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ABSTRACT

Because efforts to explain international saving differentials using traditional economic variables have not been very successful (Bosworth, 1993), some economists have proposed that national saving differences reflect cultural differences. We attempt to test that hypothesis by using data from the US Census to examine whether immigrants to the US from high-saving countries tend to save more than immigrants from low-saving countries. While we do find highly statistically significant differences in immigrants' saving behavior by country of origin, those differences do not match up with the differences in national saving rates. In particular, immigrants from high-saving Asian countries do not save more than other immigrants.

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1 Introduction

From 1970 to 1980, the average national saving rates of OECD countries ranged from a low of 7.8 percent (for the United States) to a high of 33.2 percent (for Luxembourg). Why are there such large differences in saving rates across countries? Economists generally try to explain differences in economic behavior by differences in the economic environment. Many such explanations for international saving rate differences have been proposed and tested, including the effects of varying economic growth rates, social security systems, tax incentives, and land and housing prices.[1] Because such explanations have been largely (though not entirely) unsuccessful, some economists have also considered the possibility that saving differences stem at least partly from cultural rather than strictly economic differences across countries.[2]

Carroll, Rhee, and Rhee (1994, henceforth CRR) attempt to test for cultural effects on saving using household data from the Canadian *Survey of Family Expenditures*; they find that the saving patterns of immigrants to Canada are not statistically different for immigrants from different places of origin. However, as CRR themselves note, the *SFE* data are very imperfect for the purposes of their empirical tests. One problem is that the country of origin is not specifically identified; instead, the place of origin is reported as one of five broad regions.[3] A second big problem is the small size of the sample of immigrants in the SFE data; there were only slightly more than 150 immigrants from the two regions contributing the smallest number of immigrants.

In this paper, we try to answer the same set of questions CRR examined using a data set that addresses both of these data problems. We use household data from the 1980 and 1990 Census of Population and Housing in the United States. In the Census data, the country of birth and the year of immigration are specifically identified. And sample size is much less of a problem: There are sixteen individual

[1]Hayashi (1986, 1989) and Bosworth (1993) are recent representative studies.

[2]Bosworth (1993), for example.

[3]The regions are North and West Europe (with the United States), South and East Europe. China and South-East Asia, Other Asia, or Others.

countries for which we have data on at least 150 immigrants in both 1980 and 1990.

However, using the Census data has a trade-off: The Census does not contain information on consumption, and so individual saving rates cannot be estimated directly from the difference between income and consumption as in the SFE. Fortunately, however, the Census contains data on household wealth holdings. Our approach is to estimate future wealth holdings for the households in the 1980 Census sample and past wealth holdings for the households in the 1990 Census sample, and to construct mean saving as the difference.

In contrast to the results of Carroll, Rhee, and Rhee (1994), we find that the saving patterns of immigrants *are* significantly different across country of origin. However, the saving patterns of immigrants do not match up with the saving patterns in aggregate data: The immigrants from countries with high saving rates, such as Japan, Korea, Taiwan, do not have higher saving rates than the other immigrants in our sample. Therefore, our findings do not support the proposition that differences in saving rates across countries simply reflect uniformly different national cultural attitudes toward saving.

A possible explanation of our results is that they reflect sample selection effects. To be concrete, immigrants from Mexico may come to the United States for very different reasons, and from a very different socioeconomic stratum, than immigrants from Germany. If the households who come from country A are largely selected from a low-saving group within country A and the households who come from country B come mostly from a high-saving group within that country, the saving rates of immigrants from country A are likely to be lower than those from country B even if on average country A has a higher saving rate than country B. Our results therefore do not rule out the possibility of cultural influences on national saving rates, but they do suggest that there is probably more variation in saving across different groups within individual countries than there is in average saving rates across countries.

The rest of the paper is organized as follows. The method of estimating households saving rates from the two Censuses is explained in section II. Section III

describes the data and section IV presents empiral results. Section V concludes.

2 Methods for Estimating Saving Rates

The data for our analysis are from the 1980 and the 1990 Census of Population and Housing. If the Census data had a panel data structure, we could track indiviual households over time and estimate indiviudal saving as the change in wealth between two periods. However, Census data do not have a panel structure.[4] To calculate changes in wealth holdings, we need to estimate what the level of wealth holdings would have been in 1990 for the individuals we observe in the 1980 Census, and what the level of wealth holdings would have been in 1980 for the individuals we observe in the 1990 Census, respectively. This section presents our method.

We assume that the disposable labor income of individual i at time t can be described by the equation

$$Y_t = P_t + v_t, \tag{1}$$

where P_t denotes permanent labor income and v_t denotes a transitory shock to income.[5] We also assume that consumption is a constant proportion of the person's total permanent income at time t, i.e., permanent labor income and capital income,

$$C_t = \alpha(P_t + rW_t) \tag{2}$$

where r is the interest rate and W_t is the level of wealth holdings at time t. The individual's budget constraint implies that

$$W_{t+1} = (1 + r)W_t + Y_t - C_t \tag{3}$$

By combining (2) and (3), we get the equation (4),

$$W_{t+1} - W_t = (1 - \alpha)(rW_t + P_t) + v_t \tag{4}$$

[4]Even though the Census by definition counts everybody, the subsample included in Public-Use Microdata Samples is randomly drawn each decade and there is no information linking people in the 1990 subsample to people in the 1980 subsample. So it is impossible to track individual households over time.

