagged state unemployment rates (lagged by 1 to 5 years) to adjust for economy level trends (Klerman and Danielson 2011).

The CPS interviews persons living within the same housing unit for four consecutive months, drops them from the survey for the next eight months, and re-enters them into the survey for the following four months. Thus families with a December interview that falls in months 1-4 will have a second interview the following December in months 5-8. We use a number of CPS public-use identifiers known to facilitate matching individuals across successive interviews (years), namely household identification number, the household number, and the person's line number (see e.g. Madrian & Lefgren, 1999; Kaushal & Kaestner, 2013). Because the CPS sampling frame is residences and not people, we also use the respondent's sex, race/ethnicity, nativity, state of residence, and period of arrival in the U.S. to match individuals in the December CPS of year t with individuals in the following December CPS of year t+1. We are able to match about 59 percent of children with native-born parents and 51 percent of children with at least one Mexican immigrant parent.

The CPS undercounts the Mexican population in the U.S. Passel (2005) has estimated that the CPS misses approximately 10 percent of the undocumented.

[10] See http://www.census.gov/hhes/www/poverty/data/threshld/ for a complete list of thresholds by year.

[11] We also computed the median income of families in each income category in the March CPS and assigned that value to respondents in the corresponding income category in the December CPS-FSS. The results from preliminary logistic regressions, available upon request, indicate that the relationship between income to needs and food insecurity among children is very similar from the two specifications of income - median income and imputed income. We have elected to present results from the latter.

This limitation afflicts most publicly available datasets and is perhaps less severe in the CPS that tries to cover the entire civilian non-institutional US population.

Research Methodology

Our first objective is to study the extent to which the observed socio-economic differences between Mexican immigrant and native families explain the difference in food insecurity among these groups. We define families where at least one parent is born in Mexico as Mexican immigrant families.[12] These families are further stratified into two groups: families where both parents are born abroad and families where one parent is US born. We call the former as the first-generation Mexican families and the latter as the blended-generation Mexican families. Families where both parents are US born (or no parent is foreign-born) are the category of comparison and for convenience we call them native families. Equation (1) describes our baseline model estimated over a combined sample of children aged 17 or less in these three groups of families:

(1) $FI_{ist} = X_{it}\beta + \beta_p * First_{it} + \beta_M * Bld_{it} + \delta * D_{st} + \pi_s + \pi_t + u_{ist}$,

where FI is a dichotomous variable indicating food insecurity among children. X_{it} is a vector of socio-economic characteristics, namely, mother's age (dichotomous variables indicating the following age groups: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, >54), parent's marital status, number of children less than 18, number of adults aged 18-64 and number of elderly persons aged 65 and older in the household, educational attainment of parents (neither parent completed high-school, at least one parent completed high-school but neither has any college education, at least one parent has some college, but neither has a BA degree, and at least 1 parent has a BA or higher education), whether the family lives in a rented place, and the race/ethnicity of children in native-born families[13] , income to needs ratio (defined as income as a proportion of the official poverty threshold for that family[14] and included as dichotomous variables: <50% of the poverty threshold, 50-99%, 100-149%, 150-199%, 200-249%, 250-299%, >300% of the poverty threshold), parents' employment (categorical variables indicating, no parent in employed, at least one parent is employed part-time, none full time, at least 1 parent is employed full-time), and whether a parent is disabled.

D_{st} is a vector of time-varying state variables (current and lagged unemployment rates – lagged by 1-5 years) to capture the business cycle trend that is likely to impact food insecurity.[15] π_s denotes state fixed effects, and π_t

[12] The CPS collects nativity information on both parents.

[13] Four dummy variables indicating whether the native child is: non-Hispanic White , non-Hispanic black, Hispanic, or other. The variables are zero for the immigrant families.

[14] Based on family size and composition.

[15] Inclusion of fewer lags did not alter the coefficients of interest.

denotes year fixed effects. In the regression analysis we sequentially add the socio-economic variables and variables that capture the business cycle to study the size of their impact on food insecurity.

The variable First is equal to 1 if no parent is born in the US, otherwise 0; the variable Bld is equal to 1 if one parent is born in the US and one in Mexico, otherwise 0. Families where both parents are born in the US are the category of comparison. β_p estimates the difference in food insecurity between the first generation Mexican immigrant families and native families and β_M estimates the difference in food insecurity between the blended generation Mexican immigrant families and native families. If the differences in food insecurity between the three groups are entirely driven by differences in observed characteristics, the estimated values of β_p and β_M would be modest and statistically insignificant.

The blended generation Mexican families are more likely to be integrated with the US population than the first generation Mexican families. Besides, the blended-generation Mexican families are eligible for all means-tested programs, whereas eligibility in the first-generation Mexican families is dependent on the legality of their residency, and for adults, the legality and duration of residency in the US. Thus, we expect the blended-generation Mexican families to be less food insecure than the first-generation Mexican families.

In a parallel analysis, using a model similar to equation (1) with SNAP participation as the dependent variable, we investigate the extent to which observed factors predict the differences in SNAP participation between the Mexican immigrant groups and natives. We also study whether food insecurity (and food stamp participation) differs for families where both parents have been in the U.S. for less than five years versus families where at least one parent has been in the country for 5 years or more. [16]

Next, we use a short panel of longitudinal data (2 year-panel) to study whether economic and demographic factors influence food insecurity among children in these three groups of families differently. Our objective is to study if there are any causal links between food insecurity and family characteristics. Many of the demographic and economic characteristics of families such as income, employment status, and disability status are endogenous to food insecurity. For instance, there may be a third factor, e.g. parents being undocumented that may cause food insecurity as well as low income. Thus our use of child fixed effects allows us to control for these unobserved time-invariant factors and study if changes in family characteristics between years t and t+1 (e.g.

[16] The data on year of arrival are based on the question: "In which year did the respondent move to the U.S. permanently." Repeat migrants may interpret it variously: some may provide the year of first entry and others the year of last entry (Jasso, Rosensweig, and Smith 2000). Little can be done to address this problem in our data. Our findings have to be interpreted in light of it.

changes in income, employment status, marital status, etc.) influence food insecurity and whether these effects differ for the first-generation Mexican immigrant families, the blended-generation Mexican immigrant families and native families. Equation (2) describes the regression model for this analysis:

(2) $FI_{ist} = \alpha_i + \lambda * X_{it} + \lambda_p (X_{it} * First_{it}) + \lambda_m (X_{it} * Bld_{it}) + \varphi * D_{st} + \tau_t + e_{ist}$

There are two main differences between equations (1) and (2). One, equation (2) includes a set of child fixed effects (α_i). Inclusion of child fixed effects implies that any time-invariant variables (e.g. state fixed effects) are dropped out. Two, in equation (2), X_{it} is interacted with $First_{it}$ and Bld_{it}. Note that the main effects of $First_{it}$ and Bld_{it} drop out of the model because both variables are time-invariant for each child in our sample. The coefficients of interest in these models are λ_p and λ_m that estimate the difference in the effect of socio-economic characteristics on food insecurity among children in the first-generation and native families and the blended-generation and native families, respectively. Further, using a model similar to equation (2) with SNAP participation as the dependent variable, we estimate the difference in the effect of socio-economic characteristics on SNAP participation in the first-generation and native families and the blended-generation and native families.

