

**Food Stamp Program Participation of Refugees and Immigrants:
Measurement Error Correction for Immigrant Status**

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Abstract

In 1996, after two decades of increasing participation in cash and noncash public assistance programs by immigrant households (Borjas and Hilton, 1996), the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) drastically altered the availability of federal public assistance to legal immigrants but ostensibly not to refugees. Refugees were given a 5-year exemption from rules that applied to other legal immigrants. Yet, since 1996 the participation rate of refugees in public assistance programs such as Temporary Assistance for Needy Families (TANF), SSI, General Assistance, food stamps, and Medicaid has fallen at least as fast as for other foreign-born residents. From 1994 to 1997, refugee participation in TANF fell by 27 percent and participation in the Food Stamp Program (FSP) fell by 37 percent (Fix and Passel, 1999). During the same period participation in the FSP dropped by 30 percent for immigrants and 21 percent for natives.

This paper consistently estimates the effect of refugee status on participation in FSP even with measurement error in the identification of refugees and misreporting of food stamp participation. Specifically, this research seeks to accomplish three goals: (1) to estimate the impact of refugee status on take-up of the FSP using the March CPS for the years 1994–2001; (2) to demonstrate the impact of the PRWORA reform on the refugee effect; and (3) to correct for errors in measurement for refugee and legal permanent resident (LPR) status using methods that will help future researchers obtain consistent estimates when the key explanatory variable is known to be measured with error.

We draw conclusions from this paper along two dimensions. The first is methodological. The typical approach to measuring refugee status grossly underestimates the effects of refugee status on participation in the FSP. Additionally, failure to account for response error in program participation additionally understates the effects of all variables on participation. Hence studies failing to account appropriately for these problems are biased and cannot be used for policy analysis.

The far important dimension is that the story of FSP participation among immigrants and refugees is a complex one. A simple dummy variable for immigrant and refugee status fails to capture important

aspects of the story. Refugees are more likely to participate in the FSP near the time of arrival, but their participation rates are declining with the time in the United States. Also, refugees are more sensitive to the economic climate than are U.S. citizens and other immigrants. Finally, there is clearly a differential effect between citizens and noncitizens. Immigrants who opt for citizenship are more likely to participate in welfare programs than those who do not.

Food Stamp Program Participation of Refugees and Immigrants: Measurement Error Correction for Immigrant Status

I. INTRODUCTION

Before 1996, citizens, legal immigrants, and refugees all had equal access to means-tested public assistance programs. However, in 1996, after two decades of increasing use of cash and noncash public assistance programs by immigrant households (Borjas and Hilton, 1996), the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) drastically altered the availability of federal public assistance to legal immigrants but ostensibly not to refugees (Fix and Tumlin, 1997). PRWORA gave refugees a 5-year exemption from the food stamp and TANF (7 years for SSI and Medicaid) rules that deny benefits to other legal immigrants.

Few expected the changes in immigrant access to welfare to affect the participation patterns of refugee households. Yet, since 1996 the participation rate of refugees in public assistance programs such as Temporary Assistance for Needy Families (TANF), Supplemental Security Income (SSI), General Assistance, food stamps, and Medicaid has fallen at least as fast as for other foreign-born residents. From 1994 to 1997, refugee participation in TANF fell by 27 percent and participation in the Food Stamp Program (FSP) fell by 37 percent (Fix and Passel, 1999). During the same period, participation in the FSP dropped by 30 percent for immigrants and 21 percent for natives.

The larger percentage change among refugees runs counter to expectations; the changes in federal and state laws established tougher standards for legal immigrants but not for refugees. Whereas strong economic conditions may result in higher employment rates for immigrants and refugees alike, immigrants, with higher average levels of education than refugees, should benefit more from economic booms than refugees.

We estimate food stamp participation probits to differentiate between refugee and immigrant effects of the 1996 welfare reforms. We further distinguish between the effects of welfare reform on

naturalized and noncitizen residents by refugee and immigrant status. The estimation strategy corrects for two types of measurement error: error in identifying true refugee status and errors in the reporting of food stamp participation. The model estimates demonstrate the importance of both corrections.

Welfare reform reduced the food stamp participation of immigrants beyond reductions by natives. Our estimates clearly show that the probability of program participation decreased for non-naturalized immigrants as a result of the 1996 reforms. Refugees are more likely to participate than either immigrants or natives. While the likelihood of participation generally decreased for non-naturalized refugees after 1996 (contrary to prediction), we attribute most of this to a strong relationship between refugee status and falling unemployment. Finally, other things equal, our estimates show that the participation likelihood for naturalized refugees increased after welfare reform. One interpretation may be that citizenship is endogenous and that welfare reform encouraged refugees to become citizens. However, we do not see this same pattern for immigrants, who have an even stronger reason to become citizens.

II. RECENT IMMIGRATION IN THE U.S.

After years of rising welfare participation, immigrants and immigrant use of public assistance became part of the welfare debate leading up to the 1996 welfare reforms. Immigration to the United States, 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 1991–2000, the 9 million immigrants entering the United States exceeded the number of any previous decade, including the 10-year boom from 1901 to 1910 during which the country accepted nearly 8.8 million immigrants (INS table 1, pg 6). In 2000, the Immigration and Naturalization Service (INS) granted nearly 850,000 immigrants legal permanent residence (Table 1). Of those arriving in the United States in 2000, 8 percent were refugees or asylum seekers, down somewhat from 1997 when refugees constituted 14.0 percent of all immigrant arrivals. And the immigration applications keep coming. As of February 2002, over 3.6 million applications for immigration and change of legal status were pending at the INS.

TABLE 1
Immigrants Admitted, Fiscal Years 1993–2000

	All Immigrants	Refugees and Asylum Seekers
1993	904,292	127,343
1994	804,416	121,434
1995	720,461	114,664
1996	915,900	128,565
1997	798,378	112,158
1998	654,451	52,193
1999	646,568	42,852
2000	849,807	65,941

Source: 2000 Statistical Yearbook, Immigration and Naturalization Service.

For descriptive purposes, we adopt the INS legal definition of immigrants, “persons lawfully admitted for permanent residence in the United States” (INS Annual Report: Legal Immigration, Fiscal Year 2000). As we explain below, data limitations will complicate clear identification of immigrants because not all foreign-born people living in the United States are admitted for permanent residence. Most immigrants apply for an immigrant visa through the State Department while living abroad. If granted a visa, they become legal residents upon entering the United States. Aliens who enter the United States on temporary visas such as temporary worker, student, or travel visas may apply to the INS for permanent resident status from within the United States. Refugees are a subset of all immigrants, those granted refugee status prior to coming to the United States because of clear and credible fear of persecution due to 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 (2000 Statistical Yearbook of the Immigration and Naturalization Service.). 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.

Prior to PRWORA, few researchers concerned themselves with the legal status of immigrants. Welfare policies made no distinction among immigrants. In fact, welfare policies made no distinctions between legal immigrants and natives. As long as the household met the categorical limits (such as being a single parent, disabled, or unemployed) and the means tests on income and assets, the household qualified for benefits. Past researchers had academic interests in immigrants, some even in refugees, but welfare policy issues did not drive the interest in immigrants. Until recently, labor market issues dominated the economics research on immigrants.

III. WELFARE REFORM AND IMMIGRANTS

PRWORA enacted two sets of provisions, those that applied to all applicants or recipients and those that applied to noncitizen, foreign-born applicants or recipients. The broader provisions limited

benefit reciprocity to 60 months, encouraged states to put program recipients to work, and gave states latitude to design programs that encouraged self-sufficiency while discouraging out-of-wedlock births. The second set of provisions placed eligibility restrictions on noncitizen immigrants. Immigrants who arrived in the United States prior to 1996 but were not yet naturalized became “unqualified” for federal benefits, although states had the option to provide them with TANF and Medicaid benefits. Immigrants arriving after August 1996 were also labeled unqualified; states are not allowed not extend to them TANF or Medicaid benefits for 5 to 7 years or until their household has accrued 40 quarters of qualified work or until they become naturalized citizens. Food stamp eligibility was subsequently extended to children, disabled, and elderly immigrants in the United States prior to the signing of PRWORA.

Refugees were largely spared by PRWORA. Under the new law, refugees were given “qualified” status and exempted from the immigrant restrictions for 5 to 7 years. Because refugees have a faster track to citizenship, most will be naturalized before they reach their exemption limit. Therefore, refugees, regardless of their arrival date, qualify for food stamps, TANF, Medicaid, child health insurance programs, and other federal aid such as Pell grants and student loans.

