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ABSTRACT

The relationship between the wealth or income of parents and children is an important economic issue in both positive and normative senses. In this paper, we estimate elasticities of sons' income or wealth with respect to the wealth of their fathers for a sample of households in nineteenth century Utah. We find the elasticity relating the wealth of fathers to sons to range from .10 to .34 depending on the variables held constant such as occupation, age and residence. Elasticities based on observation of the wealth of fathers and sons in the same year were higher than those based on a lagged value of the fathers' wealth. The death of the father prior to observation of the sons' wealth increased the elasticity about three fold. The elasticity between the income of sons and wealth of fathers was low (.09 to .21) but significant even though the sons' incomes were observed fifteen years after the wealth of fathers. In general, the data suggest a persistent relationship between the economic status of parents and their children with substantial regression toward the mean so that an economic elite was unlikely to be based upon intergenerational transmission of economic success.

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Intergenerational Effects on the Distribution of Income and Wealth: The Utah Experience, 1850-1900

Does our economy create an aristocracy of wealth? Regression toward the mean is a well established principle in statistics, biology and much of the natural world. But how quickly does the level of economic rewards regress toward the mean between generations? This is an important economic issue in both positive and normative senses. Social historians have considered the question of intergenerational mobility to be central to judgments that might be made about some ideal of social justice.[1] Sociologists have used large quantities of occupational data to examine intergenerational mobility.[2] Scholars concerned with the distribution of income have been quickly led to consideration of parents' income, education and IQ as well as less quantifiable factors upon the level of income of children.[3] The key issue is the extent to which each individual starts as a "tabula rasa" upon which choices are made and combined with luck to determine economic achievement. In most of this work, there is an implicit, if not explicit, assumption that intergenerational influences conflict with the ideals of social justice.

There are, however, few studies that have explicitly measured intergenerational correlations of income and wealth. Menchik has examined the relationship between the wealth of wealthy parents and their children using a sample from Connecticut for a period from 1930 onward.[4] He estimates the elasticity between the wealth of parents and children to be between .69 and .79 depending on the variables included in the regression

and the estimating procedure. Such elasticities are consistent with regression toward the mean but suggest that the process was quite slow since an elasticity of 1.0 would imply that no regression toward the mean had taken place. Certainly the level of wealth in the sample (only parents with net wealth of more than $40,000 were in the sample) affected the estimate of the elasticity. Menchik also found that the number of siblings affected the wealth of the child, presumably through division of the parents' estate among more heirs.[5] Lebergott has also examined intergenerational wealth movements for the very wealthy in a more casual way but over a longer time period. He concludes that for his sample of very wealthy, in the nineteenth and early twentieth century, there is substantial regression toward the mean.[6] Studies of intergenerational mobility for England have been completed by Harbury, McMahon, and others. This research, finding little intergenerational mobility, is also generally confined to the very elite.[7]

It is useful to divide the factors that influence the distribution of economic rewards into three conceptual categories. There are, first, a set of household or individual characteristics, such as education, occupation, place of residence or perhaps family size in some contexts, that can be acquired or changed by individual decisions. Such characteristics, which we label choice variables, involve decisions households make, often in response to the signals of the marketplace. We assume that households try to acquire those characteristics that maximize income and wealth. Hence, an increase in the return to a particular characteristic (e.g. an occupation) induces more households to obtain that characteristic. This movement (e.g. occupational change) would continue until the return to that characteristic matches the cost of acquisition for the marginal

household. That individuals respond to market signalled opportunities and that the market responds to the choices that individuals make by making the characteristic relatively less attractive serves to dilute the observable effect of choice variables upon the individual level, and consequently upon the aggregate distribution, of wealth and income. In general, the choice-market leveling process would be more pronounced on income, a flow, than on wealth, a stock.

Households also have characteristics which, in contradistinction to choice variables, are not under the control of the individual and therefore cannot evoke a choice-market leveling process although the market may respond in a variety of ways to such characteristics. Characteristics such as race, gender, IQ and birthplace are not matters of choice so that a household may not be able to change these characteristics regardless of the relative return or penalty associated with them. We consider such variables as Ricardian since they share the essential characteristic that land possessed in Ricardo's model of distribution--namely inelastic supply. Clearly, such Ricardian characteristics as sex and IQ do affect the level and distribution of income and wealth. In addition, an ex ante choice variable is Ricardian ex post in the sense that one can choose a new alternative but one cannot change the historical path of past choices nor their cumulative effects. For example, a previous occupational choice may affect current and future income; that previous choice is currently a Ricardian characteristic since it cannot be changed regardless of the return conditional on alternative choices in the past and even though the characteristic itself may be changed.[8] Or, for example, the wealth of a household may be influenced by the decision and timing of a decision to migrate to a particular place. The migration decision is volitional ex

ante but may continue to affect the level of wealth long after the choice has been made so that a clear difference in wealth positions is observable between those who did and those who did not migrate to a particular place.[9]

The final influence upon the level and distribution of income and wealth is stochastic. Attempts to explain the distribution of earnings or income with observable variables usually fall short of explaining as much as fifty percent of the variance. Perhaps as a consequence, stochastic theories of income distribution have been a dominant theme in the distributional literature.[10] Moreover, if markets adjust quickly in ways consistent with income or wealth maximizing choices, a model of income determination comprised of choice variables and a random element would yield results that suggest that the stochastic factors were all important since the income differentials from different choices would have been quickly narrowed by market forces.

