

Do Immigrants Free Ride More Than Natives?*

Una Okonkwo Osili[†]

Jia Xie[‡]

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Abstract

Are immigrants a burden on host societies, because they receive benefits from, but do not contribute to, the provision of public goods and services? Questions like these have shaped public debate on immigration policy in the United States and Western Europe, and have fueled a large body of research. In this paper, we investigate theoretically and empirically the implications of immigration for the private provision of public goods. We do not find evidence that immigrants free ride more than the native-born. Moreover, immigrants are less likely to receive assistance from non-government sources compared to similar native-born households.

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[†]Contact Information: Department of Economics, Indiana University-Purdue University Indianapolis, Indianapolis, IN 46202; phone: (317)278-7219, email: uosili@iupui.edu.

[‡]Contact Information: Department of Economics, Indiana University, Bloomington, IN 47405; email: jiaxie@indiana.edu.

1 Introduction

Are immigrants a burden on host societies, because they receive benefits from, but do not contribute to the provision of public goods and services? Questions like these have shaped public debate on immigration policy in the United States and Western Europe, and have fueled a large body of research. In August 1996, the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), combined with the 1996 Immigration Reform Act, greatly reduced federal welfare eligibility for U.S. immigrants. As the proportion of foreign born in the U.S. population reaches 12 percent - the highest level since 1930, there is a growing interest in the benefits and costs of immigration for the public sector.¹

Although there is extensive research on U.S. immigrants' use of means-tested welfare programs (Fix and Passel, 2002; Borjas, 2006), several open questions remain. In this paper, we investigate a new aspect of this debate –the private provision of public goods. Specifically, we examine whether immigrants free ride, or enjoy benefits from the voluntary contributions of others without contributing to the provision of those benefits, more than the native-born. Beyond the relevance of this question to current policy debates, the extent to which households differ in their willingness to contribute to public goods is of fundamental interest to economists and social scientists (Bergstrom, Blume and Varian, 1986; Roberts, 1984; Samuelson, 1954; Warr, 1982). In 2005, nearly 90 percent of U.S. households gave money or volunteered time to the United Way, the American Red Cross, the Salvation Army and many other charitable causes, and total monetary contributions amounted to about 260 billion dollars, nearly 2.2 percent of GDP (Source: Giving USA, 2006).²

U.S. charitable organizations have received significant attention in the recent debate on immigration policy because some researchers have argued that the services that charitable organizations provide to immigrants may have grown after welfare reform (Ku and Freilich, 2001; Hungerman, 2005). Moreover, nonprofit charitable organizations are not legally required to verify immigration status, when they provide assistance or when they receive voluntary contributions. And the financ-

¹The concern that immigrants could place a burden on host societies is not a new one. During the colonial period, immigration laws restricted the entry of non-citizens likely to become dependent on public charity. In 1645, the Massachusetts enacted the earliest public charge laws. Immigration laws were strengthened in the early twentieth century to allow the deportation of non-citizens who became a public burden.

²To date, much of the existing literature on contributions to public goods has emphasized the role of gender. For example, Andreoni, Brown, and Rischall (2003) find strong evidence that men and women have different preferences towards charitable contributions.

ing of social services, health care, higher education, and disaster relief, and other public goods in the U.S. depends heavily on private contributions or on a mixture of public and private contributions, perhaps more than in any other industrialized nation.

The empirical analysis in this paper is based on a new philanthropy supplement to the 2001 wave of the Panel Study of Income Dynamics (PSID) and the September 2003 supplement of the Current Population Survey (CPS). The PSID data represent the largest one-time study of monetary and time contributions toward public good provision in the United States and also provide information on private transfers to non-household members and the receipt of benefits from non-government organizations, providing a comprehensive picture of transfer behavior. We use the CPS data to study time contributions. Taken together, these data sources provide a unique opportunity to examine whether immigrant and the native-born households differ in their likelihood of contributing toward public good provision and of receiving assistance from non-government sources.

We do not find evidence that immigrants free ride more than the native-born. First, immigrant status has no statistically significant impact on the likelihood of monetary contributions toward public good provision. Second, immigrant households are less likely to receive assistance from non-government sources compared to similar native-born households. Third, immigrant-native differences in monetary and time contributions tend to diminish over time as immigrants acquire U.S. experience. Finally, we examine the behavior of second-generation immigrants to study the long-term impact of immigration, and we find no significant differences between the children of immigrants and third or higher generations of Americans in their voluntary contributions of money and time. Our results are robust to income and wealth controls and alternative empirical specifications.

The remainder of the paper is organized as follows: Section 2 provides the background of this study, Section 3 presents an overview of the econometric methods used in this paper. Section 4 describes the data. Section 5 discusses the results. Section 6 presents the conclusions, and Section 7 is the mathematical appendix.

2 A Model of the Private Contribution Decision

In this section, we present a conceptual framework for examining immigrant-native differences in contributions to public goods. We describe the differential game model and its implications verbally. However, a more formal analysis of the model is available in the appendix.

We consider two main channels through which immigrant status may affect voluntary contributions. The first channel that we explore is that resource constraints differ across immigrants and the native-born. More specifically, we assume that immigrants have lower initial wealth holdings compared to the native born, i.e., $A_0^i < A_0^n$, where A_t^j stands for the household j 's wealth at time t . We examine the impact of lower initial wealth on the voluntary contributions of immigrants compared to similar native-born households.

A second channel through which immigrant status can impact contributions to public goods occurs if immigrant households face different incentives to private transfer networks comprising non-household members compared to the native-born. Several researchers have noted the importance of private transfer networks and coresidence among immigrant households (Becker and Toms, 1979 and Glick and Van Hook, 2002). One concern is that the household's participation in private transfer networks may reduce their contributions to public goods. To analyze the role of private transfers to the extended family, we assume that households are altruistic, and we set the utility function to be a weighted combination of the household's own felicity and the welfare of the extended family. We also assume that the immigrants' extended family members have lower initial wealth than extended family of native-born households, i.e., $A_{F0}^i < A_{F0}^n$, where A_{Ft}^j stands for household j 's extended family wealth at time t .

The household j 's utility function³ that serves as the basis for our analysis is defined as:

$$U(x_t^j, l_t^j, ; g_t^j, v_t^j; G_t, V_t) + \beta U_F(A_{Ft}^j)$$

where $0 < \beta < 1$, and $U(x_t^j, l_t^j; g_t^j, v_t^j; G_t, V_t)$ and $U_F(A_{Ft}^j)$ satisfy the typical assumptions⁴ and Inada Condition.

In the first part of the utility function, the household j 's own felicity depends on private con-

³ $j = i$ stands for the immigrant household, while $j = n$ stands for the native household

⁴ Utility functions are continuously differentiable and strictly concave. Utility increases at a decreasing rate for each argument. In addition, cross partials on utility functions are zeros.

sumption, x_t^j , leisure, l_t^j , the warm-glow effect of own monetary and time contributions (Andreoni, 1989), g_t^j and v_t^j , and the aggregate public monetary and time contributions to the community, G_t and V_t .

Households face monetary and time constraints at each time t . We assume that the household j can allocate income toward private consumption (x_t^j), monetary contributions toward public good provision (g_t^j), private transfers to the extended family (e_t^j), and savings (s_t^j). Because of the tax deduction associated with charitable giving, the cost of monetary contribution is $1 - \tau$, where τ is the tax rate. In addition, each household has the same time endowment, L , and allocates it across the following activities: work (n_t^j), leisure (l_t^j), and voluntary time contributions (v_t^j), i.e. $n_t^j + l_t^j + v_t^j = L$. The household j 's resource constraint is as follows:

$$\dot{A}_t^j = wn_t^j + rA_t^j - x_t^j - (1 - \tau)g_t^j - e_t^j.$$

The second part of the utility function captures the household's preference over the well-being of the extended family, $U_F(A_{F_t}^j)$, which for simplification, is assumed to depend only on the extended family's wealth $A_{F_t}^j$. We assume that transfers play an important role in the extended family's wealth accumulation process.

$$\dot{A}_{F_t}^j = e_t^j$$

The three key implications of the differential game model can be sketched and briefly explained verbally.

First, immigrant households provide lower monetary and time contributions than native-borns due to their lower initial wealth. However, both the immigrants and the natives increase their monetary and time contributions over time. Moreover, the immigrant-native gap in monetary(time) contributions diminishes over time if the decreasing speed of marginal utility in monetary(time) contributions for the immigrant does not exceed a fixed multiple of the corresponding speed for the native household, where the multiple is pre-determined by the initial wealth of both households.⁵

Second, private transfers to the extended family network are a function of the time discount

⁵More formally, A sufficient condition for diminishing immigrant-native gap in monetary(time) contributions is that $\frac{U_{g_t^n g_t^n} - U_{g_t^i g_t^i}}{U_{G_t} G_t} \geq 2(1 - \frac{\lambda_0^i}{\lambda_0^n})$ or $U_{g_t^i g_t^i} > \frac{\lambda_0^i}{\lambda_0^n} U_{g_t^n g_t^n}$, $\left(\frac{U_{v_t^n v_t^n} - U_{v_t^i v_t^i}}{U_{V_t} V_t} \geq 2(1 - \frac{\lambda_0^i}{\lambda_0^n}) \right)$ or $U_{v_t^i v_t^i} > \frac{\lambda_0^i}{\lambda_0^n} U_{v_t^n v_t^n}$, $\forall t \geq 0$. Refer to the Appendix for more details.

factor ρ , the interest rate r , and initial extended family wealth, A_{F0}^i . The price of charitable giving $1 - \tau$, does not directly impact private transfers although there may be an indirect effect via the household's budget constraint. Moreover, even though there is no direct substitution effect between charitable giving and private transfers, we should note that transfer behaviors may be positively correlated through time due to common unobserved terms. In general, both are correlated with the time discount factor, the interest rate, and the extended family's wealth. We test both of these implications in our empirical work.