Measures of refugee status are typically not available in large cross-sectional data sets of the type necessary for participation model estimation. Most postwelfare-reform studies have tried to identify immigrants and refugees using the Current Population Survey (CPS), the Survey of Income and Program Participation (SIPP), or the decennial census. We highlight four studies (see Table 2) to demonstrate different ways in which immigrants are identified or classified: Passel and Clark (1998); Borjas and Hilton (1996); Borjas (2001); and Lofstrum and Bean (2000).

Passel and Clark (1998) may represent the most comprehensive effort to disentangle the legal status of immigrants. The report classifies the foreign-born population as naturalized citizens, legal permanent residents, refugees, legal nonimmigrants, and undocumented or illegal aliens. The CPS asks respondents about their country of birth, number of years in the United States, and their citizenship status. Passel and Clark assign the status of refugee if, in the year of entry, more than half of immigrants from

TABLE 2
Alternative Definitions of Immigrant

Authors	Data Source	Immigrant Definition
Passel and Clark (1998)	March 1995 CPS	Six legal status categories with complex rules (based on time in United States, student, work, and marital status, highest degree, and occupation) to isolate nonimmigrants, and undocumented aliens. Refugees if more than 50% of arrivals from sending country are refugees. Citizenship is direct answers to CPS question.
Borjas and Hilton (1996)	SIPP 1984, 1985, 1990, and 1991.	Immigrants defined as all persons born abroad.
Borjas (2001)	CPS 1995–1999	Separates immigrants into citizens and noncitizens and presents statistics for post-1996 arrivals. Refugees status assigned if coming from one of the 13 main refugee sending countries.
Lofstrom and Bean (2001)	CPS 1994–1999	Immigrants defined as all foreign-born. Refugees not identified.

the sending country were refugees. Nonimmigrants and illegal aliens are identified with a hierarchy of rules and a probabilistic model, respectively. Those not determined to be citizens, refugees, nonimmigrants or undocumented aliens are assigned the status of legal permanent resident. In sharp contrast to the detailed identification process above.

Borjas and Hilton (1996) do not attempt to identify refugees. Using the SIPP, they classify anyone born abroad as an immigrant.

The Borjas (2001) study estimates impact of welfare reform on food security, estimating food stamp, TANF, and Medicaid participation equations in the process. Borjas estimates effects of the policy change on noncitizen and noncitizen nonrefugee households relative to citizen households. To identify nonrefugee households, Borjas identifies the 13 “main” refugee-sending countries using INS records. He then classifies a household as a refugee household if it came from one of the “main” refugee sending countries. Borjas does not present estimates for refugee households, but he does take care to exclude refugees or at least immigrants from refugee-sending countries, recognizing that refugees are exempted from the restrictions placed on post-1996 immigrants.

Finally, Lofstrom and Bean (2001) study the impact of local labor market conditions on immigrant welfare participation. Using the March 1995–2000 CPS, they classify households as immigrant households if the respondent is foreign-born. Lofstrom and Bean argue that citizenship status is endogenous and should not be used to distinguish among households. Moreover, they make no attempt to identify refugees.

IV. ERROR IN MEASURING REFUGEE STATUS

None of the data sources available to study program participation correctly measures refugee status. The SIPP and CPS do not ask if respondents are refugees, leaving researchers to develop decision rules to assign refugee status. As such, refugee status is always measured with error.

Previous studies of food stamp participation either do a poor job of identifying refugees or make no attempt to do so. Even what Borjas calls the main refugee-sending countries often send more immigrants than refugees in a given year. Yet the refugee variable is crucial to our analysis as we hypothesize that refugees will respond differently to welfare reform than nonrefugee immigrants.

A tempting way to address this assignment problem is to use the proportion of immigrants who are refugees from a particular country in a particular year. Unfortunately, this approach will not yield consistent estimates in a probit model. Using the proportion of refugees as a proxy will induce heteroskedasticity into the structural error term. Heteroskedasticity is well known to cause bias in probit (and logit) models (see Madalla, 1983). Further, the structural errors are no longer normally distributed, and hence a standard probit model and MLE estimation will not yield consistent results. The methodology used below formally accounts for the fact that only the probability of being a refugee is available and will yield consistent estimates.

V. HYPOTHESES

There are a number of reasons why we expect refugees to have higher participation rates in safety net programs such as food stamps. Primary among these are the fact that documentation of accumulated human capital may not be available. Individuals fleeing persecution may not be able to formally document education and other training. Hence, conditional on that education (which is typically reported in survey data), refugees are more likely to participate in safety net programs than immigrants who are not refugees.

We also expect that failing to correct for the measurement error in assigning refugee status from external data will result in slopes that are attenuated compared to the consistent slopes. Moreover, it may affect the estimation of other slopes as well. In particular, it is likely to affect the estimation of coefficients on other types of immigrants. To determine if there are differences in participation rates between immigrant groups, correcting for the measurement error in refugee status is crucial. Of interest

are not just the static differences in participation rates between immigrants and refugees, but how those rates change with length of residence. It is hypothesized that refugees may participate at a higher rate initially, but that the participation rate may fall off faster over time. The difficulty of isolating the refugee effect has prevented this kind of analysis in previous studies.

Finally, given the structure of the TANF program, we expect that the pre and post TANF participation differentials for refugees should not decline. Hence relative to both natives and other immigrants, it is possible that these rates will increase. Unlike other studies, we expect to be able to isolate both country of origin effects and refugee effects. This is crucial, since the country of origin of refugees has changed over the 1990's.

VI. DATA SOURCES

There is no perfect source of data for the study of immigrant participation in FSP or any other public assistance program. Administrative data such as those maintained by the INS provide no information on program participation. The USDA Quality Control (QC) now collects data on refugee status, but those data are not available prior to welfare reform. Furthermore, the estimation of program participation equations requires data on nonparticipants not available in the QC data. Three major household surveys—the Census, CPS, and SIPP—ask questions on country of birth that assist in assigning immigrant status. Census data have frequently been used to study immigration (Bean et al., 1997). However, the 2000 Census data are not yet available, and the 1990 Census data do not allow our focus on welfare reform. Borjas and Hilton (1996) use SIPP but settle for a weak definition of immigrants, namely all those who are foreign-born. Such a definition includes refugees who now have special status and illegal aliens and nonimmigrants who do not qualify for welfare benefits under any conditions. It is well known that SIPP data offer the advantage of strong program participation data and longitudinal data on households. Unfortunately, the sample sizes are small, particularly with respect to our focus on refugees.

The primary data for our 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. As mentioned previously, however, current policy rules require more precise definitions of immigrant status, including those of refugee, legal permanent resident, nonimmigrant foreign-born, and illegal alien. As explained below, we focus on improving the identification of refugees and, at this point, consider all immigrants who respond to the CPS to be legal and permanent immigrants. Future work will use techniques developed by the Urban Institute to assign immigrants legal status (Passel and Clark, 1998).

Rather than use aggregate measures of refugee shares, we take advantage of data provided by the INS titled “Immigrants Admitted to the United States.” These are person-level records containing immigration status of persons admitted as legal permanent residents, along with several individual characteristics. These data are available (from the Inter-university Consortium for Political and Social Research [ICPSR]) for each year beginning in 1972 and through 1998, a wider time span than similar aggregate tables currently available.

While person-level records are preferable for our analysis, the aggregate data provided in the INS World Tables provide a descriptive measure of the extent and evolution of immigration patterns. These aggregate data on new immigrant arrivals to the United States, available only for the years 1982 through 1999, are summarized in Table 3. Row 1 of Table 3 shows that over the 17 years of available data, immigrants originated from 109 countries. Of these 109 countries, 31 countries of origin had immigrants who were classified as refugees. It is important to note that not all immigrants from those countries were classified as refugees even within the same year. Overall, the INS classified about 24 percent of the immigrants from refugee-sending countries as refugees. This highlights the danger of crude measures of refugee status. The second row of the table indicates that the number of countries sending both immigrants and refugees fluctuated over time. In any given year there were, on average, 101 countries

TABLE 3
Summary of Aggregate Immigration and Refugee Data, 1982–1998

	Countries Sending Immigrants			Countries Sending Refugees					
	Total Immigrants	Countries	Immigrants per Country	Total Refugees	Countries	Refugees per Country	Percent Refugees	Minimum Percent	Maximum Percent
All years	16,155,067	109	148,211.6	1,527,071	31	49,261.0	24.3	0.1	79.2
Per year	950,298	101	8,122.2	89,828	24	3,752.0	28.9	22.0	44.4
Selected Years									
1982	687,824	95	7,240.3	93,693	19	4,931.2	30.6	0.1	73.2
1985	639,331	94	6,729.8	62,594	19	3,294.4	26.1	0.3	55.1
1990	1,645,576	102	16,133.1	109,089	30	3,636.3	29.8	0.0	100.0
1995	870,383	108	8,059.1	4,712	23	4,712.6	23.3	0.1	88.5
1998	794,858	108	7,359.8	107,006	18	5,944.8	27.8	0.0	88.0

Source: INS Statistical Yearbooks, selected years.

sending any immigrants and only 24 countries sending refugees. Again, on average, about 28 percent of the of the immigrants from those countries sending refugees were classified as refugees.

