Like Mother, Like Daughter?:
A Socioeconomic Comparison of Immigrant Mothers and Their Daughters*

Margaret Hwang Smith
SmithFinancialPlace
125 W. 8th Street
Claremont, CA 91711
fax: 909-621-8576
margaret@smithfinancialplace.com

Gary Smith
Department of Economics
Pomona College
425 North College Avenue
Claremont CA 91711
fax: 909-621-8576
gsmith@pomona.edu

Abstract

Studies of the intergenerational socioeconomic mobility of immigrants rely on aggregate data, which yield biased mobility estimates. We use a unique data set of matched mother-daughter pairs and find more geographic and socioeconomic mobility among the daughters of foreign-born mothers than among the daughters of white California-born mothers. If ZIP code is a reasonable measure of socioeconomic status, then half of the gap between California-born and foreign-born mothers is erased within a generation.

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* Correspondence: Gary Smith

Like Mother, Like Daughter?

The United States is said to be a land of opportunity, where people can make of their lives what they want—where the son of Jamaican immigrants can become Secretary of State and a poor child from Hope, Arkansas, can become president. But it also said that millions of Americans are trapped in an intergenerational cycle of poverty and despair. Michael Harrington (1962) wrote that “the real explanation of why the poor are where they are is that they made the mistake of being born to the wrong parents.” A 2003 Business Week article entitled “Waking Up From the American Dream” and a 2004 Paul Krugman essay entitled “The Death of Horatio Alger” both argue that economic mobility in the United States is a myth.

Socioeconomic mobility is particularly important for immigrants, who often incur enormous financial and social costs because they hope to make better lives for themselves and their children. California is the entry point for many U. S. immigrants and a potentially rich source of data for investigating whether America is truly a land of opportunity. This paper uses a new methodology and fresh data to investigate the socioeconomic mobility of immigrants.

Background

Researchers have studied two kinds of economic mobility: during an individual’s lifetime and across generations. One way to measure mobility during a lifetime is to divide the income distribution into quintiles at two different points in time and calculate how many people changed quintiles during this time interval. Researchers have generally found that 25-30 percent of the adult population change quintiles annually, 40-50 percent change quintiles during 5-year intervals, and approximately 60 percent change quintiles during 10-year intervals (for example, Sawhill and Condon 1992; Burkhauser, Holtz-Eakin, and Rhody 1998).

Intergenerational mobility can be gauged by comparing children with their parents by estimating this equation

$$Y = \alpha + \beta X + \varepsilon \quad (1)$$

where Y is the logarithm of some measure of the child's economic well-being, X is the logarithm of a similar measure of the parent's economic well-being, and the estimated parameter β is the elasticity of the child's economic well-being with respect to the parent's economic well-being. An estimated value of β close to 0 indicates complete intergenerational mobility; a value close to 1 indicates no mobility. The measures of economic well-being, Y and X, are usually income, either for a single year or averaged over 3-5 years, with elasticity estimates ranging from 0.2 to 0.6 (for example, Solon 1992, Zimmerman 1992, and Mazumder 2003). Charles and Hurst (2003) look at net worth and estimate an elasticity of 0.37. Corak (2006) gives a literature review and comparable elasticities fore several different countries.

One problem with these studies of lifetime or intergenerational mobility is that income and financial wealth at a single point in time are not reliable measures of lifetime wealth. A better measure would be inherited wealth plus the present value of labor income over one's lifetime or, equivalently, the present value of spending over one's lifetime plus bequest. Unfortunately, it is very hard to estimate these more comprehensive measures.

Another weakness of intergenerational mobility studies is that they have traditionally focused on fathers and sons. Chadwick and Solon (2002) is evidently the only study of this type that considers daughters and the only study that looks at family income, rather than an individual's income. Family income is arguably the more relevant measure since one important aspect of mobility is the extent to which people marry people from different socioeconomic backgrounds.