[5]For simplicity of presentation, we do not use subcript i for individual i.

which merely states that the change of wealth is equal to saving. Our objective is to estimate the saving rate $(1-\alpha)$ using the 1980 and the 1990 Census. If the saving rate is time invariant, the change of wealth for n years is,

$$W_{t+n} - W_t =$$
$$(1-\alpha)\{[P_t + ... + P_{t+n-1}] + r[W_t + ... + W_{t+n-1}]\} + v_t + \ldots + v_{t+n-1}$$

The saving rate $\gamma \equiv 1-\alpha$ will therefore be equal to

$$\gamma = \frac{W_{t+n} - W_t}{[P_t + ... + P_{t+n-1}] + r[W_t + ... + W_{t+n-1}] + e} \tag{5}$$

where e is the sum of transitory income v_t for the n years. If we assume that the transitory shock to income v_t is an i.i.d process with mean zero, e should be close to 0. So we can estimate the saving rate as

$$\hat{\gamma} = \frac{W_{t+n} - W_t}{[P_t + ... + P_{t+n-1}] + r[W_t + ... + W_{t+n-1}]}. \tag{6}$$

Equation (6) states that the saving rate is the ratio of the change in wealth for n years to the sum of permanent labor and capital income during the same period. Hereafter the starting period t denotes 1980 and the ending period $(t+n)$ denotes 1990. Since we do not have Census data for the intervening periods, we have to estimate the sum of permanent labor income and wealth during the period. First, we assume that the growth rate of permanent labor income is constant:

$$P_s = G_y P_{s-1} \tag{7}$$

Then the sum of the permanent labor income in the denominator is

$$P_t + ... + P_{t+n-1} = P_t \frac{1 - G_y^n}{1 - G_y} \tag{8}$$

Second, we assume that the sum of wealth in the denominator can be approximated by

$$W_t + ... + W_{t+n-1} \approx n \frac{W_t + W_{t+n}}{2} \tag{9}$$

Under these assumptions, the saving rate can be estimated by

$$\hat{\gamma} = \frac{W_{t+n} - W_t}{P_t \frac{1-G_y^n}{1-G_y} + rn\frac{W_t+W_{t+n}}{2}} \tag{10}$$

Equation (10) can be re-written as a function of the permanent income/wealth ratio and the growth rates of income and wealth by dividing both numerator and denominator by W_t:

$$\hat{\gamma} = \frac{G_w^n - 1}{\frac{P_t}{W_t}\frac{1-G_y^n}{1-G_y} + rn\frac{1+G_w^n}{2}} \tag{11}$$

where G_w is the annual growth factor for wealth, analogous to G_y for permanent labor income.

Using equation (11), we can estimate saving rates if we can observe individuals' W_t, W_{t+n}, P_t, and P_{t+n}. But for the households in the 1980 Census extract, we have only Y_{1980} and W_{1980}, and for the households in the 1990 Census, we have only Y_{1990} and W_{1990}. So we need to develop a method to estimate what the level of income and wealth would have been in 1990 for the households in the 1980 Census and the level of income and wealth in 1980 for the households in the 1990 Census, respectively. Following a similar method in Carroll (1994), for each Census separately we first regress income and wealth data on household characteristics whose changes over the decade can be predicted with reasonable accuracy (such as age) or which do not change at all (such as country of origin and date of origin). A particular household's income and wealth in the period when we do not observe that household is assumed to be given by the predicted income and wealth from the income and wealth regressions for the unobserved period for a consumer with the appropriately backdated or projected characteristics.

To be more precise, let the subscript i represent the households observed in the 1980 Census and j represent the households from the 1990 Census. We first run the following income regressions for each immigrant group k in the 1980 Census.

$$Y_{ik1980} = X_{i1980} b_{k1980} + v_{ik1980} \tag{12}$$

where Y_{ik1980} is labor income in 1980 of household i who immigrated from country

k. X_{i1980} is a set of variables indicating household characteristics. For the 1990 Census, we estimate a similar income regression:

$$Y_{jk1990} = X_{j1990} b_{k1990} + v_{jk1990}. \tag{13}$$

In X_{it} and X_{jt}, we include only variables whose changes between 1980 and 1990 can be predicted with reasonable accuracy. In particular, X_{it} includes age, sex, duration of residence, occupation, and education. While there are doubtless some households for whom education and occupation change, our sample includes only households whose head is older than 35, and Carroll (1994) shows that occupation and education tend to be fairly stable for households over age 25.

After we estimate the income equation for each year, the permanent labor income of household i in 1980 and the permanent income of household j in 1990 are assumed to be the fitted incomes of the equation (12) and (13), respectively. Then we assume that the permanent income of household i in 1990 can be represented by,

$$\hat{P}_{ik1990} = \hat{X}_{i1990} \hat{b}_{k1990}, \tag{14}$$

where $\hat{X}_{i1990}$ is the household characteristics we would expect to observe in 1990 for household i which is actually observed in 1980. Similarly we assume that the permanent labor income of individual j in 1980 can be estimated by,

$$\hat{P}_{jk1980} = \hat{X}_{j1980} \hat{b}_{k1980}. \tag{15}$$

For wealth, we adopt the same procedures: For each Census, we first regress wealth on the same X variables as in the income regression and get the fitted values of wealth in 1980 for household i and the fitted values of wealth in 1990 for household j. Then we assume that the wealth holdings in 1990 for household i can be estimated as