The last five rows of Table 3 present averages for particular years. In 1990, for example, 102 countries sent immigrants to the United States. Of those 102, 30 countries had immigrants who were classified as refugees. The refugees from those countries, on average, made up about 29 percent of the total immigrants from those countries. Indeed, some countries had very few immigrants classified as refugees, while others had all (or nearly all).

The INS data sets obtained through ICPSR contain the universe of all persons given Legal Permanent Resident status during that fiscal year. The data sets are available for 1972 through 1998. 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 Legal Permanent Resident status. The second type is conversion: individuals who have been living in the United States for some period of time under another type of visa, and are now applying for adjustment to Legal Permanent Resident status.

From these 27 years of data, we construct files of persons entering the United States in each of the periods identified in the CPS data.¹ We further break these files by gender. For all years after 1971, we have the universe of all entrants. For years prior to 1972, we only have individuals who entered and postponed their application for Legal Permanent Resident status to sometime after 1971. 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.

To obtain probabilities of refugee status, we analyzed the probability of being classified as a refugee for each country, in each CPS time period, by gender. The marginal proportion of refugees for each country/time/gender group was calculated. Additionally, for country/time/gender groups with

¹CPS groups by years: prior to 1950, 1950–1959, 1960–1964, 1965–1969, 1970–1974, 1975–1979, 1980–1981, 1982–1983,...1996–1997, 1998–2001.

sufficient observations and variation in both refugee status and age at entry, we calculated a probit model from the data. Hence, all country/time/gender groups have a marginal proportion. Many (but not all) country/time/gender groups also have an intercept and slope coefficient from a probit model. We argue that since we have the universe of immigrants, this is a calculation rather than an estimate.

The relationship to age was typically negative. The average coefficient on age (across country/time/gender groups) was $-.023$, and 66.8 percent of the age coefficients calculated were negative. The minimum was $-.088$, while the maximum was 0.047 . In general, men were more likely to be refugees than women.

Two other variables were available in the INS data: the occupation of the individual in the country of origin and the marital status at time of immigration. A number of matching issues persuaded us against using these variables. First, the occupation code in the INS data corresponds to the job in the country of origin. While home-country occupation may be a strong predictor of future earnings, it is not clear that it would be a strong predictor of refugee status. Moreover, the occupation of the individual in the United States some years later (and hence in the CPS) may differ markedly from the occupation in the country of origin. This is likely to be most prevalent for refugees who may have a difficult time establishing credentials in the United States. Similarly, the marital status at the time of immigration may be different than the marital status some years later. Since we only have current marital status, we cannot use this as a matching characteristic.

The results of the analysis of the INS data were then matched, by country/time/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/time/gender groups yielded a valid probit model, the probability of being a refugee was calculated from the probit model based the age at entry of the CPS individual. For immigrants whose country/time/gender group did not yield a valid probit, the marginal proportion of refugees was used. In

many cases the reason that a particular country/time/gender did not have a valid probit was that all (or none) of the immigrants were refugees. Finally, because of the paucity of data in the pre-1950 period, we assigned zero probability of refugee status to immigrants from this period.

The data deriving from the CPS are household-level observations with demographic information on the head of the household. For married heads we also included spouse data in all of our regression models. Armed forces households, nonfamily households and households, with heads of household less than 18 years old were excluded from the sample. The final sample size is 231,536. We later excluded observations from the 1997 and 1998 CPS years (corresponding to 1996 and 1997 program participation years), the year including and following passage of TANF. Excluding 1996 removes the “anticipation” effect, while excluding 1997 allows for full implementation of the new policies. The final sample thus includes 217,288 households.

We put considerable thought into the question of what do with households that contained more than one family. We chose not to omit multifamily households from our analysis because these households disproportionately include refugees and immigrants. Table 4 presents the percentage of households with multiple families for five citizenship classifications of the head of the household. In particular we compare the households headed by native-born citizens to those headed by either naturalized citizens (immigrants who have become U.S. citizens) or resident aliens (immigrants who have not become U.S. citizens). The naturalized citizens are not markedly different from the native-born citizens. Approximately 90 percent of the households headed by either native-born citizens or naturalized citizens are single-family households. In contrast, households headed by a resident alien are nearly twice as likely to contain multiple families. There may also be compelling reasons to omit multifamily households. A food stamp unit is defined to include all individuals in a household who share cooking arrangements, something we cannot determine from CPS data. Despite the complications it may introduce, we find the differential likelihood of immigrants to live in multifamily households to be a

TABLE 4
Citizenship and Families per Household

Citizenship of Head of Household	Percent of Row		Percent of All Households
	Single Family	Multiple Families	
Native-born	89.8%	10.2%	87.1%
Native, U.S. territory	87.4	12.6	1.0
Born abroad of native parents	86.0	14.0	0.9
Naturalized	89.6	10.4	4.5
Resident alien	82.3	17.7	6.5
Total	89.2	10.8	100.0

Source: Authors' calculations from Current Population Surveys, 1994–2000.

compelling argument in favor of including such households, and all regressions include a multifamily dummy variable.

Table 5 presents means and standard deviations for the variables used in the analysis. The demographic statistics are not markedly different from those typically seen in microeconomic samples. The typical (average or modal) household is headed by a 47-year-old married white male with a high school degree. Female-headed households constitute approximately 31 percent of the sample. Households headed by an African American constitute 9.6 percent of the sample. Households headed by a person who has never married constitute 5 percent of the sample, while 15 percent of the sample households are headed by persons who have been married but are not currently married. While high school graduates represent the modal head of household (approximately 32 percent of the sample), the second and third largest educational categories are some college (18 percent) and a four-year degree (15 percent). In fact, nearly 50 percent of the sample has a head of household who has obtained some postsecondary education. Only 7.6 percent of the sample reported receiving food stamps sometime in the previous calendar year.

The main populations of interest are all immigrants and immigrants who came as refugees. The CPS provides five citizenship categories (as noted in Table 4). For this research, the two citizenship categories of interest are Naturalized Citizen and Resident Alien. These two categories represent all immigrants. We consider those individuals who are children of U.S. citizens but born abroad to be nonimmigrants. Such individuals are, by definition, U.S. citizens from the moment of birth. The experiences of persons who migrate from U.S. territories (Puerto Rico or Guam, for example) are likely to be different than those who migrate from non-U.S. territories, and hence they too are not defined as immigrants. It may be of interest to examine these issues further. The two immigration categories together comprise 11.6 percent of the sample. Naturalized citizens are the smaller of the two groups, representing 4.7 percent of the sample. In the CPS, persons who immigrated to the United States are asked their country of origin and the year of immigration. As noted above, the probability that an individual is classified as a refugee was assigned from the immigration tables based on gender, age at immigration,

TABLE 5
Descriptive Statistics (CPS years 94–96 and 99–01)

	Mean	Stand Deviation
Age	47.00	15.50
Married, spouse present	0.77	0.42
Single, never married	0.07	0.25
Female	0.34	0.47
African American	0.10	0.29
Native American	0.01	0.11
Asian American	0.03	0.17
Hispanic origin	0.14	0.35
Veteran	0.22	0.41
Elementary school only	0.08	0.27
Some high school	0.09	0.29
Grade 12, no diploma	0.01	0.11
High school graduate	0.32	0.47
Some college, no diploma	0.18	0.38
Associate/vocational degree	0.07	0.26
Four-year degree	0.15	0.36
Master's degree	0.06	0.23
Ph.D., M.D., J.D., etc	0.03	0.17
Disabled	0.10	0.30
Household received food stamps in previous year	0.08	0.27
Native citizen	0.87	0.11
Naturalized citizen	0.05	0.22
Resident alien	0.08	0.27
Probability of being a refugee (from immigration data)	0.01	0.09
Indicator for pctrefugee > 0	0.09	0.29
Years since immigration (minimal value)	2.30	7.29
Years since immigration (maximal value)	2.74	9.05
N		217,287

country of origin, and year of immigration. Overall, the probability of having refugee status is 1.04 percent or about 8 percent of all immigrants. Hence, we expect that our sample includes approximately 2,260 heads of household who are refugees.

