FERTILITY, MIGRATION, ALTRUISM & GROWTH*

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Fertility, Migration, Altruism and Growth

Consider migration to a higher income region as a human capital investment in which parents bear migration costs and children share returns. Migrants from a population with heterogeneous intergenerational discount rates will be self-selected on intergenerational altruism, or patience. Selection on patience provides an alternative explanation for Chiswick's classic earnings-overtaking result. Other supporting evidence is: 1) Soviet Jews who migrate to Israel despite high migration costs are self-selected to have more children than members of the same birth cohort who migrate later when costs are low. We distinguish selection from treatment effects using a comparison group of women who migrate after childbearing age. 2) Immigrants favor bequests more and spend more time with their grandchildren in the U.S. Health and Retirement Survey. 3) Immigrant-absorbing countries like the U.S. have higher fertility than other countries at comparable income levels. Selection on patience implies that immigrant-absorbing regions will grow faster, or have higher per capita income, or both.

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I. Introduction

The recent transition of much of the OECD to negative population growth raises interesting questions about fertility in the developed world.[1] Many middle and high income countries display persistent differences in fertility unexplained by differences in per capita income or by women's labor force participation. Are these due to persistent differences in preferences and norms or a response to local economic and social conditions? How much can local conditions influence intimate decisions like family size? The apparent assimilation of local fertility rates by immigrants [Blau, 1992] provides evidence that they do. Yet assimilation is hard to distinguish from self-selection. An alternative explanation for apparent assimilation is congregation of similar types to the same countries.

In this paper we pursue an economic theory of self-selection on fertility, based on Becker's [1981] concept of intergenerational altruism. We argue that migration should properly be viewed as a human capital investment in which the welfare of descendants is a critical concern. In the face of high migration costs and returns that are disproportionately realized by descendants, intergenerationally altruistic families are more likely to migrate. The importance of intergenerational altruism in migration decisions has appeared in the work of Borjas [1993] and Tcha [1996].[2] Our innovation is the observation that immigrant families self-selected on altruism are likely to either have more children, or to have higher quality children (depending on relative prices). Thus positive selection of immigrants on fertility is suggested by theory. Like Chiswick's [1977] classic paper on self-selection of immigrants on ability, our theory could explain the earnings of immigrants eventually exceeding those of natives, but we shall concentrate on the implications of selection on altruism for fertility.

Figure 1 graphs total fertility rates[3] against income per capita in 1992 for a sample of countries with GDP per capita above about $2000. The line illustrates the well known negative correlation of income and fertility, fitted here as a linear regression of the logarithm of fertility on the logarithm of per capita GDP. The negative time series correlation for individual countries, the "fertility transition" is also well established. With the exception of Sweden and Ireland all the European countries in this sample and Japan are below replacement levels of total fertility while the U.S. (at TFR=2.1) is above. If these differences persist they imply strong divergence in population.

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[1] See Andorka [1986] surveys the literature on declining European fertility.

[2] Tcha [1996] argues that altruism towards children explains why general wages in the destination region of internal migrants are more highly correlated with migration flow than occupation-specific wages of the migrant. Mincer [1978] analyzes the role of altruism towards spouses in internal migration decisions.

[3] The total fertility rate is the sum of current age-specific birthrates across all ages. Here and throughout this paper we use the term fertility to refer to bearing of children who survive their first few months of life. Infant mortality rates in the Soviet Union and Israel in this period are low.

Two categories of countries are disproportionately above the fertility transition line. The first are predominantly Muslim countries. The economics of pronatalism in traditional and fundamentalist Islam is discussed elsewhere [Berman 1998]. The second category are countries historically populated almost entirely by voluntary migration over the last few centuries: the Western Hemisphere, Australia and Israel.[4] That positive correlation between historical immigrant-absorption and fertility motivates the rest of this paper.

Is that positive correlation due to the effect of living in a particular place, or to selection? Migration between countries with differing fertility rates can provide information selection. Immigrants from low income, high fertility countries to the United States who arrive as young women have fertility rates very similar to those of American women [Blau, 1992]. This is often interpreted as *assimilation*. Yet they also have observable characteristics that would predict negative fertility *selection* such as high education and income, when compared to women who remain in their country of birth.

In studying self-selection Jewish immigrants to Israel from Eastern Europe are interesting for a three reasons.[5] First, they come from countries with unusually low fertility, considering their relatively low income per capita, as shown in Figure 1. Second, Soviet Jewish women have high rates of educational attainment. This may mute the possibility for positive self-selection of migrants on education, which would imply negative selection on fertility, which apparently occurred in previous studies. Third, and most importantly, they provide large samples of immigrants from waves of migration by the same birth cohorts, but at different migration costs. The first wave migrated at very high and uncertain costs in the 70s and early 80s, while the second wave exploited a surprise opportunity to migrate at relatively low cost from 1989 onwards. This allows us to test a key implication of our model, that selection on intergenerational altruism is when migration costs are high (so that the net present value of the migration investment is low).

In the figure Israel is a positive outlier, with relatively high fertility (2.8 lifetime births per woman) for its income and female labor force participation rates. Friedlander and Feldmann [1993] and Berman [1998] point out that among Israeli Jews this high fertility rate is due mainly to the fertility of the orthodox and ultra-orthodox communities, who average 4.5 and 7 births per

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[4] Many European countries currently have higher proportions of foreign born among residents than do countries in the Western hemisphere. The migration costs incurred to the Western hemisphere were probably larger, both in direct costs and in the loss of country specific human capital such as language.

[5] Other aspects of this migration have attracted the attention of labor economists. The remarkably successful integration of the huge recent influx of (formerly) Soviet immigrants into the Israeli labor market is the subject of studies by Flug and Kasir [1993], Eckstein and Weiss [1998], Friedberg [1997], Weiss and Gotlibovski [1995]. The roles of language acquisition and education in the economic assimilation of previous waves of migration has been studied by Chiswick [1997] and Friedberg [1995], respectively.

woman respectively. Israel's secular Jewish majority averages about 2.1 births per woman, like the U.S.

Women immigrating from Eastern Europe to Israel do much better than "assimilating" the local fertility rate. Consider two arrival cohorts, both born around 1950. Those who arrived in the early 1970s, spending their fertile years in Israel, have 2.5 lifetime children by the 1990s. When compared with secular Israeli women, they "overtake" the natives in fertility, just as Chiswick's immigrants to the U.S. overtake the natives in earnings. Women from the same birth cohort who arrived in the 1990s, after spending their fertile years abroad, have 1.7 lifetime children, which is close to the USSR TFR of 1.5.[6]

Can this 0.8 child difference in fertility can be treated as the effect of moving to a Western economy where housing is less cramped and basic household goods are supplied reliably at lower prices? If so, it would predict a large baby boom in former communist countries when their economic transition is finally completed. The same prediction may apply to emigrants from those countries. Thus the distinction between treatment and self-selection in the fertility of migrants is important for prediction. We use a comparison group of women who migrate at high cost too old to experience a treatment effect in order to separately identify treatment and self-selection effects. *That method reveals that the 0.8 child difference in fertility is largely due to self-selection.* The literature has stressed the importance of country of birth in measuring selection effects [Borjas 1987, 1994; Friedberg 1995]. We also develop an alternative identification method which predicts the stock of children at home and imposes a functional form on years since migration and "fertile" years since migration to identify the treatment and selection effects. That method also results in large estimated selection effects.

Evidence for positive self selection of migrants in fertility is consistent with intergenerational altruism playing an important role in migration decisions. Selection on altruism implies, in turn, that immigrant-absorbing countries will tend to behave like doting parents, investing more in the welfare of their children either through faster accumulation of human and physical capital, or through higher fertility, or both. That mechanism suggests permanent differences in population growth or per-capita income, or both, between the immigrant absorbing regions and other regions.

To distinguish selection on altruism from other reasons for selection on fertility we examine other testable implications of the model, finding that among U.S. retirees, immigrants are significantly more likely to a) believe that bequests are important and b) spend time with their grandchildren. Those effects are robust to the inclusion of controls for the shadow value of time and other socio-economic characteristics.

[6] A more comparable figure would be 1.7. The USSR TFR dropped in the mid 1990s to 1.5, but was stable at 1.7 during the 1980s. The drop was due to reduced fertility of cohorts younger than those we report on.

Section II presents the theory, which is a straighforward extension of Becker [1991]. In section III we examine the implication that immigrants are altruists. Section IV presents estimates of selection and treatment effects on fertility for Soviet immigrants to Israel. Section V concludes.