We have developed these arguments more extensively elsewhere and have tried, in particular, to separate the three differing effects.[11] In this paper we push the analysis a different direction with some tentative explorations about the nature and importance of intergenerational factors in determining the individual level and aggregate distribution of income and wealth. We view the impact of parents on the income or wealth of their children as another kind of Ricardian effect. Parents' wealth or income, their financing of educational investment for their children, decisions about the number of siblings a child will have, parents' age at death and decisions about inter vivos gifts or inheritance are to a large degree, if not completely, beyond the control of children. Any of the mentioned parental characteristics as well as others may affect the distribution and level of wealth and income of children. It may be useful,

however, to consider separately the effects that such parental characteristics have on subsequent choices that children make from pure transfers of income or wealth between generations. We consider, then, in this paper general intergenerational correlations and attempt a partial decomposition of these correlations into effects attributable to pure transfer and those attributable to choices that children make. A residual category may reflect the effect of parental characteristics on environment or perhaps IQ issues that we also partially address.

The following section considers more fully intergenerational relationships in the determinants of income and wealth. Next, the data set collected for nineteenth-century Utah will be briefly described since we test against these data. The major section of the paper will explore a number of intergenerational patterns within the Utah economy of that period. A short conclusion follows.

INTERGENERATIONAL TRANSMISSION OF ECONOMIC REWARDS

Parents influence the income and wealth of their children through many diverse channels. The principal task of the researcher is to tease out the marginal effects on wealth and income of children of the various intergenerational transmission mechanisms, and, importantly, to find the interactive elements of the story. For example, parents may clearly increase the wealth of their children through bequest. The extent of this material inheritance is affected, however, by family size if the inheritance pattern tends to be multigeniture. In general, one would expect interactions between demographic variables, such as family size and death age of parents and the mechanisms, such as material bequest, education, occupational choice and IQ, by which parents influence the economic success of their children. Indeed, the persistent demographic trends

toward smaller families and longer individual life expectancy suggest interesting possibilities in terms of intergenerational economic patterns.

Does the trend toward fewer children increase or decrease economic mobility between generations? It could be argued that the trend toward the two-child family that seems to characterize modern industrialized societies will reduce the intergenerational mobility especially if family size is inversely correlated with income and education. The educational level of the children is affected by the educational level of the parents.[12] One would expect the decline in family size to tighten the relationship between the educational levels of highly educated parents and their children. Such parents will be able to invest more time and money in their fewer children. One would also expect that parents would have more ego involvement in the education of each child when there are fewer children. Thus, one might expect more regression toward the mean in the educational levels of children relative to the educational levels of parents when family size is larger. If this is true, the decline in family size should reduce intergenerational economic mobility and increase the influence of parents on children's economic rewards. It should be noted that families with lower levels of educational attainment are also likely to educate children to higher levels when family size is smaller. Thus, the asymmetric relationship between the decline in family size and both income and educational levels serves to decrease economic mobility.

Similar interactions between family size and occupational choice might be expected.[13] Parents with high status occupations will have stronger effects on the occupational status of children if family size is small. Thus regression toward the mean of the occupational hierarchy is reduced with smaller family size among higher occupational status families.

It is doubtful that there are offsetting effects at the other end of the occupational scale.

Thus there are likely to be predictable relationships between family size and education and occupation; similar arguments could be made for IQ. These are all ways in which parents might affect children's characteristics, either choice or Ricardian. However, direct material bequest is clearly a way that parents with wealth can directly influence the wealth position, and perhaps income position as well, of their children.

Parents who happen to be in the upper strata of the income or wealth distribution due to high educational attainment, high IQ, good occupational choice or luck can prevent what regression toward the economic mean that might be in store for their children by giving them wealth that will ensure their relative position. Obviously, the strategy that parents follow in inheritance disbursement will be crucial. Primogeniture, for example, will tend to generate a more unequal distribution than a multigeniture system.[14] Further, if parents offset the inequalities in the economic condition of their children by giving larger inheritances to children whose economic fortunes are less bright, they will narrow the range of inequality and, at the same time, keep their children from moving downward economically as might otherwise be the case.[15] Larger family size combined with multigeniture reduces the impact of inheritance. Since the poor leave little or no wealth to their children, the downward trend in family size interacts with inheritance to reduce intergenerational economic mobility.

Regression toward the mean occurs because parents who were economically successful are unable to pass on the characteristics (and luck) that made them successful and those who were unsuccessful are similarly unable

to pass on unsuccessful traits (and bad luck). It seems plausible that smaller family size will reduce the overall regression toward the mean across generations so that there will be less intergenerational economic mobility, ceteris paribus.

A common advertising theme for life insurance companies is to show the son who would have gone to college to become a doctor if his father had not died an early death leaving the family impoverished because of the loss of the father's income stream. A common theme of TV dramas concerns the schemes of children to do away with elderly parents who are consuming their wished-for inheritance by refusing to die. The death age of the parents is likely to affect the economic transmission mechanism between generations just as family size does. The trend in life expectancy, to the extent that it reflects some increase in adult life expectancy, generates two offsetting effects on intergenerational economic patterns. The reduction in the probability of the death of a father and (to a lesser extent) mother during working age will tend to improve the economic position of children. Conversely, the longer life expectancy with retirement may have the effects of reducing the material inheritance of the children from their parents.[16]

Conjecture about the potential intergenerational economic relationships is a poor substitute for intergenerational data. Unfortunately, such data are quite rare. Intergenerational samples tend to be small, often concentrated in the most wealthy strata of the distribution and difficult to analyze. Menchik's sample contained 173 cases suitable for regression. Brittain's data contain about 250 brothers so that there are fewer than 125 parents in the sample.[17] Larger and more numerous samples are needed if the intergenerational transmission mechanism of economic

status is to be understood. The date for Utah in the nineteenth century holds promise as one addition to the sparse intergenerational data bank.

