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Food Stamp Program Participation of Refugees and Immigrants

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The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) dramatically changed the availability of food stamps to immigrants, but not to refugees. However, refugee usage of food stamps in the post-reform era has declined more than usage of either other immigrants or native citizens. We investigate food stamp program participation of immigrants and refugees to ascertain if the resulting decline was an unintended effect of the reform or is due to some other phenomena. We use data from the Immigration and Naturalization Service to construct an instrument for refugees. We find that refugees are more likely than other immigrants to use food stamps. While PRWORA clearly reduced non-refugee immigrant food stamp participation, the post-reform era decline in refugee usage is fully attributable to a strong refugee response to changing labor market conditions. We also find that refugees' use of food stamps declines rapidly with time in the United States, unlike that of other immigrants.

JEL Classification: H53, J61, C13

1. Introduction

From its inception in 1977 until the 1996 welfare reforms, the food stamp program provided food assistance to low-income households, including legal immigrants, who met nationally uniform income and asset eligibility tests. After two decades of increasing food stamp use by immigrant households (Borjas and Hilton 1996), the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) drastically altered the availability of food stamps to non-citizen legal immigrants but not to refugees (Fix and Tumlin 1997). Immigrants who arrived in the United States prior to 1996, who could not demonstrate 40 quarters of work history, and who were not yet naturalized became ineligible for federal food stamp benefits.[1] Immigrants arriving after August 1996 were also made ineligible. In contrast, refugees were largely spared by the PRWORA. Under the new law, refugees were given "qualified" status, allowing them to qualify for food stamps regardless of their arrival date.

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[1] The work requirement applies to the sum of all quarters worked by all members of the immigrant family, including spouses, parents, and children. Immigrant families with 40 or more cumulative work quarters are eligible for benefits, as are families in which an immediate member serves or has served in the U.S. military (Fix and Zimmerman 1999).

Refugees were also given a five-year exemption from the new law's eligibility restrictions to non-refugee legal immigrants.[2]

Few expected the 1996 changes in immigrant access to food stamps to affect the participation patterns of refugee households that were exempted from PRWORA immigrant restrictions. However, from 1994 to 1997, refugee participation in the food stamp program fell by 37% (Fix and Passel 1999). During the same period, participation in the food stamp program dropped by 30% for immigrants and by 21% for natives. Such an unexpected decline in program participation among a constituency that the reforms were designed *not* to affect indicates that there may have been some unintended consequences of the reform. Understanding the impact of policy change on behavior and identifying potential unanticipated consequences is crucial for future efforts of policy makers in targeting reforms effectively.

The purpose of this paper is to disentangle the impact PRWORA might have had on refugee behavior from other, potentially confounding, influences on that behavior. Additionally, while other investigations of immigrant behavior typically combine refugees and non-refugees into a single group (e.g., Borjas 1994; Borjas and Hilton 1996; Lofstrom and Bean 2002), the analysis in this paper will indicate whether this grouping is appropriate or whether refugee behavior is distinct from that of non-refugee (NR) immigrants. Further, the methodology we employ to identify refugees can be applied to analyses of other issues of relevance to the growing immigrant population. The analysis will also correct for measurement error in the reporting of food stamp participation, a correction that is found to be important.

The results demonstrate that refugees behave quite differently, at least regarding food stamp participation, and that not distinguishing them from NR immigrants will bias results as they relate to "immigrants" overall. Specifically, we find that refugees are dramatically more likely to participate in the food stamp program than are either NR immigrants or native-born individuals with like characteristics, and NR immigrants may be less likely to participate than are native-born individuals. Within the context of the 1996 reforms, we find no evidence that the clearly documented reduction in refugee food stamp participation can be attributed to PRWORA. We also find that refugee participation in the food stamp program is far more sensitive to the local unemployment rate than it is for either native-born individuals or NR immigrants. Finally, we find that while NR immigrants' usage of food stamps increases or remains steady with years in the United States, refugees' participation declines with time since immigration.

2. Background

Immigration to the United States, the numbers and policies for which are controlled by the U.S. Congress, increased significantly in the late 1980s and continued through the 1990s. In the decade ranging from 1991 to 2000, the nine million immigrants entering the United States exceeded that of any previous decade, including the 10-year boom from 1901 to 1910, during

[2] The 1998 Agriculture Research Extension and Education Reform Act subsequently restored food stamp benefits for selected immigrants, including pre-enactment children, elders, and the disabled. More recently, the 2002 Farm Bill extended eligibility to low-income immigrant children and disabled legal immigrants who arrived after August 1996 and to legal immigrants with five years of residency, provided they and their sponsors met stricter and more enforceable deeming guidelines (Capps et al. 2004).

Table 1. Food Stamp Participation by Immigrant, Age, Poverty, and Pre-Post-Reform

Variable	All	Natives	Immigrants	NR Immigrants	Refugees[a]
FS participation	0.0768	0.0730	0.1056	0.0990	0.1778
Under 65 years	0.0845	0.0813	0.1062	0.1022	0.1534
Over 65 years	0.0503	0.0457	0.1026	0.0810	0.2680
Not poor	0.0297	0.0280	0.0442	0.0404	0.0858
Poor	0.3975	0.4086	0.3484	0.3319	0.5187
Pre-reform	0.0929	0.0876	0.1366	0.1281	0.2258
Post-reform	0.0592	0.0568	0.0762	0.0716	0.1288
By year of arrival					
1970s cohort			0.1141	0.1137	0.1193
1980s cohort			0.1321	0.1258	0.1970
1990s cohort			0.1101	0.0949	0.2590
Observations	295,382	260,985	34,397	31,492.6	2900.398

Based on authors' calculations using Current Population Survey 1994–2001, excluding CPS years 1996 and 1997. NR = non-refugee; FS = food stamp program participation.
[a] Refugees variable constructed by authors.

which the country accepted nearly 8.8 million immigrants (Immigration and Naturalization Service 2000a; table 1, p. 18). In 2000, the Immigration and Naturalization Service (INS) granted nearly 850,000 immigrants legal permanent residence. Of those immigrating to the United States in 2000, 8% were refugees or asylees, down somewhat from 1997, when refugees comprised 14% of all immigrant arrivals. As of April 2003, over five million applications for immigration and change of legal status were pending at the Bureau of Citizenship and Immigration Services (Immigration and Naturalization Service 2002).

To be clear, the legal definition of immigrant comprises "persons lawfully admitted for permanent residence in the United States" (Immigration and Naturalization Service 2000b). As we explain below, data limitations will complicate clear identification of immigrants, as not all foreign-born people living in the United States are admitted for permanent residence. Immigrants may apply for legal permanent resident (LPR) status while still living abroad or as an adjustment to their visa while living in the United States. In 2004, 62% of all immigrants were already living in the United States on temporary visas, such as temporary worker, student, or travel visas, when they obtained LPR status (Rytina 2005). To open the doors to certain highly skilled workers in fields such as information technology, the Immigration Act of 1990 increased the number of temporary work visas granted each year and made it easier to transition from temporary worker status to permanent resident status (Lowell 2001).

Refugees are a distinct subset of all legal immigrants, those granted refugee status prior to coming to the United States because of clear and credible fear of persecution as a result of race or ethnicity, nationality, or political or religious beliefs. Each year the President, after consulting with Congress, approves new refugee limits by region of the world based on an assessment of worldwide need. The President set an upper limit of 70,000 refugees per year in 2002, 2003, and 2004 (Rytina 2005). Along with temporary workers and students, refugees also apply for an adjustment of their legal status to "permanent resident" after arriving in the United States.[3] Asylees are another subset of legal immigrants. Asylees come to the United

[3] Refugees are eligible for adjustment to permanent resident status after living continuously in the United States for at least one year.

States without any guarantee of residency and apply for asylee status based on a substantiated fear of persecution should they return to their home country. Asylees can apply for adjustment to legal permanent resident status one year after gaining asylee status. Asylees are treated the same as refugees with regard to food stamp eligibility and throughout this paper.

In response to the tightening of immigrant eligibility rules under PRWORA, some states chose to extend state-funded food stamp benefits to legal immigrants until they attained federal eligibility. Zimmerman and Tumlin (1999) report that 17 states extended food stamp benefits to legal immigrants arriving prior to August 1996. Ten states (California, Colorado, Connecticut, Maine, Maryland, Massachusetts, Minnesota, Nebraska, Washington, and Wisconsin) chose to extend food assistance benefits to immigrants arriving after August of 1996. Analyzing the trends in food stamp participation pre- and post-PRWORA, Borjas (2004) finds much larger participation drops in states that did not extend benefits to non-citizen legal immigrants.

Broadly, investigation of the impact of the 1996 welfare reforms on immigrants falls into two categories, descriptive and multivariate policy analysis. The work by Fix and Passel (1999), Capps et al. (2004), and Zimmerman and Tumlin (1999) clearly describes the overall decline in participation in the period following the implementation of PRWORA. These authors carefully isolate immigrants from natives and citizens from non-citizens. The multivariate policy analyses, including those of Borjas (2002, 2004), Lofstrom and Bean (2002), and Van Hook (2003), estimated participation models controlling for individual characteristics to isolate the impact of PRWORA's "chilling effect" from other explanations, such as changing economic conditions, state fixed effects, and changes in citizenship.

Measures of refugee status are typically not available in large cross-sectional data sets of the type necessary for participation model estimation. Most post-welfare reform studies have tried to identify immigrants and refugees using the Current Population Survey (CPS), the Survey of Program Participation, or the decennial census. Researchers typically take one of two approaches: either they do not attempt to identify refugees separately from all immigrants (for example, see Lofstrom and Bean 2002) or they remove any household with immigrants from countries with relatively high percentages of refugees (for example, see Borjas 2002; Cortes 2004). Passel and Clark (1998) may represent the most comprehensive effort to disentangle the legal status of immigrants, although not for the purposes of multivariate analysis. However, their methodology is not applicable to a multivariate analysis such as the one undertaken here.