II. Self-selection of Immigrants on Fertility and Altruism

Migration is at least partially an investment in human capital. Even the wealthiest immigrants can hardly ignore the financial aspects of such a decision for themselves and for their children. Migration is expensive and expensive to reverse, especially for immigrants from Eastern Europe before 1989. Thus the appropriate horizon for this investment is intergenerational.

Consider a couple maximizing an intergenerational utility function in the tradition of Becker [1981], Razin and Ben-Zion [1975] and Becker and Barro [1988]:

$$U = 2v(c_0) + \rho(n+2)v(c_1)$$

where the couple has n children. The parents consume c_0 each in period 0 and they and the children consume c_1 each in period 1. v(.) is assumed to be concave. Here ρ represents both intergenerational altruism and a discount factor for future utility but we call it simply altruism since that resonates better with our theme.

The couple cannot borrow so intertemporal saving can only be performed by investing in human capital, a, by migrating, or by having children. This investment cost includes all pecuniary and nonpecuniary costs of migration, including language acquisition and loss of country specific human capital. The migration investment is not a function of the number of children (all of whom are assumed to migrate with the parents), to stress the nonpecuniary aspects. The migration investment has a return for both parents and children, all of whom will realize a higher wage in the destination country. Parents work in the first period at wage w_0 and all family members work in the second period at wage w_1 .

$$c_0 = w_0 - kn - a ,$$

$$c_1 = w_1(1+ra) ,$$

$$a \geq 0 ,$$

$$n \geq 0 .$$

For simplicity, we rule out migration or other investments by children. Though migration is a discrete choice we treat it as continuous to illustrate the nature of the solution. (Alternatively, we could imagine a continuum of places to migrate to, with a linear envelope of costs and returns.)

Maximizing utility by choice of number of children, n, and investment in migration, a, yields the first order conditions:

$$2kv'(c_0) = \rho\ v(c_1)$$

$$2v'(c_0) = \rho(n+2)w_1rv'(c_1)$$

That is, the cost of a child in foregone utility equals the discounted benefit and the cost of investment is equal to its discounted return. Now consider heterogeneity in altruism, .[7] In the neighborhood of the maximum (assuming an interior solution), second order conditions can be shown to yield[8]

$$\frac{da}{d\rho} > 0 \quad and \quad \frac{dn}{d\rho} > 0 \quad .$$

In short, immigrants self select on altruism and altruistic couples prefer more children, implying positive selection of immigrants in fertility.[9]

III. Altruism of Immigrants: Bequests and Doting Grandmothers in the U.S.

The model's prediction on the altruism of voluntary immigrants toward future generations is testable using indicators of attitudes to children and grandchildren. The U.S. Health and Retirement Study (HRS) provides two such indicators: Attitudes toward bequests and time spent with grandchildren. The 1992 wave interviewed a representative sample of 7,600 persons aged 51-61 in 1992, and spouses, (12,600 persons in all). It asked a set of questions designed to analyze interrelationships between retirement, health, income and wealth.[10] Questions included cover demographics, financial and housing status, employment and retirement plans, health insurance, life insurance and relationship with siblings. In couples only the member deemed most knowledgeable about financial matters answered the financial status questions.

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[7] We assume that spouses share the same ρ. Mating of likes seems plausible here, since co-ordinated consumption within a couple argues for agreement on savings decisions.

[8] See Appendix for a proof. The partial second derivatives $U_{n\rho}$ and $U_{a\rho}$ are positive but the cross-partial $U_{na} = 2kv''(c_0) + \rho w_1rv'(c_1)$ has an ambiguous sign. The first term is negative, reflecting the higher forgone income associated with migration cost a for large families due to the concavity of $v(c_0)$. The second term is positive, reflecting the higher returns to migration for larger families. In the neighborhood of a maximum the first two cross-partial derivatives must dominate, which is key to the result.

[9] The positive effect of altruism on fertility generalizes to some but not all models that allow investment in both quality and quantity of children. If we think of child quality as capital per capita then the Ramsey Growth model with endogenous fertility is a generalization. In some versions of that model fertility increases in altruism (e.g. Becker and Barro [1988]; Barro and Becker [1989]) while in others the effect is ambiguous (Razin and Sadka [1995]).

[10] For details about the HRS see http://www.umich.edu/~hrswww/overview.

Table 1 reports descriptive statistics for our two measures of altruism and a set of possible predictors. The left panel reports means and standard deviations for the 6686 observations for which observations on the full set of variables was available. Respondents were asked to choose if leaving an inheritance was 1 - "not important," 2- "somewhat important," or 3- "very important." The mean value was 1.96. 10% of respondents are immigrants, 49% are women and average net worth is $210,000. Religious observance is measured on an increasing scale from 1 to 5, with a mean of 2.9. The right panel reports on the 551 working grandmothers who reported nonzero hours worked per week and answered all these questions. They averaged 832 annual hours with their grandchildren and 7% were immigrants.

The left panel of Table 2 reports a linear regression of the bequest measure on potential predictors. The first specification includes only the immigrant indicator and the religious observance measure. Both coefficients are positive and significant. The coefficient on "immigrant," at .175, is over 5 times the size of that on religious observance, meaning that immigrant status predicts a larger increase than does a shift from the lowest to the highest category of observance.[11] Including measures of wealth, schooling and the wealth of children does little to change that coefficient on immigrant status. It is also robust to including the number of children and grandchildren.

The HRS also asks individuals if they will leave a large inheritance. Answers are coded in order of increasing inheritance from one to five. We don't think that this is a reliable indicator of altruism since it will be influenced by wealth and children's wealth. The model suggests that immigrant families will have faster asset accumulation across generations than others in both human and physical capital. Intergenerational consumption smoothing in that case may imply pecuniary transfers from children to parents rather than inheritance. But, in the interests of full disclosure, the right panel of Table 2 reports similar regressions predicting the answer to the inheritance question. For comparability, these results are reported in the same format as those in the left panel. Though the coefficient on immigrant is negative in the leftmost column of the right panel, it becomes less so when net worth is included and becomes negative when a measure of children's wealth is included. Nowhere is it statistically significant.

Table 3 reports similar regressions predicting the hours a grandmother spends with grandchildren. The leftmost column of results reports that immigrant grandmothers average 203 more annual hours with grandchildren than native grandmothers. That estimate is robust to conditioning on hours worked. Adding age, marital status and especially "years since migration" increases that estimate to 759 hours a year more with grandchildren, which is reduced by 18 hours in each year since migration. Accounting for net worth and grandchildren increases the estimate to 1160 hours per year (in the first year), while adding schooling, children and especially children's wealth, reduces the estimate to 963 hours per year. Schooling has a negative coefficient, perhaps

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[11] The categorical nature of the inheritance variable suggests using a limited dependent variable analysis rather than linear regression. We chose linear regression in order to obtain simple, interpretable coefficients. The statistical content of the estimates in Table 2 is essentially unaffected by using ordered probit analysis instead.

reflecting higher shadow value of time. Children's wealth also has a negative coefficient, suggesting specialization within the family in child care. Estimates in the first, third and fourth columns differ significantly from zero at the 5% level.

The tables cannot be interpreted as proof that immigrants are more altruistic than natives since we can't rule out the possibility that some key variable has been omitted. Most reasonable candidates have been included, though, so these results are suggestive. They are consistent with the stereotypes of immigrant parents saving for their children and of immigrant mothers moving into college dormitories to cook and clean at exam time.

An important shortcoming of this data is that not all immigrants are self-selected in our model. If the net present value of migration is high enough, even people with high discount rates will take on a migration investment. That may be the case for migration through reunification of families, for example. In a causal interpretation of the regressions in the table, the inclusion of the high discount (low altruism) individuals will bias coefficients toward zero. We turn now to data that allow us to distinguish high from low cost migrations.

IV. Migration and Selection: Evidence from Soviet Jewish Migration to Israel

The Institution: High and Low cost waves of Soviet Migration to Israel

Changes in migration policy in the Soviet Union allow us to compare immigrants in high and low migration cost regimes. In that sense they provide a "natural experiment" (i.e., a plausibly exogenous source of variation) to study how migration cost affects selection in fertility. Figure 2 illustrates the time series of immigration to Israel from the (former) Soviet Union from 1960 through 1996. This is voluntary migration. It occurred in spurts, responding to changes in the home country policy toward migration on the one hand and to changes in the perceived risk of staying for Jews on the other. Over time Israel became a relatively attractive destination, as per capita income surpassed that in the Soviet Union and her security stabilized. Exit permits began to be granted in significant numbers in the early 1970s, though at high cost. In the 1982 the flow of immigrants shifted to the U.S. which temporarily expanded its' definition of refugee status. In 1989 the CIS conducted a major policy shift, removing restrictions and allowing free migration of Jews to Israel, while the U.S. reduced access through refugee status

It's important to stress that migration out of the East Block up till 1988 was a fairly expensive venture. Property was often confiscated, an applicant's right to work would often be suspended, heavy fees were imposed and the status of relatives in the communist party may have been compromised. In contrast, migration to Israel since 1989 has been much easier, both because of reduced restrictions in the countries of origin and because of surprisingly positive economic and social outcomes in Israel for immigrants.