UTAH DATA SET

Nineteenth-century Utah is uniquely suited for the creation of an intergenerational sample. This uniqueness is generated by the conjunction of several data sources. The first of these is the U.S. census. The censuses of 1850, 1860 and 1870 are unusual in that each contained question about wealth. In 1850, the census marshal asked each household to estimate the value of the real property of the household. In 1860 and 1870, the marshal also requested, in addition, the value of personal property so that the sum of the real estate and personal property give an estimate of total wealth. The households were not to consider mortgage or liens against the wealth so that the estimate is of gross wealth. The census wealth estimate would probably be lower than gross wealth obtained from probates since it is likely that individuals underestimated their personal property for the census marshal because of the diversity of personal wealth. The probate usually has some kind of itemization of personal wealth and is, therefore, likely to be higher.[18] The census also contains data on occupation, birthplace, sex, city and county of residence, age and household size. We have collected the census data described above on all households in the Utah census for the 1850-1870 period. We then linked together any households that appeared in more than one census. The linkage was accomplished by hand rather than computer. Name spellings often deviated since the census marshal wrote the names. Age, birthplace and occupation were useful sources for linkage. We later used demographic records to check the linkages made. During this period of time Utah was growing rapidly due to migration of Mormons from the mid-western U.S. and

northern Europe. Thus, of the 19,137 households appearing in the 1870 census, 2411 households also appear in the 1860 census; 211 households also appear in 1850 but not 1860; while 480 households appear in all three censuses.

Most of the households of nineteenth-century Utah belonged to the Church of Jesus Christ of Latter-day Saints (Mormons). The Church kept extensive records of contributions made by members. Members were asked to pay a tenth of their income to the Church. In some years, the Church recorded their payment and the percentage this payment was of one tenth of the households income.[19] These Church records are obviously not a perfect source of income estimation, but they do compare favorably with the few alternatives. For example, an examination of the individuals who paid income tax during the Civil War in the U.S. and contributions to the Church indicate that the income estimated from the Church records would on average be higher than the income estimated from the tax records. We have collected data on all the individuals on the Church records for twelve different years between 1855 and 1900. We have linked these records together for a sample of 8600 individuals some of whom are also in the census records.

The Mormon Church encourages its members to do extensive genealogy research resulting in the intergenerational linkage of many nineteenth-century Utah families. The Genealogical Society Library of the Church in Salt Lake City contains a large collection of forms called "family group sheets" that list the vital statistics on a family. These family group sheets greatly facilitate the intergenerational linkage of households.[20] We combined the family group sheets (vital statistics and kinships), the Church records (income and place of residence) and census records (wealth

and occupation) to create an intergenerational sample of fathers, sons and brothers. Currently there are twelve potential income observations (1855, 1857, 1859, 1861, 1866, 1870, 1875, 1880, 1885, 1890, 1895, and 1900), three potential wealth observations (1850, 1860 and 1870) and demographic data on family members (date and place information on birth, marriage and death). Clearly, for any given combination of observations on both fathers and sons the sample size shrinks quickly. For example, if we consider sons who made contributions to the Church in 1885 for whom we also have the percentage those contributions were of income and relate this to fathers with wealth in 1870, our sample size shrinks to 469 father-son combinations. If we further constrain the sample to cases where the father had died before 1885, the sample is reduced to 170. We hope to add wealth observations for later years (through probate and tax records) and more individuals to the intergenerational sample.

A feature of the Utah sample that provides opportunity but creates difficulties is that a percentage of the population practiced polygyny (polygamy) during this period. The Mormon Church encouraged wealthier members to marry more often so that there will be a correlation between wealth, income and number of wives. Furthermore, polygyny will significantly affect the bequest patterns and therefore the intergenerational patterns. We have not really come to grips with the analytical problems intrinsic in this feature of the data.

Before moving to a summary of the intergenerational patterns within the Utah data, it may prove useful to examine the distributional structure of Utah in the nineteenth century as well as some of the findings to date concerning the determinants of household wealth. The period from 1850 to 1870 was a time of rising inequality in Utah. Table 1 compares the level

of inequality in Utah to that of the United States as a whole. In 1850, shortly after Mormons had settled in Utah, the distribution of wealth as measured by value of real property was more equal in Utah than it was in the U.S. But, there was a definite trend toward more inequality as reflected by the data for 1870. The wealth held by the top 1% is actually higher in Utah than the U.S. though the Gini coefficient is lower. There is no way, at present, to ascertain whether or not the trend toward more inequality continued beyond 1870. It is unlikely that the distribution of wealth or income became more unequal than that of the U.S.

While Utah is experiencing an increase in inequality, there is substantial economic mobility during the 1850-1870 period as measure by the movement of households within the distribution of wealth from one census year to the other. Table 2 reports the movement of 2192 households relative to each other between 1860 and 1870. The households are divided into deciles for 1860 and 1870 so that a transitional matrix is formed to measure the economic mobility within the economy.[21] Random movement of households would imply an expected value of .1 in each cell of the matrix with expected mean decile in 1870 equal to 5.5 regardless of the initial decile in 1860. The upper tail of the wealth distribution displays considerable immobility while much of the rest of the matrix suggests near randomness. Thus, the Utah economy, perhaps like many others, was fairly open to movement except at the very top.