$$\hat{W}_{ik1990} = \hat{X}_{i1990} \hat{d}_{k1990} \tag{16}$$

and the wealth holdings of household j in 1980 can be estimated as

$$\hat{W}_{jk1980} = \hat{X}_{j1980} \hat{d}_{k1980}. \tag{17}$$

After estimating permanent income and wealth holdings in 1980 and in 1990 for all households i and j, we can calculate the growth rate of permanent income and wealth for each household. For each household i in the 1980 Census, the permanent income growth rate G_y is estimated as (suppressing household subscripts)

$$G_{iy} = [\hat{P}_{i1990}/\hat{P}_{i1980}]^{(1/10)} \tag{18}$$

and the growth rate of wealth is estimated as

$$G_{iw} = [\hat{W}_{i1990}/\hat{W}_{i1980}]^{(1/10)}. \tag{19}$$

These estimated growth rates are used to calculate the saving rates in the equation (11) for each household. Similar equations yield estimated growth rates for the consumers j in the 1990 Census. Note that this method yields two separate estimates of the average value of G_y and G_w for each country: one estimate using consumers from the 1980 Census and projecting X_{i1980} forward, and one estimate using consumers from the 1990 Census and projecting X_{j1990} backward.

After estimating individual saving rates of immigrants and native born Americans, we merge the two datasets and run the following regression to test the importance of cultural effects:

$$\gamma_h = b_0 + \sum_k [\beta_k + \delta_k D_h] R_{ik} + b_1 Z_h + e_h \tag{20}$$

In equations (20), γ_h denotes the saving rate of household h. D_h is the duration of residence in the United States for household h since immigration. R_{hk} is a dummy variable that is equal to one if household h belongs to immigrant group k, and equal to zero otherwise. Z_h is a set of control variables that measure other household characteristics that should be related to saving.

Carroll, Rhee and Rhee (1994) argue that the parameters β_k can be regarded as the sum of a general 'immigration effect' at the time of entry and country-specific 'cultural' effects at the time of entry. Here, a general 'immigration effect' is taken to mean the effect on saving that is common to all immigrants, while a 'cultural effect' is

taken to mean an effect on saving that is specific to the immigrants from a particular country. CRR indicate that if the *mean* value of *all* the β_k's is significantly different from zero the regression should be said to have identified a general immigration effect on saving, while if the β_k's *differ* significantly across country of origin, those differences should be taken to reflect 'cultural' effects on saving.

Over time, via assimilation, the behavior of immigrants may become more similar to that of the natives. In our model this would imply that δ_k's sign is the opposite of β_k's sign. If the sign of δ_k is different from the sign of β_k, then after $-\frac{\beta_k}{\delta_k}$ years in the country, the net immigration and cultural effects will reach zero. By analogy with the logic of the previous paragraph, the mean value of the δ_k's can be interpreted as the general assimilation effect, while any differences in δ_k's across country of origin could be taken to reflect the cultural effect on assimilation.

In sum, according to the interpretation of CRR, if all β_k's and all δ_k's are not statistically different from zero, we can say that there is no evidence of either immigration or cultural effects on saving: the saving rates of immigrants do not appear different from those of native born Americans. If we can reject the hypothesis that all β_k's are identical and all δ_k's are identical, we can conclude that there is evidence for a 'cultural' effect on saving that differs by country of origin.

3 Data

Our samples are from the 1980 and the 1990 Census of Population and Housing in the United States. We used the 5 percent sample (A Sample) which covers over 4 million housing units and is the largest among the three Public-Use Microdata Samples. Observations were deleted if the recorded income is topcoded,[6] if family income is less than $2000 in 1980 dollars, if the household contains more than one subfamily, if the house value is topcoded,[7] if the household has a mixed country of

[6] In 1980, individual income is topcoded at $75,000, and $140,000 in 1990

[7] Topcoded at $200,000 in 1980, $400,000 in 1990

origin, if household income is above the top 0.9985 percentile (around $200,000 in 1980, $300,000 in 1990) or if the household has a second mortgage.[8]

We further restrict our sample for our hypothesis test. We include only married couples where the head of household's age is greater than 35 and less than 50 in the 1980 Census and where the age is greater than 45 and less than 60 in the 1990 Census. The reason that we include only households whose head is older than 35 is to exclude temporary residents who might have different saving objectives from long term immigrants. We believe that the proportion of temporary residents is significantly smaller among middle-aged or elderly immigrants. Our households from the 1990 Census are ten years older on average than those from the 1980 Census because we try to track the same cohorts between 1980 and 1990. For a similar reason, we exclude households if the head is not married, since we believe their marital status is more likely to be changed between 1980 and 1990 than is the status of married couples. After these exclusions, we select only immigrants from the following 16 countries for which there were more than about 150 immigrant households in both Censuses: Argentina, Canada, China, Colombia, Cuba, Germany, Greece, India, Italy, Japan, Korea, Mexico, the Philippines, Portugal, Taiwan, and the United Kingdom. For comparison purposes, we also include about 900 randomly selected native born American households for each Census in our sample.

The labor income of a household is defined as the sum of the labor income of its individual members. The wealth of a household is the sum of financial wealth and housing equity. Since the Census does not report financial wealth directly, the financial wealth variable is constructed as the capitalized value of interest and dividend income.[9] The Census provides information on the current market value of housing, so we need to estimate the value of outstanding mortgage debt in order to

[8]We exclude housholds with a second mortgage because of the difficulty of estimating housing wealth for these households, given that the Census does not provide information on when and for how long the second mortgage is taken out. Fortunately, the number of households with second mortgages is not large: 3 percent of the total sample in 1980, and 6 percent in 1990. The proportion increased in 1990 as a result of changes in tax laws and deregulation of the financial industry.