<u>PSID Data</u>

The primary source of income data for most mobility studies is the Panel Study of Income Dynamics (PSID), which is based on an annual survey conducted by University of Michigan's Survey Research Center, beginning in 1968, of approximately 5,000 families and their descendants. (The wealth data used by Charles and Hurst came from special PSID surveys conducted in 1984, 1989, 1994, and 1999.) The PSID has the virtue of providing nearly 40 years of panel data. One drawback is that there is some attrition in the sample, particularly among low- and high-income families—which can be a fatal flaw for studies of intergenerational economic mobility.

The usable data also tend to yield relatively small samples. Solon's seminal 1992 paper looked at 348 father-son pairs; when he used 5 years of income data, the sample was reduced to 290 father-son pairs. Chadwick and Solon (2002) studied 372 married daughters.

There are also issues related to the confounding effect of age on income and wealth. For example, in Solon's study of income dynamics, the father's income was for fathers whose ages ranged from 27 to 68 with an average of 42, while the son's income was for sons whose ages ranged from 25 to 33, with an average of 29.6. In the study by Charles and Hurst, parental wealth was averaged for 1984 and 1989 (when the parents' average age was 52 years), and their children's wealth was for 1999 (when their average age was 37.5 years). This takes us back to our earlier observation that income and financial wealth at a point in time are not reliable measures of lifetime wealth because both can vary substantially over one's lifetime.

<u>Immigrant Mobility</u>

Research on socioeconomic mobility in the United States has paid relatively little attention to immigrants. Myers and Cranford (1998) and Myers (1999) are important exceptions, but they look at decennial census data at two points in time, ten years apart, beginning with the 1970 Census, which was the first census since 1930 to ask an immigration question: "For persons born in a foreign country.… When did he come to the United States to stay?" As Myers notes, "to stay" is an unfortunately ambiguous phrase. The 2000 Census changed the wording to "When did this person come to live in the United States?," which may well elicit different answers. These studies conclude that adults who were the children of immigrants are generally more geographically dispersed and economically well off than are immigrants.

Chiswick (1977) and Carliner (1980) use 1970 U. S. Census data to compare the wages of first, second, and third generation immigrant males. Chiswick finds that there is little difference in the earnings of white male Americans with foreign-born parents and white male Americans with native-born parents. Carliner finds that second-generation immigrants work longer hours and have higher wages and incomes than do first- and third-generation immigrants. Of course, many of the second- and third-generation immigrants in the 1970 Census are not the sons and grandsons of the first-generation immigrants in the 1970 Census.

Borjas (1993, 1994) looks at several decennial censuses with the data disaggregated by country of origin. In his 1993 paper, Borjas uses 1940, 1950, 1960, and 1970 Census data for males aged 25-64 to compare the wages of men born in a foreign country with men who were born in the United States with at least one parent born in a foreign country. He finds that the country of origin is an important explanation of wage differentials among both first- and second-generation immigrants. In his 1994 paper, Borjas looks at 1910, 1940, and 1980 Census data and concludes that, as measured by average earnings in the worker's occupation, male wage differentials for first-generation immigrants in the 1910 Census did not completely disappear among second-generation immigrants in the 1940 Census and third-generation immigrants in the 1980 Census. For example, a 20 percent wage differential in 1910 is associated with a 12 percent differential in 1940 and a 5 percent differential in 1980.

Smith (2003) uses aggregate Census and Current Population Survey (CPS) data to compare the education and income of first-, second-, and third-generation Hispanic male immigrants. Parrado and Morgan (2008) use aggregate Census and CPS data to compare the fertility of first-, second-, and third-generation Hispanic female immigrants. Aydemir, Chen, and Corak (2006) analyze Canadian 1981 and 2001 Census data and conclude that there is somewhat more generational mobility for Canadian immigrants than for U.S. immigrants.

None of these studies compare immigrants with their children; instead they compare aggregate data for first-generation immigrants with aggregate data for second-generation immigrants—which is problematic because of the wide age ranges in the aggregated data and the fact that the relative income of immigrants depends on the year of immigration.

The most fundamental problem with aggregate data is that socioeconomic status may affect the number of children immigrants have, and this will bias measures of socioeconomic mobility based on generational averages of census data. Most obviously, if a high-income immigrant family has no children, this will increase the average income of the first generation without affecting the average income of the second generation—thereby reducing the calculated intergenerational increase in average income. More generally, if high-income immigrant families have relatively few children, then measures of upward mobility based on aggregate data will be biased downward.