Regressions reported elsewhere have shown some of the important influences upon the level of wealth for households of the 1850-1870 period.[22] In addition to the anticipated effects of age and occupation upon wealth, time of entry, place of residence, birthplace and sex of the household head have significant impacts upon household wealth. For an OLS

regression including age, age^2, occupations, county of residence, birthplace, sex of household head, migration between census years and duration measured by first appearance in the census, duration was influential upon the level of wealth, contributing 231% higher level of wealth ceteris paribus. Foreign birth of the household head reduced wealth to about 80% of the control group level; rural residence about 60% of the control group level; female headed household about 76% of that level. In more complex regression formulations, it becomes clear that the path of choices that the households made about occupation and place of residence retained influence upon wealth over time.[23] Someone moving from a craft to a farmer had a different wealth position ceteris paribus than someone who remained a farmer for both periods of observation. This result is not surprising but should be kept in mind when considering the intergenerational effects since part of the influence of parents is to give children an economic legacy in terms of an initial place of residence (urban-rural) and probably occupation as well.

To summarize, Utah during this period is characterized by rising inequality, high levels of economic mobility for the same household observed at two different points in time, and substantial influence by Ricardian elements such as birthplace, sex of household head and decisions taken earlier. The stage is then set to examine intergenerational relationships that may exist. It should be emphasized that the results reported here are preliminary since the data set is still in the process of creation and may contain errors of construction as yet undetected.

INTERGENERATIONAL CORRELATIONS WITHIN THE UTAH SAMPLE

We assume a specification throughout the work reported here that transforms either the income or wealth observations by the natural logarithm.

Other variables are not transformed, hence the specification is log-log when wealth or income appears as a regressor (e.g. father's wealth) and log-untransformed otherwise. When a regressor has been transformed by the natural logarithm, the regression coefficient is interpreted as an elasticity; when no transformation has occurred the coefficient is interpreted as the percentage change in wealth or income attributable to the regressor (characteristics) of interest. Thus,

$$w_j^i = e^{a_0 + \sum_j^n \beta_j x_j^i} \text{ and } \ln(w_j^i) = a_0 + \sum \beta_j x_j^i$$

where one of the X_j^i (jth characteristic of ith individual) is $\ln(w_{father}^i)$ and the other variables are those described in Table 3.

We first consider simple models of the contemporaneous correlation of sons' and fathers' wealth, Table 4. While the results reported in Table 4 use data for 1870, essentially the results are obtained when 1860 data are used. In 1870, then, the simple elasticity, adjusting only for age and a possible life cycle ($\ln(W) = a + b\,age + c\,age^2 + d\ln(FW)$) is .302. For this sample, fathers were about thirty years older than sons and held about two-thirds more wealth on average, with the respective means being \$812 and \$1353. However, the contemporaneous correlation is lower than a comparable correlation when the father is dead. That is, among those whose father has died, there is a higher correlation between a son's wealth and father's wealth prior to death than between living sons and fathers. This obviously suggests that inheritance matters in this economy since inheritance cannot be a factor in a contemporaneous relationship between the wealth of sons and their fathers. However, contemporaneous elasticities greater than zero suggest that something more than direct transfer is a part of the relationship we observe and that the correlation

may reflect some indirect influences of parents on children through IQ, educational levels, occupational choices, cultural influences, nepotism as well as direct, inter vivos, transfers. It would be useful to separate the contemporaneous correlation between wealth of fathers and sons into the marginal effects of each component. To do so requires endogenization of all intergenerational influences--a formidable exercise, and one that is not possible with our data. We can only consider, as a consequence, some of the influences on son's wealth and possible relationships between those influences and parental influence.

We do not have data on education, likely to be a key intergenerational variable. However, for nineteenth century U.S. society, education beyond basic skills was probably not as important to wealth accumulation and high income as education is for the twentieth century. We can explore other variables however. Consider first, equation 1 of Table 4. We have expanded the specification to include birthplace, age, the portfolio division between real and personal wealth, county of residence, and father's age and wealth. We find a pronounced life cycle in wealth holdings, with wealth increasing with age at a decreasing rate and then declining slightly in later years. Foreign birth reduces an individual's wealthholdings by 29 percent relative to US born individuals with otherwise comparable characteristics. This is an obvious effect of parental choice on the wealth of children.

The portfolio variable is also a significant determinant of wealth since a 10% increase in the share of one's wealth held in real estate increased wealthholdings by 4.7%. This portfolio effect reflects the fact that there were significant pressures against the land supply suitable for productive activity in Utah so that capital gains on land exceeded capital

gains derived from other forms of wealthholding. Neither time of entry into the economy (T) nor county of residence (based on an urban-rural dichotomy with U70 indicating residence in Salt Lake County) were significant determinants with wealth.

The elasticity of son's wealth with respect to father's wealth is now .26. Father's age appears to have no impact on son's wealth but is retained in the regressions to attempt to normalize father's wealth for life cycle influences. Thus, in equation 1 we have adjusted for son's age, birthplace, portfolio decisions, county of residence and father's age; yet, the elasticity of wealthholding between father and son has only fallen by 14% from .301 to .26.