Data

The Israel Central Bureau of Statistics (CBS) Labor Force Survey (LFS) randomly samples approximately 22,000 households per year and surveys individuals aged 15 and older to generate about 100,000 annual observations. We pool 23 years of LFS incoming cohorts from 1974 through 1996 to generate large samples of (formerly) Soviet immigrants for analysis.

Predicting the number of children

Unfortunately, the LFS does not ask how many children a woman has had in her lifetime. The survey does ask how many children a woman has between the ages of 0 and 17, with subcategories for 0-1, 2-4, 5-9, 10-14 and 15-17 (10-13 and 14-17 before 1987).[12] Children 18 and older are not reported as they are usually in the military. The age of persons in the 18-24 bracket is suppressed (to protect national security).

We use the distribution of children aged 0-17 to estimate the number of children a woman has given birth to in her lifetime. Let f(age,c) be the number of children so far of a woman, as a function of age and birth cohort. Let g(age,c) be the number of children aged 0-17 so far. Assume that the youngest age of mother at first birth is 16 (there are only a few at age 15 in the sample), so that child will outgrow our measurement when the mother is 34. So

$$f(age,c) = g(age,c) \text{ if } age<34$$

$$f(age,c) = g(age,c) + g(age-18,c) \text{ if } age>33$$

We approximate g(age-18,c) by using information from the closest cohort available for women aged more than 33, calculate it's mean and add it to the reported number of children aged 0-17 to predict f(age,c).

Figure 3 illustrates this procedure, graphing the means of observed number of children and the predicted number of children f(age) for East Block immigrants aged 25 and older. While f(age) should increase monotonically, it actually decreases sometimes. This is mostly due to difficulty distributing children to ages within age brackets. Fertility levels off at around age 38 at 97% of its eventual level. We exploit that flat portion of the distribution and use the predicted number of children at ages 38-47 as our measure of lifetime childbearing.

Estimation

In this section we estimate both the effect of time in Israel on fertility and the selection effect, using an early arrival cohort who arrived too old to have children in Israel to identify the latter. To illustrate our identification strategy, consider a concrete example with birth cohorts

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[12] In 1974-79 the "own children" is unavailable. We use instead a predicted value based on a measure of children in the household of the same ages. That prediction can be done with R-squared values above .9 in the 1980-96 data.

1940 and 1950 and arrival cohorts 1970 and 1990. The 1970 arrival cohort faces high costs while the 1990 cohort faces low costs, so the model predicts altruism and higher fertility for the early arrivals. Some women born in 1950 immigrate early, at age 20, in 1970. The rest arrive late, at age 40, in 1990. The difference in their observed fertility at age 40, in 1990 is

(1) $f_{early,young} - f_{late\,,\,young}$

That difference can include both a treatment effect of residence in Israel and a selection effect due to differing costs of migration.

Now consider the older, 1940, cohort who migrated in the same two periods, some at age 30 in 1980 and others at age 50 in 1990. These women could not have experienced a treatment effect, as they were essentially past their fertility window in 1980 before any of them had arrived in Israel. Differences in the fertility of these two groups would be due only to selection and can be measured by

(2) $f_{early,\,old} - f_{late\,,\,old}$

Now assuming that the selection effect is the same for the young and old cohorts, we can identify the treatment effect by "differences in differences" as (1) - (2).

Unfortunately, the data don't quite allow this, as the late, old group are not observed till 1990, at age 50, by which time we have a very poor measure of their fertility, since most of the children have left home. Alternatively, we can assume that the fertility of the late arrivals is the same for young and old

(3) $f_{late\,,\,young} = f_{late\,,\,old}$.

We offer some evidence from the CIS below to support that assumption, showing that fertility rates in the CIS were stable for this cohort.

Restated as an estimating equation,

(4) $f = \alpha + \beta \text{ early} + \gamma \text{ young} + \delta \text{ early*young} + \varepsilon,$

$\text{Cov(early},\varepsilon) = \text{Cov(young},\varepsilon) = \text{Cov(early*young}, \varepsilon) = 0$.

Here β is the effect of selection. δ is the treatment effect of spending a fertile period in Israel (that is, the effect that would have been observed had early migration been randomly assigned among eventual immigrants). The birth cohort effect, γ , is assumed to be zero in (3).

To achieve precision in estimates we define early and late arrivals and young and old women a little more broadly. Early arrivals immigrate by 1982. Late arrivals immigrate between 1989 and 1996. We ignore the few immigrants in the 1983-88 period to avoid the possible confounding effects of selection between the U.S. and Israel as destinations. Young women are born in 1948-52. Old are born in 1938-42.

Results

Table 3 compares descriptive statistics for early and late arrivals from the former Soviet Union, both young and old. The "young" group were born, on average, in 1950. The average early arrival was in 1977-78, while the average late arrival was in 1990. We have restricted attention to arrivals from the former Soviet Union to allow comparability with the late migration, which is 98% from there. Over the period since 1955 two-thirds of immigrants from Eastern Europe have come from the Soviet Union, another 23% from Romania and 8% from Poland. Early migrants from other countries are much less likely to be self-selected because migration costs were not always as high. In fact, most Jews had emigrated from Poland and Romania by the 1980s.

This table allows direct calculation of our restricted differences in differences estimator. The difference in predicted children between early, young and late, young is

$$(2.49-1.71) = 0.78.$$

But old, early arrivals are predicted to have 2.45 children, even though (almost) all these children were born before migration. This is evidence of positive selection. Assuming no cohort effect, the selection effect is estimated as

$$(2.45-1.71) = 0.74.$$

The difference between these two yields an estimated treatment effect of

$$(0.78-0.74) = 0.04,$$

which is quite small. The selection effect, on the other hand, is quite large. A 0.7 child difference exceed the difference between the TFR of U.S. Canada and Australia (at about 2) and the Western European average (of about 1.5). For societies with total fertility rates in the neighborhood of the replacement rate of two, that selection effect is enough to make the difference between stable and rapidly shrinking population in the long run.

Are there other observable differences between arrival cohorts in Table 4 that could account for differences in fertility? It's important to note in comparing cohorts the usual "natural" experiment practice of arguing that the treatment and comparison groups should have similar observable characteristics doesn't apply here. The estimated selection effect could not have occurred under random assignment, by definition. Earlier arrival cohorts are more likely to be (self-classified as) Jewish, more likely to be married, less educated (by about 1.5 years for the later birth years) and slightly more likely to be Ultra-Orthodox. All of these differences are associated with higher fertility for the earlier arrival cohort, but are unlikely to be the cause of the gap in fertility. The differences are either too small to explain the large difference in fertility (in the case of education, Ultra-Orthodoxy or Jewish) or more likely to be reflections of higher preference for children (currently married and less years of education).

Table 5 performs the same analysis in a regression, reporting standard errors and allowing for robustness checks. The left two columns illustrate the decomposition of the early-late difference into treatment and selection effects for all arrival years (in contrast to the 1960+

arrivals discussed above). The early arrivals have 0.86 more children per woman than the late arrivals, from the same birth cohort. This difference is precisely estimated. Adding in the "early-old" group (woman aged 35 or older on arrival who immigrated in the high cost period up till 1982) allows estimation of a selection effect of 0.74 quite precisely and a treatment effect of 0.11(= 0.86-0,74). The treatment effect is not precisely enough estimated to infer that it differs from zero.

Moving to the right in Table 5 we report estimates for progressively later sets of arrival years. In doing so we probably gain accuracy as the immigrants may be increasingly similar to the 1989+ arrivals. On the other hand we generally lose precision in the treatment effect estimates as the sample size drops. In all these samples the selection effects are quite large and precisely estimated. The middle column, describing the 1960+ arrival cohort cohorts is the one reported in the text, with a selection effect of 0.74 and a small treatment effect, not significantly different from zero. The 1970+ arrival cohorts have negative, but still statistically insignificant treatment effects.