Suppose, for example, that there are two immigrant males, one earning $40,000 and the other earning $20,000 at the time of the 1980 Census. The first immigrant has one son who earns $80,000 at the time of the 2000 Census; the second immigrant has three sons, each earning $40,000 when the 2000 Census is taken. Each son earns 100 percent more than his father, but the average income of the second generation is only 67 percent higher than the average income of the first generation. A more general discussion of this bias is in the Appendix.

This bias can be avoided by comparing parents with their children, instead of comparing the average income of first-generation immigrants with the average income of second-generation immigrants. Mayer, Duncan, Greg, and Kalil (2004) is the only paper we have found that matches parents with their children. They use the National Longitudinal Survey of Youth (NLSY) and the Children of the NLSY (CNLSY) to obtain data for both mothers and their daughters relating to 17 adolescent characteristics in five domains: cognitive skills, psychological characteristics, negative behaviors, social activities, and gender role attitudes. The mother's education and family income are used to measure socioeconomic status. The mother's adolescent characteristics are used to predict her adult socioeconomic status, and the mother's adolescent characteristics and socioeconomic status are used to predict her daughter's adolescent characteristics. They conclude that a mother's adolescent behaviors are more important than her adult socioeconomic status in predicting the daughters' adolescent characteristics. However, they do not measure socioeconomic mobility and they do not look at immigrants.

We have not found any studies that use data for matched pairs of parents and children to investigate intergenerational mobility among immigrants—which is unfortunate since the United States is a nation of immigrants and assertions about it being a land of opportunity usually refer to the fact that so many immigrants come to the United States to build better lives for their children. The cliché is that parents sacrifice so that their children can thrive. Is this a myth or a reality?

The widespread neglect of females is also unfortunate, since daughters and sons may lead quite different lives. In the movie Gran Torino, the daughter of Hmong immigrants says that "the women go to college and the men go to jail." If true, then measures of upward mobility based on the experience of sons may not apply to daughters.

A Fresh Approach

Birth records are likely to be more accurate than census surveys and, because they include virtually everyone who has children, will include many foreign-born mothers who are overlooked by the census. Another virtue of birth records is that they provide information about women, while most studies of mobility focus on males.

Birth-record information about the mother's place of birth can be used to identify foreign-born mothers. If their daughters later become mothers, too, we can use birth-record data on names, date of birth, and place of birth to match daughters with their mothers. We can then compare the residential ZIP codes of the foreign-born mothers and their daughters at the time when each are having children.

Borjas (1992, 1993, 1994) argues that the intergenerational income elasticity (β in Equation 1) may be different for immigrants than for the general population because of "ethnic" or "social" capital. Borjas (1995) argues that ethnic neighborhoods have cultural and socioeconomic effects on the accumulation of human capital that constrain intergenerational mobility.

One research question is simply how much geographic mobility there is between generations: how often do the grown daughters of foreign-born mothers live in different ZIP codes than did their mothers? A second research question is intergenerational socioeconomic mobility. Since residential ZIP code is a reasonable proxy for socioeconomic status (Fryer and Levitt, 2004; Currie and Moretti, 2007; Miller, 2008), we can gauge the intergenerational socioeconomic mobility of the daughters of foreign-born mothers by determining how often daughters move to higher-income ZIP codes and how often they move to lower-income ZIP codes.

Data

It has been estimated that one-fourth of the people living in southern California were born in other countries and that almost one-fourth of all foreign-born residents of the United States live in southern California (Myers 1999). California is consequently a potentially rich source of data for investigating whether America is truly a land of opportunity for immigrants.

The California Department of Health Services (CDHS) maintains a statistical data base compiled from birth certificates for virtually all children born in California. The CDHS data identify the mother's birthplace for 99.96 percent of all births; the Committee for the Protection of Human Subjects and the Vital Statistics Advisory Committee allowed us to access otherwise confidential information on the child's first, middle, and last name; and the mother's first name and birth surname. Mothers can consequently be linked to their mothers, thereby creating an intergenerational data base. (A parallel study of fathers and sons is not possible because CDHS data do not include the father's first name or middle name, and do not include the father's last name before 1989.)