In equation 2, occupation is added to the variables included in equation 1. The occupational responses given in the census have been classified into five categories--white collar and professionals, craftsmen, service workers, laborers, and farmers. The occupation of farmer is added to U.S. birth and rural residence as the control or reference group. One would expect some of the contemporaneous influence of parents upon the economic position of their children to be transmitted through the selection of occupation by the children. While the occupational classifications do increase the proportion of the variance in wealth that is explained, the elasticity of son's wealth with respect to father's wealth only falls slightly from .26 to .22. An occupational classification of white collar or professional significantly increases wealth while classification of laborer reduces wealth substantially. The effects of birthplace and portfolio holding are diluted slightly with the addition of occupation as a variable. In terms of simple correlations, there is virtually no relationship between occupational choice of sons as craftsmen or service

workers and father's wealth. Higher father's wealth increases the probability of the sons being a white collar or professional (simple correlation is .20). Lower father's wealth increases the probability that the son will be a laborer (simple correlation is -.25). But, clearly, occupational classification is not the major transmission mechanism for the parental influence upon son's wealth. Nevertheless, the intergenerational wealth elasticity falls from .31 to .22 or by 27 percent when the effects of birthplace, portfolio choice and occupation are controlled for. There are two interesting observations about this change. First, it is clear that children of wealthy parents make choices different from children of less wealthy parents--when we allow for sons to have differing characteristics, the impact of fathers' wealth declines. Second, there remains a strong impact of father's wealth on son's holdings, that is independent of some individual characteristics such as age, birthplace, portfolio composition, and occupation.

Presumably, if this independent impact is through the environment, genetics, social contacts, etc., the effect should be independent of the time of measurement. We have already noted that comparable findings hold for 1860 contemporaneous data. However, if one selects a sample of fathers in 1860 with sons in 1870, and estimates a specification comparable to those reported in Table 4 but with fathers' 1860 wealth rather than the contemporaneous observation, the elasticity falls from .22 to .10 (results are summarized in Table 5). The coefficients of the sons' other characteristics (age, birthplace, county of residence and occupation) are similar for 1870 and 1860 even though the samples are different. The exceptions to these similarities are the portfolio variable where the effect is significantly higher in 1860 and the classification as laborer in 1860 which has less effect than the same classification in 1870.

We know that there is considerable wealth mobility from 1860 to 1870 but that mobility is not a satisfactory explanation of the fall in the elasticity of the intergenerational effect since there is no reason to believe that the 1870 observation on father's wealth is superior to the observation in 1860. We simply do not expect the kind of decay in effect suggested by the results and the results are puzzling.

Using a sample of sons with fathers holding wealth ten years earlier does allow us to get at bequest a little more precisely since we can select those sons whose fathers died in the decade between 1860 and 1870. One such specification is reported as equation 2 in Table 5. The sample is, unfortunately, small with only 64 cases. We find, however, that the intergenerational wealth elasticity increases threefold, to .34. The major difference between this sample and the one where the elasticity is around .1 is that the father is dead. Hence, we must be picking up an inheritance effect. Note that the size of the elasticity suggests substantial regression toward the mean but not independence of son's position from father's position. The suggested inheritance effect is, moreover, less than that suggested by Menchik's sample of the wealth in Connecticut. There are several plausible reasons for the lower estimated elasticity. The Utah population is much poorer and represents the whole spectrum of the wealth distribution while Menchik's sample is the richest extreme of the wealth distribution. A segment of the Utah population practiced polygamy so that the typical pattern of wealthholding (parents, then mother after father's death, then children after mother's death) has no meaning for the polygamist family. Finally, family size is much larger in the Utah sample. Nevertheless, the increase in the intergenerational wealth elasticity when the sample is restricted by the death of the father is quite large.

The structure of the sample changes when the limitation of prior death of the father is imposed upon the data. The percentage that are foreign born increases slightly while the effect of foreign birth falls by 36%. The mix of wealth shifts in favor of real wealthholding rather than possession of personal wealth. Further, the elasticity of wealth with respect to the portfolio choice increases by 47%. This result suggests that fathers tended to bequeath land to their sons if there was an inheritance and that such bequests of land enhance wealth because of the increased capital gains of land relative to personal wealth. Those whose father had died prior to 1870 were slightly older, which is to be expected, and tended to be farmers, again reflecting the inheritance of land. The sons in the sample restricted to the death of the father prior to 1870 were wealthier than the average son in 1870 ($1119 compared to $846) while the fathers in that sample are poorer ($863 compared to $1119). This structural change is due in large part to the life cycle effect.

Table 6 reports the intergenerational effect of father's wealth upon the income of the sons. The data necessary to compute the estimate of the son's income from the Church records exists for the largest sample in 1885 so that year will be the focus of the regressions for income. Equation 1 gives the results for all sons on whom we have income data for 1885 and equation 2 is confined to those sons whose fathers had died prior to 1885. The structures of the two samples in terms of age, birthplace and county of residence are quite similar. The primary structural change between the two regressions is the older age of fathers in 1870 for the sample with fathers dying prior to 1885. Son's income and father's wealth have higher mean values for the prior death sample ($457 and $1620 compared to $358 and $1366 respectively).

Equations 1 and 2 of Table 6 show similar effects of age, birthplace and county of residence upon income. Unlike the wealth patterns we have reported, the life cycle for income does not peak within the plausible age range although it does have a concave path relative to age in both equations. Foreign birth reduces income (effect is not statistically significant in equation 2) but the effect is not as large as it is on wealth. County of residence has a larger impact on income than it does on wealth with residence in the urban county increasing income significantly. Father's wealth in 1870 has an impact on the income of the son in 1885 with an elasticity of .135 where all sons are considered and an elasticity of .212 where only sons whose fathers have died are considered.

We obviously do not know what the contemporaneous elasticities are since our last observation for wealth is in 1870. Hence, we do not know whether the contemporaneous elasticities would be larger than those reported here. It is striking, however, that we find a fairly large impact that persists over the decade and one half interval, again suggesting that father's wealth is correlated with unmeasured sons' characteristics that are independent of time (e.g. genetic, cultural, environmental, etc.). In addition, we find a spread in the impacts for sons with deceased fathers that is consistent with explicit intergenerational transfers of wealth (which then affect the income stream of the recipient).