Overall, the table provides very strong evidence of large selection effects in fertility by arrival cohorts of immigrants. High cost immigrants have between 39 and 54% more children than low cost immigrants in this sample.

Testing the identifying assumption

These estimates rely on the assumption that γ=0, i.e. that there was no cohort effect in Jewish fertility in Eastern Europe for 38-47 year olds between the pre-82 and post-88 periods. To investigate that assumption we examine cohort-specific fertility in these periods for urban Russians, as a proxy for the fertility of Soviet Jews, who were mostly urban and highly assimilated. Table 6 reports observed fertility for urban Russians in both 1982 and 1992. Reported is the number of children born so far for cohorts aged 35-39 and 40-44. These figures are estimated using the reported fertility of synthetic cohorts at five year intervals as reported in Vishevsky [1996] (Table 1.13 and Figure 1.1). The Table reports that the fertility rate of urban Russians in 1992 at 2.0 children per woman is close to that of Jews of the same age immigrating from the CIS in 1989-96. More importantly, fertility was stable for these cohorts from the late 70s to early 90s.[13] We read this as evidence supporting the assumption that there was no cohort specific decline in fertility in the 1980s for Eastern European Jews.

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[13] The stable fertility rates for this cohort stand in sharp contrast to the recent rapid decline in the total fertility rate of Rusian women, from 2.22 in 1987 to 1.39 in 1994 [Vishnevsky, 1996]. That decline is almost entirely due to drastically reduced fertility rates of younger women.

Predicting Children at Home: An Alternative Approach

An alternative to predicting eventual fertility using current children at home is to measure fertility using children at home directly, estimate the effect of selection on children at home and interpret it in terms of lifetime fertility. Figure 4 illustrates the difference in fertility between early and late arrival cohorts from all East Block countries, by age. Averaged across ages, this gap is 0.376 children. 92.6% of the stock of children-years at home are spent with mothers aged 25 or older.[14] If children spend all 18 years at home, (of which we observe 92.6%) over the 36 years between 25 and 60 (inclusive) the integral of the gap represents $0.376*36/(.926*18) = .376*2.16 = .81$ children. This is reassuringly close to the estimated difference in predicted lifetime children between early and late arrival cohorts (0.86) reported in Table 5 for immigrants from the former Soviet Union only.

Using the children at home measure allows us to exploit data from mothers at all ages, greatly increasing precision. It also allows controls for birth cohorts and country (or even republic) of birth, freeing us of the identifying assumptions above. To separate the gap in children at home into treatment and selection effects we use an alternative assumption to the old/young classification above. Treatment effects are posited to be a monotonic function of years since migration and of fertile years since migration,

$$\theta = \theta(y,f) .$$

Years since migration (y) capture the effects of assimilation of local culture, increased lifetime income and access to higher wages through accumulation of local human capital, such as language. Fertile, or childbearing, years since migration (f) is measured as the number of years between ages 17 and 42 spent in Israel. (These are the ages in which the birth rate exceeds 1% for the early arrival cohort). It should capture the effect of local prices and wages on childbearing decisions during the years at which a woman is most at risk of having children. It seems plausible that these effects will be monotonic.

The stock of children at home is then estimated as

$$k = g(age) + \theta(y,f) + \beta\, early + X\gamma + \varepsilon . \qquad (5)$$

The first term represents the effect of age on fertility and the exit rate of children at age 18 (or possibly earlier). The second term is the treatment effect of residence in Israel. β measures the effect of early migration on children at home, conditional on treatment, which we interpret as the effect of selection on altruism, or ρ. X is a matrix of demographic characteristics: decade of birth and country of origin.

Table 7 describes summary statistics for the data available for this exercise. The columns labeled "full sample" describe a sample of some 32,300 observations from the LFS, of which 81% arrived in the early (high cost) period. 46% of arrivals are from the former Soviet Union, 17% from Poland and 28% from Romania. Birth cohorts date back to the 1910s, but there are some as recent as the 1970s.

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[14] Author's calculation based on LFS 1974-1996.

Table 8 reports the results of estimating (5). The first column reports the coefficient on "early" arrival (arrival by 1982) of 0.376 with a full set of age indicators for g(age). The second reports the result of adding 6 country indicators, which reveals that the bias due to the omission of country of origin was negative - the early migrants tended to come from less fertile source countries, such as Poland and Romania. The third column adds birth cohort effects as well. Here we find that the bias due to omission of birth cohort effects in Table 5 was negative, since earlier birth cohorts of immigrants actually had lower birth rates on average. Thus the country and age controlled estimate of the early-late arrival gap in fertility is 0.495 children at home, or using the calculation above (0.495 x 2.16 =)1.07 lifetime children.

The right three columns report the decomposition of that coefficient on "early" into selection and treatment effects, using years since migration, y , and childbearing years since migration, f, to represent treatment. Years since migration has a large and concave effect, accounting for a third of the difference in fertility by itself (column 4). Childbearing years since migration turn out to have a tiny effect (column 5). The results are unchanged by adding quartic terms. This table provides clear evidence of large selection and treatment effects, both significantly different from zero, with the former about twice the size of the latter, even controlling for country of origin. In terms of lifetime children, these results can be interpreted as 0.70 children due to selection and 0.37 children due to treatment.

One weakness of this approach is that the former Soviet Union country indicator includes a large number of disparate republics, including South Central Asian republics which tend to high fertility and European republics with lower fertility. The 1995 and 1996 LFS include detailed country codes for 13 former Soviet Republics. Table 9 addresses this concern by limiting the estimation of (5) to the 1995 and 1996 data for the USSR and Poland, though including all survey years for other countries. (A full list of republics is included in the note to Table 9.) Summary statistics for these data are reported in the right panel of Table 7.

The first column Table 9 reports the age-adjusted coefficient on "early" for the data with information on Soviet republics as 0.342, only slightly lower than the estimate in Table 8, which was based on all survey years for Soviet immigrants. The second column adjusts for country and republics of origin, showing that the omitted variable bias incurred by ignoring republics of birth was strongly negative. Once adjusted for both place of origin and birth cohort, the coefficient on early arrival rises to 0.509. In this sample controlling for treatment effects reduces the coefficient on early by more than in the previous, to 0.194, as year since migration have a much stronger effect in the more recent survey data for immigrants from the former USSR. Interpreted in terms of lifetime children, that would mean a (0.509 x 2.16 =) 1.10 child gap between early and late arrivals. Of this, a smaller but still significant portion is selection (0.42 children) and a larger portion is the treatment effect of residence in Israel (0.68 children). The difference in the effects of years since migration between the two samples is hard to explain, but it doesn't seem to be due to an omitted variable bias in republics of origin. It may be that assimilation of fertility rates is working differently for more recent Soviet immigrants than for previous cohorts.

Comparing the results from the stock of children at home to those based on predicted children reveals that the principal finding of large estimated selection effects is robust to drastic changes in the method of identification and in the composition of the sample. While the two methods disagree on the size of the treatment effect of residence in Israel on fertility, we are more convinced by those in Tables 8 and 9 based on the stock of children at home, as they allow a much richer set of controls. If the early/late gap could be properly adjusted for age and origin controls the (noisy) estimates of treatment effects in Table 5 may not be statistically smaller than those in Tables 8 and 9. We conclude that the age- and origin-adjusted fertility gap between high and low migration cost arrivals is over a child, of which about half is due to selection and about half to treatment. This large selection effect is supporting evidence for the claim of selection on altruism.

VI. Interpretation and Conclusion

We have argued that intergenerational concerns are a key factor in migration decisions and that heterogeneity in altruism induces positive selection of immigrants in fertility. Our estimates report selection effects more than large enough to explain the average half-child per woman difference in total fertility between the shrinking populations of Western Europe and the stable (non-immigrant) populations of U.S., Australia and Canada. Positive selection is consistent with the model offered of altruism and migration as a human capital investment. Of course this is only an interpretation, since other mechanisms of positive selection are possible. Yet the model of altruism is also supported by evidence that immigrants to the U.S. are more likely to think that it's important to leave an inheritance and are also more likely to spend time with their grandchildren than are natives.

Considering that Eastern European immigrants arrived with a very secular background, assimilation to the fertility level of secular Jewish Israelis may be the correct prediction of the assimilation model. That is approximately what our estimates suggest, with the treatment (assimilation) effect bringing them to 2.1 or 2.2 children per woman, slightly above the level of secular Israeli women of 2.0.