Our second objective is to test the "chilling" hypothesis that posits that mixed status Mexican families, who are eligible for means tested programs in the US, do not claim SNAP benefits because of fears of jeopardizing the residency of other family members who may be undocumented. To test this hypothesis, we stratify Mexican immigrant families in three groups: All-citizens (Cit_{it}) are Mexican immigrant families that have no non-citizen member, mixed status families (Mx_{it}) are Mexican immigrant families with both citizen and non-citizen members, and all-non-citizens ($NCit_{it}$) are families that have no citizen member. Equation (3) describes the model:

(3) $FS_{ist} = X_{it}\theta + \theta_c * Cit_{it} + \theta_m * Mx_{it} + \theta_n * NCit_{it} + \vartheta * D_{st} + \sigma_s + \sigma_t + \upsilon_{ist}$

Here FS is a dichotomous variable indicating whether the family participated in SNAP last year. All the members in Cit families are allowed to participate in SNAP if the family meets the income and asset criteria. At least one member in the Mx families (the citizen member) is eligible for SNAP if the family's income/assets are below the threshold. If the "chilling" hypothesis is correct, some Mx families may not apply for SNAP even though they are eligible because of the fear that the residency status of the non-citizen member would be jeopardized. Thus the coefficient for Mx would be negative and less than the coefficient for Cit. We expect the coefficient for NCit to be the lowest because

these families are less likely to be eligible for SNAP. Previous research shows that over 80% of non-citizens from Mexico are undocumented (Paseel 2005).

Our final objective is to test if the USDA outreach initiative and the ARRA expansion increased SNAP participation and lowered food insecurity among Mexican immigrant families. We expect these policies to be most effective in raising SNAP participation among mixed status families, who are most likely to suffer from the "chilling effect." We assume that outreach initiative reached all Mexicans living in a state with a Mexican consulate office, but it did not reach Mexicans living in states where there is no consulate office. Accordingly we create a variable on Mexican consulate office, which equals 1 if a state has a Mexican consulate office, otherwise zero. We construct three dummy variables indicating the following time periods: pre-outreach years: 2001-2004, outreach years: 2005-2008, and outreach and ARRA expansion years: 2009-2011. Equation (3) is estimated with four sets of additional interactions: (i) the three period dummies interacted with the variable on consulate office; (ii) three way interactions of Cit, Mx, and NCit, each, with the indicator for pre-outreach years and the variable on consulate office, (iii) three way interactions of Cit, Mx, and NCit, each, with the variable on outreach years and the variable on consulate office, and (iii) three way interactions of Cit, Mx, and NCit, each, with the variable on ARRA expansion years and the variable on consulate office. We expect the coefficients on the interactions of outreach years, consulate office, and Mx and ARRA expansion years, consulate office, and Mx to be positive and statistically significant. Further, in regressions with SNAP participation as the outcome variable, if the coefficient on the interaction of outreach years, consulate office and NCit and the coefficient on ARRA expansion years, consulate office and NCit are close to zero and statistically insignificant that would be evidence against the speculations that these policies have benefited the undocumented.

Next, we create a measure of proximity to the consulate office which is equal to 2 if the respondent lives in an MSA[17] with a consulate office; 1 if there is a Mexican consulate office in the state of residence but not the MSA of residence, and 0 if there is no consulate office in the MSA or state of residence. We hypothesize that the effect of outreach/ARRA expansion would be higher on Mexican immigrants living in closer proximity to the consulate office. Thus, the effect would be higher on Mexican immigrants living in MSAs with a consulate office than on Mexicans who live in MSAs without a consulate office, but in

[17] With the introduction of the new geographic codes defined by the OMB in May 2004, the concept of Metropolitan Statistical Area (MSA) was replaced by Core Based Statistical Area (CBSA). Thus, we use MSA or PMSA FIPS codes to assess proximity to a consulate office for respondents surveyed between 2001 and 2003. For respondents surveyed in 2004 and onward, we use the Metropolitan CBSA FIPS code. For the eight consulate offices not situated within a defined MSA/CBSA, we use county FIPS codes.

states with a consulate office. Further the effect would be larger on mixed status families that are the target of the outreach initiative and ARRA expansion. We estimate a model similar to that described in the previous paragraph with two modifications: the variable on Mexican consulate is replaced by the proximity variable that goes from 0 to 2 depending on proximity to consulate office and the regressions include 50 additional controls for MSA of the consulate in addition to state fixed effects.

Finally, we create an outreach intensity variable equal to the number of consulate offices in a state divided by its Mexican population. Models specified in earlier are estimated with one modification: the consulate variable is replaced by the intensity variable. Here too we expect the coefficient on the interaction of outreach years, consulate intensity, and Mx and the coefficient on interaction of ARRA expansion years, consulate office and Mx to be positive and statistically significant. These last sets of analyses are also conducted with two dependent variables: SNAP participation and food insecurity among children. Standard errors are clustered on the state-year of residence.

Results

Table 1 provides descriptive data on food insecurity among children and percent that participated in SNAP. There are two main points to note. One, food insecurity among children in Mexican immigrant families – first-generation and blended generation families combined -- is more than twice the prevalence of food insecurity in native families (21.9 percent versus 9.7 percent). The first generation families are more food insecure and among them the more recent arrivals are the most vulnerable. Two, in line with the high prevalence of food insecurity, Mexican immigrant families are more likely to participate in SNAP. However, the blended-generation families have higher levels of SNAP participation even though they face lower food insecurity than the first generation families, and even among the first generation – the most vulnerable families where both parents are in the US for less than five years are the least likely to receive SNAP benefits. The SNAP participation rates thus reflect eligibility rather than food insecurity levels in these families.

To investigate the factors associated with differences in food insecurity and SNAP participation among Mexican immigrant and native families, we apply models based on equation (1) and the results are presented in Table 2. Panel 1 has the estimates with food insecurity among children as the outcome variable and panel 2 has the estimates with food stamp participation as the outcome. Results are presented from seven models that sequentially add control variables to draw inferences about their impact on the differences in food insecurity (and SNAP participation) among the first-generation Mexican immigrant families and natives and the blended-generation Mexican immigrant families and natives.