It now remains to examine the effect of family size and early death of a father upon the wealth and income position of sons in the sample. It was postulated earlier in the paper that larger family size should attenuate the relationship between the economic position of a father and son. It was also suggested that early death of a father would adversely affect the economic position of children. Table 7 is a rough attempt to examine the

initial relationship between some demographic variables and intergenerational patterns of wealth and income. Two variables are entered into these regressions to reflect family size and premature death of a father. SIB is calculated by subtracting infant mortality from the the children of a father. It should be noted that many of the siblings counted under this variable may be half brothers or sisters to the individual being examined in the regression since the practice of polygyny created a very complex kinship network. The mean number of the SIB variable varies from 8 in the early part of the period to 13 in the latter years. FDE is a dummy variable that indicates that the father died before age sixty.

The sibling variable is significant in only one of the four regressions reported in Table 7. In equation 3 where the sample is constrained to sons whose fathers have died, an increase in the number of siblings living to adulthood reduces income by a small amount. For example a farmer in Salt Lake County who is U.S. born, fifty years of age, whose father was average in age and wealth in 1870, would have a 13% lower income in 1885 if he had ten siblings instead of five. In each of the regressions where the SIB variable has been entered, the coefficient has been negative though not often significant. Similarly, the dummy for death of the father has a negative coefficient but is not significant in either case.

Even though the early death of the father and family size are not statistically significant variables in the simple regressions or specifications reported here, their inclusion as variables does change the elasticity of intergenerational wealth. Inclusion of the SIB variable raises the elasticity between father's and son's wealth by 23% from .22 to .27. This is the expected direction of change of the elasticity suggesting

that family size does interact with the father's wealth. The inclusion of the SIB and FDE variables also increases the elasticity of intergenerational wealth in equation 2 of Table 7; but in this case the effect is much smaller. This is a curious result since the sample of equation 2 is confined to sons whose fathers have died so that the inheritance effect is measured. The effect of introducing demographic variables to the income equations for 1885 is to reduce the elasticity between son's income and father's wealth in both instances. The results of the introduction of both a sibling variable and a variable for the death age of the father indicate that there may be offsetting relationships between wealth, income, family size and perhaps the death age of the father. For example, one would expect an increase in the number of siblings to reduce the material inheritance and possibly dilute other intergenerational mechanisms. However, economic success may induce a larger family size for parents so that family size may proxy for economic success of the father not fully captured by the measure of wealth in 1870.

CONCLUSION

The Utah data for the nineteenth century indicate that there is a persistent relationship between father's and son's wealth. This relationship exists prior to inheritance of wealth by a son upon the death of his father, and consequently reflects the genetic or cultural inheritances that might be. In addition to these inheritances, the father determines the initial position in terms of residence and to a lesser extent occupation from which the son makes choices. That endowment of an initial position is an important component of the Ricardian heritage of an individual. The fact that introduction of birthplace and urban residence change the intergenerational wealth elasticity is evidence of the impact

that the initial position from which a son started within the Utah economy is important. The intergenerational elasticity increases with the death of the father as expected.

The introduction of the demographic variables of family size and early death of the father proved to have little impact in a simple OLS regression. The coefficients displayed consistent plausible signs but appeared to have little effect. The suspicion that there are strong multidirectional relationships between these variables and economic variables suggests that a more rigorously specified set of equations may be needed to fully explore the demographic issues relative to intergenerational economic patterns.

Much more work needs to be done on the Utah data in order to bring the sample to full usefulness as a testing ground for intergenerational economics. The death of the mother should be added as should birth order and the more complex aspects of the marriage structure implied by polygamous marriages. We intend to add more data in order to possibly increase sample size and to add estimates of wealth through use of probate or tax data. Nevertheless, this preliminary exploration provides sufficient evidence to demonstrate that the economic position of parents provides another Ricardian influence to the determination of the level and distribution of income and wealth. The magnitude of this influence is not extremely large and regression toward the mean appears to be a dominating tendency within the intergenerational economic process.

NOTES

[1]See, for example, Stephen Thernstrom, The Other Bostonians (Cambridge, Mass., 1973) and Edward Pessen, Riches, Class and Power Before the Civil War (Lexington, Mass., 1973).

[2]Peter Blau and Otis Dudley Duncan, The American Occupational Structure (New York, 1967).

[3]See Christopher Jencks et. al., Inequality (New York, 1972); Christopher Jencks et. al., Who Gets Ahead? (New York, 1979); Zvi Griliches and William Mason, "Education, Income and Ability," Journal of Political Economy (May/June Supplement, 1972), pp. 74-103; Paul Taubman, Sources of Inequality of Earnings (Amsterdam, 1975); Paul Taubman (ed.), Kinometrics: Determinants of Socioeconomic Successes Within and Between Families (Amsterdam, 1977).

[4]Paul Menchik, "Inter-generational Transmission of Inequality: An Empirical Study of Wealth Mobility," Economica (November, 1978), pp. 349-362.

[5]Ibid., p. 356.

[6]Stanley Lebergott, The American Economy (Princeton, 1976).

[7]C. D. Harbury and P. E. McMahon, "Inheritance and Characteristics of Top Wealth Leavers in Britain," Economic Journal (September, 1973), pp. 810-833. For a survey of inheritance literature, see Gian Singh Sahota, "Theories of Personal Income Distribution: A Survey," Journal of Economic Literature (March, 1978), pp. 1-55.

[8]See our working paper, "Choice and Ricardian Elements in the Distribution of Income and Wealth."