Self-selection implies overshooting (in the Chiswick [1978] sense) by the early, young immigrants, assuming that Jews from Eastern Europe and the CIS have the same distribution of altruism. Compared to secular Israeli Jews we see strong evidence of overshooting, with the combined assimilation and self-selection effects giving the early, young immigrants a fertility rate of 2.5, as compared to 2.3 for non Ultra-Orthodox Israeli women [Berman and Klinov, 1998]. Thus the level of selection effects is consistent with the predictions of both models.

If self-selection on altruism and intergenerational concerns are truly central to migration decisions then how can we explain the pattern reported in the rest of this literature? Historically and recently we have repeatedly observed that the fertility of immigrants from high to low fertility countries looks much more like that of that of their new neighbors than that of their old neighbors [Blau, 1992; Ford, 1990]. That pattern is generally attributed to a combination of income effects, grouping of people with like tastes and negative selection in fertility, which is observed as positive selection on predictors of low fertility such as wealth and education [Blau, 1992]. Jewish immigrants from the former East Block are for the most part not selected on education or wealth and experience a smaller transition in income levels. *Once those effects are muted, selection on altruism may become the dominant phenomenon.* That insight may become a key factor in understanding the fertility choices of the current generation of high income residents of the developed world.

The former East Block and China have historically been outliers in their low fertility despite low income. The practical implication of the large estimated self-selection effect is that we should expect at most a mild baby boom in these countries (or among low emigration cost emigrants from those countries) when they are exposed to a standard of living like that in Israel. We should not expect of them the high fertility rate experienced by the 1950 birth cohort that arrived in Israel before 1981.

Self-selection of immigrants on intergenerational altruism provides an alternative explanation for Chiswick's classic finding that earnings of immigrants rise over time to eventually overtake those of natives [Chiswick, 1978]. That is a clear prediction of the Ben Porath human capital accumulation model [Ben Porath, 1967]. Selection on altruism is also consistent with Borjas [1987], which finds a positive correlation between the eventual income of individuals in the United States and average income in the country of origin (conditional on measured skills). The lower the net return to migration the greater the altruism (low discount rate) required to justify migration.

Heterogeneity in intergenerational altruism has three important implications if this altruism is passed from generation to generation in families or ethnic groups. First, since natural selection favors intergenerationally altruistic dynasties, their growing proportion in the population is a force to increase fertility. This implies that populations with total fertility rates currently below two will not eventually disappear. The patient dynasties will increase their population share, increasing the aggregate total fertility rate and eventually inheriting the developed world.

A second implication of altruistic dynasties is that countries who received voluntary immigrants over the last century may have higher average levels of altruism and thus higher long fertility rates, holding income constant. This observation is consistent with the fact that Australia, Canada and especially the United States have higher total fertility rates than the OECD average (TFR of 1.9, 1.9 and 2.1 respectively, as compared to the OECD average of 1.6).

Finally, in the Ramsey growth model high levels of intergenerational altruism imply higher GDP in the steady state growth path through both greater population and higher investment. It may also imply higher GDP per capita in the steady state and faster convergence to steady state levels of GDP per capita.[15] That should also be true of countries who received voluntary immigrants over the last century. This observation is consistent with income levels above the OECD average for Australia, Canada and especially the United States. Thus convergence in per capita income may be limited by differences in the composition of national populations, which are in turn due to historic differences in per capita income. A small historical advantage in per-capita income could be amplified by self-selecting altruists to yield a permanent gap in income and population growth.

[15] In the steady state of a Ramsey growth model with exogenous fertility, per capita income increases in intergenerational altruism if the interest rate is decreasing in per capita capital. In the same model with endogenous fertility the countervailing influences of altruism on capital accumulation and population growth make the result ambiguous. See, for example, Barro-Becker [1989] and Becker-Barro [1988].

Appendix: Comparative Statics

The Effects of Altruism on Fertility and Investment in Migration

Substituting constraints into the utility function, couples choose (n,a) to solve

$$\begin{aligned}
&MaxU(c_0,c_1) = 2v(w_0 - kn - a) + \rho\ (n+2)v(w_1(1+ra)) \\
&such\ that \\
&a \geq 0, k \geq 0.
\end{aligned}$$

First order conditions are:

$$\begin{aligned}
0 &= U_n = -2kv'(c_0) + \rho v(c_1) \\
0 &= U_a = -2v'(c_0) + \rho(n+2)w_1 r v'(c_1)
\end{aligned}$$

Second order conditions are:

$$\begin{aligned}
U_{nn} &= 2k^2 v''(c_0) < 0\ , \\
U_{aa} &= 2v''(c_0) + \rho(n+2)w_1^2 r^2 v''(c_1) < 0\ , \\
\Delta &\equiv U_{nn}U_{aa} - U_{an}^2 > 0\ , \\
where\ U_{an} &= 2kv''(c_0) + \rho v'(c_1)w_1 r\ .
\end{aligned}$$

To solve the comparative static effects of changing ρ, we use the following simplifying result.

$$\begin{aligned}
&U_{n\rho} = v(c_1) > 0 \\
&and\ U_{a\rho} = (n+2)w_1 r v'(c_1) > 0 \\
&so\ applying\ the\ first\ order\ conditions\ yields \\
&U_{n\rho} = kU_{a\rho}\ .
\end{aligned}$$

Now applying Cramer's rule yields positive effects of altruism on both n and a in the neighborhood of a maximum.

$$\frac{dn}{d\rho} = \frac{[U_{na}U_{a\rho} - U_{n\rho}U_{aa}]}{\Delta}$$
$$= \frac{U_{a\rho}}{\Delta}[U_{na} - kU_{aa}]$$
$$= \frac{U_{a\rho}}{\Delta}[2kv''(c_0) + \rho v'(c_1)w_1 r - k(2v''(c_0) + \rho(n+2)w_1^2 r^2 v''(c_1))]$$
$$= \frac{U_{a\rho}}{\Delta}\rho w_1 r[v'(c_1) - k(n+2)w_1 r v''(c_1)] > 0 .$$

$$\frac{da}{d\rho} = \frac{[U_{na}U_{n\rho} - U_{a\rho}U_{nn}]}{\Delta}$$
$$= \frac{U_{a\rho}}{\Delta}[U_{na}k - U_{nn}]$$
$$= \frac{U_{a\rho}}{\Delta}[k(2kv''(c_0) + \rho v'(c_1)w_1 r) - 2k^2 v''(c_0)]$$
$$= \frac{U_{a\rho}}{\Delta}k\rho w_1 r v'(c_1) > 0 .$$

These are the results reported in Section IV.

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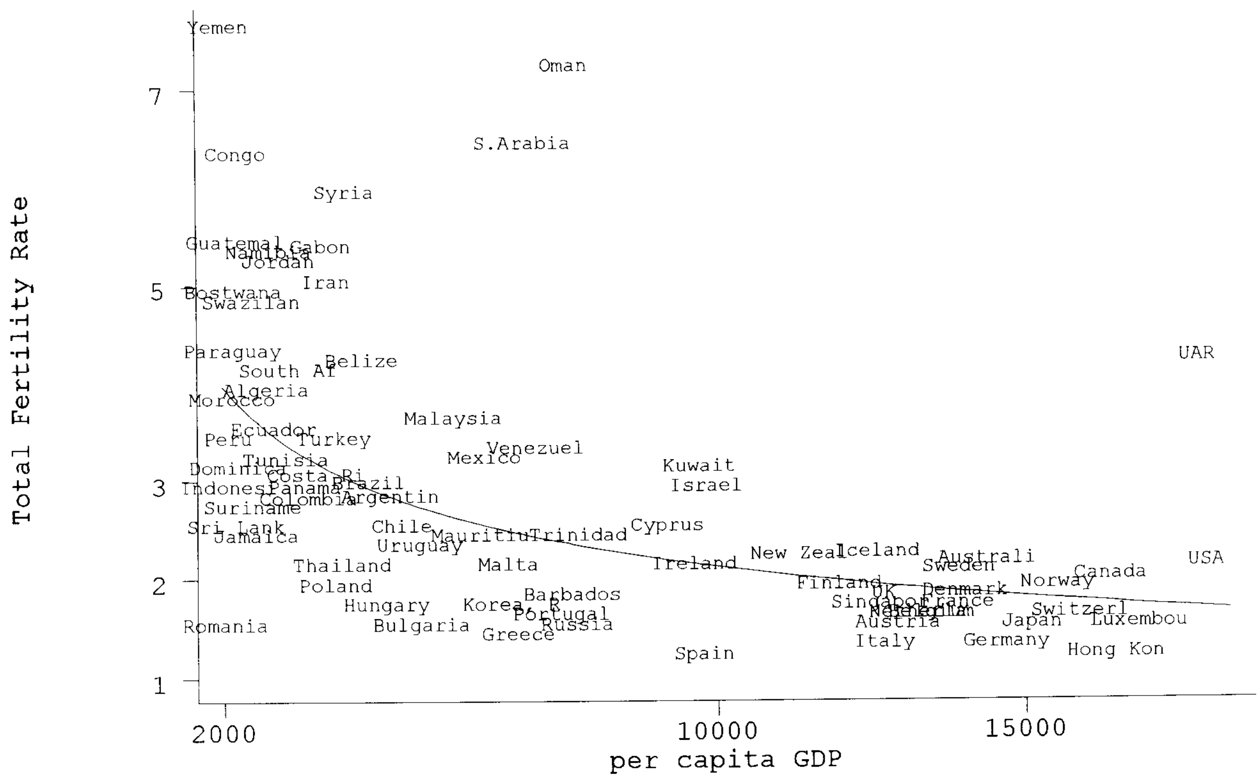

Figure 1: Fertility and Income, 1992

Source: UN Demographic Yearbook, 1994; World Tables 1995.