Table 1 demonstrates the difference in food stamp participation rates by immigration status using CPS data for the years 1993 to 2000 (CPS years 1994 to 2001), omitting the years 1996 and 1997 to allow for implementation of PRWORA across states. Over the entire time period, food stamp participation averaged 7.7%. Non-refugee immigrants participated at a rate of 9.9%, while refugees participated at a rate of 17.8%. For natives and NR immigrants, younger households participated at a lower rate than did households headed by a person over 65 years of age. The opposite holds for refugee households. Among poor households, immigrants participate at a lower rate than natives. Over the entire time period, 41% of native households, 35% of NR immigrant households, and 52% of refugee households participated in the food stamp program. Table 1 also demonstrates the larger drop in participation among immigrants after PRWORA than among natives, with rates dropping for refugees as well as for NR immigrants. We also see that refugees who have spent fewer years in the United States participate at a much higher rate. The rates reported in Table 1 are comparable to those found by Borjas (1994), who examined food stamp participation rates among immigrants.

3. Data

The primary data for our food stamp participation analysis are the March Demographic files of the CPS for the years 1994 through 2001, which offer large sample sizes, program participation data, and reasonable immigrant data. These data have been widely used to study immigration (Fix and Passel 1999). The CPS asks questions on citizenship and country of birth, which will allow us to assign an immigrant status for each individual. We focus on improving the identification of refugees, a subset of immigrants.

Our approach to identifying differences in participation between refugees and other groups makes use of data provided by the INS titled "Immigrants Admitted to the United States," data which are available for the period ranging from 1972 through 1998. These data contain the universe of all persons applying for LPR status during a particular fiscal year. There are two types of immigrants captured in these files. The first type is new entrants: individuals who are entering the United States and simultaneously applying for LPR status. The second type comprises conversions: individuals who have been living in the United States for some period of time under another type of visa and who are now applying for adjustment to LPR status.

In addition to some demographic data, the INS data provide information on entry into the United States. Of particular interest here is the year of initial entry and the status of entry. The year of entry establishes when the individual first came to the United States (comparable to the question in the CPS), while the status at entry determines the initial classification at entry. It is from this classification that we identify refugees and asylees. The INS data use a number of codes to indicate refugee and asylee status, which can change from year to year depending on circumstances within various countries.

Three Estimation Samples

The data deriving from the CPS are household-level observations with demographic information on the head of the household. For married heads we also include spouse data in our regression models. Armed forces households, non-family households, and households with heads of household under the age of 18 years are excluded from the sample. This results in 389,883 households. We also exclude observations from the 1997 and 1998 CPS years (corresponding to 1996 and 1997 program participation years), the year including and following the passage of Temporary Aid to Needy Families. Excluding 1996 data removes the "anticipation" effect, while excluding 1997 data allows for full implementation of the new policies. This sample, hereafter called the full sample, includes 295,382 households.

An important issue in this context, and one we address more fully in our sensitivity tests, is that of illegal immigrants. The Census Bureau and other researchers indicate that the CPS respondents include some illegal immigrants (see Jasso et al. 2000). Illegal immigrants are not a part of the population we intend to study, and, if they were identified, we would exclude them from our study. To see the impact of illegal immigrants on our findings, we follow the method of Passel and Clark (1998), constructing two samples that attempt to exclude illegal aliens. In one sample, hereafter referred to as the "No Central Americans" sample, we exclude all immigrants from Central America and Mexico. This represents one extreme case and is certainly removing individuals from the sample who are not illegal immigrants. The "full" sample represents the other extreme, the failure to remove any illegal immigrants. Households

with some illegal immigrant adults may legally receive food stamp benefits as a result of mixed citizenship within the household. Illegal immigrants who have a child in the United States may have a child who qualifies for food stamps (see Van Hook and Balistreri 2006); hence, it may not be accurate to simply remove households containing some illegal immigrants.

A third sample, hereafter referred to as the "intermediate" sample, is also constructed and removes only Central Americans and Mexicans who are under the age of 40 years and who have less than a high school education. This sample reflects work by authors such as Passell (1986), Bean, Telles, and Lowell (1987), Fix and Passell (1994), Lowell and Suro (2002), Lubotsky and Ibarraran (2007), who have attempted to identify the characteristics of undocumented or illegal immigrants. Foreign-born individuals legally visiting the United States on temporary visas for work or schooling are also ineligible to receive food stamps. There is no way to identify these individuals in the CPS. In order to address this, our third sample also excludes households in which the head of household is an immigrant working for the government and in which the spouse, if any, is not in the labor force. We also exclude immigrant households in which the head of the household or the spouse is a student and in which any non-student head is not in the labor force. Additional samples were constructed to further test robustness. These samples remove only recent immigrants from Central America and Mexico (in part because of past amnesties, most illegal immigrants are recent), remove only young immigrants from Central America and Mexico, remove only low-education immigrants from Central America and Mexico, and remove only agricultural workers from Central America and Mexico. These restrictions were also repeated only for immigrants from Mexico. Our results are qualitatively similar across all of these samples (results are available from the authors by request). We discuss results from the intermediate sample only and provide the full sample and the No Central American sample results in the Appendix 2.

Means of Samples

Table 2 presents means for the variables used in the analysis for each of the three samples as well as for the subsample of immigrants. The fifth column also presents means for refugees. The fifth column was calculated using the probability of being a refugee (described below) as a weight. Since we do not know who is actually a refugee, the averages for the refugee measures here are less than 1. Panel A presents the means for variables representing the household or the head of household. Panel B presents the means for the spouse when the head of the household is married with spouse present. The demographic statistics are not markedly different from those typically seen in household samples. The typical (average or modal) household is headed by a 49-year-old married white male with a high school degree. Female-headed households comprise approximately 40% of the sample. Households headed by an African-American comprise 10.1% of the sample. Households headed by a married couple comprise about 56.8% of the sample. While high school graduates are the modal head of household (approximately 32% of the sample), the second and third largest educational categories comprise those with some college (18%) or with a four-year degree (15%). In fact, nearly 50% of the sample has a head of household who has obtained some post-secondary education. Almost 8% of the sample reported receiving food stamps at some time in the previous calendar year. As can be seen in panel A, approximately 3.8% (or 11,357) of the households comprise immigrants from Mexico or Central America. Dropping households comprising individuals who immigrated from Central America yields the second

Table 2A. Means for Samples, Household, and Householder Variables

Variable	Full Sample	No Central Americans	Intermediate Sample	All Immigrants	Refugees[a]
Food stamp participation	0.077	0.074	0.075	0.106	0.178
Age	49.496	49.874	49.791	45.836	49.357
Female	0.404	0.405	0.404	0.388	0.343
African-American	0.101	0.104	0.102	0.071	0.045
Hispanic	0.121	0.086	0.107	0.515	0.529
Asian	0.027	0.028	0.027	0.166	0.225
Native American	0.011	0.011	0.011	0.004	0.000
Elementary school	0.089	0.073	0.081	0.255	0.185
Some high school	0.093	0.090	0.090	0.100	0.079
High school—no diploma	0.012	0.012	0.012	0.023	0.019
High school graduate	0.318	0.323	0.323	0.233	0.271
Some college	0.179	0.183	0.181	0.113	0.124
Associates/technical degree	0.071	0.073	0.072	0.046	0.059
College graduate	0.153	0.158	0.155	0.136	0.158
Master's degree	0.056	0.058	0.057	0.053	0.057
Terminal degree	0.029	0.030	0.029	0.040	0.048
Married spouse present	0.568	0.566	0.568	0.613	0.613
Veteran	0.194	0.201	0.197	0.033	0.017
Disabled	0.134	0.136	0.135	0.086	0.119
Multi-family household	0.059	0.054	0.057	0.108	0.074
Number of children under age 5 years	0.206	0.193	0.197	0.323	0.217
Number of children age 5 to 18 years	0.574	0.549	0.562	0.811	0.664
Local unemployment rate	5.095	5.038	5.077	5.996	6.044
Immigrant	0.116	0.082	0.102	1.000	1.000
Refugee_main	0.015	0.016	0.015	0.128	0.889
Refugee_30	0.014	0.014	0.014	0.119	0.895
Refugee_IV	0.010	0.010	0.010	0.084	0.760
Years in U.S.	2.201	1.672	2.051	18.902	17.581
Central Americans	0.038	0.000	0.024	0.320	0.003
Young, low-education Central American students or government workers	0.001	0.000	0.000	0.012	0.015
Sample size	295,382	284,025	290,644	34,397	2900.4

[a] Refugees variable constructed by authors.

sample of 284,025 households. Approximately 0.1% (or 418) of the households comprise immigrants from Mexico or Central America with less than a high school education, who are under the age of 40 years, working in agriculture, or are non-citizen government workers or non-citizen students. Dropping only these households from the full sample yields the intermediate sample of 290,644 households.[4] Overall there is little difference between the three samples.

[4] According to the Bureau of Census, some immigrants in the CPS are illegal aliens, most of who come from Central America (including Mexico). Obviously, not all immigrants from Central America are illegal, nor are all Central American immigrants with less than a high school education. Illegal immigrants are categorically ineligible for food stamps. Hence, the full sample should understate the level of overall immigrant use of food stamps (thus biasing downward the coefficient on immigrant). In contrast, the samples that remove all Central American immigrants will bias the results only if legal Central American immigrants are more or less likely to participate in food stamp programs than are other legal immigrants, controlling for education and other characteristics. Since all legal immigrants must meet the same requirements, including demonstrating some economic viability, we argue that the samples excluding Central American immigrants likely do not significantly bias coefficients. Interestingly, the main conclusions of this paper hold qualitatively across all three samples.