CDHS birth data include the mother's residential 5-digit ZIP code; Census data show the median household income by ZIP code. (We work with median income throughout because the income distribution is skewed.) We gauge geographic and socioeconomic mobility by comparing the residential ZIP codes of adult daughters and their mothers.

CDHS residential ZIP-code data only go back to 1982. The most recent data are for 2007. Thus we look at CDHS birth data for the years 1982 through 2007. In a study of intergenerational birth weights using CDHS data, Currie and Moretti (2007) include pre-1982 data by using the ZIP code for the hospital where the baby is born. However, they note that hospital ZIP codes are a noisy proxy for residential ZIP codes; for those years where hospital and residential ZIP codes are available, there is only a 0.5 correlation between median income in hospital and residential ZIP codes.

We need to select a benchmark census year for measuring median household income for each ZIP code. There is a 0.9 correlation between 1990 and 2000 Census data on median household income in California ZIP codes. For each matched mother-daughter pair, we used the 2000 Census to determine the median household income in the ZIP codes the foreign-born mother lived in when she gave birth and in the ZIP code that her daughter lived in when she gave birth. A comparison of these median household incomes is a measure of whether the daughter is living in a less affluent or more affluent ZIP code than did her mother at a similar stage of her life.

Methods

Ideally, we would like to compare immigrants with families that have been U. S. residents for several generations. The CDHS data allow us to identify the daughters of California-born mothers. However, the CDHS data do not identify the father’s birthplace and only go back one generation on the mother’s side. Thus we do not know whether the daughter of a California-born mother has a foreign-born father or whether the California-born mother is herself the daughter of immigrants. So, we use as our control group daughters whose mothers were born in California and whose mother and father are both white.

It might be misleading to compare mothers and daughters at different stages of their lives; for example, to compare a mother when she has her fourth child with her daughter when she has her first child, or vice versa. We consequently use the number-of-children information in the CDHS data to compare mothers and their daughters at comparable stages of their lives. Specifically, if the daughter was the mother's first child, we compare the ZIP code of the mother at the time she has her first child with the daughter's ZIP code when she has her first child. Similarly, if the daughter was the mother's second child, we compare the ZIP codes of the mother and daughter when each has her second child. In some of our analyses, we further restrict our data set to mothers and daughters whose ages are no more than 1 year apart at the time they give birth.

Our first measure of mobility is simply that—how frequently do daughters live in different ZIP codes than did their mothers? The normal distribution gives the p-value for a difference-in-proportions test of the null hypothesis that the probability that an adult daughter will live in the same ZIP code her mother does not depend on whether the mother was born in a foreign country.

For our second measure of mobility, we look at each matched mother-daughter pair who live in different ZIP codes and calculate the frequencies with which the daughter lives in a higher-income or lower-income ZIP code than did her mother. The binomial distribution gives the p-value for testing the null hypothesis that a daughter who moves to a different ZIP code is equally likely to move to a higher-income or lower-income ZIP code. We also use a difference-in-proportions statistic to test the null hypothesis that the likelihood of moving to a higher-income

ZIP code does not depend on whether the mother was foreign-born.

Our third test looks at the paired difference in ZIP-code income for each mother-daughter matched pair

$$d = I_M - I_D \tag{2}$$

where I_M is the median income in the mother's ZIP code and I_D is the median income in the daughter's ZIP code. The null hypothesis is that the expected value of each paired difference is zero: E[d] = 0. The Wilcoxon signed-rank test for paired differences is a nonparametric test of the null hypothesis that the median of the paired differences is zero.

Our fourth test separates the mothers and daughters into deciles based on their ZIP-code income. We then calculate the frequency with which daughters are in the same decile as their mothers. A difference-in-proportions statistic tests the null hypothesis that the probability that a daughter is in the same income decile as her mother is independent of whether the mother is foreign-born or California-born.

Our fifth test uses our intergenerational data set of matched mother-daughter pairs to estimate Equation 1 for foreign-born and California-born mothers. We use a t statistic to test the null hypothesis that the elasticities are equal.