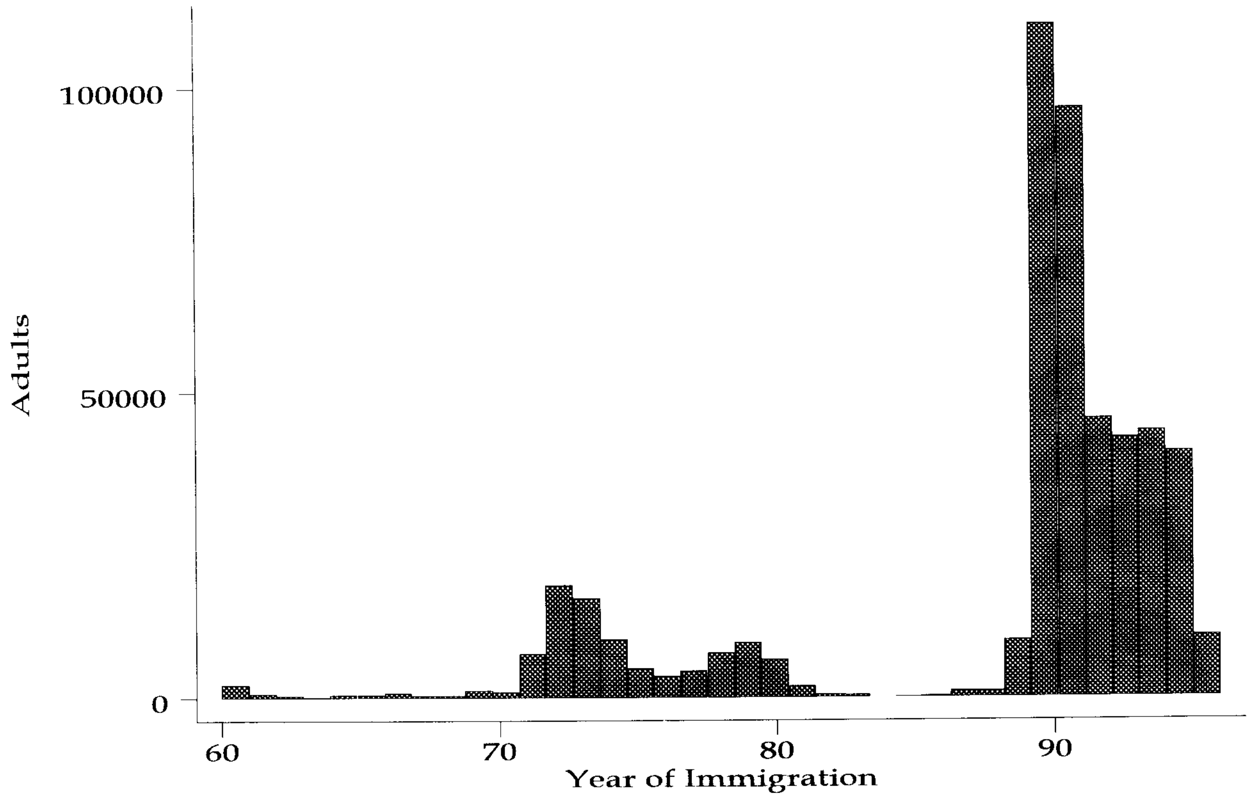

Figure 2: Adult Immigrants from the (former) Soviet Union: 1960-96
Source: Israel Labor Force Survey, 1996.

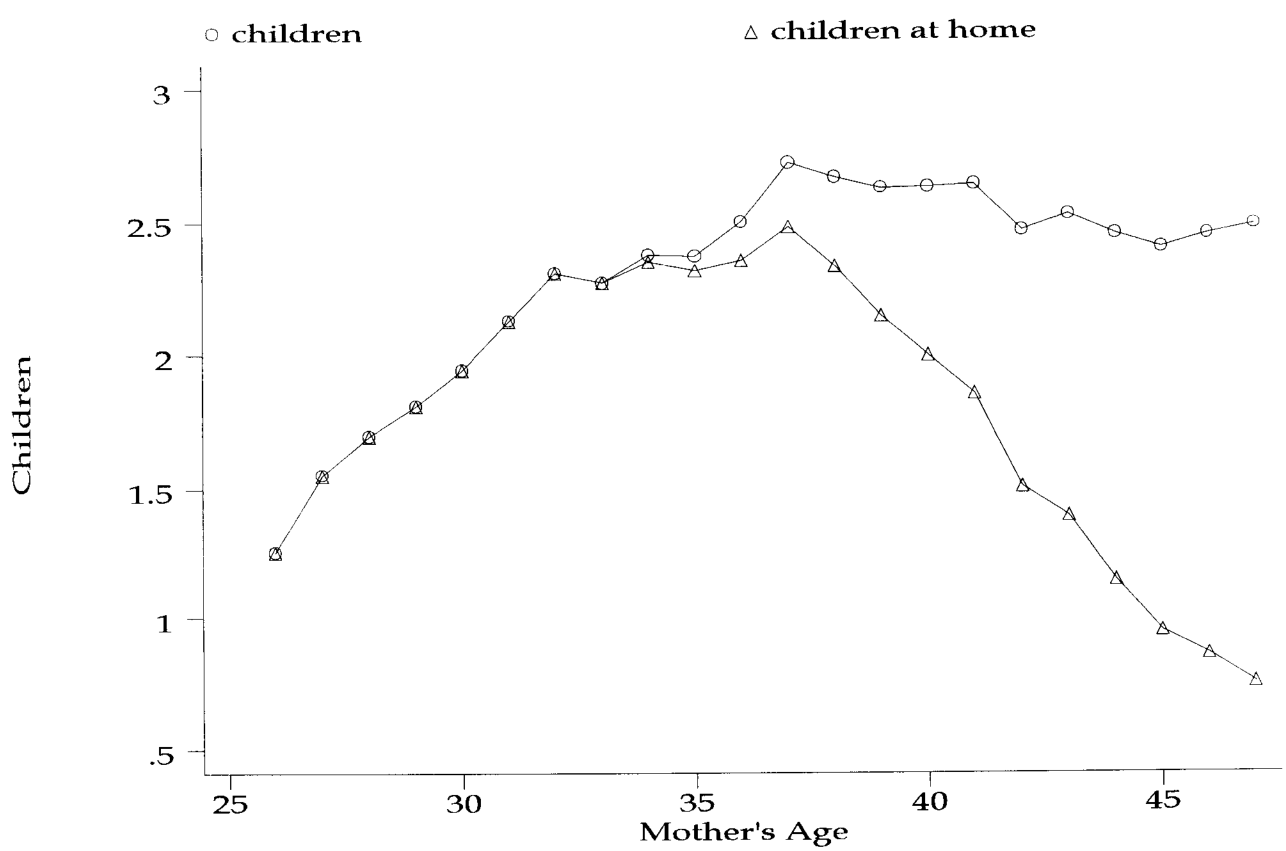

Figure 3: Estimated Fertility Using Children at Home
Source: Israel Labor Force Survey 1974-1996, author's calculations.