Table 2B. Means for Married Spouse Present, Spouse Variable

Spouses	Full Sample	No Central Americans	Intermediate Sample	All Immigrants	Refugees[a]
Age	46.645	47.045	46.911	42.666	45.7882
Female	0.791	0.791	0.792	0.769	0.815783
African-American	0.058	0.060	0.059	0.049	0.033684
Hispanic	0.125	0.087	0.110	0.507	0.450572
Asian	0.034	0.035	0.035	0.174	0.256936
Native American	0.009	0.009	0.009	0.005	0.00185
Elementary school	0.066	0.047	0.057	0.247	0.186404
Some high school	0.077	0.073	0.074	0.102	0.073063
High school—no diploma	0.010	0.009	0.010	0.022	0.017997
High school graduate	0.362	0.370	0.366	0.258	0.312278
Some college	0.170	0.175	0.172	0.104	0.108403
Associates/technical degree	0.081	0.084	0.083	0.052	0.061262
College degree	0.160	0.166	0.163	0.140	0.151521
Master's degree	0.053	0.056	0.054	0.047	0.056384
Terminal degree	0.020	0.020	0.020	0.028	0.032689
Disabled	0.078	0.079	0.079	0.058	0.086495
Married spouse present households	167,811	160,826	164,970	21,088	1777.3

The full sample includes all non-military adult-headed households. The second column excludes all immigrants from Central America and Mexico, an extreme attempt to reduce the impact of illegal immigrants. The intermediate sample removes young, low-educated Central American and Mexican immigrants. This sample is our preferred approach to reducing the impact of illegal immigrants.

[a] Refugees variable constructed by authors.

The fourth and fifth column comprise immigrants (from the full sample) and refugees. These results are typical of those associated with similar samples (see, for example, Borjas 2004; Cortes 2004). We note that immigrants in general tend to be less well-educated than native-born individuals, while refugees are slightly more well-educated than typical immigrants. Refugees are more likely to be Asian and less likely to be African than typical immigrants.

The *Years in U.S.* variable is the number of years since the head of household first entered the United States to stay. For native born, this variable is zero and should be thought of as the interaction with the immigrant indicator.

The *local unemployment rate* variable was constructed from Bureau of Economic Analysis annual unemployment rates. For households residing in an identified metropolitan statistical area (MSA), the unemployment rate for the MSA was assigned. For those households not assigned to a metropolitan area, the overall state unemployment rate was assigned.

The variable *immigrant* derives from the citizenship status reported in the CPS. Households headed by an individual whom the CPS classifies as "Foreign Born" (as opposed to native) were considered immigrants with the following exceptions. Individuals born abroad of U.S. parents are classified as "Native." Individuals born in U.S. territories (for example, Guam) are also classified as natives. Overall, nearly 12% of the households comprise immigrants. When all immigrants from Central America are dropped, this percentage falls to 8.2%; in the intermediate sample this percentage is 10.2%.

Some researchers (see, for example, Fix and Passell 1999) separate immigrants into two categories: naturalized citizens and permanent residents. Others (Borjas 2004) argue that this distinction is endogenous. Van Hook (2003) finds support for the endogeneity argument. Because of the potential of endogeneity, we combine naturalized citizens and permanent residents into a single category.

We present results for two measures of refugee status. The first one, Refugee_main, is similar to measures used by other researchers (such as Borjas 2002): individuals from the 13 "refugee sending countries." Based on the INS World Tables, 1,527,071 refugees entered the United States between 1982 and 1998. Of the over 1.5 million refugees, over 300,000 (20%) derived from countries other than the 13 refugee sending countries. Furthermore, of all immigrants from the 13 main refugee sending countries, only 32% were refugees. We find that 1.5% of our sample households are considered refugees under this definition.

Our preferred measure of refugee status, which we will call Refugee_IV, is the probability of being a refugee, as derived from our INS models. Here, we see that the average probability is about 1% in our CPS sample.

4. Modeling and Estimation Approach

Food Stamp Program Participation

Moffitt (1983) proposed a standard model of program participation based on utility maximization. We follow similar applications (for example, Fraker and Moffitt 1988; Blank and Ruggles 1996; Borjas 2002; Ziliak, Gundersen, and Figlio 2003) in positing a reduced form model of the households' participation decision. Based on the model of Moffitt (1983), the agent maximizes a utility function, $U(Y + \theta PB) - \phi P$, which is a function of private income sources Y, an indicator P for participation in the food stamp program, and B, the level of the benefit from the food stamp program. The coefficient θ allows the food stamp benefit to have differential marginal utility from a similar cash transfer, while the coefficient ϕ represents utility costs of participation such as stigma. The household will participate if

$$U(Y + \theta B) - U(Y) > \phi, \tag{1}$$

that is, if the gain in utility from the benefit is higher than the utility cost of participation. Moffitt (1983) notes that labor force participation, which affects Y, is endogenous to the decision and models the two decisions jointly, while Hagstrom (1996) estimates a joint model of labor force participation for both husbands and wives along with food stamp program participation.

Our interest lies in estimating a reduced form participation model. Potential income is determined by factors such as age and education, whether the household has one or two potential earners (married or single), and also local labor market conditions. Moffitt (1983) notes that the stigma parameter, ϕ, may be a function of age, race, and family composition. Following standard indirect utility results, we posit that the household will participate in food stamp programs if

$$U(Y(X) + \theta B(S,T,X)) - U(Y(X)) - \phi(X) > 0, \tag{2}$$

where X are demographic characteristics and local labor market conditions, S are state-level dummies, and T measures changes in the level and availability of benefits over time. The benefit may be, in part, determined by labor force participation, which in turn is determined by demographic characteristics. The benefit also may be determined by eligibility requirements, in this case by immigrant and refugee status. It may also be that potential earnings and tastes for

leisure and program participation differ by immigrant and refugee status. To arrive at an estimable model, we specify a single index threshold crossing model:

$$\begin{aligned} FS &= 1 \text{ if } D_i\beta + \gamma I_i + \delta R_i + \varepsilon_i > 0, \\ FS &= 0 \text{ otherwise.} \end{aligned} \tag{3}$$

The variable FS is an indicator for food stamp program participation by the household. The term $D_i\beta + \gamma I_i + \delta R_i + \varepsilon_i$ represents the reduced form indirect utility differential for participating in food stamp programs (see Eqn. 2). A similar model is estimated by Borjas and Hilton (1996) and Borjas (2002). The variable D represents demographic characteristics of the head of household (age, education, race, gender, marital status) and of the spouse, if present. The variable I is an indicator that the head of household is an immigrant. The variable R is an indicator for refugee status. We assume that ε_i is normally distributed, thus giving rise to a probit model for participation. The structural parameters (θ, ϕ) cannot be recovered: the parameters β, γ, and δ represent the net effect of these variables on the agents' indirect utility. They can be interpreted as factors that increase or decrease likelihood of participation. For example, we find that refugees are more likely to participate than other groups. This may be due to lower potential earnings, Y, or to higher benefit levels, B, which would make participation more valuable. It may also be due to lower stigma, ϕ, thus making participation less costly.

After PRWORA, some states extended state-funded food stamp benefits to non-eligible immigrants (for example, see Zimmerman and Tumlin 1999; Borjas 2004). Additionally, there are many state-level variations in the application process, in substitute programs, and other economic conditions that might result in state variation in participation. To account for this, we include state dummy variables in all of our specifications. We do not report these coefficients, but they are available on request. We have also experimented with interactions between the state dummy variables and the immigrant and referee variables. Because of small populations of immigrants in some states, it was difficult to identify state-specific interaction effects. However, the general results below were robust to these specifications.

The probit model described by Equation 3 implies that

$$\Pr\{FS = 1\} = F(D_i\beta + \gamma I_i + \delta R_i), \tag{4}$$

where F is the cumulative distribution of the standard normal density. Using the law of total probabilities, we can then write the probability expression for food participation as

$$\Pr\{FS = 1\} = F(D_i\beta + \gamma I_i + \delta)\Pr\{R_i = 1\} + F(D_i\beta + \gamma I_i)\Pr\{R_i = 0\}. \tag{5}$$

This expression then gives rise to a specification that can be estimated using maximum likelihood, since the probability $\Pr\{R_i = 1\}$ is obtained from the immigration data, as described below. It should be noted that if F were simply the identity function (that is, if we posited a linear probability model), then this estimation approach would be identical to traditional instrumental variables estimation. One might be tempted to include *Rhat* (the probability of being a refugee) simply as a regressor in the probit model. However, this induces heteroskedasticity into the error term that can bias probit estimation. Further, it induces a non-normal distribution that can also bias probit estimates. We examined this option as well and found that it overstated the coefficient γ.[5] The probability decomposition technique we

[5] Those results are available from the authors.

employ suffers from none of these problems. The model and likelihood function are easily expanded to include terms that are interacted with the refugee status variable. The key assumption is that we have the probability of refugee status for each person. Essentially this is an instrumental variables approach. The next subsection describes how country, year, gender, and age are used to construct the probability of being a refugee.

The Probability of Refugee Status

From the 27 years' worth of INS data, we construct files of persons entering the United States in each of the periods identified in the CPS data.[6] For all years after 1971, we have the universe of all legal entrants. Our treatment of potentially illegal immigrants is discussed below. For years prior to 1972, we only have individuals who entered and postponed their application for LPR status to sometime after 1971.[7]

The INS data allow us to calculate the marginal proportion of refugees for each country by entry year and gender. Additionally, for country/entry year/gender groups with sufficient observations and variation in both refugee status and age at entry, we calculate probit models with age as the explanatory variable. Hence, all country/entry year/gender groups have a marginal proportion. Of the 6652 country/time/gender groups, 1788 also have an intercept and slope coefficient from a probit model. Of the remaining 4864 groups for which no probit was calculated, 3566 are country/time/gender groups with no refugees (for example, Canada), and 77 are cases in which all immigrants were refugees. Of the remaining 1221 groups for which no probit was fit, 835 of them were cases in which less than 1% of all immigrants were refugees, and the remaining were cases in which there were so few immigrants that the model would not converge.

In the 1788 probit models calculated, the relationship to age was typically negative. The average coefficient on age (across country/time/gender groups) was -0.023, and 66.8% of the age coefficients calculated were negative. The minimum was -0.88, while the maximum was 0.047. In general, men were more likely to be refugees than women.