Third, we examine the relationship between extended family resources on monetary and time contributions as well as private transfers. A_{Ft}^i has a positive impact on monetary (time) contributions. The relationship between extended family's wealth A_{Ft}^i and private transfers e_t^i , however, is ambiguous, due to the wealth and substitution effect. However, under the assumption that $R'(A) > 0$ on $A \in R_+$, where $R(A) = \frac{U'_F(A)}{U''_F(A)}$, extended family's wealth has a negative effect on private transfers, both initially and over time. These implications can be tested using the empirical data. Moreover, we also note that if the utility on extended family's wealth, $U_F(A_{Ft})$ satisfies that $R'(A) > 0$ and $R''(A) \leq 0$ on $A \in R_+$, then the immigrant household provides more private transfers than the native household does; However, private transfers decrease for both households over time, and the immigrant-native gap in private transfers diminishes over time, i.e., the private transfers decrease faster for the immigrant household than for the native household.⁶

3 Empirical Specification

This section presents an empirical model of the household's decision, whether immigrant or native-born to contribute to the voluntary provision of public goods in a given community. Let i index households and k index communities. We specify the empirical model as follows:

$$Y_{ik} = \beta_0 + \beta_1 \text{Immigrant}_i + \beta_2 (\text{Duration} * \text{Immigrant}) + \beta_3 X_{ik} + \beta_4 C_k + u_k + e_{ik}, \quad (1)$$

where Y_{ik} is the "latent variable" in the analysis that measures the net expected utility to household i , from contributing money (time) to public good provision in community k , X_{ik} represents a

⁶More formally, A sufficient condition for diminishing immigrant-native gap in private transfers over time is that $R'(A) \geq 0$ and $R''(A) < 0$ or that $R'(A) > 0$ and $R''(A) \leq 0$ on $A \in R_+$.

vector of observable and unobservable household characteristics including head’s age, sex, marital status, educational attainment, household size, number of children in the household, log per capita permanent income, the household’s racial or ethnic group; C_k is a vector of community attributes, and i_k are the error terms. To control for community-level variables, we include state fixed-effects in all specifications. We do not observe the “latent” variable, Y_{ik} , but only the choice made by the household, which takes value 1 if household contributes money (time) toward public good provision (i.e. Y_{ik} is positive), and 0 otherwise.

$$P_{ik} = \begin{cases} 1 & \text{if } Y_{ik} > 0 \\ 0 & \text{otherwise} \end{cases}$$

Equation (1) represents the fully specified model. We build up to this model and first estimate a parsimonious specification, which includes an indicator variable for immigrant status. The basic specification is a probit model, which captures the likelihood that a household has contributed money (time) toward public good provision in the survey period. We then include the interaction of duration of stay and immigrant status. The parameter on the duration of stay variable measures how time in the United States affects the immigrant’s likelihood of voluntary contributions of money and time. We also examine time contributions along with monetary contributions. Voluntary time contributions may be particularly important for the provision of local public goods and services.

Our theoretical model provides important insights for private transfer behavior. To explore these implications, we estimate an identical specification for private transfers to non-household members. We observe private transfers only where a household has made a positive net transfer to non-household members (excluding transfers to children and alimony payments). To study the impact of immigrant status and duration of stay on private transfer levels, we estimate a Tobit model with the same controls of household characteristics as those in the probit model.

In addition, we examine how immigrant status affects the incidence of receipt of benefits from non-government sources and how the immigrant-native comparison evolves as immigrants gain U.S. experience. The empirical probit model for receipt of assistance from non-government sources is

specified as follow:

$$Receiptofbenefit_{ik} = \beta_0 + \beta_1 Immigrant_i + \beta_2 (Duration * Immigrant) + \beta_3 X_{ik} + \beta_4 Ck + u_k + e_{ik}. \quad (2)$$

4 Overview of Data Resources

To study contributions and free riding behavior, we examine monetary and time contributions, private transfers, as well as receipt of assistance for both immigrants and native-born households. The data on monetary contributions are drawn from a new module of the 2001 wave of the Panel Study of Income Dynamics (PSID). The new 2001 PSID module used in this study is unique because it provides high-quality data on voluntary contributions toward public good provision comparable to the U.S. Individual Taxpayer Return data (Wilhelm, 2006).⁷ Moreover, the PSID provides detailed information on the incidence and levels of private transfers within extended family, and on the incidence of receipt of assistance from non-government sources, including churches, community groups, and families.

We also examine the 2003 Current Population Survey (CPS) to study time contributions. Both the 2003 CPS and the 2001 PSID provide detailed information on the incidence and the levels of time contributions. The two data sources have some distinct strengths and weaknesses for the purposes of this study. The PSID contains unusually detailed information on income and wealth, which are typically unavailable within existing data sets on voluntary contributions, allowing us to more fully control for the household's economic position. Although the PSID is a longitudinal survey with extensive information on income and wealth, it has a relatively small sample of immigrants.⁸ In contrast, the Current Population Survey provides a relatively large sample of immigrants. However,

⁷The PSID philanthropy module is the only data set on giving comparable to the IRS taxpayer data in coverage. However, we should note that the IRS taxpayer database provides a more accurate picture of charitable giving at and above the 90th percentile of charitable giving. The IRS tax data is less suitable for this study because immigrant status and experience is not recorded, and immigrants may be less likely to itemize their deductions.

⁸We exclude the Survey of Economic Opportunity (SEO) sample in PSID in our investigation. The 1997 migration module of the PSID provides information on immigrant status, country of origin, year of migration to the United States, and legal status upon arrival. Here, "new" immigrants are defined as those who arrived in the United States after 1968.

it has some disadvantages because it contains less detailed information on income, wealth, and contains no information on monetary contributions and private transfer behavior. Due to the large sample sizes of immigrant and native-born households in the CPS (5773 immigrant households and 50,538 native-born households), we can compare some of our results across the two surveys, which serves as an important robustness check.⁹

4.1 Immigrant-Native Differences in Monetary Contributions to Public Goods

Table 1 provides summary statistics from the PSID on monetary contributions toward public good provision.¹⁰ We examine whether a household gave a monetary contribution to a charitable organization and the total amount (measured in U.S. dollars) contributed during the survey period. Immigrant households have a lower incidence of monetary contributions compared to native-born households (43 percent of immigrants versus 66 percent for the native-born population contribute money to charitable organizations). Conditional on monetary contributions, immigrant households also have lower mean levels of monetary contribution to charitable organizations compared to native-born households. The average monetary contribution level for immigrants is \$1243.19 compared to \$1918.34 for native-born households.

4.2 Immigrant-Native Differences in Private Transfers

From Table 1, we find that on average, immigrant households have a higher rate of participation in private transfer networks compared to native-born households. Private transfers refer to transfers of money and goods to family, friends, and neighbors living outside the household (excluding child support and alimony payments). In the theoretical model, differences in extended family resource constraints may induce a higher incidence of private transfers for immigrants compared to the native-born. The PSID provides information on incidence and levels of private transfers which may include financial support toward education expenses, medical costs, and housing and allow non-

⁹We also note some differences across the two surveys. The longitudinal nature of the PSID means that recent immigrants that arrived in the U.S. within the last 10 years make up a smaller share of the immigrant sample (16 percent of the PSID immigrant sample is composed of recent arrivals compared to 28 percent for the CPS).

¹⁰Our key dependent variable on monetary contributions was constructed using the following questions, which was posed to PSID survey respondents: “During the year 2000, did you or anyone in your family donate money, assets, or property with a combined value of more than \$25 to religious or charitable organizations?”

household recipients to cope with adverse shocks to income.¹¹ We examine whether a household gave a private transfer to a non-household member in the survey period, and the total amount (measured in U.S. dollars) transferred during the survey period. About 18 percent of immigrant households reported sending private transfers compared to 10 percent of native-born households. However, conditional on participating in private transfer networks, immigrant households have lower mean levels of private transfers compared to the native-born. Among those households that participate in private transfer networks, the mean private transfer to non household members is \$3025.06 for immigrants and \$5117.53 for the native-born.

4.3 Immigrant-Native Differences in Volunteering

Both the PSID and CPS provide information on volunteering. From Table 1, the mean estimates on time contributions from the two surveys are comparable. We examine whether or not the household head or wife volunteered and the total hours volunteered by the head and wife during the survey year. On average, immigrant households have a lower incidence of volunteering compared to native-born households in both surveys. According to the PSID, 15 percent of immigrant households volunteered time compared to 35 percent of native-born households. The CPS provides similar results in that time contributions to public goods are also less prevalent among immigrant households (about 16 percent of immigrant households contributed time to an organization, compared to 35 percent of native-born households in the CPS). Conditional on time contributions, the total number of hours of volunteer labor is also lower for immigrant households.¹²

4.4 Immigrant-Native Differences in Receipt of Assistance

An important issue that has been raised within the context of recent debates on immigration policy is whether immigrants rely on benefits from non-government sources—health care, education and other social services because they face restrictions in accessing government benefits, particularly at

¹¹In 2005, U.S. immigrants sent \$40 billion to their origin families in Latin America and the Caribbean, according to the Inter-American Development Bank (IADB). According to the World Bank, global remittances amounted to \$232 billion in 2005.