[9]We capitalize the interest and dividend income using the nominal 10 year t-bill rate minus the current CPI inflation rate.

estimate housing equity. We assume that all home mortgages have 30 years maturity and that the household has been paying them down at the observed current payment rate from the date the household moved into its current housing unit. Then, using the information on the monthly mortgage payment, outstanding mortgage debt is estimated as the present value of future mortgage payments. In calculating the present value, we use the discount rates of 10.66 percent for the 1980 data and 9.81 percent for the 1990 data, the average mortgage rates for mortgages on existing homes for 1979 and 1989, taken from the Survey of Current Business. Housing equity is defined as the difference between the reported market value of the housing unit and the estimated present value of mortgage debt.[10]

Table 1 presents some descriptive statistics by country of origin, including average real wealth and income in 1980 dollars. Immigrants from Mexico, Colombia, Greece, and Cuba have low incomes in both Censuses, while immigrants from the U.K., Canada, Germany, Japan, the Philippines, and India have high incomes. The distribution of wealth across country of origin is similar to that of income. Over the decade, the wealth holdings of immigrants increased by about a factor of three, while the wealth holding of native-born Americans increased by one and half times. Table 1 also shows that Asian immigrants have, on average, a shorter duration of residence than the immigrants from Latin America or European countries.[11]

Table 2 and Table 3 report the distribution of educational attainment and the distribution of occupations of immigrants, respectively. As noted above, we assume that educational attainment and occupation do not change between 1980 and 1990. The results in Tables 2 and 3 are largely consistent with this assumption: differences in educational attainment and occupation across countries in 1980 resemble the dif-

[10] An alternative method of estimating housing equity is to calculate accumulated value of past mortgage payments including downpayment as in Carroll (1994). But this method does not account for changes in housing price and therefore, we think our method is better.

[11] Note that durations of residence in 1990 for most countries of origin are quite close to ten years more than durations in 1980. Of course, we restricted the 1990 sample to households who had been in the US for at least ten years. What the correspondence between 1980 and 1990 durations tells us is that we are probably doing a fairly good job in identifying the same cohorts of people in both Censuses.

ferences in 1990. The tables also show that there are large differences in educational attainment across countries. The educational attainment of immigrants from Italy, Mexico, and Portugal is lower than average whereas more than half of Indian and Taiwanese household heads have more than six years of college education. Given these differences in education, it is not surprising that we find that more than 40 percent of Mexican and Portugese household heads are blue collar workers, and over 60 percent of Indian, Japanese, and Taiwanese household heads are managerial or professional workers.

4 Estimation Results

Table 4 presents the results for the income regressions (the equations (12) and (13) and Table 5 for wealth regressions of the same specification. To allow differences in income and wealth profiles across different countries of origin, we run these regressions separately for each country.[12] Instead of reporting the results for 17 countries individually, Table 4 and Table 5 show the mean and the standard deviation of the estimated coefficients across the 17 regressions. Large standard deviations in the second and the fourth columns show that the estimated coefficients vary significantly across country of origin. Individual R-sqaureds for income regressions range from 6 to 32 percent with the averages of 18 percent for the 1980 samples and 16 percent for the 1990 samples. The average R-squareds for wealth regressions are 13 percent for the 1980 sample and 11 percent for the 1990 sample, respectively.

Table 6 reports the estimated saving rates for each country of origin. The first four columns report the annual growth rates of permanent labor income and wealth for the 1980 and the 1990 samples, respectively. The growth rates are estimated as explained in the equations (18) and (19). As expected, the growth rates estimated

[12]The income and wealth regressions include households whose heads are aged between 25 and 60, even though we will use these coefficient estimates to construct saving rates only for households whose heads are older than 35 and younger than 50 in 1980. We use the extra data because it improves the precision of our coefficient estimates in the income and wealth regressions.

using forward projection from the 1980 data (Gy_{80} and Gw_{80}) and using backward projection from the 1990 data (Gy_{90} and Gw_{90}) are very similar for all countries.

Table 6 shows that the income growth rates of immigrants are higher than those of natives, consistent with findings in other studies (e.g. Bloom and Gunderson (1989) and CRR). The annual growth rate of real labor income for natives was about 0.1 percent, consistent with the widespread finding that real wages stagnated during the 1980s in the US. Real income growth rates for Canadian, German, and Japanese immigrants were less than 1 percent, only modestly greater than the growth rate for natives. However, immigrants from Argentina, China, Greece, Italy, Korea and Taiwan experienced more than 2 percent annual labor income growth rates. There is even greater variation in growth rates of wealth. Immigrants from Colombia, Greece, India, Italy, Japan, and Portugal had greater than 10 percent real growth rates of wealth in the 1980s. For the other immigrants, the wealth growth rates are between 6 and 10 percent, still higher than the 5 percent figure posted by natives.