The CPS asks all immigrants the year of immigration. However, the public use tapes only provide a range of years. Immigrants after 1980 are grouped into 2-year intervals. Immigrants prior to 1980 are grouped into 5-year intervals, and immigrants prior to 1960 are grouped into 10-year intervals. All immigrants prior to 1950 are grouped together. Hence, the number of years since immigration cannot be measured precisely. We construct two measures: the minimum and the maximum possible given the interview year and the range provided.² In some cases, the maximum possible resulted in a value that was larger than the age of the individual. We then replaced the maximum value with the age. The averages of the two measures differ only slightly, less than half a year.

Table 6 presents the means of the variables used in the analysis for each of the two immigrant groups. The main difference between the two groups is highlighted by the age and years in United States variables. The typical naturalized citizen is older and has been in the United States longer than the typical resident alien. The legal requirement for 5 years of residency prior to citizenship does not fully explain the difference in age or years since immigration. The other striking differences between the two groups are education and use of food stamps. The resident aliens have lower educational attainment, with over 30 percent having only an elementary school education, versus only 16 percent for the naturalized citizens. Resident aliens are also more than twice as likely to have received food stamps in the previous year (15 percent) than naturalized citizens (6.3 percent). In fact, naturalized citizens have a lower incidence of food stamp use than the native-born U.S. citizens (6.8 percent).

Comparing the two groups to the remainder of the sample, one notes that resident aliens have a much higher (more than twice) incidence of food stamp receipt than the overall sample. It is also interesting to note that while immigrants are more likely to have only an elementary school education,

²Another alternative is to randomly assign year of entry.

TABLE 6
Means for Immigrants (CPS Interview Years 94–96, 99–01)

Demographics of Head of Household	Naturalized Citizens	Resident Aliens
Age	49.8	39.97
Married, spouse present	0.79	0.73
Single, never married	0.05	0.12
Female	0.33	0.36
African American	0.07	0.06
Native American	0.005	0.004
Asian American	0.21	0.14
Hispanic origin	0.41	0.65
Veteran	0.07	0.01
Elementary school only	0.17	0.32
Some high school	0.07	0.13
Grade 12, no diploma	0.02	0.03
High school graduate	0.25	0.22
Some college, no diploma	0.14	0.09
Associate/vocational degree	0.06	0.04
Four-year degree	0.18	0.10
Master's degree	0.07	0.04
Ph.D., M.D., J.D., etc	0.05	0.03
Disabled	0.08	0.05
Probability of being a refugee (from immigration data)	0.10	0.06
Indicator for pctrefugee > 0	0.57	0.82
Years since immigration (minimal value)	24.90	13.11
Years since immigration (maximal value)	30.17	15.24
Household received food stamps in previous year	0.06	0.15
N	11,189	16,920

naturalized citizens are more likely to have a 4-year degree or a terminal degree than the full sample. Resident aliens have decidedly the lowest educational attainment, being less likely to have graduated from high school or have college or higher degrees.

For descriptive purposes, Table 7 presents statistics for the subsample of immigrants who have a positive probability of being a refugee (hereafter called potential refugees), meaning their country of origin sent refugees in the year they came to the United States. Comparing this sample to the sample of all immigrants in Table 8 above, we note that potential refugees are slightly older than nonrefugees (when we observe them in the CPS). They are also slightly better educated. They have also been in the country for fewer years than the overall average of all immigrants. Finally we note that the disparity in food stamp use between naturalized citizens and resident aliens is larger—only 5.4 percent of naturalized citizens have used food stamps, while 17.3 percent of resident aliens have used food stamps among the potential refugee group.

Table 8 presents the average FSP participation by year and citizenship and refugee status. Three general relationships are of interest. First, there is an overall decline in food stamp participation use. In 1994, 9.2 percent of the sample used food stamps, versus only 5.5 percent in 2000. This trend is generally mirrored in each subpopulation, with the exception of naturalized potential refugees. Their food stamp use seems to be relatively consistent at about 5 percent. The second major relationship is that resident aliens are much more likely to use food stamps than their naturalized counterparts. Indeed, naturalized citizens use food stamps at a lower rate than the native households as a whole. In contrast, food stamp use by resident aliens can be as high as 19 percent. Finally, we note that the differential between naturalized citizens and resident aliens is even higher within the potential refugees category.

VII. MODEL AND ESTIMATION

Following the standard participation literature, we will estimate a threshold-crossing model of FSP participation utilizing this sample. Of primary focus here is the variable for refugee status. Ideally,

TABLE 7
Means for Potential Refugees (CPS Interview Year 94–96, 99–01)

Demographics of Head of Household	Naturalized Citizens	Resident Aliens
Age	44.34	38.45
Married, spouse present	0.77	0.73
Single, never married	0.07	0.12
Female	0.35	0.35
African American	0.07	0.06
Native American	0.004	0.004
Asian American	0.28	0.15
Hispanic origin	0.48	0.66
Veteran	0.02	0.003
Elementary school only	0.16	0.32
Some high school	0.08	0.14
Grade 12, no diploma	0.02	0.03
High school graduate	0.24	0.22
Some college, no diploma	0.13	0.09
Associate/vocational degree	0.06	0.03
Four-year degree	0.19	0.10
Master's degree	0.07	0.04
Ph.D., M.D., J.D., etc	0.05	0.03
Disabled	0.06	0.05
Probability of being a refugee (from immigration data)	0.18	0.08
Years since immigration (minimal value)	18.14	11.36
Years since immigration (maximal value)	20.70	12.98
Household received food stamps in previous year	0.07	0.16
N	6,401	14,000

TABLE 8
Food Stamp Participation (Percent) by Year for Immigration Groups

CPS Interview Year			All Immigrants		Potential Refugees	
	All Households	Native Households	Naturalized	Resident Alien	Naturalized	Resident Alien
1994	10.5	10.0	6.5	19.4	8.2	20.5
1995	9.9	9.2	6.7	20.0	9.4	21.5
1996	9.7	8.9	8.5	18.2	11.2	19.4
1997	9.2	8.7	7.4	16.2	9.6	16.5
1998	7.8	7.4	6.3	13.9	8.0	14.2
1999	6.7	6.4	6.1	10.7	6.3	11.3
2000	6.2	5.9	5.8	10.2	6.7	11.1
2001	5.7	5.6	5.0	8.2	5.5	9.1

we would have an indicator determining the refugee status for each individual (notationally, R). The basic model is

$$\begin{aligned} FS &= 1 && \text{if } D_i\beta + \gamma R_i + \delta_1 N_i + \delta_2 A_i + \varepsilon_i > 0 \\ FS &= 0 && \text{otherwise} \end{aligned}$$

The variable D represents demographic characteristics of the household (specifically of the head of the household, the spouse if present, and the number of children), the variable R is an indicator that the head of the household is a refugee, while N and A are indicators for naturalized citizens and resident aliens. We assume that ε_i is normally distributed, thus giving rise to a probit model for participation. It should be noted that since we do not condition on eligibility, this model represents an interaction between eligibility and participation.

The probit model implies that

$$\Pr\{FS = 1\} = F(D_i\beta + \gamma R_i + \delta_1 N_i + \delta_2 A_i)$$

where F is the cumulative distribution of the standard normal density. In our case, however, R is not observed, but rather R_{hat} is observed. R_{hat} is the probability that $R = 1$, conditional on country of origin and year of immigration (or group of years) and the head's age at year of entry to the United States. Since the probability R_{hat} is computed from immigration data, that is, the population of all immigrants, it is the actual probability that a randomly selected person who emigrated from the country during the given time period will be a refugee. Using the law of total probabilities, we can then decompose the above expression

$$\Pr\{FS = 1\} = F(D_i\beta + \gamma + \delta_1 N_i + \delta_2 A_i)\Pr\{R_i = 1\} + F(D_i\beta + \delta_1 N_i + \delta_2 A_i)\Pr\{R_i = 0\}.$$

This expression then gives rise to a model that can be estimated using maximum likelihood, since the unconditional probability $\Pr\{R_i = 1\}$ is known from the immigration data. One might be tempted to include R_{hat} simply as a regressor in the probit model. However, this induces heteroskedasticity into the error term which can bias probit estimation. Further, it induces a nonnormal distribution which can also

bias Probit estimates. We examined this option as well and found that it overstated the coefficient γ .³ The probability decomposition technique we employ suffers from none of these problems. Furthermore, 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 correct probability of refugee status for each person. Essentially this is an instrumental variables approach. We are using year of immigration, gender, country of origin, and age at immigration as instruments.