The results of the analysis of the INS data were then matched, by country/year of entry/gender, to the individuals in the CPS data. For individuals who were not immigrants, the probability of being a refugee is set to zero. For those who were either born in a foreign country of native parents or born in a U.S. protectorate, the probability of being a refugee is also set to zero. For other immigrants whose country/entry year/gender groups yielded a valid probit model, we assign the probability of being a refugee from the probit model based on the age at entry of the CPS individual. For immigrants whose country/entry year/gender group did not yield a valid probit, we use the marginal proportion of refugees. See Redstone and Massey (2004) for an analysis of the CPS data on year of entry. Finally, because of the paucity of data in the pre-1950 period, we assigned zero probability of refugee status to immigrants from this period. These constructed probabilities for refugee status for each individual serve as the instrument for refugee status.

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[6] CPS groups by years: prior to 1950, 1950–1959, 1960–1964, 1965–1969, 1970–1974, 1975–1979, 1980–1981, 1982–1983, ..., 1996–1997, and 1998–2001.

[7] We examined the proportion of refugees in the periods prior to 1971 as well as the countries of origin. While not a perfect match, the periods in the 1960s are not inconsistent with the periods in the 1970s fully observed. The 1950s were less consistent, and the period prior to the 1950s was clearly a selected sample.

The validity of an instrument has two components. The first component is that the instrument has predictive power for the variable in question. In this case, it is quite clear that refugee status varies by country, year, and gender. We also find that the age variable is typically significant in our model, and so it too is predictive. The second issue is whether these variables are independent of the participation decision, conditional upon the variables included in the specification already. It should be noted that age and years in the United States are included in the regression. We explore this issue in the robustness section and find that our results appear to be robust to this assumption.

A number of differences between our approach and that of other researchers are worth noting. As noted above, some researchers address the refugee issue by dropping immigrants from certain countries from the analysis. Dropping observations from refugee countries is similar to including a measure of refugee status like Refugee_main in that there are still many refugees unidentified in the data, and some non-refugees are excluded. Other researchers include country-specific dummy variables. This again combines both refugees from those countries with non-refugees. It fails to identify any refugee-specific effect. Our approach identifies the refugee-specific effect, but because we use country of origin as an instrument, our approach prevents us from identifying country-specific effects. As noted in the next section, we do explore region-specific effects and year of immigration–specific effects. Our basic results appear robust in this regard.

Measurement Error in Participation Reporting

In addition to addressing the measurement problem in refugee status we address measurement error in reports of food stamp program participation. Bollinger and David (1997) demonstrate that there exists substantial misreporting of food stamp program participation in survey data. As discussed in both Bollinger and David (1997) and Hausman, Abrevaya, and Scott-Morton (1998), the probability of reporting participation in food stamp programs can be written as:

$$\Pr(\textit{Reported Food Stamp Participation}) = (1 - p - q)\Pr\{FS = 1\} + p. \tag{6}$$

The terms p and q are the rates of false positives and false negatives, respectively. We use the results of Bollinger and David (1997), specifically the estimated error rates p and q, to construct the likelihood function. Bollinger and David (1997) find the proportion of false-positive rate to be about 0.32%, while the false-negative rate is about 12.15%. The probability of true food stamp participation, $\Pr\{FS = 1\}$, is constructed from the probability expression above. The resulting likelihood function combines both our new correction to address and measure the participation differential for refugees and the correction proposed by Bollinger and David (1997) to address response error in the self-report of food stamps. Maximum likelihood estimation maximizes the following log likelihood function with respect to β, γ, and δ:

$$\begin{aligned} L = {} & FS_i * \ln[(1 - 0.1215 - 0.0032) * (F(D_i\beta + \gamma I_i + \delta)\Pr\{R_i = 1\} \\ & + F(D_i\beta + \gamma I_i)\Pr\{R_i = 0\}) + 0.0032] + (1 - FS_i) \\ & * \ln[(1 - 0.1215 - 0.0032) * (1 - F(D_i\beta + \gamma I_i + \delta)\Pr\{R_i = 1\} \\ & - F(D_i\beta + \gamma I_i)\Pr\{R_i = 0\}) + 0.1215)]. \end{aligned} \tag{7}$$

Here, *FS* is the food stamp program participation reported by the household. While other approaches to correct for response error in reports of food stamps are available (see, for example, Giannarelli 1992), the results of Bollinger and David (1997) are particularly well suited to this problem. Overall, we find that the measurement error correction is far less important than separating refugees from other immigrants.

5. Estimation Results

To facilitate an understanding of the results we organize them into three subsections. In the first subsection we present two sets of baseline results: one with no measure of refugees included and one using the Refugee_main variable described above. This section establishes baseline results similar to those of studies that use these kinds of measures of refugee status.[8] In the second subsection we present results using the instrumental variables approach to consistently estimate the refugee coefficients. The results demonstrate the importance of a consistent estimation procedure and the impact of the mismeasurement of refugee status inherent in previous procedures. In the third subsection we present two final specifications. These specifications both include the correction for measurement error in the reporting of food stamps and include interactions with local unemployment rates and the years since immigration. This section presents our preferred results that support our main conclusion that refugees are substantively different than other immigrants in their usage of food stamps and in their response to PRWORA. Failure to account for this difference biases conclusions about immigrants in general and disguises the experiences of an important subpopulation.

Baseline Estimates

Table 3 provides for five model specifications. In addition to the covariates presented, state fixed effects were included to account for state differences in policy, administration, and enforcement of the food stamp program. Other specifications, including year dummy variables, were found to reveal similar results. The coefficients on the demographic variables are as one would expect. Age and education are negatively associated with food stamp program participation, while the presence of children or disabled persons increases the probability of participation.

Column 1 of Table 3 presents estimates for a specification similar to those of other analyses in which refugees are grouped with NR immigrants. The coefficient on post-reform is negative and significant, as has been well established in the literature. The coefficient on the local unemployment rate is positive, indicating that local labor market conditions are significant in determining participation. The coefficient on immigrant is positive and significant. This type of result has led researchers and policy makers to the conclusion that immigrants are more likely to use welfare programs than are native-born individuals.

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[8] Borjas (2002) also accounts for immigrant heterogeneity by including controls for cohorts, age at the time of arrival, and years in the United States, variables we use as exclusion restrictions in our instrumental variable approach.

Table 3. Food Stamp Program Participation Estimates

	Immigrant Only Specification	Refugee_main Specification	Refugee_IV Specification	Refugee_IV with Unemployment Rate	Refugee_IV Long Specification
Householder variables					
Age	−0.016	−0.017	−0.017	−0.019	−0.019
	(49.09)**	(49.77)**	(49.61)**	(48.52)**	(47.77)**
Female	0.494	0.499	0.503	0.561	0.565
	(36.38)**	(36.62)**	(36.83)**	(35.59)**	(35.69)**
African-American	0.447	0.456	0.452	0.504	0.505
	(33.09)**	(33.71)**	(33.37)**	(32.66)**	(32.72)**
Hispanic	0.268	0.268	0.258	0.294	0.322
	(16.97)**	(16.96)**	(16.21)**	(15.95)**	(17.33)**
Asian	0.062	−0.039	−0.033	−0.050	−0.098
	(1.55)	(0.94)	(0.80)	(0.97)	(1.83)
Native American	0.360	0.360	0.357	0.390	0.392
	(10.85)**	(10.81)**	(10.73)**	(10.20)**	(10.26)**
Elementary school	0.472	0.480	0.485	0.573	0.575
	(31.41)**	(31.86)**	(32.07)**	(32.60)**	(32.65)**
Some high school	0.403	0.405	0.406	0.461	0.461
	(31.02)**	(31.03)**	(31.09)**	(30.74)**	(30.63)**
High school—no diploma	0.238	0.236	0.242	0.268	0.266
	(7.45)**	(7.40)**	(7.54)**	(7.28)**	(7.21)**
Some college	−0.171	−0.172	−0.172	−0.197	−0.194
	(13.29)**	(13.29)**	(13.28)**	(13.21)**	(12.99)**
Associates/technical degree	−0.287	−0.289	−0.290	−0.324	−0.321
	(14.58)**	(14.65)**	(14.63)**	(14.10)**	(13.95)**
College	−0.569	−0.573	−0.579	−0.706	−0.711
	(28.96)**	(29.00)**	(29.11)**	(27.36)**	(27.45)**
Master's degree	−0.706	−0.706	−0.710	−0.914	−0.916
	(18.87)**	(18.77)**	(18.75)**	(16.67)**	(16.85)**
Terminal degree	−0.626	−0.643	−0.651	−0.871	−0.869
	(11.49)**	(11.56)**	(11.58)**	(9.90)**	(10.21)**
Married spouse present	−0.933	−0.926	−0.927	−0.870	−0.885
	(27.20)**	(26.93)**	(26.85)**	(20.44)**	(20.74)**
Veteran	0.000	0.008	0.012	0.016	0.019
	(0.02)	(0.51)	(0.77)	(0.86)	(0.97)
Disabled	0.815	0.817	0.818	0.959	0.959
	(74.48)**	(74.46)**	(74.39)**	(72.83)**	(72.78)**
Spouse variables					
Age	−0.001	−0.001	−0.001	−0.007	−0.007
	(1.09)	(1.56)	(1.62)	(7.62)**	(7.39)**
Female	0.363	0.367	0.367	0.387	0.393
	(16.86)**	(16.96)**	(16.92)**	(14.98)**	(15.16)**
African-American	−0.072	−0.064	−0.063	−0.032	−0.029
	(2.65)**	(2.36)*	(2.30)*	(0.97)	(0.90)
Hispanic	−0.021	−0.004	−0.004	−0.013	−0.016
	(0.94)	(0.18)	(0.18)	(0.49)	(0.59)
Asian	0.367	0.322	0.277	0.276	0.229
	(7.82)**	(6.66)**	(5.58)**	(4.32)**	(3.47)**
Native American	0.226	0.227	0.229	0.283	0.288
	(4.23)**	(4.24)**	(4.27)**	(4.50)**	(4.56)**
Elementary school	0.271	0.280	0.282	0.394	0.391
	(10.74)**	(11.03)**	(11.05)**	(12.68)**	(12.52)**
Some high school	0.328	0.334	0.336	0.410	0.409
	(15.40)**	(15.61)**	(15.68)**	(16.15)**	(16.09)**