Results in model 1 (panel 1) are similar to the descriptive data in Table 1 (column 2) and show that compared to native families, food insecurity among children in the first generation Mexican families is 13.5 percentage points higher and among children in the blended-generation families 7.5 percentage points higher. Inclusion of demographic characteristics (namely mother's age, parents' education and marital status, number of children, number of adults and number of elderly persons in the family, family lives in a rented dwelling, race/ethnicity of native families, state and year effects) in model 2, lowers the difference by 37 percent for children in the first-generation families and by around 29 percent for the blended-generation families. Inclusion of parental employment and disability status increases the difference somewhat. This is partly because Mexican immigrant families have higher employment rates than native families. Further, inclusion of controls for income to needs ratio lowers the gap considerably (Model 4), however, a substantial gap remains. Further, food insecurity among children is 3.5 percentage points higher among more recent arrivals (Model 5) than first generation families where at least one parent has been in the US for more than five years, and non-citizen children experience 4.3 percentage points higher food insecurity than citizen children in immigrant families. Note that estimates remain robust with the inclusion of state unemployment rate (current and lagged) in models 6 and 7.

To sum up, estimates in Panel 1 suggest that the difference in food insecurity among Mexican immigrant and native families remain even after adjusting for a rich set of controls capturing demographic, economic, and geographic differences. Adjusted estimates suggest that the 1st generation Mexican immigrant families in the US for more than 5 years have a 5.2 percentage-point (55% =5.3/9.7) higher incidence of food insecurity among children than native families and the blended-generation families have a 3.2 percentage-point (33%=3.2/9.7) higher incidence of food insecurity among children than native families. Incidence of food insecurity among families that have arrived in the past five years and among children who are non-citizens is even higher.

Does SNAP participation reflect these differences in food insecurity? Panel 2 in Table 2 presents estimates from models similar to those used in the food insecurity regressions and provides some insight into this question. Unadjusted differences in Model 1 show that compared to native families, the 1st-generation Mexican families are 4.5 percentage points more likely to participate in SNAP and the blended generation families are 8.8 percentage points more likely to participate in SNAP. However, in model 2 that adjusts for demographic and state and year effects, the difference becomes negative for the 1st generation Mexican families and is much lower for the blended-generation families. Additional controls for parents' employment and disability status and incomes-to-

needs ratio (model 4) indicate that the 1st generation families are 11 percentage points less likely to receive SNAP and the blended-generation families are one percentage point less likely to participate in SNAP than native families. Further, more vulnerable groups - families in the US for less than five years, non-citizen children – are much less likely to receive SNAP benefits than other Mexican immigrant families.

To sum up, results in Table 2, controlling for a rich set of economic, demographic, geographic variables, show that children in Mexican immigrant families are more likely to be food insecure than children in native families, yet the Mexican immigrant families are less likely to participate in SNAP. Among Mexican immigrant families, the more vulnerable group – the 1st generation families -- are less likely to participate in SNAP. Finally, even among the more vulnerable, groups at a higher risk of food insecurity – in the US for less than 5 years, non-citizen children – are the least likely to participate in SNAP.

Our second objective is to study whether adverse economic circumstances are more likely to increase food insecurity among children in Mexican immigrant families compared to native families. For this analysis, we use the longitudinal aspect of the CPS-FSS data and run models based on equation (2). To check if our analysis is influenced by differences in the cross-sectional data used in Table 2 and the matched data, we first run all analyses using the longitudinal data (matched data) and the results, presented in Table 3, are similar to those in Table 2.

Table 4 has estimates from the child fixed effects models. The full results of these models are presented in Appendix Table A.2. We discuss estimates only of the effect of income-to-needs ratio because we are specifically interested in income, the most important determinant of food insecurity. We have elected to use the income to needs ratio as a continuous variable, and not a categorical variable as in previous analysis, because we want to exploit the full scale of variation in income. An analysis using the categorical variable would be based on families that move across income-to-needs categories between t and t+1 – and there may not be too many such families in our data. As expected these estimates show that increases in income to needs ratio lower food insecurity. However, food insecurity in Mexican immigrant families is far more sensitive to income with the interaction term being statistically significant for mixed status families. Similarly, SNAP participation declines with income, and here too SNAP participation among Mexican families is more sensitive to income than among native families.

Model 5 introduces the income to needs ratio as a quadratic term. The mean income to needs ratio in our data is 1.36 for the first generation Mexican immigrants, 2.02 for the blended generation Mexican immigrants, and 3.28 for native families. We computed the marginal effect of income to needs ratio for the three groups around each of these three values. For each income to needs value,

the pattern of the estimated effect remains the same as in the linear model: the estimated effect is negative and larger (in absolute terms) for the Mexican immigrant families and among the Mexican immigrant families the estimated coefficient is larger (in absolute terms) among blended generation families, though often the difference is statistically insignificant. Similarly, estimates from model 5, panel 2, yield the same result: SNAP participation among Mexican immigrant groups is more sensitive to the income to needs ratio than SNAP participation among native families.

In our final analysis, we test the "chilling" hypothesis that posits that mixed-status Mexican families, who are eligible for means tested programs in the US, do not claim SNAP benefits in fear of jeopardizing the residency of other family members who may be undocumented. To test this hypothesis, we stratify Mexican immigrant families in three groups: all-citizens are Mexican immigrant families that have no non-citizen member, mixed-status families are Mexican immigrant families with both citizen and non-citizen members, and all-non-citizens are families that have no citizen member (see Appendix Table A.3 for the descriptive data on these groups). Results from models described in equation (3) are presented in Table 5.

Panel 1 presents estimates with SNAP participation as the outcome variable. Unadjusted estimates (Model 1) suggest that compared to native families all citizen and mixed status families are 5 to 7 percentage points more likely to use SNAP and all non-citizen families are 12 percentage points less likely to use SNAP. In model 4 that adjusts for family's economic and demographic characteristics, Mexican immigrant families are much less likely to use SNAP than native families; the difference is large for mixed status families (minus nine percentage points) and much larger for all non-citizen families (minus 30 percentage points). A large proportion of non-citizens are likely to be undocumented, which largely explains the low SNAP participation of this group (Passel and Cohn 2011). All members in all citizen families and at least 1 member in mixed status families are eligible for SNAP, thus policy does not deter these families from using SNAP. The fact that these families are also more likely to be food insecure (model 4 in panel 2) also suggests that they should be more incentivized into using SNAP. Our estimates thus suggest that SNAP participation in mixed status and to some extent in all citizens families is weakened by the "chilling effect."

Finally, we investigate whether the outreach initiative and ARRA expansion increased SNAP participation of Mexican immigrant families. Our hypothesis is that the outreach and ARRA expansion are most effective in states with a Mexican consulate office. Because SNAP participation in mixed status families is more likely to be dampened by the 'chilling effect', any outreach initiative should target these families. And finally, because Mexican non-citizen

families (all members non-citizens) are most likely to be undocumented, if outreach/ARRA expansion increased their SNAP participation that would lend some credence to the speculation that outreach/ARRA expansions benefited the undocumented Mexican families.