¹²We do not find that there are significant differences in the incidence of time contributions across the two surveys. However, reports of hours volunteered are higher for both immigrants and natives in the PSID, and we attribute these differences to variations in survey methodology.

the federal level.¹³ The PSID provides information on the extent to which households, whether immigrant or native-born, receive assistance from non-government sources—specifically churches and community organizations that provide assistance for needy. In the PSID, households were asked the type of help received in the past two years from non-government sources including churches and community groups. For example, households provided information on assistance received in the form of housing, child care, transportation, clothing, health care, job training, and so on.

The data available in the PSID covers benefits received over a two-year period. About 2.5 percent of the sample reports receiving assistance from non-government sources. We focus our attention on whether immigrants are more likely to receive assistance from non-government sources. Table 1 indicates that on average, immigrants are less likely than native-born households to receive assistance from non-government sources (2 percent of immigrant households compared to 3 percent of native-born households report receiving assistance).

4.5 Immigrant-Native Differences in Household Characteristics

In Table 1, we also find that there are important differences in income and wealth among immigrant and native-born households.¹⁴ Both the PSID and the CPS provide information about income and other household characteristics that influence transfers toward public good provision. We construct a measure of permanent income using the PSID in order to capture a household’s economic position, as this factor has been shown to have a larger effect on transfer behavior than transitory income (Auten, Holger-Sieg, & Clotfelter, 2002).¹⁵ Mean permanent household income is lower among immigrant households compared to native-born households (mean permanent income is \$42631.29 for immigrants compared to \$62063.49 for native-born households). In both surveys, immigrant households also tend to be larger than native-born households. However, even after adjusting for differences in household size, we still find lower per-capita permanent household income for the immigrant sample. The average wealth holdings of immigrant households is also considerably lower compared to the native-born households.

¹³The U.S. 1996 welfare reforms were designed to lower welfare participation; following welfare reform, access to major federal means-tested public assistance programs, including food stamps, AFDC, Supplemental Security Income (SSI), and Medicaid became more restricted even for legal immigrants.

¹⁴Immigrant households refer to households where either the head or spouse was born outside the United States.

¹⁵Our measure of permanent income is based on average family income from 1997, 1999, and 2001 waves of the PSID. Total family income can contain negative values. The number of households with negative numbers for those variables is relatively small, and we replace these negative values with missing values.

In addition, the heads of immigrant households tend to be younger, more likely to be married, non-white, and tend to have lower levels of educational attainments. Heads of immigrant households are also more likely to be unemployed, suggesting that immigrants tend to be more economically vulnerable than native-born household heads. The price of monetary contributions is calculated by 1 minus the marginal tax rate for itemizers; it is unity for non-itemizers. We calculate the marginal tax rate for itemizers using TAXSIM version 5 (Feenberg and Coutts, 1993).¹⁶ We note that emphasizes that higher marginal tax rates should lower the price of monetary contributions.

To capture extended family’s resources, we use a proxy variable— household head father’s education. We find striking differences in the educational attainment of extended family members among immigrant and native-born households. Specifically, while 96 percent of immigrant heads’ fathers have obtained less than a high school education, only 36 percent for heads’ fathers for native-born households have not completed high school.

4.6 Second-generation Households

Table 2 provides summary information for second-generation and third or higher generation households.¹⁷ We note that second-generation households comprise about 10 percent of the native-born households in both the PSID and CPS data. By comparing the first columns in Tables 1 and 2, we find that in contrast to immigrant households, second generation households have higher incidence and levels of monetary and time contributions, but lower incidence and levels of private transfers and receipt of assistance. In fact, we find that the transfer behavior of second-generations is very similar to that of third or higher generations of the native-born. Interestingly, second-generation immigrants have higher mean levels of education, income, and wealth compared to third or higher generations. In addition the extended family’s educational attainment of second generation households are comparable to that of third or higher generation households.

¹⁶The 18 input variables used to calculate the price of giving include tax year (2000), marital status, number of children in the family unit, number of taxpayers (head and spouse) over 65 years of age, labor income of the head, labor income of the wife, dividend income of head and spouse, property income, pension income, gross social security income, transfer income, rent paid, property taxes paid, itemized deductions (charitable deduction and medical deduction), child care expense, and unemployment compensation.

¹⁷Second generation households are defined as households where the head has at least one parent who is an immigrant.

5 Results and Discussion

5.1 The Impact of Immigrant Status on Monetary Contributions

We now turn to discuss results from the regression analysis on the impact of immigrant status on contributions to public good provision. Table 3 (Panel A) presents results from the baseline regression on monetary contributions. The estimates in all panels of Table 3 include controls for socio-demographic variables, the price of giving, and log permanent income.¹⁸ We also report marginal effects (calculated at the variable means) for the probit and Tobit estimates.

From Column 1, we find that immigrant status has no statistically significant impact on the likelihood of monetary contributions. The Tobit specification on contribution levels (Column 2) also shows that immigrant status does not have a statistically significant effect on the level of monetary contributions to charitable organizations.

5.2 The Impact of Immigrant Status on Private Transfers

The theoretical model highlights the importance of private transfer networks. In Table 3 (Panel B), we present results for private transfers to non-household members. Starting at the mean, we find that immigrants are 10-14 percentage points more likely to give private transfers to non-household members compared to similar native-born households, holding other variables constant. Controlling for household characteristics, the amount contributed to private transfer networks is also significantly higher among immigrant households compared to the native-born. Specifically, we find that the level of private transfers, for those households who participate in private transfer networks, is about 62-78 percent higher for immigrant households compared to similar native-born households. In contrast to the results on charitable giving, immigrant households appear more likely than similar native-born households to participate in private transfer networks, even after we have controlled for economic and demographic variables.

¹⁸The control variables in our analysis are age, age squared, education, gender, marital status, nonwhite, Catholic, family size, log permanent income, unemployment and region dummies. For dichotomous variables, the results represent the change in the probability and the percentage change in level of contributions associated with a change in the indicator variable from zero to one.

5.3 The Impact of Immigrant Status on Time Contributions to Public Goods

The baseline findings on the impact of immigrant status on time contributions toward public good provision are summarized in Tables 3. We use both the PSID (Panel C) and the CPS (Panel D) to study time contributions. Because we have two data sources on time contributions, the results here present an important robustness check.

In Table 3 (Panel C), we show results from the PSID. Here, we find that immigrants are significantly less likely to contribute time and have lower levels of time contributions, compared to similar native-born households. Specifically, from the PSID (Panel C), immigrants are 10-14 percentage points less likely to volunteer compared to a similar native-born household. Estimates based on the CPS (Panel D) yield similar results; Immigrant households are 14-15 percentage points less likely to contribute time. When we examine hours volunteered, we find that volunteer hours for an immigrant household are about 50 percent and 52 percent lower in PSID, and CPS, respectively compared to a similar native-born household.

5.4 The Impact of Immigrant Status on Receipt of Assistance from Non-government Sources

The baseline findings on the impact of immigrant status on receipt of assistance from non-government sources, including churches, community groups, and families, are summarized in Table 3 (Panel E). The key dependent variable is defined as follows: whether an individual receives some type of assistance from non-government sources, including churches, community groups, and families. We are particularly interested in immigrant-native differences in the receipt of assistance from non-government sources, as this aspect provides a comprehensive picture of free-riding behavior.

We find that immigrants are significantly less likely to receive assistance from non-government sources, compared to similar native-born households. Specifically, immigrant households are 0.4-0.7 percentage points less likely to receive assistance compared to a similar native-born household.

5.5 The Impact of Duration of Stay

The results from the baseline regression model suggest that immigrant households are not significantly different from native-born households in their monetary contributions, however, we do find

that immigrant households are less likely to receive assistance from non-government sources. An important question is how monetary and time contributions, private transfers and the receipt of assistance evolve as immigrants accumulate U.S. experience, and acquire language skills, social norms, and processes of their host communities.¹⁹ One testable implication of the model is that monetary and time contributions will increase with duration of stay for immigrant households.²⁰ In Table 5, we adopt a flexible specification in order to examine the impact of immigrants' duration of stay in the U.S. on transfer behavior.

The results from Table 4 (Panel A) show no significant difference in the likelihood of monetary contributions between immigrants and native-born households when we include controls for duration of stay. We also examine the level of contributions. However, we find that only recent immigrants—those who migrated to the U.S. within the past 10 years—have a significantly lower levels of monetary contributions compared to similar native-born households (the omitted category). The results suggest that as immigrants gain U.S. experience, their incidence and levels of monetary contributions will tend to increase.²¹

Table 4 (Panel B) allows us to examine the effects of the duration of stay on private-transfer behavior by using a flexible specification. We should note that these results indicate that immigrant households have a higher likelihood of participating in private transfer networks for the first 20 years. However, for immigrants who have been in the U.S. for 20 years or longer, the immigrant-native gap in private transfers diminishes. The results on private transfers present an interesting contrast to the results on charitable giving: although the length of stay in the U.S. reduces immigrants' participation in private-transfer networks, it tends to increase immigrants' monetary contributions to charitable organizations.