The sixth and seventh columns report the estimated saving rates for each country of origin, calculated using equation (11). All immigrants have higher saving rates than natives. Immigrants from Greece, Italy and Portugal had the highest saving rates, over twenty percent of income annually. Immigrants from Cuba, Mexico, the Phillipines, and Taiwan had the lowest saving rates, less than ten percent annually. The order of estimated saving rates of immigrants is quite different from what we observe from the cross country aggregate data reported in the last column.[13] In the aggregate data, the three Asian countries (Japan, Korea and Taiwan) have the highest saving rates. If cultural effects were an important source for cross country saving rate differentials, we would expect to see high saving rates for immigrants from these Asian countries. However, the results from our Census data show that

[13]The national saving rates are calculated using the Summers and Heston (1988) data. The gross national saving rate is defined as the ratio of gross domestic product minus private and public consumption expenditures over gross domestic product. The figures are the averages for the period 1979 to 1988.

their saving rates are not higher than those of other immigrants. Japanese saving rates are a little bit higher than the average saving rates of immigrants (14.5 percent for the 1980 samples and 14.7 percent for the 1990 samples), but Korean and Taiwanese saving rates are lower than the average. In Table 7, we try to see whether these results hold even after we control for other household characteristics.

Table 7 presents the results of our central test. It estimates the saving rate equation (20). The variable Z_h includes not only the dummy variables for education, occupation, and sex, which are used in the income and wealth regressions, but also several control variables which capture other household characteristics that might be related to saving behavior.[14] The first two columns report the results of the regressions when we do not allow for assimilation effects (i.e., in equation (20), δ_k is assumed to be zero). The first column reports the estimated coefficients of β_k and the second column reports their t-statistics. The β_k's are all positive, indicating that saving rates of immigrants are higher than that of natives by 2 to 24 percent. Columns three and four report the results of estimating the specification in which there are cultural effects on the level of the saving rate (the β_k's are allowed to differ) but not on the speed of assimilation (δ_k are constrained to be equal). The β_k's are all positive again and very close to the figures in the first column. The common assimilation effect, δ_k, is negligible (0.1 percent). As reported at the bottom of the table, an F test decisively rejects the hypothesis that there are no cultural effects on the level of the saving rate, i.e., that the β_k's are the same. However, as found in Table 6, the immigrants with highest saving rates come from Greece, Italy, and Portugal, not from Japan, Korea, and Taiwan.

The last two columns report the results when we allow for country specific assimilation speeds. Both β_k's and δ_k's are allowed to differ across countries of origin. The results show that β_k's are all positive again and δ_k's become significant. However, for many countries, δ_k has the same sign as β_k indicating no sign of assimilation

[14]The extra control variables are the income and wealth level at the beginning year (1980), location of residence, and the number of children.

in saving behavior. For the countries which have different signs of β_k from δ_k, the estimated assimilation speeds are quite diverse. The estimated speeds imply that it takes 27 to 62 years to close a 5 percent saving rate gap. The results for F tests are reported at the bottom of the table. The hypotheses that β_k's and δ_k's are the same, individually or jointly, across countries of origin are all rejected decisively.

In sum, we do find that the saving patterns of immigrants are significantly different across country of origin, in contrast with the results of Carroll, Rhee and Rhee (1994). Using their terminology, such a finding constitutes evidence of 'cultural' effects on saving. However, the 'cultural' effects that we find do not match up with the differences in aggregate saving rates across countries: The immigrants from countries with high saving rates, such as Japan, Korea, Taiwan, do not have higher saving rates than the other immigrants in our sample. Rather, we think our results suggest that immigrants from different countries may have had very different motivations for immigrating, and may come from very different socioecnomic groups within their home country. The country-specific 'cultural' effects identified in our regressions would then have to be interpreted as reflecting the common 'subculture' of the sample of people from each country who chose to immigrate to the U.S., rather than reflecting an overall 'national' culture for each country. As a result, while our results generally support the proposition that people with different backgrounds may have systematically different reactions to the same economic environment, the results do not provide any evidence to support the proposition that international saving differences are attributable to such cultural differences.

5 Conclusion

This paper tests for cultural effects on saving rates by comparing the saving behavior of immigrants to the United States from different countries, using data from the 1980 and 1990 Censuses. Since Census data do not provide information on consumption expenditures, we estimate household saving rates using the information on reported

wealth holdings and income.

Using the 1980 and 1990 Census data, we regress individual wealth holdings and income on personal characteristics whose changes can be perfectly predicted between two census years, such as age and race. The coefficients from these regressions are then used to estimate future or past wealth holdings and income. A particular household's future or past income or wealth holdings are assumed to be given by the predicted values of income or wealth holdings after considering the predictable changes of personal characteristics. Then the household saving rates are estimated as the ratio of changes in wealth for years between 1980 and 1990 to the sum of income during the same period.

Our empirical results show that the saving patterns of immigrants are significantly different across country of origin, contrary to the result of Carroll, Rhee and Rhee (1994). However, our findings do not provide supporting evidence for the importance of cultural effects in explaining international saving rate differentials, since the saving patterns of immigrants do not resemble the national saving patterns of the countries they come from. The immigrants from countries with high saving rates, such as Japan, Korea, Taiwan, do not have higher saving rates than the other immigrants in our sample. One plausible explanation of our results might be that households immigrate to the U.S. from different countries for very different reasons and from different socioeconomic strata, and that the reason for immigration or the immigrant's initial socioeconomic stratum is strongly correlated with the saving behavior of the immigrant after arrival in the U.S.