Table 3. Continued

	Immigrant Only Specification	Refugee_main Specification	Refugee_IV Specification	Refugee_IV with Unemployment Rate	Refugee_IV Long Specification
Spouse variables (cont.)					
High school—no diploma	0.209	0.215	0.212	0.244	0.239
	(3.81)**	(3.91)**	(3.84)**	(3.71)**	(3.60)**
Some college	−0.103	−0.102	−0.103	−0.115	−0.112
	(4.64)**	(4.56)**	(4.59)**	(4.21)**	(4.07)**
Associates/technical degree	−0.235	−0.236	−0.239	−0.341	−0.346
	(6.98)**	(6.99)**	(7.04)**	(7.45)**	(7.48)**
College graduate	−0.329	−0.331	−0.339	−0.498	−0.505
	(10.06)**	(10.03)**	(10.15)**	(9.79)**	(9.96)**
Master's degree	−0.359	−0.364	−0.376	−0.697	−0.617
	(5.36)**	(5.36)**	(5.44)**	(4.45)**	(4.86)**
Terminal degree	−0.321	−0.366	−0.391	−0.534	−0.594
	(3.14)**	(3.41)**	(3.52)**	(2.94)**	(3.35)**
Disabled	0.619	0.618	0.617	0.797	0.795
	(29.25)**	(29.09)**	(28.91)**	(29.65)**	(29.63)**
Household-level variables					
Multi-family household	−0.016	−0.011	−0.011	−0.017	−0.018
	(1.07)	(0.76)	(0.72)	(0.95)	(1.04)
Children under 5 years	0.473	0.474	0.477	0.559	0.562
	(60.59)**	(60.59)**	(60.70)**	(57.26)**	(57.33)**
Children ages 5 to 18 years	0.267	0.269	0.269	0.319	0.319
	(63.36)**	(63.58)**	(63.51)**	(61.69)**	(61.54)**
Local unemployment rate	0.049	0.048	0.048	0.056	0.056
	(19.89)**	(19.39)**	(19.32)**	(16.48)**	(16.43)**
Post-reform (1998–2000)	−0.173	−0.175	−0.175	−0.197	−0.198
	(16.62)**	(16.81)**	(16.80)**	(15.84)**	(15.88)**
Immigrant	0.062	−0.050	−0.072	−0.076	−0.105
	(3.18)**	(2.38)*	(3.39)**	(1.45)	(1.77)
Immigrant*post-reform	−0.103	−0.121	−0.104	−0.157	−0.154
	(3.98)**	(4.18)**	(3.51)**	(4.19)**	(4.11)**
Refugee_main		0.686			
		(17.34)**			
Refugee_main*post-reform		0.099			
		(1.67)			
Refugee_IV			1.043	−0.106	0.683
			(20.71)**	(0.44)	(2.97)**
Refugee_IV*post-reform			0.001	0.427	0.614
			(0.02)	(3.63)**	(5.16)**
Immigrant* unemployment				−0.004	−0.004
				(0.71)	(0.58)
Refugee*unemployment				0.181	0.220
				(5.89)**	(7.44)**
Years in U.S.					0.0004
					(0.28)
Refugee*years in U.S.					−0.063
					(12.87)**
Constant	−1.165	−1.149	−1.154	−1.077	−1.087
	(24.94)**	(24.55)**	(24.61)**	(19.72)**	(19.87)**
Observations	290,644	290,644	290,640	290,640	290,640

Absolute value of z-statistics in parentheses. All specifications include state fixed effects.

* Significant at 5%.

** Significant at 1%.

The coefficient on the interaction with immigrant and post-reform is negative and significant. This demonstrates that the reform has some effect on participation among immigrants beyond the overall effect registered in the post-reform coefficient.

Column 2 of Table 3 includes the Refugee_main dummy variable as the measure of refugee status and an interaction with the post-reform indicator.[9] In interpreting these results it is important to note that refugee is a sub-classification of immigrant: All refugees are also classified as immigrants. Therefore, the large and positive coefficient on Refugee_main indicates that refugees have a much higher propensity to participate in the food stamp program than do other immigrants and the native born (adding the coefficient on immigrants to the coefficient on refugees). The coefficient on immigrant is now negative and statistically significant because refugees are accounted for separately. In an effort to account for the presence of illegal immigrants, we have experimented with other samples, and in no case was the coefficient on immigrant positive and significant, and in all cases the coefficient on the refugee indicator was positive and significant. Hence, regardless of how illegal immigrants are handled, we conclude that failing to separate out refugees results in biased conclusions about NR immigrants and fails to identify the experiences of the refugee population. Finally, note that the coefficient on the interaction between immigrants and post-reform remains negative. This implies that immigrants, regardless of citizenship, are less likely to participate in food stamp programs than are non-immigrants. This is consistent with prior work, in particular the work of Van Hook (2003), since we are combining citizenship groups. The coefficient on the interaction between Refugee_main and post-reform is a small positive and insignificant number. It appears that both NR immigrants and refugees have had a decline in post-reform participation that is even larger than that experienced by the native-born population (recall, again, all refugees are also immigrants, and so the immigrant coefficients apply to them as well). The fact that there appears to be no difference between immigrants and refugees is somewhat puzzling since refugees were exempt from the more stringent rules applied to other immigrants.

Instrumental Variables Estimation

Column 3 of Table 3 presents the same specification as column 2, but it uses our preferred instrumental variables estimation approach, described above. As can be seen, the coefficient on the refugee variable, Refugee_IV, increases dramatically compared to that of Refugee_main. The mismeasured estimates in column 2 are attenuated toward zero, as is often the case with mismeasured coefficients. Note also that the coefficients on immigrant are all negative and significant and have increased in magnitude relative to the coefficients reported in column 2. Again, this is a typical result from measurement error; other coefficients are biased as well, particularly those closely correlated with the mismeasured variable. In contrast, the coefficients on other variables have changed very little. For example, the coefficient on *some college* for the householder is very stable across all columns at about −0.173. Similarly the other coefficients on educational categories are stable across the samples and specifications.

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[9] Another variant of this approach would classify any immigrant from a country in a specific time period as a refugee if 30% or more of the immigrants from that country/time were refugees. The results are comparable and available upon request.

Here we see that NR immigrants are less likely to participate in food stamp programs than are the native born. In contrast, refugees are heavy users of the food stamp program. Refugees tend to be disadvantaged in local labor markets as a result of poor language training and less preparation in general for economic life in the United States. Nearly all refugees are placed on food stamps upon arriving in the country. As we will see below, refugees do tend to work their way off food stamps over time, as policy makers expect. Separating refugees from other immigrants shows that previous studies that conclude that immigrants in general are high users of food stamps miss an important story. Still puzzling, however, is the fact that the coefficient on refugees interacted with the post-reform variable is negative but not significant. Since the coefficient on the interaction between immigrants and post-reform is negative and significant, it appears that forces acting on refugees and NR immigrants in the post-reform period had the same effect on both groups.

Extended Specification

The results in this section now include the correction for response error in reporting of food stamp participation discussed in the methodology section. Column 4 in Table 3 presents the first results to correct for measurement error in reporting food stamp program participation. Additionally, the specification presented in column 4 includes an interaction between the local unemployment rate and the indicators for both immigrants and refugees.

As noted in Bollinger and David (1997), the main effect of response error in food stamp program participation is attenuation of slope coefficients. For example, the coefficient on having some college changes from −0.172 in column 3 to −0.197 in column 4. The increased magnitudes of the coefficients in column 4, compared to prior specifications, are due to the correction for measurement error in food stamps.

The coefficients on post-reform increased slightly in magnitude when correcting for measurement error in food stamp participation. Its continued significance implies that the reforms did reduce native-born use of the food stamp program. The coefficient on immigrant increases but is no longer statistically significant. We suspect this is largely due to the inclusion of interactions with the unemployment rate. Similarly, the coefficient on the interaction between immigrants and the post-reform era is larger in magnitude and still negative and significant. Again, the results indicate that food stamp program participation of immigrants fell even more sharply in the post-reform era than did participation of the native born.

The coefficient on Refugee_IV declines markedly in column 4. Additionally, the coefficient on the interaction between Refugee_IV and the post-reform era has now become positive and is significant. The puzzling negative coefficient on Refugee_IV and its post-reform interaction disappear when we control for refugees' interaction with local labor markets. Indeed, the coefficient on the interaction between refugee and post-reform is large enough to completely offset both of the negative post-reform coefficients (the general one and the interaction with immigration), indicating that refugees did not see a post-reform decline in food stamp program participation. There does not appear to be any "chilling" effect on refugees. Indeed, in the intermediate sample, the results indicate that refugee food stamp program participation rose by 7.3% in the post-reform period holding constant labor market conditions.

