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ABSTRACT

This paper examines tax return-generated data on the labor force behavior of people before and after they receive inheritances. The results are consistent with Andrew Carnegie's century-old assertion that large inheritances decrease a person's labor force participation. For example, a single person who receives an inheritance of over $150,000 is roughly four times more likely to leave the labor force than a person with an inheritance below $25,000. Additional, albeit weaker, evidence suggests that large inheritances depress labor supply, even when participation is unaltered.

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> Warren Kendall...heir to an insurance company fortune...says he's worth about $5 million and has an income of "about, oh, $300 and some thousand a year." [H]e has never held a job, or wanted to. Going down to sea in cruise ships is his full-time pursuit. He estimates that he has taken about 250 cruises over the past couple of decades, spending at least 50 percent to 70 percent of the year afloat [Morgenthaler, 1991, p. A1].

1. INTRODUCTION

In a famous passage from an essay published in 1891, Andrew Carnegie opined that "the parent who leaves his son enormous wealth generally deadens the talents and energies of the son, and tempts him to lead a less useful and less worthy life than he otherwise would..." [Carnegie, 1891/1962, p. 56]. We can view Carnegie's statement as a conjecture about the effects of inheritance on the labor force behavior of the recipient -- the greater the inheritance, the lower the recipient's work effort and attachment to the labor force. Knowing whether Carnegie was correct would clearly be useful in designing sensible tax policies for bequests and inheritances. In addition, evidence concerning Carnegie's conjecture would cast light on several important contemporary controversies in economics:

Sources of wealth accumulation. The effect of bequests on work effort figures prominently in the debate over the extent to which the life-cycle model accounts for lifetime accumulations of wealth. In any given year, an individual's life-cycle saving is the difference between that year's levels of labor earnings and consumption. The present value of life-cycle saving is the discounted sum of the differences between these flows. To the extent that receipt of an inheritance reduces labor supply, earnings fall and so does life-cycle saving, *ceteris paribus*. Thus, Blinder [1988] and others have argued that in calculating the contribution of life-cycle saving to total wealth accumulation (i.e., the sum of life-cycle saving and inheritances) one should compute life-cycle saving in the absence of inheritances.

In other words, ignoring the labor supply response to inheritances will bias downward estimates of the proportion of wealth due to life-cycle saving.

Fiscal policy and generationally-linked behavior. In recent years, debates over the efficacy of government fiscal policy have centered on the question of whether individual behavior can be characterized as forward-looking and generationally-linked.[1] In this view, all generations in a family realize that they are operating off of a common intertemporal budget constraint. Therefore, the timing of an intergenerational transfer is irrelevant and should have no effect on real behavior, providing that the time of donor's death is known with certainty or annuity markets are perfect. Examination of Carnegie's conjecture allows us to examine this proposition from a new standpoint. If labor supply declines after receipt of an inheritance, doubt is cast on the validity of the generationally-linked model, at least in its extreme form.

Normality of leisure. Treatments of the conventional theory of labor supply generally assume that leisure is a normal good. However, as Pencavel [1986, pp. 63-64] notes, the econometric support for this proposition is weak at best, perhaps because nonwage income is poorly measured in conventional data sets and/or is endogenous. A finding that Carnegie's conjecture is correct would be consistent with the normality of leisure.

Carnegie's conjecture has not attracted much investigation. To be sure, econometric studies of labor supply abound, and, as suggested above, many of these studies include estimates of the effect of nonwage income upon hours of work and/or labor force participation rates (see Killingsworth [1983] and Pencavel [1986]). In principle, one might use such estimates to infer the impact of inheritances on labor supply, but such an exercise would probably not be fruitful for several reasons. First, nonwage income is typically not well-measured in conventional data sets, which renders unreliable the associated behavioral

elasticities. (See Avery, Elliehausen, and Kennickell [1988] and Pencavel [1986, p. 63] on problems relating to the measurement of nonwage income and assets in survey data.) Second, even if nonwage income were accurately measured, in a life-cycle context it should be endogenous to the labor supply decision. Finding suitable instruments in these circumstances is difficult. Third, conventional data sets have few observations on the very wealthy, and most of those who receive substantial inheritances start out at the upper end of the income and wealth distributions. For example, in the Panel Study of Income Dynamics (PSID) for 1989 there are only 239 individuals with income in excess of $50,000 (see Duncan and Hill [1989], Table 2). It is problematic to make inferences about how these people would behave by looking at another segment of the income distribution.