Table 4 (Panels C and D) allows us to examine how duration of stay affects time contributions. The baseline results from the PSID and the CPS suggest that immigrants are less likely to contribute

¹⁹We should note that there are some limitations because we rely on cross-sectional data on charitable giving. Ideally, longitudinal data would allow us to observe a given household over time, enabling us to separately identify the role of cohort or “time of arrival” effects and duration effects in the assimilation process.

²⁰A large number of studies investigate the extent to which immigrants' earnings, skill levels, and occupational attainment converges to the native born (Borjas & Friedburg, 2006; Borjas, 1994; Borjas, 1985; Chiswick, 1978). Chiswick (1978) estimates that the wages of the foreign born converge to the native-born wages after 15 years. Borjas (1985) argues that the use of cross-sectional data may overstate the rate of wage assimilation.

²¹We also examine the inclusion of the immigrant's length of stay (in years) in the U.S. interacted with immigrant status (results not shown). The parameter on the duration of stay variable captures how an additional year in the U.S. affects the immigrant's likelihood of giving. From our results, an additional year in the U.S. has a positive effect on charitable giving.

time compared to similar native-born households. However, we find that immigrant participation in volunteer activity does increase with time in the U.S. We are particularly interested in time contributions because volunteer activity tends to be closely linked with the private provision of local public goods. In the PSID, the magnitude and significance of the coefficient on immigrant status decreases when duration of stay controls are introduced. From the PSID, immigrants with more than 20 years of U.S. experience are not significantly different (at the 5 percent level of significance) from similar native-born households in both incidence and levels of time contributions. The results from CPS show the same pattern in that the impact of immigrant status on time contributions diminishes with time in the U.S., although time contributions for immigrant households remain significantly lower than that of

Finally, Table 4 (Panel E) examines how duration of stay affects the receipt of assistance. We find that the incidence of immigrants' receipt of assistance increases over time. In particular, immigrants with more than 20 years of U.S. experience are not significantly different from similar native-born households in receipt of assistance.

To summarize, the results on monetary and time contributions, private transfers, and the receipt of assistance suggest that the transfer patterns of immigrant households tend to converge to that of the native-born, as immigrant households gain US experience. We should also note that immigrants with more than 20 years of U.S. experience are not significantly different from similar native-born households in both incidence and levels of private transfers.

5.6 The Impact of Household Characteristics

Now that we have discussed the impact of our main variables of interest—immigrant status and duration of stay, we turn to examine how additional variables other than immigrant status impact monetary and time contributions, private transfers, and the receipt of assistance. These results are shown in Appendix Tables 1-4.

The theoretical model provides some insights how age, price of giving, permanent income, and other household variables affect transfer behavior for immigrants and native-born households. Appendix 1 allows us to study the impact of demographic variables on monetary contributions. Consistent with other studies on monetary contributions, we find that there are significant life-cycle effects in monetary contributions to charitable organizations. Both the incidence and levels

of monetary contributions increase with age, but eventually declines among older households.²²

We also draw on the literature on voluntary contributions which emphasizes the role of the price of giving and the role of income on monetary contributions. Because income and the price of giving are measured in logs, we can interpret the coefficients on these variables as elasticities. Clotfelter's (1985) review of the literature points to a highly price-elastic term, implying that the tax deduction stimulates more in monetary contributions toward the provision of public goods than its costs in terms of foregone tax revenues to the government. From the baseline Tobit model, presented in Column 2 of Appendix 1, the price elasticity estimate of -2.63 indicates that a 10 percent reduction in the price of giving is associated with a more than 26 percent increase in the level of giving. The estimate of income elasticity on the level of charitable giving is 1.02.²³

In addition, male-headed households are about 5 percentages less likely to give to monetary contributions; and the level of contributions is also significantly lower for male-headed households. Educational attainment, marital status, and household size are positively associated with both the incidence and levels of monetary contributions. In particular, an additional year of schooling increases the likelihood of monetary contributions giving by about 3 percentage points, and the level by 20 percentage points. Unemployed heads have a 14.5 percentage points lower likelihood of monetary contributions. Interestingly, *rbeign nonwhite* has a negative and statistically significant impact on the incidence and level of monetary contributions.

We also investigate the effect of additional household variables on private transfers. The theoretical model provides some testable implications for private transfers to non-household members. Appendix 2 presents the full set of regression results for the baseline model for private transfers. Consistent with the theoretical model, we find that the price of monetary contributions has an insignificant effect on the likelihood and the levels of private transfers (suggesting that private transfers and monetary contributions are not likely to be close substitutes). Household permanent income has a positive and significant impact on the incidence and level of private transfers. Family size has a negative and significant impact on the incidence and levels of private transfer. Interest-

²²One interesting implication of the theoretical model that we examine is that immigrants will increase their monetary contributions faster than native-born households over time. When we include age and age squared interacted with immigrant status, we do not find these interaction terms to be statistically significant for either the likelihood or levels of monetary contributions.

²³We have also considered the interaction of the price of giving and immigrant status and do not find this to have a statistically significant impact.

ingly, we find that marital status, educational attainment, and gender do not have a statistically significant impact on the incidence or levels of private transfers.

We compare results on time contributions across the CPS and PSID in Appendix 3. Although the specifications are not identical, the estimates are similar across the two surveys. Male-headed and non-white households are significantly less likely to contribute time. Marital status and family size have positive and significant impact on time contributions. Households with higher levels of income and educational attainment are more likely to contribute time and make larger time contributions. In addition, income has a larger impact on monetary contributions than on time contributions. From the PSID, the price of giving also has a negative impact on time contributions (although the measured elasticity is much lower and less significant than observed for monetary contributions).

Finally, Appendix 4 presents results on the receipt of assistance from non-government sources. Comparable to the findings for monetary contributions, the receipt of benefits also has significant life-cycle effects. Younger households are less likely to receive benefits, however we find a higher incidence of the receipt of benefits among older households at around the age of 77. Larger households are also more likely to receive assistance. It is interesting to note that richer households with higher levels of education are less likely to report receiving assistance from non-government sources.

5.7 Robustness and Specification Checks

5.7.1 Extended Family Resources

Another insight from the theoretical model is that variation in extended family resources can induce differences in the transfer behavior of immigrants compared to native-born households. We do not have a direct measure of extended family resources. However, we exploit a proxy variable — that is available in the PSID— household head father’s education . Our results on immigrant status are robust to the inclusion of this variable (see Panel I in Table 5). The results indicate that immigrant status still has an insignificant impact on monetary contributions, a significant positive impact on private transfers, a significant negative impact on time contributions, and a significant negative impact on receipt of benefit. However, we should note that impacts(marginal effects)

of immigrant status fall in magnitude after we include the control of head father’s education in our baseline estimations. Specifically, in probit regressions, the marginal effects at mean of head’s father’s education on monetary contributions, private transfers, time contributions, and receipt of benefits are -0.6 percent, 7.8 percent, -9.0 percent, and -0.6 percent, respectively. Recall that in Table 3 of baseline models the corresponding marginal effects at mean are -2.2 percent, 10.4 percent, -10.7 percent, and -0.7 percent, respectively. Moreover, in the Tobit models, when we include father’s education as an additional control, the marginal effects of immigrant status on monetary contributions, private transfers, and time contributions are -28 percent, 50 percent, and -47 percent respectively, while the corresponding marginal effects in our baseline Tobit models are -28 percent, 62 percent, and -52 percent, respectively. This result strengthens our confidence that variation in extended family resources do explain in part, some of the immigrant-native differences in transfer behavior.

We can also investigate the direct impact of head father’s education on transfer behavior. We find that head’s father’s education has significant positive effects on monetary and time contributions, but less robust negative effect on private transfers. These results appear consistent with the predictions from the theoretical model under the assumption of CARA utility function.

5.7.2 Including Alternative Income/Wealth controls

Another important issue that emerges from the theoretical model is the need to take into account the resource constraints facing immigrant and native-born households. In the baseline specification, we have included a measure of permanent incomes to capture wealth and income differences between immigrant and native-born households. To examine the robustness of the results, we introduce additional controls for wealth and annual household income in order to ensure that our results on the impact of immigrant status captures more than differences in income and wealth (see Panel II in Table 5).²⁴ We should mention that when we include controls for yearly income, and household wealth in addition to permanent income, the results on the impact of immigrant status on monetary and time contributions, private transfers, and the receipt of assistance are all robust to the inclusion of wealth and alternative income measures. However, with the addition of

²⁴Results are not reported here. We should note that all measures of income that we have used have a positive impact on the level of charitable giving except for transfer income.

permanent income, annual household income, and wealth as controls, the coefficient of immigrant status on level of monetary contributions decreases, and is statistically significant (at the 5 percent level of significance). These results imply that at the mean, immigrants' monetary contributions are 4.3 percent lower compared to similar native-born households. The results on the impact of U.S. experience are also robust to the inclusion of wealth and alternative income measures.²⁵

5.7.3 Multivariate probit and Tobit Models

In addition, the results presented so far are based on univariate probit and Tobit specifications of transfer behavior. A concern with these results is that we have not accounted for any correlation among the error terms between charitable donations, private transfers, and volunteering. To deal with this issue, in Table 6 we estimate a trivariate specification which accounts for cross-equation correlations in transfer behavior. The results from the trivariate model are very similar to those obtained from the univariate model. We also note that all correlations in error terms (rhos) are significant. However, while there is a high correlation between error terms in the monetary contributions and the time contributions models ($\rho = 0.42$ for the trivariate probit model and $\rho = 0.40$ for the trivariate Tobit model, respectively). We find a lower correlation between error terms in the monetary contributions and private-transfer equations ($\rho = 0.13$ for the trivariate probit model and $\rho = 0.13$ for the trivariate Tobit model, respectively). We also note a low correlation between error terms in the time contributions and private transfer models ($\rho = 0.09$ for the trivariate probit model and $\rho = 0.11$ for the trivariate Tobit model, respectively). These result suggests that monetary and time contributions, and to a lesser extent the private transfer decision may be driven by common unobserved heterogeneity.