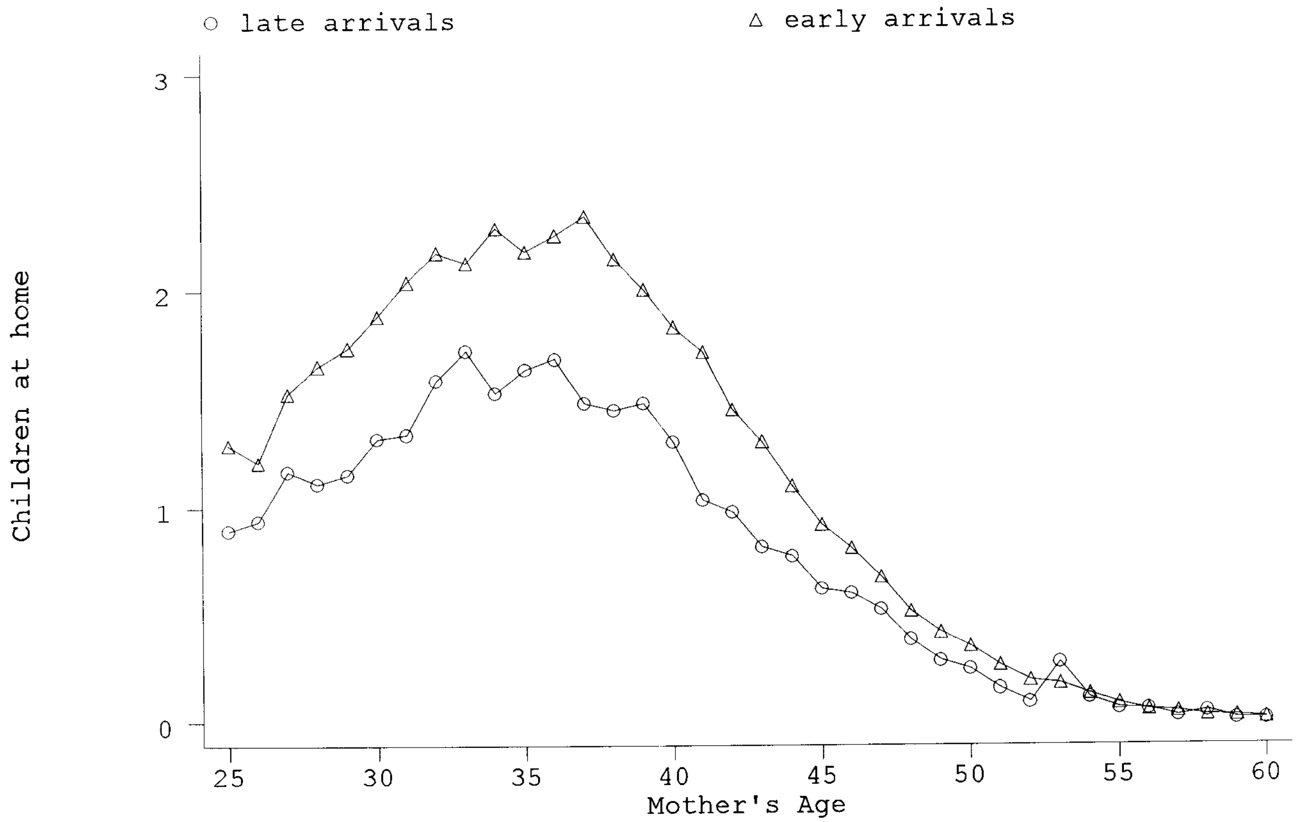

Figure 4: Children of High and Low Cost Arrival Cohorts from East Block

Source: Israel Labor Force Survey: 1974-1996

Table 1: Immigrants and Indicators of Altruism: Descriptive Statistics

U.S. Health and Retirement Study

	Full sample, including spouses		Sample of working grandmothers	
	Mean	Std. Deviation	Mean	Std. Deviation
Inheritance important*	1.96	0.74		
Will leave large inheritance**	2.53	1.38		
Annual hours with grandchildren			832	1059
Immigrant	0.10	0.29	0.07	0.25
Age	56.1	4.9	54.6	4.1
Female	0.49	0.50		
Currently married	0.65	0.48	0.57	0.50
Years since migration (immigrants only)	25.2	11.9	26.2	12.1
Religious observance***	2.9	1.4	3.0	1.3
Net Worth ($1000s)	210	483	139	301
Grandchildren	2.4	4.3	5.1	4.5
Years of schooling completed****	12.5	3.8	12.4	2.9
Children	1.8	2.3	3.6	1.9
Children with annual income above $30,000	0.2	0.3	0.4	0.4
Weekly work hours			37.2	11.2
Observations	6686		551	

Source: U.S. Health and Retirement Survey, 1992 wave.

Notes: * "Inheritance important" is coded as 1- "not important," 2 - "somewhat important" or 3 - "very important."
** "Will leave large inheritance" coded from 1 to 5 in increasing inheritance. 6709 observations.
***Religious observance is an index with values ranging from 1 to 5 in ascending order of observance.
****Years of schooling completed is recorded for years 0-16, with postgraduate study coded as 20 years.

Table 2: Predictors of Altruism: Inheritance

U.S. Health and Retirement Study

Left hand variable: Indicator of Altruism	Importance of Inheritance (Scale from 1 to 3)			Will leave "sizeable" Inheritance (Scale from 1 to 5)		
Immigrant	0.175	0.182	0.148	-0.176	-0.104	0.040
	(0.071)	(0.071)	(0.071)	(0.116)	(0.110)	(0.109)
Religious observance	0.035	0.035	0.035	0.063	0.064	0.063
	(0.007)	(0.007)	(0.007)	(0.012)	(0.012)	(0.012)
Net worth ($1000s)		0.0001	0.0001		0.00068	0.00063
		(0.00002)	(0.00002)		(0.00005)	(0.00005)
Grandchildren		-0.0004	-0.0025		-0.020	-0.006
		(0.0025)	(0.0036)		(0.004)	(0.006)
Years of schooling			-0.007			0.034
			(0.003)			(0.005)
Children			0.002			-0.021
			(0.007)			(0.013)
Children with annual income above $25,000			-0.094			0.200
			(0.030)			(0.054)
Constant	2.01	2.01	2.01	2.55	2.53	2.11
	(0.11)	(0.11)	(0.11)	(0.20)	(0.20)	(0.21)
Root mean sq. error	0.73	0.73	0.73	1.36	1.32	1.31
R-squared	0.009	0.013	0.013	0.028	0.091	0.101
Observations	6686	6686	6686	6903	6903	6903

Source: U.S. Health and Retirement Survey, 1992 wave. See Table 1 for descriptive statistics. All specifications include age, years since migration and indicators of marital status and gender.

Table 3: Predictors of Altruism: Time with Grandchildren

U.S. Health and Retirement Study

Left hand variable: Indicator of Altruism	Hours spent with grandchildren				
	All Grandmothers	Working Grandmothers			
Immigrant	203	237	759	1160	963
	(99)	(155)	(376)	(565)	(565)
Weekly hours		-3.91	-5.52	-2.35	-1.07
		(2.74)	(2.82)	(3.90)	(3.96)
Age			-12.9	-26.9	-14.9
			(7.2)	(12.2)	(12.6)
Currently Married			-130	-87.3	-62.3
			(77)	(91.4)	(91.7)
Years Since Migration			-18.0	-22.9	-20.5
			(10.8)	(16.1)	(16.1)
Religious observance			9.3	28.0	32.6
			(25.6)	(34.2)	(33.0)
Net worth ($1000s)				-0.055	-0.082
				(0.152)	(0.166)
Grandchildren				6.2	2.1
				(9.8)	(14.9)
Years of schooling					-41.3
					(19.8)
Children					-16.1
					(32.4)
Children with annual income above $25,000					-301
					(118)
Constant	866	914	1727	2290	2277
	(26)	(107)	(429)	(687)	(732)
Root mean sq. error	1121	1041	1017	1050	1037
R-squared	0.003	0.005	0.015	0.033	0.060
Observations	2046	1034	978	551	551

Source: HRS, 1992. See Table 1 for descriptive statistics.