The results from this analysis are in Table 6. In addition to the controls in Model 4 of Table 5, estimates in Table 6 include interactions of the three periods (pre-outreach, outreach and ARRA expansion) with dummy variable on whether the state has a Mexican consulate office and nine three-way interactions of the whether the state has a Mexican consulate office, period (pre-outreach, outreach and ARRA expansion) and Mexican family type (all citizen, mixed status, all noncitizen).

Estimates in Model 1 show that compared to mixed status families living in states without a Mexican consulate office, mixed status families living in states with a consulate office were 3.6 percentage points more likely to use SNAP in the ARRA expansion period. In the pre-outreach and outreach periods, the SNAP participation of mixed status families was statistically the same in states with a consulate office and in states without a consulate office. Further, a statistical test rejects the hypothesis that the estimated coefficient of the interaction term between consulate office, ARRA and Mixed status and the coefficient of the interaction term between consulate office, pre-outreach and mixed status are statistically the same (indicated by + in the Table). The coefficients on the three way interaction terms for all-citizen families are modest and statistically insignificant suggesting that the outreach initiative and ARRA expansion did not have any impact on their SNAP participation. The coefficients on the three way interaction terms for non-citizens are negative, but statistically insignificant, providing evidence against the speculation that outreach initiative or ARRA expansion increased SNAP participation of families that are likely to be ineligible for SNAP (e.g. the undocumented).[18]

Did the increase in SNAP participation lead to a reduction in food insecurity among mixed status families? We do not have a methodology to conduct a causality analysis. In panel 2, model 1 we study the associations between outreach and ARRA expansion and food insecurity among children. The estimated coefficient on the interaction term consulate, mixed status and outreach is negative and the coefficient on the interaction term consulate, mixed status and ARRA is negative but insignificant. Thus there is some evidence that food insecurity among mixed status families living in states with a consulate office declined during the outreach period, but it is unlikely to be related food stamp participation which did not rise during the outreach period. Further, while food

[18] We also did the analysis replacing the consulate variable with number of Mexican consulate offices as a proportion to the Mexican immigrant population in the state and the estimated effects were similar.

stamp participation of this group increased during the ARRA expansion, food insecurity remained statistically the same.

Our analysis is based on multiple years of cross-sectional data and is likely to be biased if return migration during the period of our study was selective on food insecurity. The last two years of the outreach expansion and the first year of the ARRA expansion in our analysis are marked by the Great Recession. If those worst affected by the Great Recession returned to Mexico, our estimates would be biased. Previous research shows that return migration is highest among Mexicans who are in the US for less than five years (Kaushal and Shang, 2013). To minimize the effect of the return migration, we repeated the analysis excluding children whose parents (both parents) have been in the US for less than 5 years and the results from these analyses are in Model 2. With SNAP participation as the outcome, estimates based on Model 2 are similar to those in Model 1, except for the coefficients on the interaction terms between non-citizens, consulate and period variables, which are negative and statistically significant, but the size of the coefficient is statistically the same across the three periods. This suggests that non-citizen families living in states with a consulate office were less likely to use SNAP and confirms the finding in model 1 that ARRA expansion and outreach did not increase SNAP participation of non-citizen Mexicans who have a lower eligibility for SNAP participation. Estimates in Model 2, with food insecurity among children as the outcome, are similar to those in Model 1, and provide some weak evidence of a decline in food insecurity among mixed status families, but the decline is statistically significant for the outreach period, and not the ARRA expansion period, when mixed status families registered an increase in SNAP participation. There is some evidence that food insecurity among non-citizens declined during the ARRA expansion, but it appears unlikely to be related to SNAP participation which declined during this period.

To test if the ARRA expansion effect that we observe is its actual effect (and not due to some spurious factor), we estimate the models in Table 6 replacing the consulate variable with a measure of proximity to the consulate office, which is equal to 2 if the respondent lives in an MSA with a consulate office, 1 if there is a Mexican consulate office in the state of residence but not the MSA of residence, and 0 if there is no consulate office in the MSA or state of residence. Results from the analysis are presented in Table 7 and show that proximity to the consulate office increased SNAP participation of mixed status families during the ARRA period. The estimated effects remain modest and statistically insignificant for other groups of Mexican immigrants. Further, these estimates also show that increase in SNAP participation did not lower food insecurity among mixed status families.[19]

[19] We also conducted the analyses in Table 6 for three sub-samples: children in single parent families, children in two-parent families, and children with low-educated parents (parent(s) have a

Conclusion

We study the factors associated with food insecurity among children and SNAP participation in the first-generation Mexican (both parents born in Mexico), the blended-generation (one parent born in Mexico and one parent born in the US) Mexican, and native families (both parents US born) to investigate the extent to which observed demographic and economic factors explain the differences in these two outcomes across the three groups. The analysis is based on cross-sectional and longitudinal data with child fixed effects and allows us to draw inferences about the effect of the outreach initiative and ARRA expansion on SNAP participation and food insecurity among children in Mexican immigrant families who are eligible for SNAP.

Estimates suggest that during 2001-2011, compared to native families, the first generation Mexican families had 2.4 times the risk of food insecurity among children and the blended generation families had 1.7 times the risk of food insecurity among children. Over 40 percent of the gap in food insecurity remained even after adjusting for a rich set of economic, demographic, and geographic variables. Adjusting for these differences, our estimates suggest that the first generation Mexican immigrant families have a 5.6 percentage points (58% =5.6/9.7) higher incidence of food insecurity among children than native families and the blended-generation families have a 3.2 percentage points (33%=3.2/9.7) higher incidence of food insecurity among children than native families. Incidence of food insecurity among children in families that lived in the US for less than five years and among children who are non-citizens is even higher.

Further, our analysis shows that after adjusting for a rich set of economic, demographic and geographic variables, Mexican immigrant families are less likely to participate in SNAP. The more vulnerable groups who are at a higher risk of food insecurity e.g. first generation Mexican immigrant families, families in the US for less than 5 years, families with non-citizen children – are the least likely to participate in SNAP.

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high school diploma or less). In samples restricted to children in single-parent families, the ARRA expansion raised SNAP participation among mixed status families and the size of the effect is somewhat larger (than reported in Table 6), which is expected given their higher economic vulnerability. In samples restricted to children in two-parent families, the effect of the ARRA expansion on SNAP participation among mixed status families is positive, but statistically insignificant. In both cases, increased SNAP participation did not lower food insecurity. When the sample is restricted to children with low-educated parents, ARRA expansion raised SNAP participation among mixed status families, and there is a corresponding decline in food insecurity. In all models, estimated effects on children with all citizen family members are modest and statistically insignificant, and for all non-citizen members, estimates are often negative and statistically insignificant. These findings are reported in Table A.4.