[9]J. R. Kearl, Clayne L. Pope and Larry T. Wimmer, "Household Wealth in a Settlement Economy: Utah, 1850-1870," Journal of Economic History (September, 1980), pp. 477-496.

[10]Sahota, "Theories of Personal Income Distribution: A Survey," pp. 7-9.

[11]Kearl, Pope and Wimmer, "Household Wealth . . ."; Kearl and Pope, "A Ricardian Theory . . . ."

[12]For example, see Jencks et al., Inequality, Ch. 5.

[13]Blau and Duncan, Occupational Structure.

[14]James E. Meade, The Just Economy (Albany, 1976); Menchik, "Inter-generational Transmission of Inequality"; Allan Blinder, Towards an Economic Theory of Income Distribution (Cambridge, 1974).

[15]J. Wedgewood, "The Influence of Inheritance on the Distribution of Wealth," Economic Journal (1928), pp. 38-55; Gary Becker, "Theory of Social Interactions," Journal of Political Economy (November/December, 1974), pp. 1063-1093; Gary Becker and Nigel Tomes, "Child Endowments and the Quantity and Quality of Children," Journal of Political Economy (August Supplement, 1976), pp. 5143-5162.

[16]These effects may not be large. If one examines changes in adult mortality rates moving from level 11 to level 22, male life expectancy at age 65 only increases 27% even though life expectancy at birth increases 54%. However, mortality rates at age 45 decline 84.5 per 1000 to 25.5 per 1000. Ansley J. Coale and Paul Demeny, Regional Model Life Tables and Stable Populations (Princeton, 1966), pp. 12, 23.

[17]John A. Brittain, The Inheritance of Economic Status (Washington, D.C., 1977).

[18]We have taken a small casual sample of probates that occurred within two or three years of the census record. The personal wealth was consistently higher on the probate inventory than the census record.

[19]The Church contributions were recorded at the local level by a "Bishop", the local lay officer of the Church. The Bishop would also record the percentage of a "full" tithing paid where a full tithing was defined as one tenth of income.

[20]Mark Skolnick et al., "Mormon Demographic History," Population Studies. Part I appears in Vol. 32 and Part II in Vol. 33.

[21]Each cell represents an estimate of the probability of moving from one decile to another. The "deciles" are uneven in size because of heaping on even values such as $500 or $1000.

[22]Kearl et al., "Household Wealth in a Settlement Economy: Utah, 1850-1870."

[23]Kearl and Pope, "Choice and Ricardian Elements. . . ," working paper.

Table 1

Comparison of Wealth in Utah and the United States

	1850		1870	
	United States	Utah	United States	Utah
Mean real wealth	$1001	$201	$1782	$644
Proportion holding real wealth	.41	.70	.43	.64
Share of wealth held by top one percent	.30	.14	.24	.27
Share of wealth held by top ten percent	.73	.52	.70	.61
Mean wealth of foreign born/mean wealth of U.S. born (whites)	.49	.77	.61	.70
Gini coefficient for real wealth	.86	.69	.84	.74
Gini coefficient for total wealth			.81	.70

Note: The sample procedures are such that the means and Gini coefficients are based on all males over age twenty and for the U.S. are based on all male heads of household over age twenty for Utah. The top percentiles are based on males over age twenty in both instances.

Source: United States: Soltow Men and Wealth. Utah: see text.

Table 2

Relative Movement of Households Within the Distribution of Wealth, 1860-1870

		1870 WEALTH DECILE											Mean Decile, 1870
		1	2	3	4	5	6	7	8	9	10	N	
1860 WEALTH DECILE	1	.170	.106	.145	.145	.085	.081	.089	.072	.068	.033	238	4.449
	2	.179	.184	.143	.161	.081	.058	.076	.054	.031	.031	223	3.920
	3	.147	.137	.157	.147	.108	.108	.078	.078	.039	.010	204	4.089
	4	.113	.118	.108	.151	.167	.113	.108	.065	.038	.022	186	4.628
	5	.055	.046	.114	.126	.122	.110	.151	.092	.089	.050	271	5.457
	6	.097	.082	.092	.082	.158	.117	.153	.133	.051	.021	196	5.161
	7	.060	.084	.130	.107	.088	.116	.116	.153	.084	.051	215	5.215
	8	.081	.031	.085	.085	.090	.094	.166	.135	.135	.099	233	6.199
	9	.055	.037	.032	.041	.051	.106	.088	.138	.240	.212	217	7.280
	10	.050	.014	.014	.023	.054	.032	.054	.108	.189	.464	222	8.257
	N	224	194	224	234	217	203	238	223	214	221	2192	

N: Number in Decile, $\Sigma N = 2192$

Note: 1 is poorest decile, 10 is wealthiest decile. The value in each cell gives the proportion of the households in a particular decile in 1860 who are in a particular decile in 1870. For example, the proportion of households in the poorest decile in 1860 who remain in the poorest decile in 1870 is .170. Decile boundaries are based on the sample of 2192 households who we found in the census in both 1860 and 1870 rather than boundaries based on the whole population in 1860 and 1870. The boundaries yield unequal decile sizes because of heaping on certain wealth values i.e. $500 or $1000.