Noting that the coefficient on the local unemployment rate is positive and significant, we turn to the two interaction terms between the unemployment rate and the immigrant and

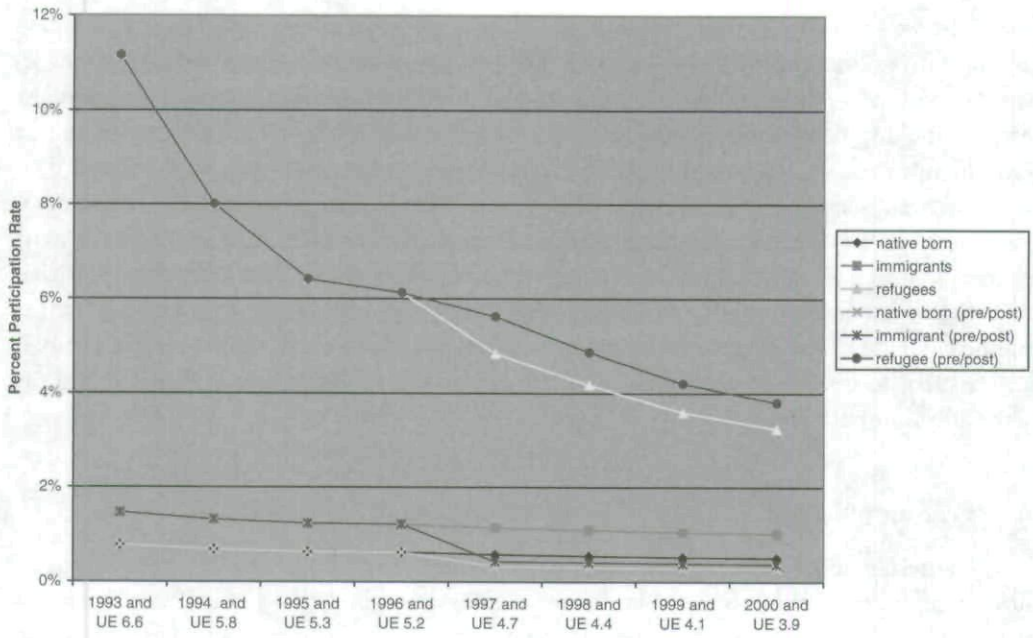

Figure 1. Unemployment Rate and Food Stamp Program Participation

refugee indicators. The coefficient on the interaction between the unemployment rate and immigrants is a very small and insignificant number. In general, immigrants' program participation appears to be no more sensitive to local labor market characteristics than is that of the native born. In sharp contrast, the coefficient on the interaction between the unemployment rate and the refugee indicator is three times the size of the coefficient on the local unemployment rate. It is statistically and economically significant: Refugees are four times as sensitive to fluctuations in the local unemployment rate compared to either native-born individuals or other immigrants. The two interaction terms for refugees imply that refugees' apparent decline in food stamp program participation in the post-reform era is largely accounted for by the coincidental improvement in the labor market. Thus, the decline in refugee use of food stamps observed in the raw data (see Table 1) can be entirely explained by this important difference.

Using the results from column 4, we present the time-series plot of the participation rate for native born, immigrants, and refugees in Figure 1. The probabilities are evaluated at the overall values for the native born, the immigrant values for immigrant, and the Refugee_main values for the refugees.[10] The unemployment rate is the average rate for the sample in each year. Each population has two plotted lines; the first line is for what would have occurred in the

[10] Overall values: A 47-year-old, white, male head of household with a high school degree. He is married to a 47-year-old white female with a high school degree. Neither the head of the household nor the spouse is disabled or a veteran. There are no children in the household, and a 5.07% local unemployment rate is observed. Immigrant values: A 45-year-old, Hispanic, male head of household with a high school degree. He is married to a 44-year-old Hispanic female with a high school degree. Neither the head of the household nor the spouse is disabled or a veteran. There are no children in the household. A 6.05% unemployment rate is observed. Refugee_Main values: A 50-year-old, Hispanic, male head of household with a high school degree. He is married to a 49-year-old Hispanic female with a high school degree. Neither the head of the household nor the spouse is disabled or a veteran. There are no children in the household. A 5.99% unemployment rate is observed.

presence of no reform, and the second line includes the reform starting in 1997. The two lines coincide for the pre-reform period (1993–1996). As can be seen, regardless of the reform, food stamp program participation among refugees would have dropped dramatically in response to the improving economy. This result is good news for both legislators and refugees. Far from indicating an unanticipated detrimental effect of PRWORA on refugees, the declining participation in the post-reform period is largely due to improved economic conditions that affect refugees more dramatically than native-born individuals or other immigrants.[11]

Column 5 extends the specification in column 4 to examine how food stamp program participation for immigrants and refugees changes with the length of time in the United States. The variable *Years in U.S.* measures the number of years since an immigrant entered the United States to stay. For the native born, this variable is zero. The variable can be viewed as an interaction between *Years in U.S.* and *immigrant*. The coefficient on immigrant now represents the difference between a native born and a new immigrant (an immigrant with zero years in the United States). Again, both the Refugee_IV approach for addressing the refugee indicator and the correction for response error in food stamp participation are used. As in column 4, we find that the coefficient on immigrant is statistically insignificant. Again, the coefficient on post-reform is negative, as is the interaction between post-reform and immigrant; both are statistically significant. The coefficient on refugee is larger, but its interpretation is now refugees who are in their first year in the United States. Examining the coefficient on *Years in U.S.* reveals that immigrants' participation in food stamp programs either increases slightly with time in the United States or does not change at all with time in the United States. In sharp contrast is the large negative coefficient on the interaction between Refugee_IV and *Years in U.S.* This coefficient is at least 10 times the magnitude of the coefficient on *Years in U.S.* for all immigrants. Clearly, over time, refugee use of food stamps declines dramatically. The more rapid decline in participation supports Cortes' (2004) findings of faster wage and human capital growth among refuges relative to economic immigrants. It is also consistent with the results of Hansen and Lofstrom (2001, 2003), who also find that refugees assimilate faster than other immigrants, but start further behind.

Figure 2 presents plots of the food stamp program participation rate against *Years in the U.S.* Again, immigrants are evaluated at the immigrant values and refugees are evaluated at the Refugee_main values (see footnote 10). The figure demonstrates the higher initial rate of participation and the higher rate of decline among refugees. Contrary to the descriptive work that motivated this research, holding unemployment constant, post-reform refugee participation in the food stamp program is higher than pre-reform participation.

The positive coefficient on the interaction between post-reform and refugee is significant and has increased in magnitude. Indeed, it indicates that in the post-reform era, had unemployment rates not changed, new refugees would have increased food stamp program participation, as this coefficient more than offsets the sum of the coefficients on post-reform and its interaction with immigrants. The coefficient on the interaction between unemployment and Refugee_IV has also increased in magnitude, further supporting the conclusion that the economic conditions were responsible for the apparent decline in refugee food stamp participation during the post-reform era.

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[11] This result is consistent with prior research indicating that changing economic conditions have a larger welfare participation effect on lower skilled workers than on relatively higher skilled workers. See Hoynes (2000).

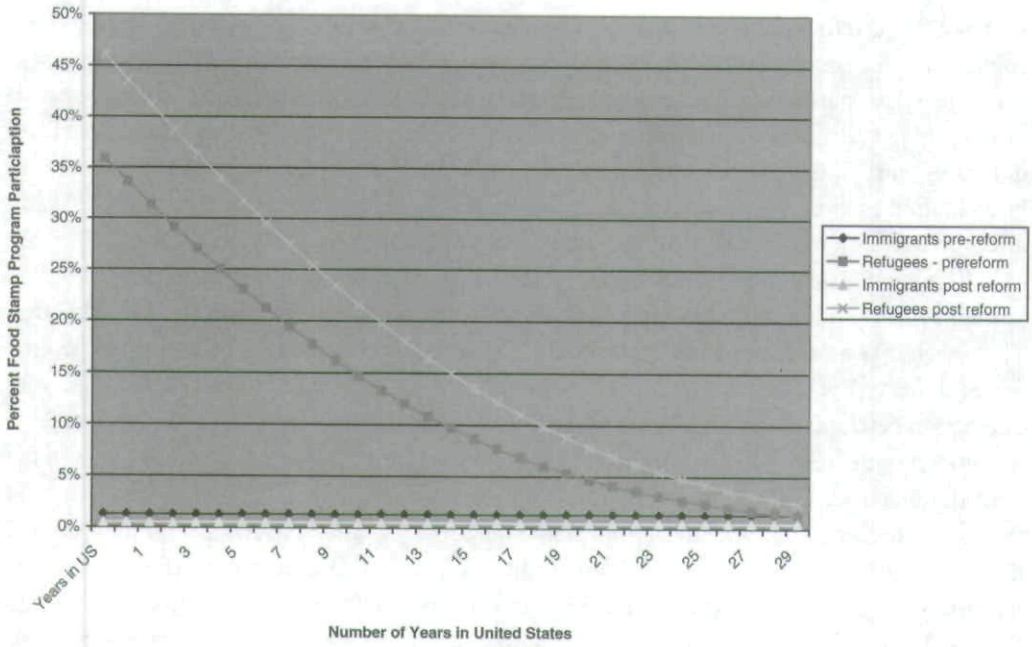

Figure 2. Food Stamp Program Participation and Immigrant Years in United States

Robustness of Results

We have explored the robustness of these results and conclusions to a variety of sample and specification issues. Space and interest preclude a full presentation of these results here. Instead we provide a brief description of our efforts to ensure that the results above are robust. All results are available from the authors upon request.

As noted above, perhaps the most important issue is how illegal immigrants may bias our results. Bean, Telles, and Lowell (1987) report that the vast majority of illegal immigrants are from Mexico and Central America. As noted in the data section, our efforts at removing illegal immigrants have focused on these populations. More broadly, however, one can intuit how including illegal immigrants might bias these results. Since illegal immigrants are, in general, not eligible for food stamps, our coefficient on immigrants would likely be negatively biased if the sample contains illegal immigrants. As we remove illegal immigrants, we expect to see the coefficient on immigrants rise. The tension arises from the unknown participation patterns for legal immigrants from these countries. While we do control for characteristics such as age and education, it may be that legal immigrants from these countries are low users of food stamps (relative to other young, low-education immigrants) and so bias the coefficient up. Hence, a larger coefficient is not necessarily right. For example, the No Central Americans sample (results reported in the Appendix 2) removes all immigrants from Central America and Mexico—many of whom are legal, highly educated, and older. These people may very well be low users of food stamps, and so that coefficient may be too high. We estimated all of our models on 11 additional samples: removing low-education Central Americans and Mexicans; removing young, low-education Central Americans and Mexicans; removing young, low-education Central American and Mexican agriculture workers; removing Mexican immigrants; removing low-education Mexican Immigrants; removing young, low-education Mexican immigrants; removing young, low-education Mexican Immigrants; removing Central American

Immigrants working in agriculture; removing Mexican immigrants working in agriculture; removing young, low-education Central American immigrants working in agriculture; and removing young, low-education Mexican immigrants working in agriculture. In general, the coefficient on immigrant in the first model varied from −0.026 (as reported in column 2 of Appendix 1) to −0.26 (as reported in column 1 of Appendix 2). Estimates from other models were typically bounded by the full sample and the No Central Americans sample. Perhaps most importantly, the coefficients on refugee, the interaction between refugee and the post-reform period, the interaction between refugee and unemployment, and the interaction between refugee and Years in the U.S. were largely unchanged across the different samples.