Analysis based on longitudinal data with child fixed effects shows that low income (measured as income to needs ratio) has a larger impact on food insecurity and SNAP participation in Mexican immigrant households than in native households. One possible explanation is that some of the challenges that Mexican immigrant families encounter including fear of deportation and stress of assimilation make them more food insecure as their incomes fall.

Further, we test the "chilling" hypothesis by stratifying Mexican immigrant families in three groups: all-citizens with no noncitizen member, mixed-status families with both citizen and non-citizen members, and all-non-citizens with no citizen member. Our analysis shows that after adjusting for demographic, economic and geographic differences, compared to native families, the mixed status families are more likely to be food insecure and yet less likely to participate in SNAP. Because of their citizenship status at least one member of the mixed status families is eligible for SNAP. Our estimates thus suggest that SNAP participation of mixed status families is weakened by the "chilling effect."

In our final analysis, we investigate if SNAP participation among mixed status families increased during the USDA outreach initiative and ARRA expansion. We find that SNAP participation increased in mixed status families during the ARRA expansion periods in states with a Mexican consulate office, however, there is no corresponding decline in food insecurity. Further, we do not find any similar evidence for Mexican immigrant families with only non-citizen members or only citizen members. Our analysis thus suggests that outreach increased SNAP participation of SNAP eligible families, but does not provide any support to the speculation that the outreach initiative or ARRA expansion increased SNAP participation in families that are not eligible for SNAP under the law.

Table 1: Descriptive Data on Food Insecurity among Children and SNAP Participation

	N	% with Food Insecurity Among Children	% that Participated in SNAP Last Year
All children	**252660**	**11.1**	**16.8**
Families with at least one Mexican Immigrant parent	21471	21.9	21.4
1st Generation Mexican Immigrant Families	16603	23.4	20.8
Both parents in US <5 years	886	25.1	12.1
Parent(s) in US 5+ years	15002	23.2	21.4
Parent(s) years since Immigration unknown	715	25.5	20.7
Blended Generation Mexican Immigrant Families	4868	16.7	23.4
Native-born Parents	231189	9.7	16.3

Notes: Based on CPS-FSS 2001-2011. Families where both parents are born abroad and at least one parent is born in Mexico are the 1st generation Mexican immigrant families and families where one parent is born in the US and one in Mexico are the blended generation families.

Table 2: Estimates of the Difference in Prevalence of Food Insecurity among Children and SNAP Participation between Mexican Immigrant and Native Families

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Panel 1: Food Insecurity among Children							
1st Generation Mexican Immigrant Families	.135***	.085***	.095***	.056***	.052***	.053***	.049***
	(.003)	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)
Blended Generation Mexican Immigrant Families	.075***	.053***	.054***	.032***	.032***	.032***	.032***
	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)
1st Generation Mexican Immigrants, parents in the US<5 years	--	--	--	--	.035*	.035*	--
					(.015)	(.015)	
1st Generation Mexican Immigrants, Child is non-citizen	--	--	--	--	--	--	.043***
							(.009)
Estimates statistically different for 1st generation and blended generation Mexican Immigrant families	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel 2: SNAP Participation							
1st Generation Mexican Immigrant Families	.045***	-.065***	-.041***	-.108***	-.096***	-.096***	-.086***
	(.003)	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)
Blended Generation Mexican Immigrant Families	.088***	0.020***	.027***	-.010 ł	-.009 ł	-.010 ł	-.010 ł
	(.006)	(.006)	(.005)	(.005)	(.005)	(.005)	(.005)
1st Generation Mexican Immigrants, parents in the US<5 years	--	--	--	--	-.135***	-.134***	--
					(.012)	(.012)	
1st Generation Mexican Immigrants, Child is non-citizen	--	--	--	--	--	--	-.128***
							(.007)
Estimates statistically different for 1st Generation and blended Generation Mexican Immigrant families	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Model includes:							
Demographic characteristics, year and state effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Parents employment, disability status	No	No	Yes	Yes	Yes	Yes	Yes
Income to needs ratio	No	No	No	Yes	Yes	Yes	Yes
State unemployment rate: current and lagged (6 lags)	No	No	No	No	No	Yes	Yes
N	252,660	252,660	252,660	252,660	252,660	252,660	252,660

*** p<0.001, ** p<0.01, * p<0.05, ł p<0.10

Notes: Children in families with at least one Mexico born parent or both US born parents are the sample of analysis. Figures in each column of a panel are from a separate regression based on an OLS model using CPS-FSS 2001-2011. Robust standard errors are in parenthesis. Children in families with both parents born in the US are the category of comparison. Also see notes to Table 1.

Table 3: Estimates of the Difference in Prevalence of Food Insecurity among Children and SNAP Participation between Mexican Immigrant and Native Families (Samples restricted to families matched in years t and t+1)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Panel 1: Food Insecurity among Children							
1st Generation Mexican Immigrant Families	.137***	.080***	.089***	.050***	.049***	.049***	.040***
	(.005)	(.005)	(.005)	(.005)	(.006)	(.006)	(.006)
Blended Generation Mexican Immigrant Families	.093***	.067***	.068***	.043***	.043***	.043***	.043***
	(.008)	(.008)	(.008)	(.008)	(.008)	(.008)	(.008)
1st Generation Mexican Immigrants, parents in the US<5 years	--	--	--	--	.045 ł	.045 ł	--
					(.026)	(.026)	
1st Generation Mexican Immigrants, Child is non-citizen	--	--	--	--	--	--	.073***
							(.014)
Estimates statistically different for 1st Generation and Blended Generation Mexican Immigrant Families	Yes	No	Yes	No	No	No	No
Panel 2: SNAP Participation							
1st Generation Mexican Immigrant Families	.073***	-.052***	-.029***	-.088***	-.080***	-.080***	-.073***
	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)
Blended Generation Mexican Immigrant Families	.115***	0.046***	.050***	.012	.012 ł	.012	.012
	(.009)	(.008)	(.008)	(.007)	(.007)	(.007)	(.007)
1st Generation Mexican Immigrants, parents in the US<5 years	--	--	--	--	-.142***	-.141***	--
					(.020)	(.020)	
1st Generation Mexican Immigrants, Child is non-citizen	--	--	--	--	--	--	-.113***
							(.011)
Estimates statistically different for 1st Generation and Blended Generation Mexican Immigrant Families	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Model includes:							
Demographic characteristics, year and state effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Parents employment, disability status	No	No	Yes	Yes	Yes	Yes	Yes
Income to needs ratio	No	No	No	Yes	Yes	Yes	Yes
State unemployment rate: current and lagged (6 lags)	No	No	No	No	No	Yes	Yes
N	130,928	130,928	130,928	130,928	130,928	130,928	130,928

*** p<0.001, ** p<0.01, * p<0.05, ł p<0.10

Notes: Children in families with at least one Mexico born parent or both US born parents are the sample of analysis. Figures in each column of a panel are from a separate regression based on an OLS model using CPS-FSS 2001-2011. Samples are restricted to families matched in years t and t+1. Robust standard errors are in parenthesis. Children in families with both parents born in the US are the category of comparison. Also see notes to Table 1.