Table 3

Definitions

Variables

1.	LSW70	Natural Logarithm of a son's wealth as reported for 1870.
2.	LFW70	Same as above for a father in 1870.
3.	LFW60	Same as above for 1860.
4.	Age	Son's age in the year wealth or income is observed.
5.	Age^2	Variable 4 squared.
6.	FBE	If foreign born, FBE = 1.
7.	Port 7	Ratio of the value of wealth in the form of real estate to total wealth.
8.	T	1860 minus the year the household is first observed in Utah.
9.	W	Occupation classified as white collar or professional.
10.	C	Occupation classified as skilled craftsman.
11.	S	Occupation classified as a service worker.
12.	L	Occupation classified as an unskilled laborer.
13.	U70	If county of residence was Salt Lake County in 1870, U70 = 1.
14.	U85	Same as above for 1885.
15.	FAGE	Father's age in the year that wealth is observed.
16.	Sib	Number of siblings or half-siblings (father's side) who do not die in infancy.
17.	FDE	If father died before age 60, FDE = 1.
18.	N	Sample size.
19.	R^2	Explained variance of regression.
20.	F	F value for either the equation or the variable in question.

Table 4

Contemporaneous Intergenerational Wealth Regressions

	1			2		
Dependent Variable:	Mean	B	F	Mean	B	F
LSW70	6.70			6.70		
Explanatory Variables:						
Age_2	32.63	.163	21.4	32.63	.16	20.9
Age^2	1136	-.0017	13.9	1136	-.0017	13.3
FBE	.30	-.288	7.5	.30	-.262	6.4
Port7	.56	.473	5.9	.56	.431	4.98
T	.45	.0072	.4	.45	.004	.16
W				.05	.47	4.3
C				.08	-.31	3.0
S				.05	-.01	0
L				.16	-.31	5.3
U70	.15	-.0028	0	.15	.10	.5
LFW70	7.21	.260	26.0	7.21	.22	18.1
FAGE	63.3	.0029	.2	63.3	.002	.1
Constant		1.09			1.51	
N_2	277			277		
R^2	.35			.38		
F	18.3			13.7		

Equation 1 and 2 are based on all combinations of fathers and sons in the sample with wealth greater than zero in 1870.

Variables are defined in Table 3.

Table 5

Intergenerational Wealth Regressions: 1870 and 1860

	1			2		
Dependent Variable:	Mean	B	F	Mean	B	F
LSW70	6.74			7.02		
Explanatory Variables:						
Age_2	34.9	.0988	7.9	40.3	.236	2.8
Age	1301	-.0010	5.1	1691	-.003	3.1
FBE	.31	-.199	3.8	.34	-.128	.3
Port7	.57	.985	26.1	.63	1.450	8.0
T	1.84	.014	1.8	4.8	.012	.1
W	.04	.650	8.9	.02	.766	1.0
C	.08	-.140	.7	.11	-.754	5.8
S	.06	.071	.1	.06	-.360	.7
L	.16	-.050	14.3	.06	-.760	3.3
U70	.18	-.198	2.6	.19	.518	3.4
LFW60	7.02	.101	3.7	6.76	.337	5.0
FAGE	56.4	-.002	.1	63.5	.010	.4
Constant		3.51			-1.62	
N_2	317			64		
R^2	.33			.50		
F	12.49			4.25		

Equation 1 is based on all combinations where father's wealth is greater than zero in 1860 and son's wealth is greater than zero in 1870.

Equation 2 is a subset of combinations in equation 1 where the father died before 1870.

Table 6

Intergenerational Income Effects

	Equation 1			Equation 2		
Dependent Variable:	Mean	B	F	Mean	B	F
LY085	5.88			6.125		
Explanatory Variables:						
Age_2	50.6	.037	52.2	51.0	.025	11.4
Age^2	31690	-.00002	51.9	22691	-.00001	11.4
FBE	.14	-.251	4.6	.12	-.151	.6
U85	.10	.381	9.4	.11	.496	6.74
LFW70	7.22	.135	10.3	7.39	.212	9.1
FAGE	54.9	-.007	1.9	61.7	.007	5
Constant		3.98				
N_2	469			170		
R^2	.187			.17		
F	17.74			4.6		

Equation 1 is based on all father son combinations where father's wealth is greater than zero in 1870 and son's income may be calculated in 1885. Equation 2 is a subset of the sample of equation 1 where the fathers had died prior to 1885.

Table 7

The Effect of Family Size and Early Death of Father on Intergenerational Wealth and Income Relationships

	Equation 1		Equation 2		Equation 3		Equation 4	
Dependent Variable:	LW70		LW70		YO85		YO85	
	B	F	B	F	B	F	B	F
Explanatory Variables:								
Age_2	.069	4.6	.243	2.8	.021	8.1	.038	52.4
Age	-.0004	.7	-.003	3.1	-.00001	8.1	-.00002	52.1
FBE	-.008	1.7	-.18	.52	-.19	.9	-.283	5.7
Port7	.474	5.5	1.42	7.33				
U70	.108	.6	.50	2.8				
W	.44	3.5	.736	.85				
C	-.29	2.5	-.736	5.15				
L	-.378	7.5	-.738	3.0				
S	.008	0	-.361	.631				
Sib	-.008	1.7	-.013	.21	-.028	11.0	-.003	.48
FDE			-.448	.02	-.15	.81		
LFW70	.27	23.7			.201	7.8	.087	4.28
FAGE	.005	.611	.010	.27	-.0054	.322	-.006	1.5
LFW60			.343	4.8				
U85					.508	7.2	.40	10.3
N_2		277		64		170		469
R^2		.37		.50		.19		.18
F		13.11		3.53		4.62		14.14

Equation 1 is based on the father son combinations with wealth greater than zero in 1870.

Equation 2 is based on the combinations where the father died between 1860 and 1870 but son has wealth greater than zero in 1870.

Equation 3 is based on combinations where the father died between 1870 and 1885 with son's income available in 1885.

Equation 4 is based on all combinations where father has wealth in 1870 and son has income in 1885.