5.7.4 Censored Least Absolute Deviations (CLAD) Model

In Table 7, we estimate the impact of immigrant status on levels of monetary contributions using Powell's Censored Least Absolute Deviations (CLAD) regression model (Powell, 1984). The CLAD model has been regarded as a desirable alternative to Tobit and other maximum likelihood estimation methods due to its robustness to conditional heteroskedasticity and distributional

²⁵Results are not reported here. We should note that all measures of income that we have used positively impact the level of charitable giving, with the exception of transfer income.

misspecification of the error term. The result on the impact of immigrant status on monetary contributions is robust when we estimate it in the CLAD regression model. Specifically, we find that immigrant status has a negative but statistically insignificant impact on the level of charitable donations.

5.8 The Long-Term Impact of Immigration on Transfer Behavior

Finally, we investigate the long-term impact of immigration on transfer behavior by examining second-generation immigrants. We define the second-generation immigrant as household where the head has at least one foreign-born parent. From a policy viewpoint, it would be useful to consider how children of immigrants compare to third or higher generation households in their willingness to contribute to public goods.

Table 8 provides empirical results from probit and Tobit models of second generation and higher generation of native-born households. We first discuss results on monetary contributions. In Column 1 of Panel A we do not find any significant differences between second-generation and third or higher generation households in the likelihood of contributing to charitable organizations. Furthermore, based on the Tobit specification (Column 2 of Panel A) we do not find any significant differences in the levels of monetary contributions.

We also examine how second-generation immigrant status affects participation in private transfer networks. This situation is of particular interest because the theoretical model suggests that private transfer behavior among the second generation may be of reduced importance. From Panel B, we see that the second generation is not significantly different from the native in their participation in private transfer networks.

In Panels C and D, we examine differences in time contributions of second-generation households compared to other native households in both PSID and CPS. Again, second generation households are not significantly different from similar third or higher generations in their incidence and levels of volunteering.

Finally, in Panel E we present the results on the receipt of benefits from non-government sources, and we do not find any significant differences between second-generation and third or higher generation households.

Taken together, the results suggest that the children of immigrants are not significantly different

in their voluntary contributions to public goods, their private transfers, and on their receipt of benefits from non-government sources.

6 Conclusions

This paper provides new evidence on immigrant and native-born differences in monetary and time contributions toward the private provision of public goods, and in the receipt of assistance from non-government sources. Taken together, the results on voluntary contributions suggest that immigrants and their children are less likely to be a burden on host societies. Immigrants tend to contribute toward the private provision of public goods, particularly as their duration of stay in the U.S. increases, and they are less likely to receive assistance from non-government sources compared to similar native-born households. The results are robust to alternative income and wealth controls and specifications, including the CLAD model and trivariate probit and Tobit models. The behavior of second-generation households (children of immigrants) provides insights into the long-term impact of immigration on voluntary contributions, and we find no significant differences between the children of immigrants and third or higher generations of American in their voluntary contributions.

Although immigrants are more likely to participate in private transfer networks, we do not find any evidence that monetary contributions to charitable organizations are substitutes for private transfers to non-household members. In addition, immigrant-native differences tend to **diminish** after controlling for permanent income and extended family characteristics. We closely analyze the impact of immigrant's duration of stay in the US on their monetary and time contributions toward public good provision, their private transfers to extended families, and their receipt of benefits from non-government sources. The results suggest that immigrants tend to adapt relatively quickly to U.S. institutions.

Beyond their role in the private provision of public goods, voluntary contributions of money and time have emerged in the recent literature as key indicators of "social capital"-defined as trust, norms, and networks that spillover to the market and state and that can improve the efficiency of society by facilitating cooperative outcomes. With this in mind, the results on immigrant-native differences in voluntary contributions to public goods may have implications for understanding the

impact of immigration on broader societal outcomes.

7 Appendix

In the appendix, we analyze a formal dynamic differential game between a representative immigrant household and a representative native-born household. We first setup a continuous-time model of the game. Then we analyze properties of a Nash equilibrium of this game, in particular, the optimal strategy (charitable behavior, i.e. monetary and time contributions and private transfers) of the objective household with respect to the other household's optimal strategy, the differences in optimal strategies between households (immigrant-native gap in charitable behaviors), and the development in time of these differences. Finally, in the subsection of Comparative Dynamics we present the key theoretical implications of the model: (1) the immigrant-native gap in monetary contributions is in part explained by income effect, instead of the substitution effect between contributions and private transfers; (2) although there is not substitution effect between charitable giving and private transfer, they are positively correlated; and (3) extended family's wealth has positive impacts on monetary and time contributions, but has a negative impact on private transfers under certain assumptions on utility of extended family's wealth.

7.1 The Model

The only exogenous differences between the immigrant household and the native household are their initial wealth levels ($A_0^i < A_0^n$) and their initial extended family's wealth levels ($A_{F0}^i < A_{F0}^n$), otherwise the households are identical. Because of this similarity, we set up one maximization problem (, considering the opponent's optimal strategy) for both households, with the upper-index $j=i$ for the immigrant household, and the upper-index $j=n$ for the native household.

$$\max_{\substack{x_t^j, l_t^j, n_t^j \\ g_t^j, v_t^j, e_t^j}} \int_0^\infty e^{-\rho t} [U(x_t^j, l_t^j; g_t^j, v_t^j; G_t, V_t) + \beta U_F(A_{Ft}^j)] dt$$

$$\text{s.t. } l_t^j + n_t^j + v_t^j = L$$

$$\dot{A}_t^j = wn_t^j + rA_t^j - x_t^j - (1 - \tau)g_t^j - e_t^j$$

$$\dot{A}_{F_t}^j = e_t^j$$

$$G_t = g_t^n + g_t^i$$

$$V_t = v_t^n + v_t^i$$

with A_0^j and $A_{F_0}^j$ given, $A_0^i < A_0^n$, $A_{F_0}^i < A_{F_0}^n$ and $\rho - r < 0$

The utility function $U(x_t^i, l_t^i; g_t^i, v_t^i; G_t^i, V_t^i)$ and $U_F(A_{F_t}^i)$ satisfy the typical assumptions²⁶ and Inada Condition. The state variables are A_t^j and $A_{F_t}^j$. The control variables are $x_t^j, l_t^j, n_t^j, g_t^j, v_t^j$, and e_t^j . The Hamiltonian is

$$\begin{aligned} H_t^j &= U(x_t^j, l_t^j; g_t^j, v_t^j; g_t^n + g_t^i, v_t^n + v_t^i) + \beta U_F(A_{F_t}^j) \\ &+ \lambda_t^j [wL - wl_t^j - wv_t^j + rA_t^j - x_t^j - (1 - \tau)g_t^j - e_t^j] + \delta_t^j e_t^j \end{aligned} \quad (3)$$

The maximum principle conditions necessary for a Nash equilibrium are:

$$\frac{\partial H_t^j}{\partial x_t^j} = \frac{\partial U}{\partial x_t^j} - \lambda_t^j = 0 \quad (4)$$

$$\frac{\partial H_t^j}{\partial l_t^j} = \frac{\partial U}{\partial l_t^j} - w\lambda_t^j = 0 \quad (5)$$

$$\frac{\partial H_t^j}{\partial g_t^j} = \frac{\partial U}{\partial g_t^j} + \frac{\partial U}{\partial G_t} - (1 - \tau)\lambda_t^j = 0 \quad (6)$$

$$\frac{\partial H_t^j}{\partial v_t^j} = \frac{\partial U}{\partial v_t^j} + \frac{\partial U}{\partial V_t^j} - w\lambda_t^j = 0 \quad (7)$$

$$\frac{\partial H_t^j}{\partial e_t^j} = \delta_t^j - \lambda_t^j \leq 0, \quad e_t^j \geq 0, \quad \text{and} \quad \frac{\partial H_t^j}{\partial e_t^j} e_t^j = 0 \quad (8)$$

$$\dot{A}_t^j = w(L - l_t^j - v_t^j) + rA_t^j - x_t^j - (1 - \tau)g_t^j - e_t^j \quad (9)$$

$$\dot{A}_{F_t}^j = e_t^j \quad (10)$$

²⁶ Utility functions are continuously differentiable and strictly concave. Utility increases at a decreasing rate for each argument. In addition, cross partials on utility functions are zeros.

$$\dot{\lambda}_t^j = -\frac{\partial H_t^j}{\partial A_t^j} + \rho\lambda_t^j = (\rho - r)\lambda_t^j \quad (11)$$

$$\dot{\delta}_t^j = -\frac{\partial H_t^j}{\partial A_{F_t}^j} + \rho\delta_t^j = \rho\delta_t^j - \beta U'_F(A_{F_t}^j) \quad (12)$$

7.2 Properties of a Nash equilibrium

Without assuming explicit utility form, one is unable to solve out the analytic solution of a Nash equilibrium. Under current model setting, however, we can still get useful general properties of a Nash equilibrium, specifically, the comparison of the optimal charitable behavior (monetary and time contributions, and private transfers) between the immigrant and the native households, as well as the time development of the comparison. We begin with monetary contributions, g_t^i and g_t^n . Then we briefly conclude for v_t^i and v_t^n , because the analysis is identical to that of monetary contributions. Finally we study the private transfer, e_t^i and e_t^n .