In all cases, we report two-sided p-values because, if the null hypotheses are false, it is *a priori* uncertain whether: the daughters are more or less likely to move to different ZIP codes if their mothers are foreign-born; the daughters who move to different ZIP codes are more more or less likely to move to a higher-income ZIP code if their mothers are foreign-born; the median of the paired income differences is positive or negative; daughters are more or less likely to be in the same income decile as their mother if they are foreign born; and the income elasticities are higher or lower for immigrants.

Results

Table 1 shows some summary data for the matched foreign-born mothers and their daughters and for matched California-born mothers and daughters (for simplicity, we do not repeatedly state that the mother and father are both white). "All pairs" includes all matched mother-daughter pairs; "same age" refers to those pairs whose ages differ by no more than one year. We will see that, other than reducing the sample sizes, this age restriction has little effect on our results—which suggests that the limited time span of our data set does not bias our results.

Table 2 shows 95-percent confidence intervals for the probability that a daughter will live in a different ZIP code than did her mother. The p-values are for tests of the null hypothesis that the probability of moving to a different ZIP code does not depend on whether the mother was foreign-born. The differences between the observed mobility frequencies for the daughters of foreign-born and California-born mothers are somewhat more pronounced for the same-age pairs, but are highly statistically significant in either case. However, this is one of those cases where the observed differences, though highly statistically significant, are not large. What is interesting is how frequently daughters move to different ZIP codes. Furthermore, the extent of intergenerational geographic mobility is understated because these data exclude daughters who move outside California.

The next question is whether these mobile daughters are moving to higher-income or lower-income ZIP codes. Table 3 provides the answers. For foreign-born mothers, whether or not we restrict our data to matched pairs whose ages differ by no more than one year, more than 60 percent of the daughters who changed ZIP codes moved to higher-income ZIP codes. For

California-born mothers, only 54 percent of the daughters who changed ZIP codes moved to higher-income ZIP codes. In each case, the data reject the null hypothesis that the daughters are equally likely to move to higher-income or lower-income ZIP codes.

A difference-in-proportions test decisively rejects the null hypothesis that the probability of moving to a higher-income ZIP code does not depend on whether the mother was foreign born. For all matched pairs, the two-sided p-value is 3.2×10^{-32}; for mothers and daughters whose ages differ by no more than a year, the two-sided p-value is 4.6×10^{-13}.

Table 4 compares the median income in the daughters' ZIP code with the median income in their mothers' ZIP code. For foreign-born mothers overall, median income in the daughters' ZIP codes is higher than median income in their mothers' ZIP codes by a substantial and highly statistically significant margin. The increase in median ZIP-code income is 6.9 percent for all foreign-born matched pairs and 11.3 percent for foreign-born matched pairs of the same age. Even though statistically significant, the average increases in ZIP-code income the daughters of California-born mothers are not large: 0.5 percent for all matched pairs and 1.3 percent for matched pairs of the same age.

Another way to look at these changes is to note that median ZIP-code income is 12.0 percent higher for the California-born mothers than for the foreign-born mothers, but only 5.3 percent higher for their daughters. That is, more than half of the difference between California-born and foreign-born ZIP-code income disappears after one generation. For mothers and daughters matched by age, the initial gap also falls by more than half in a generation, from 19.9 percent for the mothers to 9.1 percent for their daughters.

For foreign-born mothers, CDHS data identify the 9 countries (plus rest of world) shown in

Tables 5 and 6, with the data sorted by median income in the mother's ZIP code. Although many sample sizes are small, some of the observed differences are striking; for example, the large income increases for immigrants from Vietnam and China, and the income decreases for immigrants from Canada and Guam. For the largest group, Mexico, the income increase was somewhat lower than average, but still substantial.

Regression towards the mean is one possible explanation for the relatively large income increases for immigrants. Persons with relatively low income are generally more likely to have experienced bad fortune recently, while those with relative high income are more likely to have benefited from good fortune. Thus, both will tend to regress toward the mean as time passes (Kahneman and Tversky, 1973; Goldberger, 1989, Mulligan, 1997; Keil, Smith, and Smith, 2004). If foreign-born mothers are disproportionately represented among low-income groups and California-born mothers are disproportionately represented among high-income groups, the principle of regression toward the mean predicts that the income of foreign-born mothers will, overall, increase more than the income of California-born mothers.