This paper brings a unique data set to bear on assessing the validity of Carnegie's conjecture. The sample consists of the 1982 and 1985 federal individual income tax returns of a group of people who received inheritances in 1982 and 1983, along with information about the size of their inheritances. Tax return data in 1982 and 1985 allow one to compute how many members in the household were participating in the labor force in each year. Hence, we can examine transitions into and out of the labor force between 1982 and 1985, and the effect of the size of inheritances upon these transitions. In particular, we can determine whether the probability that a single individual, or one or both members of a married couple, leaves the labor force increases with the size of the inheritance. Thus, the data permit us to gauge whether the tendencies suggested by Carnegie are present.

The data and empirical strategy are described in Section 2. Section 3 presents the results. Our main finding is that the decline in labor force participation for both joint filers and single filers is significantly greater for those who receive the largest inheritances -- Carnegie was right. Additional, albeit weaker, evidence suggests that large inheritances

depress labor supply, even when participation is unaltered. Section 4 concludes with a summary and suggestions for future research.

2. DATA AND EMPIRICAL STRATEGY

Construction of our data set began with an Internal Revenue Service (IRS) sample of estate tax records. The IRS selected a one percent sample of estate tax returns of people who died in 1982 and whose estate tax returns were filed in 1982 and 1983. In addition, returns with total assets over one million dollars were sampled at a 100 percent rate. The sample included over 8,500 individuals with gross estates over $300,000, the (arbitrary) cutoff point selected by the IRS for minimum estate size.[2]

The next step was to match the estate tax returns with the beneficiaries' personal income tax returns for 1982 and 1985. We dropped some observations because of the inability to make matches, missing data, etc. Returns in which the age of the filer was less than 19 or greater than 58 years in 1982 were also deleted, so that all beneficiaries were younger than 62 in 1985. The purpose of deleting the older members of the sample was to reduce the likelihood of confounding the effects of inheritance with those of retirement. As noted, our focus is on labor market transitions between 1982 and 1985. The number of observations with usable data for these two years is 4,332. Of these, 2,700 are filed by married couples ("joint returns") and 1,632 are filed by individuals ("single returns").[3] The mean age of the beneficiaries in the sample is 39 years.

Married couples and individuals pose somewhat different data issues. With respect to married couples, our information about the labor market status of each spouse comes from Schedule W, the two-earner deduction reported on Form 1040. Between 1982 and 1986, families with two earners were allowed a tax deduction of 10 percent of the lower-earning

spouse's earned income (up to a maximum of $3,000), provided that they filed Schedule W.[4] Hence, Schedule W allows us to determine how many earners were in the family each year.[5] Unfortunately, the data do not allow us to determine which spouse is which. Thus, for example, if there were two earners in 1982 and one earner in 1985, we do not know which one dropped out of the labor force. Indeed, even if there was one spouse with earnings each year, we do not know if this was the same spouse in each year. Moreover, although we know earnings for each individual, IRS data do not include hours of work. Hence, we cannot compute wage rates.

For single returns, there is clearly no problem in matching the relevant actor to his or her earnings and age. Again, however, hours of work and wage rates are unknown to us.

These considerations suggest that it would be futile to apply conventional econometric approaches for analyzing labor supply to our data. Such approaches require data on each person's wage rate, family nonwage income, and various demographic variables. In our data set, we cannot calculate wage rates because we have no information on hours worked, and even if we could calculate wage rates, we could not match them to the correct individuals on joint returns.

Given these limitations, we choose a more modest approach that is tailored to the strengths of our data. We divide the sample into three groups based on the size of inheritance. For each inheritance group, we construct a transition matrix that shows how the number of earners in the family (zero, one, or two for joint returns; zero or one for single returns) changes between 1982 and 1985. We then make inferences about the impact of inheritance by examining the transition matrices to see if they differ, and if so, how.