A second concern is how our results are affected by the citizenship choice of immigrants. We argue above that since citizenship may be endogenous to the choice to participate in the food stamp program, we prefer not to use it as an explanatory variable. However, we did estimate our three main models separating immigrants and refugees by citizenship (and all interactions as well). We find that prior to welfare reform, naturalized immigrants were slightly less likely to participate in food stamp programs than are resident aliens or the native born (who were roughly equal), although the difference was not statistically significant. This also carried over to refugees, where the difference was significant: Naturalized refugees were less likely to participate in food stamp programs than were refugees who had not become naturalized. Refugees of either citizenship status were significantly more likely to participate in food stamp programs than were the native born or immigrants of either citizenship status. We find that naturalized refugees are more sensitive to local labor market conditions than are the native born or other immigrants, but they are less sensitive than refugees who had not chosen or qualified for citizenship. When we included the variable Years in U.S., we found that the difference in participation for refugees between citizens and non-citizens is largely explained by the time in the United States variable.

A third concern in the interpretation of these results is that the refugee measure may be a proxy for other characteristics of immigrants from particular regions of the world. Refugees are highly concentrated in origin from Asia and Central America, and so the refugee coefficient may simply reflect differences in all immigrants from these regions. In order to test this, we estimated a specification in which we replaced the simple indicator for immigrant with nine indicators for region of origin: Europe, Asia, Middle East, North America, Central America, Caribbean, South America, Africa, and Oceana (the reference category, like the immigrant indicator, is native born). These indicators were also interacted with the post-reform indicator and the unemployment rate. The estimated coefficients on the refugee indicator, the interaction between refugee and post-reform, the interaction between refugee and unemployment rate, and the interaction between refugee and Years in the U.S. differed only slightly from those reported in column 5 of Table 3. For example, the coefficient on refugee in the intermediate sample rose from 0.683 to 0.704, while the coefficient on refugee interacted with the post-reform dummy fell from 0.614 to 0.416. Qualitatively, the conclusions are quite similar.

A final concern is that the characteristics of immigrants in general appear to have changed over time (see Borjas 1999). It is possible that the characteristics of refugees have also changed over time, and hence the results we report—particularly the participation rate profile with years in the United States—is simply an artifact of changing immigrants. To test this we estimated the models on subsamples in which only recent immigrants and refugees were included. In the first specification, we included only immigrants and refugees who had been in the United States for 10 years or less. In the second specification, we included only those who had been in the United

States for six years or less. In this case, the coefficients on the refugee variables rose to 1.04. The coefficients on the interaction with Years in the U.S. and refugee were still negative and statistically significant and slightly larger in magnitude, signifying that refugees do appear to have faster convergence to native born than do immigrants. Specifications combining both the restricted immigrant sample and the country of origin were comparable to the restricted immigrant sample results.

6. Conclusions

We draw conclusions from this paper along two dimensions. The first is methodological. Ignoring refugees biases the coefficient on immigrants. The typical approach to measuring refugee status (as found in Table 3, column 2) underestimates the effects of refugee status on participation in food stamp programs. Additionally, failure to account for response error in program participation additionally understates the effects of all variables on participation.

The far more important dimension is that the story of food stamp program participation among immigrants and refugees is complex. A simple dummy variable for immigrant and refugee status fails to capture important aspects of food stamp participation decisions. Clearly, immigrants and refugees have different patterns of food stamp usage. Refugees are far more likely to participate in food stamp programs near the time of arrival in the United States, but their participation rates decline relatively quickly with the time in the United States. Secondly, refugees are far more sensitive to the economic climate than are both U.S. citizens and other immigrants.

Our results indicate a number of important policy implications. First, the decision of Congress in the mid-1990s to exempt refugees from the new eligibility rules imposed on immigrants seems to have had the desired effect on refugees. Beyond the humanitarian issue, we see that this group has what might be described as a "good" program experience: they participate heavily in food stamp programs when they first arrive, but they apparently become self-sufficient over time and rely less on food stamps. Secondly, the decision to disqualify new immigrants from food stamp programs may have been somewhat misinformed. As a whole, NR immigrants are less likely to participate in the food stamp program than are natives, holding other characteristics constant. Concern over immigrant misuse of food stamps appears to have been misplaced.

Appendix 1. Full Sample Estimates of Models

	Immigrant Only Specification	Refugee_main Specification	Refugee_IV Specification	Refugee_IV with Unemployment Rate	Refugee_IV Long Specification
Householder variables					
Age	−0.016	−0.016	−0.016	−0.019	−0.019
	(47.14)**	(48.32)**	(48.16)**	(47.21)**	(46.75)**
Female	0.504	0.51	0.513	0.573	0.576
	(37.47)**	(37.82)**	(37.94)**	(36.70)**	(36.76)**
African-American	0.454	0.458	0.458	0.51	0.513
	(33.78)**	(34.04)**	(33.96)**	(33.22)**	(33.36)**
Hispanic	0.256	0.247	0.25	0.288	0.321
	(16.36)**	(15.75)**	(15.85)**	(15.78)**	(17.44)**
Asian	0.111	0.045	−0.002	−0.006	−0.045
	(2.86)**	(1.13)	(0.05)	(0.12)	(0.86)
Native American	0.361	0.358	0.356	0.388	0.391
	(10.91)**	(10.79)**	(10.75)**	(10.23)**	(10.27)**
Elementary school	0.432	0.45	0.456	0.535	0.54
	(29.74)**	(30.84)**	(31.08)**	(31.49)**	(31.67)**
Some high school	0.383	0.39	0.392	0.445	0.446
	(30.01)**	(30.53)**	(30.60)**	(30.32)**	(30.31)**
High school—no diploma	0.214	0.221	0.224	0.245	0.247
	(6.91)**	(7.14)**	(7.21)**	(6.91)**	(6.92)**
Some college	−0.172	−0.173	−0.173	−0.199	−0.196
	(13.41)**	(13.45)**	(13.41)**	(13.37)**	(13.18)**
Associates/technical degree	−0.291	−0.293	−0.294	−0.329	−0.327
	(14.77)**	(14.83)**	(14.84)**	(14.37)**	(14.24)**
College	−0.568	−0.574	−0.579	−0.709	−0.715
	(29.00)**	(29.09)**	(29.18)**	(27.51)**	(27.56)**
Master's degree	−0.714	−0.714	−0.719	−0.923	−0.924
	(19.08)**	(18.96)**	(18.93)**	(16.85)**	(16.99)**
Terminal degree	−0.629	−0.649	−0.657	−0.881	−0.88
	(11.60)**	(11.70)**	(11.71)**	(9.92)**	(10.17)**
Married spouse present	−0.976	−0.966	−0.966	−0.939	−0.947
	(28.97)**	(28.61)**	(28.51)**	(22.60)**	(22.71)**
Veteran	−0.009	0.001	0.006	0.01	0.013
	(0.59)	(0.05)	(0.39)	(0.51)	(0.69)
Disabled	0.818	0.819	0.821	0.958	0.958
	(75.18)**	(75.07)**	(74.99)**	(73.38)**	(73.28)**
Spouse variables					
Age	0.0004	−0.0001	−0.00003	−0.005	−0.005
	(0.71)	(0.18)	(0.04)	(5.64)**	(5.62)**
Female	0.377	0.378	0.38	0.404	0.408
	(17.88)**	(17.87)**	(17.88)**	(16.03)**	(16.14)**
African-American	−0.07	−0.063	−0.06	−0.031	−0.027
	(2.58)**	(2.31)*	(2.20)*	(0.95)	(0.85)
Hispanic	−0.048	−0.029	−0.026	−0.044	−0.041
	(2.18)*	(1.33)	−1.19	(1.69)	(1.56)
Asian	0.383	0.309	0.283	0.279	0.238
	(8.27)**	(6.45)**	(5.75)**	(4.43)**	(3.63)**
Native American	0.23	0.231	0.232	0.287	0.291
	(4.32)**	(4.33)**	(4.34)**	(4.59)**	(4.65)**
Elementary school	0.23	0.24	0.245	0.33	0.332
	(9.65)**	(10.03)**	(10.20)**	(11.39)**	(11.43)**
Some high school	0.307	0.314	0.318	0.385	0.388
	(14.76)**	(15.02)**	(15.16)**	(15.64)**	(15.67)**