Table 4: How Income Affects Food Insecurity among Children and SNAP Participation in Mexican Immigrant families
Estimated Effects by Parent's Generation: Child Fixed Effects Models

	Food Insecurity among Children					SNAP Participation				
	Model 1	Model 2	Model 3	Model 4	Model5	Model 1	Model 2	Model 3	Model 4	Model 5
Income to needs ratio (INR)	-.002**	-.002**	-.002**	-.001**	-.007***	-.005***	-.004***	-.004***	-.004***	-.022***
	(.001)	(.001)	(.001)	(.001)	(.002)	(.000)	(.000)	(.000)	(.000)	(.002)
INR*1st Generation Mexican	-.012	-.012	-.013	-.012	-.021	-.017 ł	-.016 ł	-.016 ł	-.015 ł	-.012
Immigrant Families	(.010)	(.010)	(.010)	(.009)	(.016)	(.009)	(.009)	(.008)	(.008)	(.011)
INR*Blended Generation Mexican	-.017 ł	-.015 ł	-.016 ł	-.015 ł	-.039	-.014 ł	-.012 ł	-.012 ł	-.011	-.037 ł
Immigrant Families	(.009)	(.009)	(.009)	(.009)	(.022)	(.007)	(.007)	(.007)	(.007)	(.022)
INR^2					.0004***					.001***
					(.000)					(.000)
INR^2*1st Generation Mexican					.001					-.000
Immigrant Families					(.001)					(.000)
INR^2*Blended Generation Mexican					.002 ł					.002 ł
Immigrant Families					(.001)					(.001)
Model includes:										
Marital status, Employment status and disability status of parent	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Parent's education, number of children, number of adults, and number of elderly in the household, housing rented	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
SNAP participation/Food insecurity in Family	No	No	No	Yes	Yes	No	No	No	Yes	Yes
N of observations	130,928	130,928	130,928	130,928	130,928	130,928	130,928	130,928	130,928	130,928
N of groups	65,465	65,465	65,465	65,465	65,465	65,465	65,465	65,465	65,465	65,465

*** p<0.001, ** p<0.01, * p<0.05, ł p<0.10

Notes: Children in families with at least one Mexico born parent or both US born parents are the sample of analysis. Figures in each column are from a separate regression based on an OLS model using CPS-FSS 2001-2011. Samples are restricted to families matched in year t and t+1. Robust standard errors are in parenthesis. Also see notes to Table 1.

Table 5: Is there a Chilling Effect? Estimates of the Association between Family Type and Prevalence of SNAP Participation and Food Insecurity among Children

	Panel 1: SNAP Participation				Panel 2: Food Insecurity Among Children			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
All Citizens Mexican Immigrant Families	.049***	.000	.010 ł	-.020***	.077***	.049***	.052***	.032***
	(.006)	(.006)	(.005)	(.005)	(.006)	(.006)	(.006)	(.006)
Mixed Status Mexican Immigrant Families	.069***	-.042***	-.021***	-.087***	.128***	.081***	.090***	.052***
	(.003)	(.004)	(.004)	(.004)	(.003)	(.004)	(.004)	(.004)
All Non-Citizens Mexican Immigrant families	-.127***	-.244***	-.208***	-.296***	.188***	.128***	.143***	.095***
	(.004)	(.006)	(.006)	(.007)	(.013)	(.013)	(.013)	(.013)
Estimates for the following are statistically different at the p<0.05								
All citizens and mixed-status	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
All citizens and all non-citizens	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mixed status and all non-citizens	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Model Controls for:								
Demographic characteristics, year, state effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Parents' employment, disability status	No	No	Yes	Yes	No	No	Yes	Yes
Income to needs ratio	No	No	No	Yes	No	No	No	Yes
N	252,660	252,660	252,660	252,660	252,660	252,660	252,660	252,660

*** p<0.001, ** p<0.01, * p<0.05, ł p<0.10

Notes: Children in families with at least one Mexico born parent or both US born parents are the sample of analysis. Figures in each column are from a separate regression based on an OLS model using CPS-FSS 2001-2011. Robust standard errors are in parenthesis. Children in families with both parents born in the US are the category of comparison.

Table 6: Estimated Effects of the Outreach and ARRA Expansion on SNAP Participation and Food Insecurity among Children in Mexican Immigrant Families

	Panel 1: SNAP Participation		Panel 2: Food Insecurity	
	Model 1	Model 2	Model 1	Model 2
Children with both parents in the US for less than 5 years are excluded	No	Yes	No	Yes
All Citizens Mexican Immigrant Families	-.007	-.010	.050***	.051***
	(.013)	(.013)	(.016)	(.016)
Mixed Status Mexican Immigrant Families	-.094***	-.088***	.061***	.060***
	(.012)	(.012)	(.012)	(.012)
All Non-Citizens Mexican Immigrant Families	-.283***	-.252***	.120***	.115***
	(.019)	(.023)	(.039)	(.044)
Consulate*Pre-Outreach*All Citizen	-.027	-.022	-.035	-.034
	(.021)	(.022)	(.024)	(.024)
Consulate*Outreach*All Citizen	-.028	-.026	-.033	-.032
	(.018)	(.018)	(.027)	(.027)
Consulate*ARRA*All Citizen	.001	.004	-.026	-.026
	(.019)	(.019)	(.020)	(.020)
Consulate*Pre-Outreach*Mixed Status	-.011	-.013	.008	.006
	(.015)	(.015)	(.019)	(.019)
Consulate*Outreach*Mixed Status	.011	.007	-.031*	-.032*
	(.020)	(.020)	(.017)	(.018)
Consulate*ARRA*Mixed Status	.036**+	.031*+	-.023	-.020
	(.018)	(.018)	(.018)	(.019)
Consulate*Pre-Outreach*All Non-citizen	-.021	-.065**	-.002	.011
	(.027)	(.031)	(.050)	(.059)
Consulate*Outreach* All Non-citizen	-.019	-.063*	-.055+	-.063+
	(.029)	(.034)	(.057)	(.060)
Consulate*ARRA* All Non-citizen	-.024	-.071*	-.113*	-.137**
	(.040)	(.039)	(.066)	(.065)
N	252660	251774	252660	251774

*** p<0.01, ** p<0.05, * p<0.10,

Notes: Children in families with at least one Mexico born parent or both US born parents are the sample of analysis. Figures in each column are from a separate regression based on an OLS model using CPS-FSS 2001-2011. Robust standard errors clustered on state-year are in parenthesis. Children in families with both parents born in the US are the category of comparison. Regressions include all controls in Model 4 of Table 5. In addition to the variables listed in the Table, all regressions also include interactions of the three periods (pre-outreach, outreach and ARRA expansion) with dummy variable on whether the state has a Mexican consulate office.