VIII. DEMOGRAPHIC CORRELATES TO FOOD STAMP PARTICIPATION

Tables 9–12 present estimates for a progression of probit models. The series of tables demonstrates the impact of our methodological corrections while focusing on the impact of the 1997 welfare reforms on the food stamp participation of the foreign-born. As described above, welfare reforms magnified the importance of citizenship and the legal designation of refugee status.

Table 9 presents five models, variations of which will be repeated in Tables 10 and 11. The empirical literature on immigrant use of welfare has all but ignored the possibility that refugees may behave differently from other immigrants. The descriptive work on refugees has typically labeled an immigrant as a refugee if the proportion of refugees among new arrivals from the sending country exceeds some threshold. For example, Passel and Clark (1998) use a threshold of 50 percent. We use a 30 percent threshold as the “state of the literature” definition, and present the food stamp participation probits in Table 9. These estimates suffer from bias induced by mismeasurement of the refugee variable. Necessarily, the refugee indicator here misclassifies some persons as refugees who are not (potentially 70 percent of nonrefugees from refugee-sending countries), and fails to identify some refugees (all refugees from countries sending less than 30 percent refugees). Hence, we expect the estimates in Table 9 to be biased. We present them as a demarcation point, comparable to what has been done in previous literature.

³Those results are available from the authors.

TABLE 9
Food Stamp Participation Probit, Refugee = >30 Percent Refugees

	A	B	C	D	E
a_age	-0.017 (34.47)**	-0.017 (34.49)**	-0.017 (34.52)**	-0.017 (33.83)**	-0.017 (33.90)**
female	0.616 (30.31)**	0.616 (30.34)**	0.616 (30.33)**	0.618 (30.40)**	0.619 (30.43)**
black	0.407 (23.89)**	0.407 (23.87)**	0.407 (23.85)**	0.406 (23.81)**	0.407 (23.89)**
hispanic	0.194 (10.62)**	0.193 (10.57)**	0.194 (10.62)**	0.194 (10.60)**	0.204 (11.13)**
asian	0.006 -0.12	0.007 -0.14	0.001 -0.01	-0.013 -0.29	-0.034 -0.72
natamerican	0.319 (8.39)**	0.317 (8.35)**	0.317 (8.34)**	0.316 (8.33)**	0.317 (8.34)**
elem	0.396 (21.56)**	0.397 (21.57)**	0.398 (21.61)**	0.398 (21.60)**	0.399 (21.67)**
someHS	0.393 (26.19)**	0.394 (26.20)**	0.394 (26.22)**	0.393 (26.18)**	0.393 (26.18)**
HS12nodip	0.205 (5.68)**	0.204 (5.65)**	0.206 (5.70)**	0.205 (5.68)**	0.205 (5.68)**
somecollege	-0.145 (9.81)**	-0.145 (9.81)**	-0.146 (9.84)**	-0.145 (9.80)**	-0.144 (9.76)**
assocdeg	-0.282 (12.45)**	-0.282 (12.47)**	-0.283 (12.51)**	-0.282 (12.48)**	-0.282 (12.46)**
collgrad	-0.515 (21.61)**	-0.515 (21.61)**	-0.516 (21.61)**	-0.518 (21.67)**	-0.52 (21.72)**
masters	-0.624 (13.60)**	-0.624 (13.60)**	-0.625 (13.62)**	-0.628 (13.65)**	-0.628 (13.61)**
terminaldeg	-0.612 (8.87)**	-0.611 (8.86)**	-0.618 (8.91)**	-0.62 (8.92)**	-0.617 (8.83)**
marriedpresent	-1.095 (30.64)**	-1.094 (30.64)**	-1.092 (30.57)**	-1.095 (30.64)**	-1.096 (30.64)**
veteran	0 -0.03	0 -0.01	0.003 -0.14	0.001 -0.06	0.003 -0.14
disabled	0.724 (50.33)**	0.724 (50.34)**	0.723 (50.29)**	0.723 (50.27)**	0.722 (50.17)**
multifamily	-0.026 -1.75	-0.026 -1.77	-0.026 -1.76	-0.027 -1.8	-0.027 -1.82
kidsunder5	0.439 (54.21)**	0.439 (54.20)**	0.439 (54.18)**	0.439 (54.16)**	0.44 (54.23)**
kids5to18	0.244 (55.09)**	0.244 (55.09)**	0.244 (55.10)**	0.245 (55.19)**	0.244 (54.95)**
localunemp	0.053 (19.42)**	0.054 (20.36)**	0.054 (20.20)**	0.054 (20.35)**	0.054 (20.17)**

(table continues)

TABLE 9, continued

	A	B	C	D	E
yr94	0.264 (13.65)**				
yr95	0.27 (14.44)**				
yr96	0.248 (13.16)**				
yr99	0.051 (2.66)**				
yr00	0.035 -1.8				
naturalized	-0.184 (6.68)**	-0.185 (6.72)**	-0.18 (4.80)**	-0.074 -1.54	-0.194 (3.93)**
residentialien	-0.169 (8.29)**	-0.169 (8.31)**	-0.106 (4.36)**	-0.041 -1.37	-0.117 (3.75)**
residentrefugee	0.988 (21.67)**	0.989 (21.69)**	1.023 (18.44)**	1.022 (18.37)**	1.466 (20.22)**
naturalrefugee	0.479 (8.23)**	0.48 (8.24)**	0.225 (2.59)**	0.237 (2.72)**	1.053 (8.71)**
postreform		-0.23 (20.20)**	-0.214 (17.48)**	-0.213 (17.39)**	-0.214 (17.47)**
naturalizedpost			-0.009 -0.18	-0.008 -0.15	-0.011 -0.22
residentpost			-0.148 (4.60)**	-0.148 (4.58)**	-0.149 (4.63)**
residentrefugeepost			-0.126 -1.35	-0.125 -1.35	-0.13 -1.39
naturalrefugeepost			0.489 (4.23)**	0.485 (4.17)**	0.475 (4.01)**
yrsinusmin				-0.005 (3.58)**	0.001 -0.49
refugeeyrsin					-0.037 (9.50)**
Constant	-1.402 (23.72)**	-1.147 (19.41)**	-1.152 (19.49)**	-1.165 (19.68)**	-1.161 (19.61)**
Observations	217288	217288	217288	217288	217288

Absolute value of z-statistics in parentheses

* significant at 5%; ** significant at 1%

The sociodemographic coefficients are exceptionally robust to variations in the model. In addition to the demographic variables presented in the table, the specification includes state dummy variables to allow for state fixed effects. Spouse characteristics are also included in the model estimation but excluded from the table. The results are consistent with typical models of food stamp participation. For example, we find that older heads of household are less likely to utilize food stamps. Food stamp use is negatively related to educational attainment: heads of household with education beyond high school are significantly less likely to participate, while those with less than a high school education are more likely to participate. Black, Hispanic, and Native American household are more likely than households with a white head, while Asian household heads are no more likely to participate than white households. Being disabled also has a strong effect on food stamp participation.

Family structure and household structure also affect food stamp participation. Households headed by married couples are significantly less likely to participate, while female heads of household are more likely to participate. While not statistically significant at the 5 percent level, there is some evidence that multifamily households are less likely to participate, other things held constant. The presence of children increases the likelihood of food stamp use, with the younger children (**kidsunder5**) having a larger per child effect than older children (**kids5to18**).

The local unemployment variable (**localunemp**) is the unemployment rate of the metropolitan area in which the household lives. For households not identified with an MSA, we assigned the state unemployment rate. A higher unemployment rate will raise job search costs, lengthen periods of unemployment, and increase households' expected duration of need. As expected, the statistical relationship between program participation and unemployment rates is strong. We explore this further in Table 12.