On the other hand, one of the reasons for using ZIP codes as a measure of socioeconomic status is precisely because ZIP code residence is a better measure of permanent income than is annual income in any one year. Nonetheless, we can investigate the regression-to-the-mean explanation for our results by separating the foreign-born mothers' ZIP code income into deciles, and then using these same deciles to group California-born mothers. For example, 10 percent of the foreign-born bothers had ZIP code income below $22,708; we then compare the daughters of these foreign-born women to the daughters of California-born women who had ZIP code income below $22,708.

Tables 7 and 8 shows the results for all mothers and for those whose ages differ by no more than one year. It is particularly interesting that foreign-born mothers in the lowest decile had lower income than did California-born mothers, but the daughters of these foreign-born mothers had higher income than the daughters of the comparable California-born mothers, while the daughters of foreign-born mothers in the highest decile have less downward mobility than the daughters of California-born mothers.

Another way to investigate intergenerational mobility is to estimate the elasticities between mother and daughter ZIP-code income. Table 9 shows 95-percent confidence intervals for the estimated income elasticities across generations using all of the matched pairs and those matched pairs whose ages differ by no more than 1 year. The p-values are for tests of the null hypothesis that the elasticity does not depend on whether the mother is an immigrant or born in California. The differences in the estimated elasticities between immigrant and California-born mothers are statistically significant and indicate somewhat more intergenerational mobility for the daughters of foreign-born mothers than for the daughters of California-born mothers.

Conclusion

Previous studies of intergenerational mobility have paid relatively little attention to immigrants and to women. Those studies that have looked at immigrants use aggregate census data, which have a variety of problems—most notably the biases introduced by the correlation between socioeconomic status and number of children.

California birth records for the years 1982 through 2007 document that the intergenerational geographic and socioeconomic mobility of the daughters of foreign-born mothers is substantial and somewhat stronger than that of the daughters of California-born mothers. More than 80 percent of the daughters of foreign-born mothers live in different ZIP codes than did their mothers, and more than 60 percent of the daughters who changed ZIP codes moved to higher-income ZIP codes. The difference between the ZIP-code income of the daughters of foreign-born mothers and the daughters of California-born mothers is less than half the size of the difference between the ZIP-code income of their mothers. Immigrants in the lowest income decile have more upward mobility than do the California-born with comparable income and the immigrants in the highest income decile have less downward mobility than do the California-born. The intergenerational income elasticity for immigrant mothers and their daughters is smaller than for the California-born control group, which again indicates more intergenerational mobility.

Our results understate geographic mobility and likely understate intergenerational socioeconomic mobility, too, because daughters who move outside California are likely to have relatively high human capital. Geographic mobility and socioeconomic mobility are also likely to be understated because of the absence of data on daughters after the age of 25. Many daughters surely change geographic residences after the age of 25 and daughters who have children after the age of 25 are more likely to be highly educated and have professional careers (Hewlett, 2002; Ellwood, Wilde, and Batchelder, 2004).

Overall, our results do not indicate that immigrant women are confined to ethnic neighborhoods that constrain intergenerational mobility. If anything, the daughters of immigrant women have somewhat more geographic and socioeconomic mobility than do the daughters of white women who were born in California.

Appendix. Mobility Estimates Using Aggregate Data are Biased

If we have matched-pair data on the incomes of fathers and their adult sons, two reasonable measures of the intergenerational increase in income are the average percentage increase in income and the percentage increase in average income, including every father-son pair in either case. Both of these measures have the desirable property that if every son's income is higher than his father's income by a constant fraction g, then the intergenerational increase in income is also g, no matter how many sons each father has and no matter how much variation there is in income among the fathers. This is not true if we look at aggregate data where each father is counted once even if he has no sons or has more than one son.

For example, suppose that there are two immigrant males, the first earning income 1 and the second income y when a census is taken. When a later census is taken, the first immigrant has one son who earns 1 + g and the second immigrant has n sons, each earning y(1 + h).