Table 4: Characteristics of Late and Early Arrivals

Women aged 38-47 born in former Soviet Union, observed in Israel

Variable	Aged 38 or more on arrival Arrived 1989-96	Aged 35 or more on arrival Arrived 1960-82	Aged 20 or less on arrival Arrived 1960-82
Year of Birth	1949.6	1939.9	1951.6
	(0.08)	(0.15)	(0.28)
Children at home aged 0-17	0.91	1.43	1.74
	(0.03)	(0.13)	(0.10)
aged 10-17	0.65	0.53	1.18
	(0.02)	(0.07)	(0.07)
Predicted children	1.71	2.45	2.49
(all ages)	(0.02)	(0.12)	(0.09)
Year observed	1993.4	1983.0	1992.8
	(0.06)	(0.25)	(0.23)
Year of Immigration	1991.1	1977.3	1968.3
	(0.05)	(0.18)	(0.37)
Jewish	0.93	1	0.995
	(0.08)	(0)	(0.005)
Currently Married	0.77	0.80	0.86
	(0.01)	(0.03)	(0.03)
Years of Education	14.3	12.2	12.8
	(0.09)	(0.33)	(0.23)
Ultra-Orthodox	0.002	0*	0.02
	(0.002)	(0)	(0.01)
Observations	939	148	186

Source: Israel Labor Force Survey micro data 1974-96. Sample includes immigrant women from the former U.S.S.R.. Weighted with sampling weights.

* based on 132 observations

Table 5: Treatment and Selection Effects on Fertility

Post 1989 immigrants compared with pre-82 immigrants

Left hand variable: Predicted number of children

Immigrants from CIS

	Arrival Period			
explanatory variables	all years	all years	1960+	1970+
arrived early	0.86	0.74	0.74	0.67
(by 1982)	(0.05)	(0.12)	(0.12)	(0.07)
arrived early & young		0.11	0.04	-0.13
(aged ≤20 on arrival)*		(0.12)	(0.15)	(0.18)
constant	1.71	1.71	1.71	1.71
	(0.02)	(0.02)	(0.02)	(0.02)
Root MSE	0.88	0.93	0.90	0.82
R-squared	0.18	0.16	0.11	0.08
Observations	1591	1739	1273	1185

Source: See Table 3.
The left column includes only immigrants who arrived by 1982 at age 20 or less (the "early-young"), or immigrants who arrived at age 35 or more in 1989 or later (the "late-young"). All other columns includes immigrants who arrived by 1982 at ages of 35 or more (the "early-old"). Estimating equation (4) is described in text. Heteroskedasticity-consistent standard errors in parentheses. All specifications weighted using sampling weights.

Table 6: Observed Fertility of Urban Russians

Children per woman through reported age

age group	year 1977	1982	1992
35-39 [birth-years]	2.0 [1938-42]	1.9 [1943-47]	1.9 [1948-52]
40-44 [birth-years]	NA	2.0 [1938-42]	2.0 [1943-47]

Authors' calculation of observed fertility for synthetic cohorts. Based on age-specific fertility rates reported at five year intervals, beginning at ages 15-19. For example, the 1982 figure for 35-39 year-olds is calculated by adding age specific fertility rates recorded in 1962, 1967, 1972, 1977 and 1982. These rates are calculated from Vishnevsky [1996], Figure 1.1.

Table 7: Summary Statistics for Predicting Children at Home

	Full sample		Sample with USSR republic information	
variable	mean	standard deviation	mean	standard deviation
Children aged 0-17 at home	0.91	1.15	0.81	1.11
arrived early (by 1982)	0.81	0.39	0.82	0.38
y (Years since migration)	20.8	14.1	24.3	13.4
y^2	630	648	773	650
y^3	21793	29632	27161	30530
f (Childbearing years since migration: 17-42)	9.3	6.7	10.9	6.5
f^2	132	124	161	123
f^3	2048	2153	2534	2179
Birth decade:				
1910s	0.04	0.19	0.04	0.20
1920s	0.22	0.41	0.24	0.43
1930s	0.24	0.43	0.25	0.44
1940s	0.26	0.44	0.24	0.43
1950s	0.17	0.38	0.14	0.35
1960s	0.08	0.26	0.07	0.26
1970s	0.003	0.056	0.005	0.071
Country of Origin:				
USSR	0.46	0.50	0.23	0.42
Poland	0.17	0.38	0.25	0.43
Romania	0.28	0.45	0.40	0.49
Yugoslavia	0.01	0.10	0.01	0.11
Bulgaria	0.05	0.21	0.07	0.25
Albania	0.00003	0.006	-	-
Czechoslovakia	0.03	0.17	0.04	0.21
Observations	32308		23129	

Source: Israel Labor Force Survey 1974-1996. Children at home are "own children" aged 0-17, living at home, for women aged 25-42. In 1974-79 "own children" is not reported, but children in household is reported instead. For that period "own children" is predicted using the coefficient estimated from regression of "own children" on household children in the later period (a=-0.008, b=0.98, R^2 = 0.96.) Weighted using sampling weights. The LFS has a - 2 quarter in, 2 quarter out, 2 quarter in - rotation group structure. The "full sample" includes all households once, resulting in an oversampling of the initial survey year, 1974, and draws incoming rotations for 1975-1996. The sample with republic information has the same structure but includes only survey years 1995 and 1996 for immigrants from USSR, and oversamples 1995 (when republic information is available) while not sampling survey year 1994 and the fourth quarter of 1993 to include households only once.

Table 8: Treatment and Selection Effects on Children at Home

Left hand variable: Children aged 0-17 living at home

explanatory variables						
arrived early (by 1982)	0.376 (0.014)	0.421 (0.016)	0.495 (0.019)	0.321 (0.025)	0.327 (0.026)	0.324 (0.028)
y (Years since migration)				0.017 (0.002)	0.030 (0.002)	0.023 (0.004)
y^2				-0.00025 (0.00003)	-0.00037 (0.00003)	-0.00010 (0.00017)
y^3						-0.000002 (0.000002)
f (Childbearing years since migration: 17-42)					-0.033 (0.005)	-0.131 (0.010)
f^2					0.00085 (0.00023)	0.017 (0.001)
f^3						-0.00066 (0.00005)
age indicators (36)	✔	✔	✔	✔	✔	✔
country indicators (6)		✔	✔	✔	✔	✔
birth decade indicators (6)			✔	✔	✔	✔
R-squared	0.472	0.473	0.476	0.478	0.480	0.483
Observations	32308	32308	32308	32308	32308	32308

Source: Israel Labor Force Survey 1974-1996. Includes all observations in 1974 and incoming rotations in all other years. The left hand side variable is "own children" aged 0-17, living at home, for women aged 25-42. In 1974-79 "own children" is not reported, but children in household is reported instead. For that period "own children" is predicted using the coefficient estimated from regression of "own children" on household children in the later period (a=-0.008, b=0.98, R^2 = 0.96.) The seven birth decades are 1910s through 1970s. The seven country groups are USSR, Poland, Romania, Yugoslavia, Bulgaria, Albania, Czechoslovakia. Summary statistics are reported in Table 7.
Heteroskedasticity-consistent standard errors in parentheses. All specifications weighted using sampling weights.

Table 9: Treatment and Selection Effects on Children at Home Including Republic Effects

Left hand variable: Children aged 0-17 living at home

explanatory variables						
arrived early	0.342	0.517	0.509	0.265	0.250	0.194
(by 1982)	(0.018)	(0.037)	(0.038)	(0.045)	(0.046)	(0.047)
y (Years since migration)				0.020	0.039	0.041
				(0.002)	(0.003)	(0.006)
y^2				-0.00028	-0.00048	-0.00055
				(0.00004)	(0.00004)	(0.00022)
y^3						-0.000002
						(0.000003)
f (Childbearing years					-0.043	-0.156
since migration: 17-42)					(0.006)	(0.012)
f^2					0.0010	0.019
					(0.0003)	(0.002)
f^3						-0.0007
						(0.0001)
age indicators (36)	✔	✔	✔	✔	✔	✔
country and republic indicators (19)		✔	✔	✔	✔	✔
birth decade indicators (6)			✔	✔	✔	✔
R-squared	0.488	0.493	0.497	0.499	0.502	0.505
Observations	23129	23129	23129	23129	23129	23129

Source: Israel Labor Force Survey 1974-1996. See note to Table 7 for a description of sample. The left hand side variable is "own children" aged 0-17, living at home, for women aged 25-42. In 1974-79 "own children" is not reported, but children in household is reported instead. For that period "own children" is predicted using the coefficient estimated from regression of "own children" on household children in the later period ($a = -0.008$, $b = 0.98$, $R^2 = 0.96$.) The seven birth decades are 1910s through 1970s. The six country groups are USSR, Poland, Romania, Yugoslavia, Bulgaria, Czechoslovakia. The 13 republics are Lithuania, Latvia, Estonia, Belorussia, Ukraine, Russia, Moldavia, Azherbaijan, Kazhakastan, Turkimenistan, Tajikistan, Uzbekistan, Kirgistan, Summary statistics are reported in Table 7.
Heteroskedasticity-consistent standard errors in parentheses. All specifications weighted using sampling weights.