IX. IMMIGRANT LEGAL STATUS AND WELFARE REFORM EFFECTS

Columns A-E in Table 9 present alternative models intended to capture the effects of welfare reform, immigrant status, and assimilation measured by years in the United States. Column A includes year dummies for the three years of CPS data prior to welfare reform and two years after the 1996 reforms with CPS year 2001 as the omitted category. Note that years 1997 and 1998 (referring to food stamp participation in 1996 and 1997) are excluded from the data to allow time for policy changes to be fully implemented. The extreme drop in coefficients between **yr96** and **yr99**, from 0.248 to 0.051 demonstrates the huge impact that welfare reform had on food stamp participation. Keep in mind that we control for the drop in unemployment. Column B captures this same effect with a dummy variable called **postreform** which is equal to 1 for CPS years after 1998. Given the clear pattern in the year dummy coefficients and given that the immigrant coefficients are robust to the use of **postreform** in place of the year dummies, the remaining columns use the postreform dummy.

Immigrants and refugee are divided by citizenship, making for categorical variables. Nonrefugee immigrants who have attained citizenship are labeled **naturalized** and are less likely than U.S. natives to participate in the FSP. This result holds true throughout our paper. Noncitizen immigrants (**residentialien**) are also less likely than natives to participate.

Refugees, using here the “state of the literature” definition of being from a country that sent more than 30 percent refugees in the individual’s year of arrival, are also divided by citizenship status. Given that all refugees are also immigrants, the refugee coefficients give the refugee effect relative to immigrants of the same citizenship status. Other things constant, noncitizen refugees (**residentrefugee**) are more likely than other immigrants to participate in the FSP. It is important to notice that refugee effects differ in magnitude based on citizenship status. Resident refugees are more likely to participate than naturalized refugees (**naturalrefugee**). Because the refugee effects overwhelm the immigrant effects, refugees are also more likely than natives to use food stamps.

Column C further decomposes the postreform effect. Here the **postreform** coefficient captures the native response to welfare reform. As expected naturalized immigrants respond no differently from natives, while resident immigrants decrease their participation in the program. As predicted theoretically (and counter to the tabular evidence by Passell and Clark (1998), noncitizen refugees do not reduce participation relative to resident aliens. Surprisingly their naturalized counterparts actually show an increase in the probability of participation for some reason.⁴ Columns D and E show that immigrant use of food stamps decreases over time, but this effect is attributable almost entirely to decreased food stamp use among refugees.

X. CORRECTING FOR REFUGEE MEASUREMENT

As discussed earlier in this paper, it is not possible to identify refugees in the CPS with certainty. Table 10 presents results using the predicted probability of being a refugee with correction for measurement error in refugee status. Note that citizenship (naturalized or not) is a reported variable, not an imputed value. For brevity we will focus on coefficients in bold and simply note that the coefficients on the sociodemographic variables are remarkably unchanged.

Compared to Table 9, the **naturalized**, **residentialien**, **residentrefugee**, and **naturalrefugee** coefficients in Table 10 have the same signs but are larger in absolute magnitude. Although there is no analytic results for measurement error in probit models, this is consistent with other measurement error results. For example, in column B, the resident refugee effect increases from 0.989 to 1.416 while the naturalized refugee effect increases from 0.480 to 0.704. The immigrant variables indicate that immigrants, both naturalized and resident alien, are less likely than natives to receive food stamps while refugees are more likely to participate than either immigrants or natives. Column C estimates confirm

⁴The positive coefficient on naturalized refugees may reflect a tendency for refugees to complete citizenship requirements due to the changes in welfare policy. Dealing with the possible endogeneity of citizenship status is beyond the scope of this paper. We do note that the problem of endogeneity is not specific to the years surrounding the reform. As long as the current policy stands, there is a new incentive for those most likely to need benefits to pursue citizenship.

TABLE 10
Food Stamp Participation Probits: Refugee = Predicted Probability

	A	B	C	D	E
a_age	-0.017 (34.49)**	-0.017 (34.51)**	-0.017 (34.57)**	-0.017 (34.02)**	-0.017 (34.21)**
female	0.62 (30.42)**	0.621 (30.45)**	0.621 (30.45)**	0.622 (30.49)**	0.624 (30.53)**
black	0.409 (23.90)**	0.408 (23.88)**	0.408 (23.87)**	0.407 (23.84)**	0.409 (23.89)**
hispanic	0.198 (10.77)**	0.197 (10.72)**	0.199 (10.79)**	0.199 (10.78)**	0.222 (11.96)**
asian	-0.01 -0.22	-0.009 -0.2	-0.013 -0.27	-0.021 -0.43	-0.027 -0.55
natamerican	0.318 (8.36)**	0.316 (8.32)**	0.316 (8.30)**	0.316 (8.30)**	0.316 (8.31)**
elem	0.407 (21.99)**	0.407 (22.00)**	0.409 (22.05)**	0.408 (22.02)**	0.413 (22.24)**
someHS	0.397 (26.31)**	0.397 (26.32)**	0.397 (26.35)**	0.397 (26.32)**	0.398 (26.34)**
HS12nodip	0.21 (5.78)**	0.209 (5.75)**	0.21 (5.78)**	0.209 (5.76)**	0.211 (5.80)**
somecollege	-0.145 (9.77)**	-0.145 (9.78)**	-0.145 (9.78)**	-0.145 (9.75)**	-0.144 (9.70)**
assocdeg	-0.281 (12.40)**	-0.282 (12.41)**	-0.282 (12.44)**	-0.282 (12.43)**	-0.282 (12.39)**
collgrad	-0.522 (21.68)**	-0.522 (21.69)**	-0.522 (21.67)**	-0.523 (21.71)**	-0.532 (21.85)**
masters	-0.63 (13.55)**	-0.63 (13.55)**	-0.631 (13.55)**	-0.632 (13.58)**	-0.642 (13.60)**
terminaldeg	-0.618 (8.82)**	-0.617 (8.81)**	-0.624 (8.85)**	-0.625 (8.86)**	-0.631 (8.74)**
marriedpresent	-1.094 (30.49)**	-1.094 (30.49)**	-1.091 (30.40)**	-1.093 (30.44)**	-1.095 (30.42)**
veteran	0.006 -0.33	0.006 -0.34	0.009 -0.5	0.008 -0.43	0.012 -0.66
disabled	0.725 (50.21)**	0.725 (50.22)**	0.725 (50.17)**	0.724 (50.16)**	0.723 (49.97)**
multifamily	-0.025 -1.66	-0.025 -1.68	-0.025 -1.66	-0.025 -1.69	-0.025 -1.71
kidsunder5	0.442 (54.33)**	0.442 (54.32)**	0.442 (54.29)**	0.442 (54.27)**	0.443 (54.30)**
kids5to18	0.245 (55.05)**	0.245 (55.06)**	0.245 (55.06)**	0.245 (55.10)**	0.245 (54.78)**
localunemp	0.053 (19.30)**	0.054 (20.21)**	0.053 (20.06)**	0.054 (20.15)**	0.053 (19.96)**

(table continues)

TABLE 10, continued

	A	B	C	D	E
yr94	0.265 (13.65)**				
yr95	0.272 (14.45)**				
yr96	0.25 (13.21)**				
yr99	0.052 (2.65)**				
yr00	0.035 -1.81				
naturalized	-0.194 (7.04)**	-0.195 (7.07)**	-0.191 (5.11)**	-0.122 (2.50)*	-0.291 (5.73)**
residentialien	-0.206 (9.83)**	-0.207 (9.86)**	-0.146 (5.83)**	-0.104 (3.31)**	-0.218 (6.68)**
residentrefugee	1.415 (25.25)**	1.416 (25.27)**	1.474 (21.05)**	1.465 (20.86)**	2.3 (22.64)**
naturalrefugee	0.704 (10.08)**	0.704 (10.08)**	0.434 (4.03)**	0.426 (3.94)**	1.741 (11.18)**
postreform		-0.231 (20.24)**	-0.215 (17.54)**	-0.214 (17.48)**	-0.216 (17.59)**
naturalizedpost			-0.01 -0.2	-0.011 -0.21	-0.015 -0.29
residentpost			-0.144 (4.35)**	-0.144 (4.35)**	-0.142 (4.29)**
residentrefugeepost			-0.175 -1.57	-0.172 -1.54	-0.216 -1.85
naturalrefugeepost			0.477 (3.45)**	0.487 (3.51)**	0.659 (4.39)**
yrsinusmin				-0.003 (2.22)*	0.004 (2.76)**
refugeeyrsin					-0.07 (11.58)**
Constant	-1.404 (23.70)**	-1.147 (19.37)**	-1.152 (19.45)**	-1.16 (19.55)**	-1.153 (19.40)**
Observations	217287	217287	217287	217287	217287

Absolute value of z-statistics in parentheses.