+ indicates that the coefficient of the interaction term in the pre-outreach period (Consulate*Pre-Outreach*Non-citizen) is statistically different from the coefficient of the interaction term in the other periods (e.g. Consulate*Outreach*Non-citizen).

Table 7: Estimated Effects of the Outreach and ARRA Expansion on SNAP Participation and Food Insecurity among Children in Mexican Immigrant Families
Analysis based on Proximity to Mexican Consulate office.

	Panel 1: SNAP Participation				Panel 2: Food Insecurity			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
All Citizens Mexican Immigrant Families	-.006	-.009	-.008	-.011	.049***	.050***	.048***	.048***
	(.013)	(.013)	(.013)	(.013)	(.016)	(.016)	(.016)	(.016)
Mixed Status Mexican Immigrant Families	-.096***	-.090***	-.098***	-.093***	.058***	.058***	.056***	.055***
	(.012)	(.012)	(.012)	(.012)	(.011)	(.012)	(.011)	(.011)
All Non-Citizens Mexican Immigrant Families	-.283***	-.251***	-.286***	-.254***	.113***	.107**	.112***	.106**
	(.019)	(.022)	(.019)	(.023)	(.038)	(.043)	(.038)	(.043)
Proximity*Pre-Outreach*All Citizen	-.016	-.013	-.016	-.014	-.018	-.018	-.016	-.016
	(.011)	(.011)	(.010)	(.011)	(.012)	(.012)	(.012)	(.013)
Proximity*Outreach*All Citizen	-.013	-.012	-.017*	-.016*	-.015	-.015	-.013	-.013
	(.009)	(.009)	(.009)	(.009)	(.014)	(.014)	(.013)	(.014)
Proximity*ARRA*All Citizen	.000	.002	-.003	-.002	-.012	-.012	-.010	-.010
	(.010)	(.010)	(.010)	(.010)	(.010)	(.010)	(.010)	(.010)
Proximity*Pre-Outreach*Mixed Status	-.004	-.005	-.005	-.006	.006	.005	.007	.006
	(.008)	(.008)	(.008)	(.008)	(.009)	(.010)	(.009)	(.009)
Proximity*Outreach*Mixed Status	.008	.006	.005	.002	-.014	-.015	-.012	-.013
	(.010)	(.010)	(.008)	(.008)	(.009)	(.009)	(.008)	(.008)
Proximity*ARRA*Mixed Status	.020**	.018**	.017*	.015	-.009	-.008	-.006	-.005
	(.009)	(.009)	(.009)	(.010)	(.009)	(.010)	(.009)	(.010)
Proximity*Pre-Outreach*All Non-citizen	-.010	-.034**	-.008	-.031**	.005	.012	.005	.013
	(.014)	(.016)	(.014)	(.016)	(.025)	(.030)	(.025)	(.029)
Proximity*Outreach* All Non-citizen	-.009	-.032*	-.008	-.028	-.023	-.026	-.023	-.025
	(.015)	(.017)	(.016)	(.018)	(.029)	(.030)	(.029)	(.031)
Proximity*ARRA* All Non-citizen	-.011	-.037*	-.013	-.040*	-.051	-.064*	-.049	-.060*
	(.021)	(.020)	(.020)	(.021)	(.034)	(.033)	(.033)	(.032)
Includes consulate MSA effects	No	No	Yes	Yes	No	No	Yes	Yes
Includes state fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Children with both parents in the US for less than 5 years are excluded from sample	No	Yes	No	Yes	No	Yes	No	Yes
N	252660	251774	252660	251774	252660	251774	252660	251774

*** p<0.01, ** p<0.05, * p<0.10,

Notes: Children in families with at least one Mexico born parent or both US born parents are the sample of analysis. Figures in each column are from a separate regression based on OLS models using CPS-FSS 2001-2011. Robust standard errors clustered on state-year are in parenthesis. Children in families with both parents born in the US are the category of comparison. Regressions include all controls in Model 4 of Table 5. In addition to the variables listed in the Table, all regressions also include interactions of the three periods (pre-outreach, outreach and ARRA expansion) with the variable Proximity. Proximity is equal to 2 if the respondent lives in an MSA with a consulate office, 1 if there is a Mexican consulate in the state of residence but not the MSA of residence, and 0 if there is no consulate in the MSA or state of residence. + indicates that the coefficient of the interaction term in the pre-outreach period (Consulate*Pre-Outreach*Non-citizen) is statistically different from the coefficient of the interaction term in the other periods (e.g. Consulate*Outreach*Non-citizen).

Table A.1. Questions for Measuring Food Security in the Food Security Supplement of the Current Population Survey.

1	"We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
2	"The food that we bought just didn't last and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
3	"We couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months?
4	In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)
5	(If yes to Question 4) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months?
6	In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)
7	In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No)
8	In the last 12 months, did you lose weight because there wasn't enough money for food? (Yes/No)
9	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? (Yes/No)
10	(If yes to Question 9) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months?
11	"We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
12	"We couldn't feed our children a balanced meal, because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
13	"The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 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? (Yes/No)
15	In the last 12 months, were the children ever hungry but you just couldn't afford more food? (Yes/No)
16	In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No)
17	(If yes to Question 16) How often did this happen – almost every month, some months but not every month, or in only 1 or 2 months?
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? (Yes/No)

Table A.2: Estimated Effects of Family Characteristics on Food Insecurity and SNAP receipt among First Generation Mexicans, Blended Generation Mexicans, and Native Families (Models with Child Fixed Effects)