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TABLE 1
DESCRIPTIVE STATISTICS

Country	obs	income	wealth	age	fsize	kids	Years in US
1980 Census							
ARGENTINA	186	23014	27496	42.3	3.94	1.69	10.51
CANADA	676	31869	42991	43.7	3.97	1.67	14.09
CHINA	971	23486	36364	42.8	4.46	1.98	11.45
COLOMBIA	445	20702	12498	41.6	4.47	2.06	11.82
CUBA	2115	23162	20923	43.8	4.03	1.52	13.20
GERMANY	637	30300	51997	44.4	3.57	1.32	19.47
GREECE	717	20497	27077	42.9	4.21	1.92	13.77
INDIA	1095	28598	26700	40.2	3.99	1.81	8.23
ITALY	1650	21878	27577	43.3	4.48	2.08	15.75
JAPAN	385	32482	18450	40.4	3.79	1.71	6.35
KOREA	1041	24724	23216	41.3	4.38	2.08	6.58
MEXICO	4795	16887	12946	41.2	5.85	3.42	12.90
PHILIPPINES	1191	31547	31167	41.3	4.71	2.24	10.34
PORTUGAL	719	22249	17620	42.1	4.36	1.97	9.69
TAIWAN	202	27837	48328	40.4	4.1	1.87	9.07
U. K.	589	32685	41617	43.1	3.86	1.67	11.96
U. S. A.	961	26969	32938	42.1	4.04	1.78	.
1990 Census							
ARGENTINA	149	29900	69567	52.7	3.36	0.62	22.41
CANADA	466	33084	79961	54	2.76	0.25	25.22
CHINA	798	28547	86494	53	3.84	0.79	21.56
COLOMBIA	340	25624	40647	51.3	3.86	0.95	21.38
CUBA	1616	26412	45310	53.7	3.28	0.47	23.01
GERMANY	507	32062	101881	54.5	2.68	0.21	30.12
GREECE	541	25365	85333	52.8	3.76	0.8	24.10
INDIA	806	38535	78062	49.9	3.89	1.21	18.45
ITALY	1373	30278	108925	53.1	3.82	0.61	25.96
JAPAN	141	33014	83685	51.7	3.38	0.85	23.63
KOREA	671	30506	59263	51.2	3.85	0.93	16.20
MEXICO	4333	19214	29174	50.8	5.14	1.75	22.30
PHILIPPINES	1200	37306	65414	51.1	4.22	1.11	20.31
PORTUGAL	616	28061	84251	51.4	3.7	0.72	19.31
TAIWAN	174	36144	84626	51.6	3.63	0.98	20.07
U. K.	393	36260	83881	53.7	2.85	0.29	23.12
U. S. A.	859	28585	51027	52	2.82	0.41	.

TABLE 2
Distribution of Educational Attainment

Country	obs	Elementary	Middle	High	College	Graduate
1980 Census						
ARGENTINA	186	17.2	10.2	46.7	13.4	12.3
CANADA	676	15.6	22.6	35.5	12.1	14.0
CHINA	971	25.5	9.8	24.7	14.3	25.5
COLOMBIA	445	18.6	15.7	50.5	7.4	7.6
CUBA	2115	33.2	8.1	41.1	11.2	6.1
GERMANY	637	9.8	10.2	56.8	12.8	10.2
GREECE	717	47.5	13.2	30.9	3.9	4.3
INDIA	1095	2.1	3.7	13.4	17.0	63.5
ITALY	1650	67.0	8.1	21.2	1.9	1.6
JAPAN	385	2.6	3.3	17.6	57.6	18.7
KOREA	1041	3.0	3.8	28.9	40.6	23.5
MEXICO	4795	74.8	9.0	13.9	1.3	0.7
PHILIPPINES	1191	4.4	5.0	25.3	45.8	19.3
PORTUGAL	719	74.6	5.5	18.0	1.1	0.5
TAIWAN	202	1.9	0.9	13.3	20.3	63.3
U. K.	589	1.5	5.4	50.5	23.0	19.3
U. S. A.	961	9.1	13.3	56.7	12.9	7.9
1990 Census						
ARGENTINA	149	16.7	17.4	43.6	5.3	16.7
CANADA	466	17.3	23.8	39.0	8.5	11.1
CHINA	798	22.8	14.5	31.4	13.1	18.0
COLOMBIA	340	14.7	27.0	47.3	5.8	5.0
CUBA	1616	30.0	19.4	36.4	7.6	6.3
GERMANY	507	8.8	15.9	58.3	6.9	9.8
GREECE	541	42.5	21.6	30.3	3.1	2.4
INDIA	806	1.2	2.9	13.4	23.9	58.4
ITALY	1373	57.6	16.7	22.6	1.4	1.4
JAPAN	141	4.2	8.5	48.2	24.1	14.8
KOREA	671	5.0	5.0	38.1	30.8	20.8
MEXICO	4333	73.3	12.5	12.7	0.7	0.5
PHILIPPINES	1200	3.1	3.5	39.7	39.5	13.9
PORTUGAL	616	65.2	16.4	16.5	1.4	0.3
TAIWAN	174	1.7	2.3	20.6	9.7	65.5
U. K.	393	1.2	10.1	58.5	16.0	13.9
U. S. A.	859	6.7	12.1	60.3	11.8	8.9