* significant at 5%; ** significant at 1%

what we saw in Table 9, namely that naturalized immigrants and nonnaturalized refugees respond similarly to natives. Again, resident alien immigrants are less likely to participate while naturalized refugees increase food stamp participation, other things equal.

Column D shows two interesting effects when the years in the United States variables are added to the model. First, we begin to see some evidence that noncitizen refugees reduced food stamp participation despite being exempted from welfare reform immigrant restrictions. Second we see that immigrants and refugees have different assimilation patterns. Immigrants (naturalized and residents combined) show a small positive but statistically significant tendency to increase participation over time. Refugees, on the other hand, are less likely to participate in the FSP as time in the United States increases.

XI. CORRECTING FOR PROGRAM REPORTING ERROR

Table 11 presents similar results that correct for the fact that people sometimes misreport their food stamp participation status and that such misreporting is unlikely to be symmetric. We use results from Bollinger and David (1997), which finds the probability of over-reporting of 0.0032 and the probability of 0.1215 that food stamp participants fail to correctly report participation. We note that the above parameters were calculated using monthly SIPP data, which may differ from the CPS. In general, Table 11 coefficients are larger in absolute magnitude than in Table 10, even those for demographic characteristics. As noted in Bollinger and David (1997) and Hausman et al. (1998), this is consistent with other measurement error models and seems to be an empirical regularity. However, these authors know of no analytic result that ensures this.

Correcting for program reporting error further strengthens the immigrant and refugee effects in their respective directions. For example, in column B, the coefficient on **naturalrefugee** (the differential effect of being a naturalized refugee compared to naturalized immigrants) goes from 0.704 to 0.806, a 14 percent increase. In fact the **naturalized** coefficient increases by 42 percent.

TABLE 11
Food Stamp Participation Probits:
Refugee = Predicted Probability with Corrections for Food Stamp Reporting

	A	B	C	D	E
a_age	-0.02 (33.73)**	-0.02 (33.74)**	-0.02 (33.80)**	-0.02 (33.42)**	-0.02 (33.61)**
female	0.693 (29.83)**	0.693 (29.86)**	0.693 (29.87)**	0.693 (29.88)**	0.698 (29.98)**
black	0.462 (23.57)**	0.461 (23.56)**	0.461 (23.54)**	0.461 (23.53)**	0.462 (23.57)**
hispanic	0.233 (10.91)**	0.232 (10.86)**	0.234 (10.94)**	0.233 (10.93)**	0.258 (12.01)**
asian	-0.054 -0.93	-0.053 -0.91	-0.055 -0.94	-0.058 -0.99	-0.077 -1.29
natamerican	0.344 (7.84)**	0.341 (7.78)**	0.34 (7.76)**	0.34 (7.76)**	0.341 (7.76)**
elem	0.485 (22.35)**	0.486 (22.38)**	0.489 (22.47)**	0.488 (22.45)**	0.495 (22.69)**
someHS	0.453 (26.01)**	0.453 (26.01)**	0.454 (26.06)**	0.454 (26.04)**	0.456 (26.07)**
HS12nodip	0.23 (5.54)**	0.229 (5.51)**	0.231 (5.56)**	0.231 (5.55)**	0.234 (5.60)**
somecollege	-0.169 (9.83)**	-0.169 (9.83)**	-0.169 (9.85)**	-0.169 (9.84)**	-0.167 (9.73)**
assocdeg	-0.321 (12.16)**	-0.321 (12.17)**	-0.322 (12.20)**	-0.322 (12.20)**	-0.323 (12.21)**
collgrad	-0.652 (20.96)**	-0.651 (20.96)**	-0.651 (20.96)**	-0.651 (20.98)**	-0.665 (21.15)**
masters	-0.866 (12.60)**	-0.866 (12.59)**	-0.866 (12.65)**	-0.866 (12.66)**	-0.886 (12.86)**
terminaldeg	-0.99 (7.64)**	-0.986 (7.64)**	-0.976 (7.74)**	-0.973 (7.75)**	-0.983 (7.92)**
marriedpresent	-1.063 (24.59)**	-1.062 (24.59)**	-1.06 (24.53)**	-1.061 (24.55)**	-1.068 (24.65)**
veteran	0.017 -0.78	0.018 -0.8	0.021 -0.97	0.021 -0.94	0.025 -1.13
disabled	0.864 (49.62)**	0.864 (49.63)**	0.863 (49.58)**	0.863 (49.58)**	0.862 (49.47)**
multifamily	-0.026 -1.51	-0.027 -1.54	-0.026 -1.5	-0.026 -1.51	-0.026 -1.51
kidsunder5	0.515 (51.50)**	0.515 (51.50)**	0.516 (51.48)**	0.516 (51.48)**	0.518 (51.51)**
kids5to18	0.288 (53.63)**	0.288 (53.64)**	0.289 (53.64)**	0.289 (53.62)**	0.288 (53.33)**
localunemp	0.062 (18.79)**	0.063 (19.70)**	0.063 (19.54)**	0.063 (19.55)**	0.063 (19.42)**

(table continues)

TABLE 11, continued

	A	B	C	D	E
yr94	0.311 (13.52)**				
yr95	0.317 (14.26)**				
yr96	0.298 (13.35)**				
yr99	0.072 (3.17)**				
yr00	0.049 (2.11)*				
naturalized	-0.275 (8.26)**	-0.277 (8.31)**	-0.26 (5.76)**	-0.229 (3.89)**	-0.417 (6.89)**
residentialien	-0.279 (11.23)**	-0.279 (11.26)**	-0.208 (7.04)**	-0.189 (4.99)**	-0.318 (8.18)**
residentrefugee	1.779 (24.24)**	1.78 (24.28)**	1.929 (20.01)**	1.921 (19.91)**	3.003 (22.14)**
naturalrefugee	0.805 (8.90)**	0.806 (8.92)**	0.55 (4.26)**	0.548 (4.24)**	2.287 (11.77)**
postreform		-0.265 (19.72)**	-0.243 (16.94)**	-0.243 (16.92)**	-0.244 (17.00)**
naturalizedpost			-0.038 -0.62	-0.039 -0.62	-0.045 -0.72
residentpost			-0.17 (4.40)**	-0.17 (4.41)**	-0.168 (4.35)**
residentrefugeepost			-0.37 (2.58)**	-0.366 (2.55)*	-0.392 (2.75)**
naturalrefugeepost			0.517 (3.01)**	0.524 (3.04)**	0.867 (4.56)**
yrsinusmin				-0.001 -0.8	0.007 (3.83)**
refugeeyrsin					-0.094 (11.38)**
Constant	-1.389 (20.46)**	-1.088 (16.03)**	-1.094 (16.12)**	-1.097 (16.14)**	-1.094 (16.03)**
Observations	217287	217287	217287	217287	217287

Absolute value of z-statistics in parentheses.

* significant at 5%; ** significant at 1%

In column C, the postwelfare reform effect remains strong for natives, with naturalized immigrants behaving no differently from natives. Noncitizen immigrants, however, show an additional reduction in the probability of participating. On top of this immigrant effect, refugees show the same divergent pattern as before; resident refugees reduce program participation beyond resident immigrants while naturalized refugees increase participation significantly. In fact the postreform increase in participation by naturalized refugees is larger than the negative effect of **postreform**, meaning that the probability of participation is actually higher than that prior to welfare reform. Again, this may reflect the endogeneity of citizenship.

XII. DISENTANGLING THE REFUGEE EFFECTS

It is possible that the refugee and immigrant effects we observe are really capturing the differential ability of refugees and immigrants to benefit from the economic recovery. Table 12 presents four models adding interactions between the local unemployment rate and our immigrant variables and adding variables to identify new arrivals, which we define as being in the United States for less than 8 years.

In column A of Table 12 we demonstrate that the effects of unemployment on immigrant participation (**residentUE**) are about the same for resident aliens as for naturalized immigrants (**naturalUE**). For both the effect is not statistically different from zero, suggesting that both types of immigrants respond to changes in unemployment similarly to natives. In contrast, refugees have an additional unemployment effect over that of natives and immigrants. The refugee interactions of the local unemployment rate suggest that an increase (decrease) in the unemployment rate will increase (decrease) the likelihood that refugees, both naturalized and resident, will participate in the FSP. Refugees benefit more from a reduction in unemployment.