	Food Insecurity among Children		SNAP Receipt	
	Coefficient	s.e.	Coefficient	s.e.
Income-to-Needs ratio (INR)	-0.007***	0.002	-0.022***	0.002
INR*1st Generation	-0.021	0.016	-0.012	0.011
INR*Blended Generation	-0.039 ł	0.022	-0.037 ł	0.022
INR^2	0.000***	0.000	0.001***	0.000
INR^2*1st Generation	0.001	0.001	-0.000	0.000
INR^2*Blended Generation	0.002	0.001	0.002 ł	0.001
Single parent	0.003	0.015	0.056***	0.013
Single*Blended Generation	0.013	0.173	-0.098	0.131
Single*1st Generation	0.076	0.085	-0.031	0.060
One parent employed PT (<35 hours), no FT	-0.005	0.010	0.050***	0.009
No employed parents	0.016	0.011	0.073***	0.011
At least one parent is disabled	0.039*	0.019	0.025	0.016
One parent employed PT*Blended Generation	0.073	0.063	0.039	0.070
No employed parents*Blended Generation	-0.131 ł	0.074	0.022	0.069
Parent is disabled*Blended Generation	-0.064	0.074	0.123	0.118
One parent employed PT*1st Generation	0.023	0.042	0.043	0.033
No employed parents*1st Generation	0.013	0.048	0.035	0.036
Parent is disabled*1st Generation	-0.157	0.101	-0.050	0.097
Number of children <18	-0.003	0.006	0.026***	0.005
Number of adults aged 18-64	-0.002	0.006	0.011*	0.005
Number of elderly aged 65+	-0.018	0.018	-0.007	0.017
Number of children*Blended Generation	-0.050	0.046	-0.010	0.048
Number of children*1st Generation	0.029	0.027	0.007	0.023
Number of adults*Blended Generation	-0.009	0.048	0.017	0.038
Number of adults* 1st Generation	-0.016	0.021	-0.026 ł	0.016
Number of elderly*Blended Generation	-0.042	0.079	0.021	0.034
Number of elderly*1st Generation	0.033	0.067	-0.087	0.060
No parent completed HS	-0.018	0.029	0.013	0.026
One parent completed HS, no more	-0.000	0.014	0.004	0.012
One parent has some college, no BA	0.001	0.009	0.001	0.007
No parent completed HS*Blended Generation	-0.004	0.161	0.259 ł	0.139
One parent completed HS*Blended Generation	-0.042	0.139	0.138	0.104
One parent has some college*Blended Generation	-0.130	0.125	0.108	0.080
No parent completed HS*1st Generation	-0.038	0.123	-0.082	0.081

Table A.2 continued

	Coefficient	s.e.	Coefficient	s.e.
One parent completed HS*1st Generation	0.014	0.121	-0.089	0.070
One parent has some college*1st Generation	0.027	0.115	-0.120 ł	0.066
Housing is rented	0.014	0.011	0.017	0.011
Housing is rented*Blended Generation	0.118 ł	0.064	-0.095	0.070
Housing is rented*1st Generation	-0.030	0.044	-0.019	0.033
SNAP receipt	0.051***	0.012		
SNAP receipt*Blended Generation	0.013	0.055		
SNAP receipt*1st Generation	-0.026	0.041		
Food insecurity among children			0.035***	0.008
Food insecurity among children*Blended generation			0.017	0.045
Food insecurity among children*1st Generation			-0.023	0.021
N of observations	130,928		130,928	
N of groups	65,465		65,465	

*** p<0.001, ** p<0.01, * p<0.05, ł p<0.10

Notes: Children in families with at least one Mexico born parent or both US born parents are the sample of analysis. Year effects are included in all models, but not shown. Samples are restricted to families matched in years t and t+1. First generation refers to first generation Mexican Immigrant Families, blended generation refers to blended generation Mexican families.

Table A.3: Descriptive Data on Food Insecurity among Children and SNAP Participation in Mexican Immigrant and Native Families

	N	% with Food Insecurity Among Children	% that Participated in SNAP
All children	**252660**	**11.1**	**16.8**
At least one Mexican immigrant parent	21471	21.9	21.4
All Citizens Members	4222	16.8	19.5
Mixed Status Members	16106	22.7	23.1
All Non-Citizens Members	1143	29.4	2.4
Native-born Parents	231189	9.7	16.3

Notes: Based on CPS-FSS 2001-2011.

Table A.4: Estimated Effects of the Outreach and ARRA Expansion on SNAP Participation and Food Insecurity among Children in Mexican Immigrant Families

	Panel 1: SNAP Participation			Panel 2: Food Insecurity		
	Single Parent Families	Two-parent Families	Low-educated families	Single Parent Families	Two-parent Families	Low-educated families
All Citizens Mexican Immigrant Families	.010	-.020	-.024	.074***	.034*	.035*
	(.023)	(.016)	(.018)	(.027)	(.019)	(.021)
Mixed Status Mexican Immigrant Families	-.129***	-.067***	-.100***	.078***	.051***	.066***
	(.024)	(.013)	(.013)	(.023)	(.013)	(.013)
All Non-Citizens Mexican Immigrant Families	-.346***	-.245***	-.286***	.071	.128***	.126***
	(.044)	(.021)	(.020)	(.075)	(.045)	(.041)
Consulate*Pre-Outreach*All Citizen	-.008	-.030	.025	-.043	-.031	-.009
	(.041)	(.022)	(.027)	(.041)	(.031)	(.031)
Consulate*Outreach*All Citizen	-.033	-.020	-.029	-.048	-.025	-.047
	(.033)	(.020)	(.028)	(.047)	(.027)	(.038)
Consulate*ARRA*All Citizen	.015	.002	.002	-.042	-.015	-.012
	(.042)	(.022)	(.029)	(.036)	(.026)	(.030)
Consulate*Pre-Outreach*Mixed Status	.024	-.030*	.025	-.030	.018	.011
	(.034)	(.016)	(.018)	(.042)	(.021)	(.022)
Consulate*Outreach*Mixed Status	.043	-.001	.016	-.095***	-.012	-.054***
	(.034)	(.022)	(.022)	(.030)	(.018)	(.019)
Consulate*ARRA*Mixed Status	.073**	.025	.050**	-.023	-.023	-.045**
	(.032)	(.020)	(.021)	(.039)	(.019)	(.021)
Consulate*Pre-Outreach*All Non-citizen	-.035	-.011	.015	.030	-.009	.011
	(.051)	(.028)	(.030)	(.099)	(.061)	(.061)
Consulate*Outreach* All Non-citizen	-.027	-.014	-.012	-.055	-.048	-.065
	(.061)	(.030)	(.030)	(.103)	(.065)	(.063)
Consulate*ARRA* All Non-citizen	-.145**	.010	-.049	-.042	-.125	-.143*
	(.068)	(.047)	(.040)	(.138)	(.080)	(.075)
N	72911	179749	87336	72911	179749	87336

*** p<0.01, ** p<0.05, * p<0.10,

Notes: Column sub-headings describe the sample of analysis that comprise of children in families with at least one Mexico born parent or both US born parents. Figures in each column are from a separate regression based on an OLS model using CPS-FSS 2001-2011. Robust standard errors clustered on state-year are in parenthesis. Children in families with both parents born in the US are the category of comparison. Regressions include all controls in Model 4 of Table 5. In addition to the variables listed in the Table, all regressions also include interactions of the three periods (pre-outreach, outreach and ARRA expansion) with variable Consulate. Low-educated families are families where the parent(s) have a high-school diploma or less.

+ indicates that the coefficient of the interaction term in the pre-outreach period (Consulate*Pre-Outreach*Non-citizen) is statistically different from the coefficient of the interaction term in the other periods (e.g. Consulate*Outreach*Non-citizen).

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