TABLE 3
Distribution of Occupations

Country	obs	MGT	TECH	SVC	FARM	PRD	LBR
1980 Census							
ARGENTINA	186	24.1	17.2	9.1	1.0	29.5	18.8
CANADA	676	37.4	17.1	3.2	1.4	26.7	13.9
CHINA	971	34.2	14.3	36.4	0.5	7.0	7.4
COLOMBIA	445	15.2	14.8	11.0	0.6	25.3	32.8
CUBA	2115	20.7	18.2	9.6	1.3	25.4	24.5
GERMANY	637	34.2	10.6	5.3	0.9	38.4	10.3
GREECE	717	20.5	8.6	26.0	0.4	25.9	18.4
INDIA	1095	64.0	20.7	2.0	0.8	5.7	6.6
ITALY	1650	6.6	5.0	14.4	3.1	36.5	34.2
JAPAN	385	65.4	18.4	3.3	4.6	4.6	3.3
KOREA	1041	34.1	26.0	6.4	0.9	16.1	16.3
MEXICO	4795	4.1	5.0	9.2	14.7	24.0	42.7
PHILIPPINES	1191	34.8	28.2	10.9	1.9	12.0	12.0
PORTUGAL	719	2.7	4.5	8.0	5.8	23.6	55.0
TAIWAN	202	69.3	18.3	7.9	0.5	1.4	2.4
U. K.	589	49.7	13.4	2.3	1.0	24.7	8.6
U. S.	961	27.7	18.4	7.0	3.6	22.4	20.6
1990 Census							
ARGENTINA	149	27.5	16.1	13.4	0.0	25.5	17.4
CANADA	466	31.9	20.8	4.0	3.2	27.9	12.0
CHINA	798	32.3	15.7	35.7	0.3	7.3	8.4
COLOMBIA	340	17.0	18.5	11.7	0.2	23.8	28.5
CUBA	1616	18.2	23.1	10.8	1.3	23.0	23.3
GERMANY	507	30.3	13.2	5.9	0.7	39.8	9.8
GREECE	541	22.3	12.7	26.0	0.0	24.7	14.0
INDIA	806	64.5	22.4	1.6	0.6	5.9	4.8
ITALY	1373	8.8	7.3	16.3	3.4	38.3	25.6
JAPAN	141	44.6	14.8	13.4	15.6	8.5	2.8
KOREA	671	32.1	34.7	7.4	1.3	13.7	10.5
MEXICO	4333	4.3	7.3	12.0	18.4	21.8	36.0
PHILIPPINES	1200	34.3	27.5	10.5	2.5	13.3	11.6
PORTUGAL	616	3.9	7.1	10.3	6.0	28.0	44.4
TAIWAN	174	66.6	21.2	5.7	0.5	5.1	0.5
U. K.	393	42.2	17.0	3.5	1.7	27.7	7.6
U. S.	859	25.3	20.4	7.9	4.0	20.9	21.1

Occupation is coded as : MGT for managers and professionals, TECH for technicians, SVC for service workers, FARM for farmers, fishers, and forestworkers, PRD for producers, and LBR for labor workers.

TABLE 4
Income Regression Results

		1980		1990	
Country	N	mean	s.d.	mean	s.d
INTERCEPT	17	-22733.8	19370.4	-23560.3	56752.5
AGE	17	1779.2	938.5	1958.0	1665.2
AGE*AGE	17	-18.4	10.2	-21.8	11.5
EDMID	17	1558.5	6434.1	-6241.0	19541.5
EDHI	17	3547.8	9557.0	-1260.7	28094.0
EDCOLL	17	785.0	13775.3	3140.6	28791.5
EDGRAD	17	-946.3	11959.0	4935.2	30010.3
OCCFFF	17	-6010.2	68791.6	29372.4	81037.6
OCCMP	17	4683.9	9616.5	1392.0	28775.0
OCCPCR	17	1010.5	7174.6	-1303.5	23227.3
OCCSR	17	-2789.2	6856.3	-4611.8	29903.8
OCCTSA	17	1732.7	8733.6	801.9	25582.6
AGE*EDMI	17	-17.7	201.5	152.6	389.3
AGE*EDHI	17	-35.9	238.6	103.7	589.2
AGE*EDCO	17	115.3	331.1	73.7	604.8
AGE*EDGR	17	187.1	296.0	161.4	631.2
AGE*OCCMP	17	-14.7	213.1	123.5	695.4
AGE*OCCTSA	17	-14.8	186.8	64.2	646.7
AGE*OCCSR	17	-9.9	162.0	84.9	738.6
AGE*OCCFFF	17	66.1	1640.7	-505.9	1342.7
AGE*OCCPCR	17	27.3	220.7	102.1	587.6
DURATION	16	287.2	274.0	126.2	177.4
R-square	17	0.1808	0.0682	0.1632	0.0609

* Mean and Std Dev are mean and standard deviation of estimated coefficients across the 17 country regressions.

TABLE 5
Wealth Regression Results

		1980		1990	
Country	N	mean	s.d.	mean	s.d
INTERCEPT	17	-54452.7	39710.0	-4406.8	161429.4
AGE	17	2362.5	1574.5	1901.8	4965.3
AGE*AGE	17	-23.2	16.0	-28.6	46.2
EDMID	17	768.3	23645.8	-67200.0	137459.0
EDHI	17	3332.0	24964.7	-53666.4	105593.8
EDCOLL	17	2748.6	37198.3	-55319.4	124802.8
EDGRAD	17	-14444.7	36515.0	-64584.5	120234.6
OCCFFF	17	-40136.3	100249.0	16155.9	246922.8
OCCMP	17	712.2	20108.7	-43479.0	73211.8
OCCPCR	17	3062.9	17572.8	-10786.2	37703.9
OCCSR	17	6410.9	25508.1	-26953.3	53181.4
OCCTSA	17	283.5	15828.4	-43511.0	68481.9
AGE*EDMI	17	64.7	574.9	1346.2	2449.2
AGE*EDHI	17	129.9	653.5	1110.9	2050.1
AGE*EDCO	17	212.7	999.2	1308.1	2446.5
AGE*EDGR	17	714.7	973.9	1542.2	2255.0
AGE*OCCMP	17	247.2	574.4	1341.1	1857.4
AGE*OCCTSA	17	127.1	417.2	1270.4	1703.4
AGE*OCCSR	17	-217.2	599.6	625.7	1345.7
AGE*OCCFFF	17	985.2	2379.2	71.9	4141.0
AGE*OCCPCR	17	115.3	618.1	487.4	1051.5
DURATION	16	1223.6	590.9	1587.0	913.2
R-square	17	0.1325	0.0360	0.1099	0.0394

* Mean and Std Dev are mean and standard deviation of estimated coefficients from 17 country regressions.