The average percentage increase in income is

$$X = 100\left(\frac{g + nh}{1 + n}\right) \tag{1}$$

The percentage increase in average income, including every father-son pair, is

$$\begin{aligned} Y &= 100\left(\frac{1 + g + ny(1 + h)}{1 + ny} - 1\right) \\ &= 100\left(\frac{g + nyh}{1 + ny}\right) \end{aligned} \tag{2}$$

If g = h then X = Y = 100g, as desired.

If we look at aggregate data counting each father once (as would be the case with the calculation of the average income in a census), the fathers' average income is (1 + y)/2 and the sons' average income is $\frac{1+g+ny(1+h)}{1+n}$. The percentage change in average income is

$$Z = 100\left(\frac{\frac{1+g+ny(1+h)}{1+n} - \frac{1+y}{2}}{\frac{1+y}{2}}\right) \qquad (3)$$
$$= 100\left(\frac{1}{(1+n)(1+y)}\right)\left(2(1+g) + 2ny(1+h) - (1+n)(1+y)\right)$$

If g = h, then Z = 100g only in highly unlikely special cases, such as when the fathers earn the same income (y = 1) or each father has only one son (n = 1).

If the second father has no sons (n = 0), then Z is less than g if he earns more than the first father and Z is larger than g is he earns less than the first father. This makes sense because including fathers with no sons in the calculation of average first-generation income reduces the calculated percentage increase in intergenerational income if the father has a relatively high income and increases the calculated increase in intergenerational income if the father has a relatively low income.

The reverse is true if the second father has more than one son (n > 1). Now, Z is less than g if the second father earns less than the first father and Z is larger than g is he earns more than the first father. Counting fathers with more than one son only once in the calculation of average first-generation income increases the calculated percentage increase in intergenerational income if the father has a relatively high income and reduces the calculated increase in intergenerational income if the father has a relatively low income.

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Table 1 Mothers and Their Daughters

	Observations	Average Age (years)		ZIP Code		
		Mother	Daughter	Same	Different	Fraction Different
Foreign-Born Mothers						
All Pairs	16,405	22.5	19.4	2,783	13,622	0.830
Same Age	4,249	19.7	19.6	645	3,604	0.848
California-Born Mothers						
All Pairs	22,056	21.5	19.7	4,251	17,805	0.807
Same Age	6,701	19.6	19.6	1,324	5,377	0.802

Table 2 Fraction of Times Mother and Daughter Live in Different ZIP Codes

	95% Confidence Interval		
	Foreign-Born Mothers	California-Born Mothers	P-Value
All Pairs	0.830 ± 0.006	0.807 ± 0.005	7.2×10^{-9}
Same Age	0.848 ± 0.011	0.802 ± 0.010	1.3×10^{-9}

Table 3 Fraction of Times That Median Income in Daughter's ZIP Code is Higher Than in Mother's ZIP Code

	Foreign-Born Mothers			California-Born Mothers		
	Lower	Higher	P-value	Lower	Higher	P-value
All Pairs	0.392	0.608	1.4×10^{-141}	0.458	0.542	4.0×10^{-28}
Same Age	0.382	0.618	4.1×10^{-46}	0.459	0.541	1.9×10^{-9}

Table 4 Median Income in Mother and Daughter's Residential ZIP code

	Foreign-Born Mothers			California-Born Mothers		
	Mother	Daughter	P-value	Mother	Daughter	P-value
All Pairs	$35,733	$38,199	3.9×10^{-171}	$40,019	$40,230	1.4×10^{-24}
Same Age	$34,141	$38,010	3.7×10^{-58}	$40,929	$41,472	4.0×10^{-9}