TABLE 12
More Food Stamp Participation Probits:
Refugee = Predicted Probability with Additional Interactions

	A	B	C	D
a_age	-0.02 (33.61)**	-0.02 (33.61)**	-0.02 (33.61)**	-0.02 (33.68)**
female	0.697 (29.93)**	0.697 (29.93)**	0.697 (29.92)**	0.694 (29.77)**
black	0.463 (23.60)**	0.463 (23.60)**	0.463 (23.59)**	0.463 (23.61)**
hispanic	0.259 (12.04)**	0.259 (12.04)**	0.26 (12.08)**	0.258 (11.99)**
asian	-0.04 -0.67	-0.04 -0.68	-0.044 -0.73	-0.005 -0.09
natamerican	0.34 (7.76)**	0.34 (7.76)**	0.341 (7.77)**	0.341 (7.77)**
elem	0.496 (22.73)**	0.496 (22.73)**	0.496 (22.75)**	0.497 (22.82)**
someHS	0.457 (26.11)**	0.457 (26.11)**	0.457 (26.11)**	0.457 (26.12)**
HS12nodip	0.235 (5.62)**	0.235 (5.62)**	0.235 (5.63)**	0.235 (5.61)**
somecollege	-0.167 (9.71)**	-0.167 (9.71)**	-0.167 (9.69)**	-0.167 (9.69)**
assocdeg	-0.322 (12.18)**	-0.322 (12.18)**	-0.322 (12.16)**	-0.321 (12.12)**
collgrad	-0.668 (21.19)**	-0.668 (21.19)**	-0.671 (21.19)**	-0.673 (21.18)**
masters	-0.888 (12.87)**	-0.888 (12.87)**	-0.887 (12.84)**	-0.893 (12.79)**
terminaldeg	-0.986 (7.87)**	-0.986 (7.87)**	-1.005 (7.84)**	-1.038 (7.47)**
marriedpresent	-1.064 (24.57)**	-1.064 (24.57)**	-1.066 (24.59)**	-1.065 (24.57)**
veteran	0.026 -1.16	0.026 -1.16	0.026 -1.19	0.026 -1.19
disabled	0.863 (49.50)**	0.863 (49.50)**	0.862 (49.47)**	0.863 (49.47)**
multifamily	-0.027 -1.55	-0.027 -1.55	-0.027 -1.54	-0.026 -1.52
kidsunder5	0.518 (51.56)**	0.518 (51.56)**	0.519 (51.55)**	0.519 (51.52)**
kids5to18	0.288 (53.36)**	0.288 (53.36)**	0.288 (53.32)**	0.288 (53.21)**

(table continues)

TABLE 12, continued

	A	B	C	D
Localunemp	0.06 (15.59)**	0.06 (15.59)**	0.06 (15.60)**	0.06 (15.60)**
naturalized	-0.476 (4.83)**	-0.446 (6.12)**	-0.373 (4.61)**	-0.406 (4.87)**
residentialien	-0.336 (5.34)**	-0.346 (5.89)**	-0.303 (4.81)**	-0.331 (4.95)**
postreform	-0.249 (16.81)**	-0.249 (16.81)**	-0.249 (16.81)**	-0.249 (16.80)**
naturalizedpost	-0.03 -0.45	-0.037 -0.59	-0.201 (1.98)*	-0.196 -1.93
residentpost	-0.162 (3.95)**	-0.159 (3.92)**	-0.257 (4.08)**	-0.258 (4.07)**
yrsinusmin	0.007 (3.80)**	0.007 (3.80)**	0.004 -1.63	0.002 -0.81
naturalUE	0.008 -0.77			
residentUE	0.003 -0.43			
naturalrefugee	0.998 (2.22)*	1.033 (3.33)**	1.247 (3.72)**	0.489 -1.42
residentrefugee	1.762 (5.30)**	1.731 (6.39)**	1.889 (6.54)**	0.976 (3.13)**
naturalrefugeepost	1.368 (5.52)**	1.35 (6.29)**	0.861 (2.47)*	0.924 (2.46)*
residentrefugeepost	0.04 -0.23	0.05 -0.3	-0.249 -1.05	-0.146 -0.6
refugeeyrsin	-0.1 (11.83)**	-0.099 (11.89)**	-0.116 (9.68)**	-0.057 (4.54)**
naturalrefugeeUE	0.186 (3.28)**			
residentrefugeeUE	0.177 (4.13)**			
immigrantUE		0.004 -0.68	0.004 -0.61	0.004 -0.6
refugeeUE		0.181 (5.23)**	0.184 (5.17)**	0.149 (4.31)**
yrsinuspost			0.007 (2.03)*	0.007 (2.06)*
refugeeyrspost			0.031 (1.99)*	0.009 -0.62
newarrival				-0.064 -1.28
refugeenewarr				1.334 (6.59)**

(table continues)

TABLE 12, continued

	A	B	C	D
Constant	-1.075 (15.48)**	-1.075 (15.48)**	-1.075 (15.48)**	-1.004 (11.75)**
Observations	217287	217287	217287	217287

Absolute value of z-statistics in parentheses.

* significant at 5%; ** significant at 1%

Columns B–D collapse the two immigrant types into one and the two refugee types into one when interacting with the local unemployment rate. Again, we see a positive interaction effect only for refugees (**refugeeUE**). At the same time the **residentrefugeepost** effect becomes statistically insignificant. In other words, the additional postreform reduction in resident refugee food stamp participation (above that of resident immigrants) seen in Table 11 appears to be attributable to the differential effect of the falling unemployment rate on refugees. Indeed when we looked at the proportion of foreign-born heads who did not work in the past year, that proportion fell by more for refugee than for immigrant households. In 1994, 36.6 percent of refugees did not work in the past year, versus 23.3 percent for immigrants.⁵ By the 2001 CPS, the proportions had fallen to 32.32 percent for refugees and 22.2 percent for immigrants.

Finally, in column D we add variables for being new arrivals and interactions with years in the United States. Here we again a reduce probability of resident alien participation after welfare reform. The resident refugee interaction with **postreform** has a statistically insignificant coefficient. New arrival refugees participate at a much higher rate and the likelihood diminishes with years since arrival, a pattern we do not see for nonrefugee immigrants.

XIII. CONCLUSION

We draw conclusions from this paper along two dimensions. The first is methodological. The typical approach to measuring refugee status (as found in Table 9) grossly underestimates the effects of refugee status on participation in the FSP. Additionally, failure to account for response error in program participation additionally understates the effects of all variables on participation. Hence studies failing to account appropriately for these problems are biased and cannot be used for policy analysis.

The far more important dimension is that the story of FSP participation among immigrants and refugees is a complex one. A simple dummy variable for immigrant and refugee status fails to capture important aspects of the story. Clearly, immigrants and refugees have very different patterns of food

⁵The sample is not restricted to people of working age.

stamp use. Refugees are far more likely to use food stamps near the time of arrival, but their participation rates decline with time in the United States. Secondly, refugees are far more sensitive to the economic climate than either U.S. citizens or other immigrants. Finally, there is clearly a differential effect between citizens and noncitizens. Immigrants who opt for citizenship are more likely to participate in welfare programs than those who do not.

This suggests 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 may have been well thought through (a surprise indeed). Beyond the humanitarian issue, we see that this is a group which has what might be described as a “good” program experience: they participate heavily in food stamps when they first arrive, but participation declines dramatically later on. This suggests that refugees become self-sufficient. Secondly, the decision to disqualify new immigrants from food stamps may have been somewhat irrelevant. As a whole, this group is less likely to participate in welfare programs. However, as they stay in the United States longer, their participation grows. In general, however, we find that immigrants are less likely to use food stamps than native citizens. This suggests that the concern over immigrant use of food stamps was misplaced. Finally, we have the increased participation of naturalized citizens in the postreform period. Although our model is not rich enough to disentangle the effect, one possibility consistent with these findings is that immigrants who are interested in participating in welfare programs choose to apply for citizenship. This is a testable hypothesis and we plan on further research in this direction.

This paper may raise more questions than it answers. First, the results that refugees’ use of the FSP declines over time, while other immigrants’ use increases, brings to the forefront the different assimilation of refugees and immigrants. What are refugees learning that immigrants are not? The differential response of refugees to local labor market conditions suggests that labor market outcomes are also crucial to the study not only of refugees and immigrants in general, but of the impacts of welfare reform. It also suggests that models that interact refugee status with other variables may be of interest. Do

refugees and immigrants differ in their response to other variables as well? Finally, are immigrants responding to welfare reform by increasing their citizenship applications? This is the obvious way around the more stringent rules associated with immigrants. The impact of increased citizenship applications is not clear.

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