TABLE 6
Income and Wealth Growth Rates and Saving Rates

Country	Percent Growth Per Year				Saving Rates		Aggregate
	Gy_{80}	Gy_{90}	Gw_{80}	Gw_{90}	γ_{80}	γ_{90}	Saving
ARGENTINA	2.37	2.15	9.07	9.54	12.66	14.24	17.25
CANADA	0.41	0.29	6.83	6.98	10.68	11.11	25.34
CHINA	2.31	2.16	9.14	9.43	17.14	18.14	.
COLOMBIA	1.77	1.91	12.39	12.67	11.40	11.84	20.47
CUBA	1.39	1.44	8.09	8.21	9.16	9.21	.
GERMANY	0.60	0.56	6.80	7.10	13.36	14.41	23.68
GREECE	2.20	2.23	12.25	12.10	22.38	22.61	10.68
INDIA	2.95	2.92	11.28	11.21	14.37	14.45	18.72
ITALY	2.56	2.70	14.69	14.59	27.77	27.81	21.47
JAPAN	0.63	0.89	16.12	9.96	17.11	15.91	33.08
KOREA	2.01	2.07	9.64	9.93	11.84	12.00	30.39
MEXICO	1.14	1.24	9.15	9.42	9.29	9.37	25.50
PHILIPPINES	1.79	1.81	7.80	7.73	9.30	9.36	19.54
PORTUGAL	1.86	1.91	16.44	16.65	24.57	24.95	18.79
TAIWAN	2.43	1.97	5.84	4.82	10.59	8.84	34.68
U. K.	1.28	0.98	7.37	7.29	11.05	11.17	17.92
U. S. A.	0.08	0.10	4.96	5.03	6.72	6.88	13.94

Definition of variables : Gy is income growth rate (=100 times $(G_y - 1)$ as defined in the text), Gw wealth growth rate, γ is saving rate, Aggregate Saving is from Summers-Heston dataset for period 1979-1988.

TABLE 7
Saving Rate Regression Results

Variable	coeff	t-value	coeff	t-value	coeff	t-value
ARGENTINA	0.0686	18.61	0.0675	17.90	0.0198	2.619
ARGENT*DUR					0.0030	7.367
CANADA	0.0618	30.50	0.0607	27.89	0.0582	13.396
CANADA*DUR					0.0002	0.968
CHINA	0.1114	67.60	0.1103	60.49	0.0755	23.030
CHINA*DUR					0.0022	12.684
COLOMBIA	0.0407	16.72	0.0395	15.31	0.0129	2.264
COLOMB*DUR					0.0017	5.386
CUBA	0.0194	17.20	0.0182	12.70	0.0370	13.427
CUBA*DUR					-0.0010	-7.036
GERMANY	0.0858	42.59	0.0843	37.20	0.0379	6.561
GERMAN*DUR					0.0019	8.779
GREECE	0.1653	85.26	0.1641	77.10	0.1630	38.129
GREECE*DUR					0.0001	0.516
INDIA	0.0751	46.84	0.0741	42.27	0.0555	17.809
INDIA*DUR					0.0015	7.507
ITALY	0.2414	193.21	0.2401	154.71	0.2667	87.958
ITALY*DUR					-0.0012	-9.144
JAPAN	0.0907	30.40	0.0899	29.53	0.1008	23.131
JAPAN*DUR					-0.0008	-3.097
KOREA	0.0377	22.26	0.0368	20.41	0.0568	18.840
KOREA*DUR					-0.0018	-7.865
MEXICO	0.0470	57.70	0.0458	38.64	0.0418	25.951
MEXICO*DUR					0.0002	3.632
PHILIPPINES	0.0273	19.23	0.0262	16.34	0.0475	16.259
PHILIP*DUR					-0.0013	-7.878
PORTUGAL	0.2147	115.87	0.2138	109.10	0.2106	55.112
PORTUG*DUR					0.0002	1.227
TAIWAN	0.0442	12.61	0.0432	12.10	0.0603	8.478
TAIWAN*DUR					-0.0011	-2.648
UK	0.0473	21.87	0.0463	20.24	0.0434	10.065
UK*DUR					0.0002	1.078
DURATION			0.0001	1.41		
R-Square	0.8967		0.8967		0.8987	
Tests[a]	F	p-value	F	p-value	F	p-value
C(i)=C(j)	2089.10	0.0001	2088.45	0.0001	450.41	0.0001
D(i)=D(j)					45.08	0.0001
BOTH					1087.49	0.0001

a) In tests, C(i)=C(j) denotes the test for the hypothesis that all country dummies are equal, D(i)=D(j) for the hypothesis that all coefficients on duration variable are equal, and BOTH for the hypothesis that both coefficients on country dummies and duration variables are equal across countries.