From (11) we get

$$\lambda_t^j = \lambda_0^j e^{(\rho-r)t}. \quad (13)$$

By substituting (13) into (6) we get

$$U_{g_t^j} + U_{G_t} = (1 - \tau)\lambda_0^j e^{(\rho-r)t}. \quad (14)$$

By taking total derivative²⁷ on both sides of (14) and rearranging it, we get the law of motion for g_t^i as a function of g_t^n

$$\dot{g}_t^i = \frac{(1 - \tau)\lambda_0^i e^{(\rho-r)t}(\rho - r) - U_{G_t G_t} \dot{g}_t^n}{U_{g_t^i g_t^i} + U_{G_t G_t}}, \quad (15)$$

and symmetrically, the law of motion for g_t^n as a function of \dot{g}_t^i

$$\dot{g}_t^n = \frac{(1 - \tau)\lambda_0^n e^{(\rho-r)t}(\rho - r) - U_{G_t G_t} \dot{g}_t^i}{U_{g_t^n g_t^n} + U_{G_t G_t}}. \quad (16)$$

From (15) and (16), one can further get the reduced forms of law of motion of monetary

²⁷ We refer to the full derivative with respect to time as the total derivative.

contributions for both the immigrant and the native-born household:

$$\dot{g}_t^i = \frac{(1 - \tau)e^{(\rho-r)t}(\rho - r)[(\lambda_0^i - \lambda_0^n)U_{G_t G_t} + \lambda_0^i U_{g_t^n g_t^n}]}{U_{G_t G_t}(U_{g_t^i g_t^i} + U_{g_t^n g_t^n}) + U_{g_t^i g_t^i} \cdot U_{g_t^n g_t^n}}, \quad (17)$$

$$\dot{g}_t^n = \frac{(1 - \tau)e^{(\rho-r)t}(\rho - r)[(\lambda_0^n - \lambda_0^i)U_{G_t G_t} + \lambda_0^n U_{g_t^i g_t^i}]}{U_{G_t G_t}(U_{g_t^i g_t^i} + U_{g_t^n g_t^n}) + U_{g_t^i g_t^i} \cdot U_{g_t^n g_t^n}}. \quad (18)$$

Note that (17) and (18) have the same numerator, which is positive. Further because $\rho - r < 0$, then the signs of \dot{g}_t^i and \dot{g}_t^n depend on the signs of $(\lambda_0^i - \lambda_0^n)U_{G_t G_t} + \lambda_0^i U_{g_t^n g_t^n}$ and $(\lambda_0^n - \lambda_0^i)U_{G_t G_t} + \lambda_0^n U_{g_t^i g_t^i}$, respectively. Recall that λ is the marginal utility of wealth, and the immigrant is assumed to have less initial wealth than the native-born does, so $\lambda_0^i > \lambda_0^n$, then it follows that $(\lambda_0^i - \lambda_0^n)U_{G_t G_t} + \lambda_0^i U_{g_t^n g_t^n} < 0$, and thus $\dot{g}_t^i > 0$.

On the other hand, the sign of $(\lambda_0^n - \lambda_0^i)U_{G_t G_t} + \lambda_0^n U_{g_t^i g_t^i}$ is ambiguous. However, for simplification, we may assume approximately that $U_{G_t G_t} = 0$, because U_G is expected to be very close to 0 compared with U_g . Indeed, people contribute to public good provision mainly because of warm-glow effect rather than expecting the increment in the public good from their contribution will directly improve their own lives greatly; Otherwise, they would prefer to consume their contributions privately, which directly increase their utility more effectively. In addition, one dollar increment in the aggregate public goods brings almost none additional utility to a household. Simply image how little utility a household can get from sharing one dollar with, say, hundreds of other households. The above reasonings justify the approximation that $U_{G_t} = 0$ and $U_{G_t G_t} = 0$. Based on this assumption, we get $(\lambda_0^n - \lambda_0^i)U_{G_t G_t} + \lambda_0^n U_{g_t^i g_t^i} = \lambda_0^n U_{g_t^i g_t^i} < 0$, and thus $\dot{g}_t^n > 0$ as well.

Remark 1 *Both the immigrant and the native households increase their monetary contributions over time.*

The more important questions may be the immigrant-native gap in monetary contributions and how it develops over time. By subtracting (14) for the native($j = n$) from (14) for the immigrant($j = i$), we get

$$U_{g_t^i} - U_{g_t^n} = (1 - \tau)e^{(\rho-r)t}(\lambda_0^i - \lambda_0^n), \quad (19)$$

since $\lambda_0^i > \lambda_0^n$, $U_{g_t^i} - U_{g_t^n} > 0$. Then because second-order cross-partials are zeros, $U_g(\cdot)$ is strictly decreasing in g , thus $g_t^i < g_t^n$.

Remark 2 *The immigrant provides less monetary contributions than the native-born does over time.*

Since $g_t^i < g_t^n$, $\dot{g}_t^i > 0$ and $\dot{g}_t^n > 0$, to find out whether the immigrant-native gap in monetary contributions ($g_t^i - g_t^n$) diminishes over time, we only need to find out whether $\dot{g}_t^i > \dot{g}_t^n$ or not.

Proposition 1: *A sufficient condition for diminishing immigrant-native gap in monetary contributions ($\dot{g}_t^i > \dot{g}_t^n$) is that*

$$\frac{U_{g_t^n g_t^n} - U_{g_t^i g_t^i}}{U_{G_t G_t}} > 2\left(1 - \frac{\lambda_0^i}{\lambda_0^n}\right), \quad \forall t. \quad (20)$$

Proof: By subtracting (18) from (17), and by substituting (14) in, one can easily get

$$\dot{g}_t^i - \dot{g}_t^n = \frac{(\rho - r)[2(U_{g_t^i} - U_{g_t^n})U_{G_t G_t} + (U_{g_t^i} + U_{G_t})U_{g_t^n g_t^n} - (U_{g_t^n} + U_{G_t})U_{g_t^i g_t^i}]}{U_{G_t G_t}(U_{g_t^i g_t^i} + U_{g_t^n g_t^n}) + U_{g_t^i g_t^i} \cdot U_{g_t^n g_t^n}}. \quad (21)$$

Since $\rho - r < 0$,

$$\text{sgn}(\dot{g}_t^i - \dot{g}_t^n) = \text{sgn}(M_t), \quad (22)$$

where $\text{sgn}(\cdot)$ is the sign function, and $M_t = 2(U_{g_t^n} - U_{g_t^i})U_{G_t G_t} + (U_{g_t^n} + U_{G_t})U_{g_t^i g_t^i} - (U_{g_t^i} + U_{G_t})U_{g_t^n g_t^n}$.

It is easy to verify that

$$M_t > 2(U_{g_t^n} - U_{g_t^i})U_{G_t G_t} + (U_{g_t^n} + U_{G_t})(U_{g_t^i g_t^i} - U_{g_t^n g_t^n}). \quad (23)$$

Suppose now that $\frac{U_{g_t^n g_t^n} - U_{g_t^i g_t^i}}{U_{G_t G_t}} > 2\left(1 - \frac{\lambda_0^i}{\lambda_0^n}\right)$. Then by substituting (14) into the last inequality, and though calculation, we get $2(U_{g_t^n} - U_{g_t^i})U_{G_t G_t} + (U_{g_t^n} + U_{G_t})(U_{g_t^i g_t^i} - U_{g_t^n g_t^n}) > 0$. Then from (22) and (23), we know $\dot{g}_t^i - \dot{g}_t^n > 0$. This completes the proof. \square

Notice that the right hand side of (20) is a constant pre-determined by the immigrant's and the native-born's initial wealth. *Proposition 1* tells us that as long as $\frac{U_{g_t^n g_t^n} - U_{g_t^i g_t^i}}{U_{G_t G_t}}$ is above the fixed level pre-determined by both households' initial wealth, the immigrant-native gap in monetary

contributions diminishes over time.

Proposition 1 provides a complicated sufficient condition for diminishing immigrant-native gap in monetary contributions. To find other sufficient conditions which are more intuitive and more understandable, we may again assume that $U_{G_t} = 0$ and $U_{G_t G_t} = 0$. In this case, (17) and (18) are simplified to be

$$\dot{g}_t^i = \frac{(1 - \tau)e^{(\rho-r)t}(\rho - r)\lambda_0^i}{U_{g_t^i g_t^i}}, \quad (24)$$

$$\dot{g}_t^n = \frac{(1 - \tau)e^{(\rho-r)t}(\rho - r)\lambda_0^n}{U_{g_t^n g_t^n}}. \quad (25)$$

Proposition 2: *Another sufficient condition for diminishing immigrant-native gap in monetary contributions ($\dot{g}_t^i > \dot{g}_t^n$) is that*

$$U_{g_t^i g_t^i} > \frac{\lambda_0^i}{\lambda_0^n} U_{g_t^n g_t^n} \quad \text{or} \quad \frac{U_{g_t^i g_t^i}}{U_{g_t^n g_t^n}} < \frac{\lambda_0^i}{\lambda_0^n}, \quad \forall t > 0. \quad (26)$$

Proof: The result is obvious from (24) and (25). \square

Recall that U_{gg} is the decreasing speed of marginal utility of warm-glow effect from monetary contributions. Intuitively, (26) tell us that the immigrant-native gap in monetary contributions diminishes, as long as the decreasing speed of marginal utility of monetary contributions for the immigrant does not exceed a fixed multiple of the speed for the native household.