Table 5 Foreign-Born Mothers and Their Daughters, by Mother's Birthplace

		Average Age (years)		ZIP Code		Median ZIP Income		
	Observations	Mother	Daughter	Same	Different	Mother	Daughter	Increase (%)
Mexico	12,317	22.1	19.3	2,272	10,045	$36,793	$39,090	6.2
Rest Of World	3,154	23.2	19.6	388	2,766	$37,231	$40,988	10.1
Cuba	61	22.3	19.7	6	55	$39,430	$46,309	17.4
Puerto Rico	61	22.1	19.8	11	50	$40,003	$42,542	6.3
Vietnam	106	23.6	19.6	13	93	$43,712	$49,687	13.7
China	31	27.8	20.3	3	28	$45,339	$55,074	21.5
Japan	77	25.5	20.1	10	67	$45,835	$45,981	0.3
Philippines	470	25.8	19.9	69	401	$47,065	$52,092	10.7
Canada	97	24.8	20.5	8	89	$50,386	$48,284	-4.2
Guam	31	21.6	19.7	3	28	$52,976	$44,940	-15.2
total	16,405	22.5	19.4	2,783	13,622	$37,408	$40,064	7.1

Table 6 Foreign-Born Mothers and Their Daughters, by Mother's Birthplace, ages differ by no more than 1 year

		Average Age (years)		ZIP Code		Median ZIP Income		
	Observations	Mother	Daughter	Same	Different	Mother	Daughter	Increase (%)
Rest Of World	768	20.0	19.9	86	682	$35,577	$40,069	12.6
Puerto Rico	18	19.4	19.7	3	15	$36,307	$43,744	20.5
Mexico	3,306	19.5	19.5	544	2,762	$36,315	$39,083	7.6
Japan	9	20.0	20.2	2	7	$40,841	$41,669	2.0
China	4	23.5	23.31	0	4	$42,485	$56,380	32.7
Vietnam	19	20.2	20.2	1	8	$42,537	$53,936	26.8
Cuba	18	20.2	20.0	1	17	$43,340	$43,410	0.2
Philippines	73	20.5	20.4	7	66	$48,015	$54,582	13.7
Canada	24	21.0	21.0	1	23	$51,027	$46,904	-8.1
Guam	10	19.9	19.6	0	10	$56,104	$46,228	-17.6
total	4,249	19.7	19.6	645	3,604	$36,586	$39,715	8.6

Table 7 Median Income by Deciles

	Foreign-Born Mothers			California-Born Mothers		
Decile	Mother	Daughter	Change (%)	Mother	Daughter	Change (%)
1	$20,593	$31,488	52.9	$21,514	$30,661	42.5
2	$24,114	$30,375	26.0	$25,137	$32,095	27.7
3	$28,606	$32,644	14.1	$28,651	$32,881	14.8
4	$30,375	$34,751	14.4	$30,942	$34,092	10.2
5	$33,728	$36,732	8.9	$33,901	$35,699	5.3
6	$36,277	$36,769	1.4	$37,043	$37,591	1.5
7	$40,398	$40,398	0.0	$40,230	$41,423	3.0
8	$44,500	$42,970	-3.4	$44,647	$44,015	-1.4
9	$49,418	$46,468	-6.0	$49,430	$46,892	-5.1
10	$63,043	$57,601	-8.6	$63,096	$50,929	-19.3

Table 8 Median Income by Deciles, ages differ by no more than 1 year

	Foreign-Born Mothers			California-Born Mothers		
Decile	Mother	Daughter	Change (%)	Mother	Daughter	Change (%)
1	$20,275	$31,488	55.3	$21,514	$30,202	40.4
2	$23,851	$32,565	36.5	$23,841	$31,814	33.4
3	$27,471	$32,644	18.8	$27,221	$33,035	21.4
4	$30,174	$35,791	18.6	$30,217	$33,511	10.9
5	$32,644	$37,086	13.6	$32,844	$34,092	3.8
6	$35,910	$36,180	0.8	$35,910	$36,751	2.3
7	$39,225	$39,672	1.1	$39,225	$39,747	1.3
8	$42,970	$41,952	-2.4	$44,015	$42,309	-3.9
9	$49,032	$45,916	-6.4	$48,830	$46,175	-5.4
10	$61,788	$61,788	0.0	$61,724	$50,529	-18.1

Table 9 Estimated Elasticity of ZIP-code Income

	95% Confidence Interval		
	Foreign-Born Mothers	California-Born Mothers	P-Value
All Pairs	0.412 ± 0.012	0.430 ± 0.011	0.030
Same Age	0.381 ± 0.024	0.426 ± 0.020	0.005