Appendix 1. Continued

	Immigrant Only Specification	Refugee_main Specification	Refugee_IV Specification	Refugee_IV with Unemployment Rate	Refugee_IV Long Specification
Spouse variables (cont.)					
High school—no diploma	0.208	0.213	0.214	0.254	0.254
	(3.98)**	(4.06)**	(4.05)**	(4.10)**	(4.06)**
Some college	−0.104	−0.103	−0.104	−0.117	−0.115
	(4.68)**	(4.66)**	(4.65)**	(4.32)**	(4.22)**
Associates/technical degree	−0.238	−0.241	−0.243	−0.345	−0.35
	(7.12)**	(7.17)**	(7.19)**	(7.60)**	(7.64)**
College graduate	−0.334	−0.337	−0.344	−0.506	−0.513
	(10.27)**	(10.28)**	(10.35)**	(10.06)**	(10.23)**
Master's degree	−0.36	−0.368	−0.377	−0.713	−0.643
	(5.44)**	(5.46)**	(5.50)**	(4.58)**	(5.03)**
Terminal degree	−0.305	−0.355	−0.376	−0.474	−0.54
	(3.05)**	(3.36)**	(3.46)**	(2.88)**	(3.25)**
Disabled	0.618	0.615	0.616	0.784	0.784
	(29.52)**	(29.24)**	(29.12)**	(29.77)**	(29.74)**
Household-level variables					
Multi-family household	0.006	0.011	0.012	0.01	0.01
	(0.42)	(0.76)	−0.85	(0.61)	(0.6)
Number of children under 5 years	0.487	0.489	0.491	0.576	0.579
	(62.24)**	(62.31)**	(62.45)**	(58.89)**	(59.00)**
Number of children ages 5 to 18 years	0.281	0.283	0.284	0.335	0.334
	(67.99)**	(68.19)**	(68.19)**	(65.88)**	(65.57)**
Local unemployment rate	0.053	0.051	0.051	0.056	0.055
	(22.19)**	(21.51)**	(21.42)**	(16.66)**	(16.51)**
Post-reform period (1998–2000)	−0.168	−0.171	−0.171	−0.198	−0.2
	(16.29)**	(16.53)**	(16.54)**	(15.98)**	(16.09)**
Immigrant	−0.006	−0.106	−0.134	−0.259	−0.38
	(0.35)	(5.44)**	(6.71)**	(5.39)**	(7.10)**
Immigrant*post-reform period	−0.124	−0.122	−0.128	−0.154	−0.15
	(5.22)**	(4.79)**	(4.87)**	(4.63)**	(4.52)**
Refugee_main		0.804			
		(19.18)**			
Refugee_main*post-reform period		0.058			
		(0.93)			
Refugee_IV			1.094	0.165	0.984
			(22.32)**	(0.73)	(4.45)**
Refugee_IV*post-reform period			0.033	0.402	0.601
			(0.46)	(3.59)**	(5.25)**
Immigrant*local unemployment				0.01	0.01
				(1.78)	(1.76)
Refugee*local unemployment				0.154	0.199
				(5.31)**	(6.96)**
Years in U.S.					0.006
					(4.36)**
Refugee*years in U.S.					−0.068
					(14.20)**
Constant	−1.237	−1.216	−1.217	−1.127	−1.126
	(26.67)**	(26.14)**	(26.12)**	(20.74)**	(20.66)**
Observations	295,378	295,378	295,378	295,378	295,378

Absolute value of *z*-statistics in parentheses. All specifications include state fixed effects.

* Significant at 5%.

** Significant at 1%.

Appendix 2. No Central Americans Sample Estimation of Models

	Immigrant Only Specification	Refugee_main Specification	Refugee_IV Specification	Refugee_IV with Unemployment Rate	Refugee_IV Long Specification
Householder variables					
Age	–0.016	–0.017	–0.016	–0.019	–0.019
	(47.64)**	(48.38)**	(48.15)**	(47.04)**	(46.36)**
Female	0.49	0.496	0.499	0.558	0.561
	(35.52)**	(35.85)**	(35.97)**	(34.71)**	(34.82)**
African-American	0.447	0.454	0.454	0.507	0.51
	(32.98)**	(33.37)**	(33.34)**	(32.68)**	(32.76)**
Hispanic	0.299	0.277	0.275	0.312	0.342
	(18.47)**	(17.02)**	(16.82)**	(16.42)**	(17.86)**
Asian	–0.001	–0.021	–0.053	–0.056	–0.099
	(0.02)	(0.52)	(1.27)	(1.08)	(1.86)
Native American	0.362	0.362	0.362	0.396	0.399
	(10.85)**	(10.83)**	(10.81)**	(10.31)**	(10.37)**
Elementary school	0.487	0.495	0.498	0.587	0.59
	(31.34)**	(31.73)**	(31.79)**	(32.16)**	(32.23)**
Some high school	0.402	0.407	0.408	0.464	0.463
	(30.55)**	(30.83)**	(30.85)**	(30.48)**	(30.39)**
High school—no diploma	0.237	0.244	0.247	0.271	0.27
	(7.34)**	(7.53)**	(7.60)**	(7.25)**	(7.20)**
Some college	–0.174	–0.173	–0.173	–0.198	–0.195
	(13.35)**	(13.27)**	(13.20)**	(13.12)**	(12.88)**
Associates technical degree	–0.295	–0.295	–0.296	–0.333	–0.33
	(14.76)**	(14.76)**	(14.75)**	(14.25)**	(14.10)**
College	–0.572	–0.574	–0.579	–0.708	–0.712
	(28.83)**	(28.81)**	(28.86)**	(27.08)**	(27.13)**
Master's degree	–0.715	–0.713	–0.717	–0.917	–0.919
	(18.87)**	(18.74)**	(18.70)**	(16.56)**	(16.73)**
Terminal degree	–0.645	–0.659	–0.666	–0.92	–0.909
	(11.63)**	(11.66)**	(11.66)**	(9.68)**	(10.05)**
Married spouse present	–0.939	–0.929	–0.929	–0.867	–0.882
	(26.82)**	(26.51)**	(26.43)**	(19.84)**	(20.14)**
Veteran	0.002	0.008	0.013	0.018	0.02
	(0.10)	(0.53)	(0.79)	(0.92)	(1.04)
Disabled	0.816	0.819	0.821	0.964	0.964
	(73.52)**	(73.55)**	(73.51)**	(71.91)**	(71.85)**
Spouse variables					
Age	–0.001	–0.001	–0.001	–0.007	–0.007
	(1.57)	(1.87)	(2.00)*	(8.10)**	(7.87)**
Female	0.368	0.369	0.37	0.393	0.399
	(16.67)**	(16.66)**	(16.67)**	(14.76)**	(14.94)**
African American	–0.068	–0.061	–0.058	–0.022	–0.02
	(2.50)*	(2.23)*	(2.11)*	(0.67)	(0.6)
Hispanic	–0.023	–0.013	–0.014	–0.027	–0.034
	(0.95)	(0.56)	(0.57)	(0.94)	(1.14)
Asian	0.353	0.298	0.277	0.265	0.218
	(7.54)**	(6.18)**	(5.60)**	(4.13)**	(3.28)**
Native American	0.235	0.236	0.237	0.303	0.308
	(4.35)**	(4.37)**	(4.39)**	(4.78)**	(4.84)**
Elementary school	0.322	0.317	0.318	0.444	0.44
	(11.85)**	(11.60)**	(11.56)**	(13.14)**	(12.96)**
Some high school	0.343	0.346	0.349	0.431	0.431
	(15.72)**	(15.85)**	(15.95)**	(16.53)**	(16.49)**

Appendix 2. Continued

	Immigrant Only Specification	Refugee_main Specification	Refugee_IV Specification	Refugee_IV with Unemployment Rate	Refugee_IV Long Specification
Spouse variables (cont.)					
High school—no diploma	0.206	0.21	0.211	0.245	0.24
	(3.63)**	(3.69)**	(3.68)**	(3.56)**	(3.45)**
Some college	–0.104	–0.102	–0.102	–0.113	–0.11
	(4.61)**	(4.53)**	(4.49)**	(4.07)**	(3.94)**
Associates/technical degree	–0.247	–0.249	–0.25	–0.36	–0.366
	(7.21)**	(7.23)**	(7.24)**	(7.64)**	(7.68)**
College graduate	–0.336	–0.339	–0.344	–0.512	–0.516
	(10.13)**	(10.13)**	(10.20)**	(9.79)**	(9.96)**
Master's degree	–0.36	–0.367	–0.375	–0.703	–0.613
	(5.31)**	(5.35)**	(5.39)**	(4.33)**	(4.74)**
Terminal degree	–0.317	–0.357	–0.375	–0.503	–0.566
	(3.07)**	(3.30)**	(3.39)**	(2.77)**	(3.18)**
Disabled	0.621	0.62	0.621	0.805	0.804
	(28.70)**	(28.54)**	(28.46)**	(29.11)**	(29.09)**
Household-level variables					
Multi-family household	0.034	0.036	0.036	0.035	0.034
	(2.21)*	(2.34)*	(2.36)*	(1.95)	(1.87)
Number of children under 5 years	0.495	0.495	0.498	0.585	0.587
	(59.37)**	(59.30)**	(59.40)**	(55.82)**	(55.89)**
Number of children ages 5 to 18 years	0.284	0.284	0.285	0.337	0.338
	(64.53)**	(64.50)**	(64.44)**	(62.29)**	(62.11)**
Local unemployment rate	0.051	0.05	0.05	0.056	0.056
	(18.37)**	(17.76)**	(17.70)**	(15.92)**	(15.91)**
Post-reform period (1998–2000)	–0.171	–0.174	–0.174	–0.199	–0.199
	(16.04)**	(16.24)**	(16.23)**	(15.79)**	(15.82)**
Immigrant	0.114	–0.023	–0.063	–0.161	–0.235
	(5.33)**	(0.96)	(2.52)*	(1.95)	(2.56)*
Immigrant*post-reform period	–0.049	–0.041	–0.047	–0.082	–0.073
	(1.63)	(1.18)	(1.28)	(1.63)	(1.45)
Refugee_main		0.73			
		(16.54)**			
Refugee_main*post-reform period		–0.023			
		(0.35)			
Refugee_IV			1.015	–0.005	0.816
			(19.29)**	(0.02)	(3.35)**
Refugee_IV*post-reform period			–0.059	0.339	0.529
			(0.76)	(2.74)**	(4.23)**
Immigrant*local unemployment				0.007	0.01
				(0.69)	(0.92)
Refugee*local unemployment				0.164	0.205
				(5.08)**	(6.57)**
Years in U.S.					0.002
					(1.13)
Refugee*years in U.S.					–0.065
					(12.83)**
Constant	–1.201	–1.185	–1.187	–1.101	–1.112
	(25.22)**	(24.82)**	(24.84)**	(19.95)**	(20.11)**
Observations	284,025	284,025	284,025	284,025	284,025

Absolute value of *z*-statistics in parentheses. All specifications include state fixed effects.

* Significant at 5%.

** Significant at 1%.

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