Corollary 1: *Each of the followings is a sufficient condition for diminishing immigrant-native gap in monetary contributions over time:*

(i) $U_{ggg}(\cdot) \leq 0$.

(ii) $U_{ggg}(\cdot) > 0$, $\left(\frac{U_{g_0^i g_0^i}}{U_{g_0^n g_0^n}}\right)^2 \leq \frac{\lambda_0^i}{\lambda_0^n}$ and $U_{gggg}(\cdot) \leq 0$.

Proof: Our strategy is to prove that each condition is sufficient for (26) to be hold.

The sufficiency of Condition (i) is easy to prove, since $\frac{\lambda_0^i}{\lambda_0^n} > 1$.

To prove sufficiency of Condition (ii), we first prove that $U_{ggg}(\cdot) > 0$ and $\left(\frac{U_{g_t^i g_t^i}}{U_{g_t^n g_t^n}}\right)^2 \leq \frac{\lambda_0^i}{\lambda_0^n} \forall t \geq 0$, is a sufficient condition for (26), then we prove that $\left(\frac{U_{g_0^i g_0^i}}{U_{g_0^n g_0^n}}\right)^2 \leq \frac{\lambda_0^i}{\lambda_0^n}$ and $U_{gggg}(\cdot) \leq 0$ guarantee

that $\left(\frac{U_{g_t^i g_t^i}}{U_{g_t^n g_t^n}}\right)^2 \leq \frac{\lambda_0^i}{\lambda_0^n}, \forall t \geq 0$.

Firstly, Suppose $U_{ggg}(\cdot) > 0$ and $\left(\frac{U_{g_t^i g_t^i}}{U_{g_t^n g_t^n}}\right)^2 \leq \frac{\lambda_0^i}{\lambda_0^n}, \forall t \geq 0$. Then because $U_{gg}(\cdot) < 0$ and $g_t^i < g_t^n$, we get $1 < \frac{U_{g_t^i g_t^i}}{U_{g_t^n g_t^n}} < \left(\frac{U_{g_t^i g_t^i}}{U_{g_t^n g_t^n}}\right)^2 \leq \frac{\lambda_0^i}{\lambda_0^n}, \forall t \geq 0$. That is, (26) is satisfied.

Secondly, suppose $U_{gggg}(\cdot) \leq 0$ and $\left(\frac{U_{g_0^i g_0^i}}{U_{g_0^n g_0^n}}\right)^2 \leq \frac{\lambda_0^i}{\lambda_0^n}$. Then one can verify that $\frac{U_{g_0^i g_0^i} \lambda_0^i}{(U_{g_0^i g_0^i})^2} \geq \frac{U_{g_0^n g_0^n} \lambda_0^n}{(U_{g_0^n g_0^n})^2}$, which by (24) and (25) is equivalent to $\frac{U_{g_0^i g_0^i}}{|U_{g_0^i g_0^i}|} \geq \frac{U_{g_0^n g_0^n}}{|U_{g_0^n g_0^n}|}$. That is, the percentage increment of $|U_{g_t^i g_t^i}|$ is greater than the percentage increment of $|U_{g_t^n g_t^n}|$ at $t = 0$. This guarantees that for $\epsilon \rightarrow 0^+$, $\left(\frac{U_{g_\epsilon^i g_\epsilon^i}}{U_{g_\epsilon^n g_\epsilon^n}}\right)^2 \leq \left(\frac{U_{g_0^i g_0^i}}{U_{g_0^n g_0^n}}\right)^2 < \frac{\lambda_0^i}{\lambda_0^n}$. By iterating forward, we get $\left(\frac{U_{g_t^i g_t^i}}{U_{g_t^n g_t^n}}\right)^2 \leq \left(\frac{U_{g_0^i g_0^i}}{U_{g_0^n g_0^n}}\right)^2 < \frac{\lambda_0^i}{\lambda_0^n}, \forall t \geq 0$. \square

Condition (i) is simpler and neater than Condition (ii), yet less desirable, because under our utility setting $U_{ggg}(\cdot) \leq 0$ implies IARA, and the only common utility function satisfying $U_{ggg}(\cdot) \leq 0$ is the quadratic utility function. On the other hand, Condition (ii) is more desirable, because it allows for CARA, DARA, and CIES utility functions.

From the analysis above, we can conclude that the immigrant provides less monetary contribution than the native does, however, both the immigrant and the native households increase their monetary contributions over time. Moreover, the immigrant-native gap in monetary contributions diminishes in time if $\frac{U_{g_t^n g_t^n} - U_{g_t^i g_t^i}}{U_{G_t G_t}} > 2(1 - \frac{\lambda_0^i}{\lambda_0^n})$, or if $U_{g_t^i g_t^i} > \frac{\lambda_0^i}{\lambda_0^n} U_{g_t^n g_t^n}$. In particular, if the household's utility in the warm-glow effect of monetary contributions satisfies either condition in Corrolary 1, the immigrant-native gap in monetary contributions diminishes over time.

The analysis of time contributions is identical to the above analysis for monetary contributions, if we replace g_t^i with v_t^i , g_t^n with v_t^n , G_t with V_t and $1 - \tau$ with w . Similarly, we can conclude that the immigrant-native gap in time contributions is negative, i.e., the immigrant provides less time contributions compared to the native-born. However, both immigrant and native-born households increase their time contributions over time. Moreover, the immigrant-native gap in time contributions diminishes in time if $\frac{U_{v_t^n v_t^n} - U_{v_t^i v_t^i}}{U_{V_t V_t}} > 2(1 - \frac{\lambda_0^i}{\lambda_0^n})$. In particular, if the household's utility in the warm-glow effect of time contributions satisfies either condition in modified Corrolary 1, then the immigrant-native gap in time contributions diminishes over time.

Now we turn to analyze the private transfers, e_t^i and e_t^n . We concentrate on the case in which both households provide positive private transfers ($e_t^j > 0$). From (8) we know $\delta_t^j = \lambda_t^j$ and $\dot{\delta}_t^j = \dot{\lambda}_t^j$.

By substituting (11) and (12) into the last equation we get $A_{Ft}^j = U_F'^{-1}(\frac{r}{\beta}\lambda_t^j)$, where $U_F'^{-1}(\cdot)$ is the inverse function of $U_F'(\cdot)$. Then by taking total derivative on both sides of last equation, we get the policy function for private transfer e_t^j (when $e_t^j > 0$)

$$e_t^j = \dot{A}_{Ft}^j = \frac{r(\rho - r)\lambda_t^j}{\beta U_F''(A_{Ft}^j)}. \quad (27)$$

In addition, from (11), (12), and the fact that $\dot{\delta}_t^j = \dot{\lambda}_t^j$ and $\delta_t^j = \lambda_t^j$, we get

$$\lambda_t^j = \frac{\beta U_F'(A_{Ft}^j)}{r}. \quad (28)$$

By substituting (28) into (27) we get

$$e_t^j = \frac{(\rho - r)U_F'(A_{Ft}^j)}{U_F''(A_{Ft}^j)} = (\rho - r)R(A_{Ft}^j), \quad (29)$$

where $R(A_{Ft}^j) = \frac{U_F'(A_{Ft}^j)}{U_F''(A_{Ft}^j)}$.

Proposition 3:

If $R'(A) \geq 0$ on $A \in R_+$, then $e_t^i \geq e_t^n, \forall t \geq 0$ (i.e., the immigrant has no less private transfers than the native has at any time t .)

If $R'(A) > 0$ on $A \in R_+$, then $e_t^i > e_t^n, \forall t \geq 0$. (i.e., the immigrant has strictly more private transfers than the native has at any time t .)

Proof: To prove the first statement, suppose $R'(A) \geq 0$. Then by (29) to prove $e_t^i \geq e_t^n, \forall t \geq 0$, we only need to show that $A_{Ft}^i \leq A_{Ft}^n, \forall t \geq 0$. Recall that $A_{Ft}^i - A_{Ft}^n$ is a continuous function in t , and $A_{F0}^i - A_{F0}^n < 0$. Then suppose for contradiction that $\exists \tau > 0$, such that $A_{F\tau}^i - A_{F\tau}^n > 0$. By intermediate value theorem, it must be true that $\exists s < \tau$ such that $A_{Fs}^i - A_{Fs}^n = 0$. However, when $A_{Fs}^i - A_{Fs}^n = 0$, by (29) we know $e_s^i = e_s^n$, thus $\dot{A}_{Fs}^i = \dot{A}_{Fs}^n$, and $A_{Ft}^i = A_{Ft}^n, \forall t \geq s$. This is a contradiction. So $A_{Ft}^i \leq A_{Ft}^n, \forall t \geq 0$, as required.

To prove the second statement, suppose that $R'(A) > 0$. Then by (29) to prove $e_t^i > e_t^n, \forall t \geq 0$, we only need to show that $A_{Ft}^i < A_{Ft}^n, \forall t \geq 0$. Because we have proved in above that $A_{Ft}^i \leq A_{Ft}^n, \forall t \geq 0$, we only need to prove that $A_{Ft}^i \neq A_{Ft}^n, \forall t \geq 0$. Suppose for contradiction that $\exists s$ s.t.

$A_{F_s}^i = A_{F_s}^n$, then by (29), $e_s^i = e_s^n$; However, in (27), because $\lambda_t^i \neq \lambda_t^n \forall t$, if $A_{F_s}^i = A_{F_s}^n$, it follows that $e_s^i \neq e_s^n$. This is a contradiction, so $A_{F_t}^i \neq A_{F_t}^n$, and $A_{F_t}^i < A_{F_t}^n, \forall t \geq 0$, as needed. \square

Proposition 4: *The necessary and sufficient condition for decreasing/constant/increasing private transfers ($\dot{e}_t^j < 0 / = 0 / > 0$) is that $R'(A) > 0 / = 0 / < 0$.*

Proof: By taking total derivative on both sides of the (29), we get

$$\dot{e}_t^j = (\rho - r)R'(A_{F_t}^j)A_{F_t}^j = (\rho - r)R'(A_{F_t}^j)e_t^j. \quad (30)$$

Because $\rho - r < 0$, the results are obvious from (30). \square

Proposition 5: *If $R'(A) \geq 0$ ($R'(A) > 0$) on $A \in R_+$, A sufficient condition for decreasing immigrant-native gap in private transfers over time ($\dot{e}_t^i < \dot{e}_t^n, \forall t \geq 0$) is that $R''(A) < 0$ ($R''(A) \leq 0$) on $A \in R_+$.*

Proof: If $R'(A) \geq 0$ on $A \in R_+$, it follows From *Proposition 3* that $e_t^i \geq e_t^n, \forall t \geq 0$. Then suppose $R''(A) < 0$ on $A \in R_+$. Because $A_{F_t}^i < A_{F_t}^n, \forall t \geq 0$, it follows that $R'(A_{F_t}^i) > R'(A_{F_t}^n), \forall t \geq 0$. Then from (30), it follows that $\dot{e}_t^i < \dot{e}_t^n, \forall t \geq 0$.

Similarly, we can prove the sufficiency of the condition in parenthesis. \square

Combining *Propositions 3, 4, and 5*, we may conclude that if household's preference on extended family's wealth ($U_F(\cdot)$) satisfies the condition that $R'(A) > 0$ and $R''(A) \leq 0$ on $A \in R_+$, where $R(A) = \frac{U'_F(A)}{U''_F(A)}$, then the immigrant provides more private transfers than the native does over time; private transfers decrease over time for both the immigrant and the native households; and the immigrant-native gap in private transfers diminishes over time.

7.3 Comparative Dynamics

In this subsection, we investigate the relationship between private transfers and monetary contributions:

From (10), we know $A_{F_t}^j = A_{F_0}^j + \int_0^t e_t^j dt$. By substituting the this equality into (29) we get

$$e_t^j = \frac{(\rho - r)U'_F(A_{F_0}^j + \int_0^t e_t^j dt)}{U''_F(A_{F_0}^j + \int_0^t e_t^j dt)} \quad (31)$$

It is clear from (31) that private transfer at any time is pre-determined by parameters ρ , r , and $A_{F_0}^j$, and is thus independent of the price of charitable giving $1 - \tau$, implying that the private transfer is neither a complement nor a substitute to the charitable giving. This implication is consistent with our empirical result in Section 3 that the impact of price of giving on private transfers is insignificant. Moreover, this result, together with results from the analysis of monetary contributions in a Nash equilibrium, suggests that the differences in charitable giving between the immigrant and the native-born is partially caused by the income effect (the immigrant have less initial wealth than the native-born does) instead of the substitution effect between charitable giving and private transfer.

Although there is no substitution effect between charitable giving and private transfers, we should note that charitable giving and private transfer are not independent of each other. In general, both are correlated with the time discount factor ρ , the interest rate r , and the extended family's wealth $A_{F_t}^j$. For example, in (31) private transfers decrease with ρ , and increase with r ; on the other hand, it is obvious from (14) that monetary contributions also decrease in ρ , and increase in r . Taken together, private transfers could be positively correlated with monetary contributions through the effects of ρ and r . This result would predict a significant positive correlation between error terms for monetary contributions and private transfers in multivariate probit and tobit models.

How do extended family resources, $A_{F_t}^j$ affect monetary contributions and private transfers? We observe from (14) that monetary(as well as time) contributions decrease with λ_t^j ; on the other hand, from (28) it is clear that λ_t^j decreases with $A_{F_t}^j$. Taken together, $A_{F_t}^j$ has a positive impact on monetary(time) contributions. The relationship between extended family's wealth $A_{F_t}^j$ and private transfers e_t^j , however, is more ambiguous, and depends on certain properties of the utility function on extended family's wealth. However, we know from *Propositions 3* and *4* that under the assumption that $R'(A) > 0$ on $A \in R_+$, extended family's wealth has negative effect on private transfers both initially and over time.

References

- Andreoni, James, Brown, Eleanor and Rischall, Isaac. (2003). "Charitable Giving by Married Couples: Who Decides and Why Does It Matter?" *Journal of Human Resources*, Vol. 38, No. 1 (winter, 2003), pp. 111-133.
- Andreoni, James, William G. Gale, and John Karl Scholtz. (1996). "Charitable Contributions of Time and Money," mimeo, University of Wisconsin-Madison.
- Auten, Gerald, Holder Sieg, and Charles Clotfelter. (2002). "Charitable Giving, Income and Taxes: An Analysis of Panel Data," *American Economic Review*, 92(1): 371-382.
- Becker, Gary and N. Tomes (1979). "An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility," *Journal of Political Economy*, 87:1153-89.
- Bergstrom, T.C., L. Blume, and H.R. Varian. (1986). "On the Private Provision of Public Goods". *Journal of Public Economics* 29:25-49.
- Borjas, George J. (1994). "The Economics of Immigration," *Journal of Economic Literature*, 32(4): 1667-1717.
- Borjas, George J. (1985). "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants," *Journal of Labor Economics*, 3(4): 463-489.
- Borjas, George J. and Hilton, Lynette. (1996). "Immigration and the Welfare State: Immigrant Participation in Means-Tested Entitlement Programs," *Quarterly Journal of Economics*, Vol. 111, No. 2, pp. 575-604.
- Borjas, George J. and Friedberg, Rachel M. (2006). "The Immigrant Earnings Turnaround of the 1990s," Brown University mimeo, 2004.
- Chiswick, Barry R. (1978). "The Effect of Americanization on the Earnings of Foreign-born Men," *Journal of Political Economy*, 86(5): 897-921.
- Chiteji, Ngina and Darrick Hamilton (2000). "Family Matters: Kin Networks and Asset Accumulation," Washington University Center for Social Development Working Paper 00-6.
<http://gwbweb.wustl.edu/csd/Publications/2000/wp00-6.pdf>
- Clotfelter, Charles T. (1985). *Federal Tax Policy and Charitable Giving*. Chicago, IL and London: The University of Chicago Press.
- Council on Foundations and Association of Black Foundation Executives. (1993). *Donors of Color: A New Promising Frontier for Community Foundations*. Washington D.C.
- Feenberg, Daniel and Elisabeth Coutts. (1993). "An Introduction to the TAXSIM Model," *Journal of Policy Analysis and Management*, 12(1): 189-94.

Fix, M. and J. Passel (2002), "The Scope and Impact of Welfare Reform's Immigrant Provisions," Washington, DC: Urban Institute. <<http://www.urban.org>>.

Hungerman, D. (2005). "Are Church and State Substitutes? Evidence from the 1996 Welfare Reform," *Journal of Public Economics*, 89, 2245-2267.

Ku, Leighton, and Alyse Freilich. (2001). "Caring for Immigrants: Health Care Safety Nets in Los Angeles, New York, Miami, and Houston," Kaiser Commission on Medicaid and the Uninsured. Washington, DC: Henry J. Kaiser Family Foundation.

O'Neill, Michael and William L. Roberts. (2000). Giving and Volunteering in California. San Francisco: Institute for Nonprofit Organization Management, College of Professional Studies, University of San Francisco.

Powell, J.S. (1984). "Least Absolute Deviation Estimation for the Censored Regression Model," *Journal of Econometrics*, 25, 303-325.

Ribar, C. David & Wilhelm, Mark, (2002). "Altruistic and Joy-of-Giving Motivations in Charitable Behavior," *Journal of Political Economy*, University of Chicago Press, vol. 110(2), pages 425-457.

Robert, Russell D., "A Positive Model of Private Charity and Public Transfers," *Journal of Political Economy*, February 1984, 92, 136-48.

Samuelson, Paul A "The Pure Theory of Public Expenditure," *the review of economics and statistics*, VOL 36, NO 4, P 387-389.

Steinberg, Richard. (1991). "Does Government Spending Crowd Out Donations? Interpreting the Evidence," *Annals of Public and Cooperative Economics*, 62(4): 591-617.

Wilhelm, Mark, (2003). "The Distribution of Giving in Six Surveys," Department of Economics, Indiana University-Purdue University at Indianapolis. mimeo.

World Bank. (2005). Global Development Finance. Washington D.C.: World Bank.