Clearly, a concern is that other variables may affect labor supply differentially among the three groups. If so, one cannot interpret the results as reflecting the independent effects

of inheritance. Therefore, we examine the robustness of our results via some simple multivariate analyses of the labor supply decisions.

3. RESULTS

In this section, we focus first on how transition probabilities for labor force participation vary with the size of the inheritance. We then discuss some related results that bear on the plausibility of the notion that inheritances influence labor supply.

3.1 Basic Results

The results for single returns are found in Table 1. It consists of three transition matrices, one each for inheritances under $25,000, inheritances between $25,000 and $150,000, and inheritances greater than $150,000.[6] Each row shows the number of labor force participants in 1982, the columns show the number in 1985. Within each cell, the first figure is the number of observations in that cell. The second figure is the proportion of observations *in the corresponding row* that fall in the cell. The figure in parentheses is the associated standard error. Thus, for example, the element in the second row and first column of the first matrix tells us that 30 of the single individuals in our sample with inheritances below $25,000 went from being in the labor force in 1982 to not being in the labor force in 1985, and that these 30 individuals represent 4.57 percent of all the individuals in this group who were in the labor force in 1982.[7]

Was Carnegie right? According to Table 1, 4.6 percent of the individuals in the low inheritance group exited the labor force between 1982 and 1985; 10 percent of the middle group were out by 1985; and 18.2 percent of the high inheritance group were out of the labor force in 1985. (See the second rows of the matrices in Table 1.) This almost quadrupling as

we move from the low to the high inheritance groups is strongly consistent with Carnegie's conjecture. Moreover, these differences are statistically significant. The chi-square test statistic for the null hypothesis that the transition probabilities are identical is 43.8, which is easily significant at the 0.01 level. In addition, pairwise comparisons of the transition probabilities for the low versus middle groups, middle versus high groups, and low versus high groups yield t-statistics of 3.3, 3.0, and 5.5, respectively. In each instance the differences between the transition probabilities are statistically significant at the 0.01 level.

It is also interesting to examine the implications of the results in the first rows of the transition matrices, which show the behavior of individuals who were out of the labor force in 1982. Carnegie's main concern seems to have been that receipt of an inheritance would reduce the donee's labor supply. His conjecture is also consistent with the notion that those out of the workplace would be less likely to enter if they received an inheritance. The results in Table 1 support this notion. The percentage of individuals who were out of the labor force in 1982 and entered in 1985 decreases with the size of inheritance, falling from 53 percent in the low inheritance group to 16 percent in the high inheritance group. Again, the differences are statistically significant. The chi-square statistic is 24.5, while the t-statistics for low versus middle, middle versus high, and low versus high are 2.3, 3.1, and 5.3, respectively.

For completeness, we also tested the hypothesis that entire transition matrices (not just individual cells) are the same. The associated chi-square statistic is 108.6 with 6 degrees of freedom, which is statistically significant at the 0.01 level.

We next consider the corresponding results for joint returns, which are presented in Table 2. Consider first families that had one earner in 1982. In the low inheritance group, 2.2 percent of these earners were out of the labor force in 1985; in the middle group 4.4 percent were out in 1985; and in the high inheritance group 6.7 percent were out of the labor

force in 1985.[8] Thus, the greater the inheritance, the greater the propensity to go from a one-earner family to a family with no one in the labor force. Next consider families with two earners in 1982. As we move from low to high inheritance groups, the percentage in which both earners opt out of the labor force increases from 0.8 percent to 1.6 percent to 2.7 percent. The percentage in which labor force participation falls from 2 members to 1 member increases from 21.2 percent to 26.2 percent to 30.9 percent.

A consistent story appears to emerge -- higher inheritances are associated with a greater propensity to exit the market. Unlike the case of the single returns, however, some of the cell proportions are significantly different from each other (in a statistical sense) in pairwise comparisons; others are not. For example, in comparisons of returns with one earner in 1982, the transition probability to lower labor force participation is not significantly different between the middle and high inheritance groups, but is significantly different between the low and middle inheritance groups (at the five percent level) and the low and high inheritance groups (at the one percent level). Similarly, there are no significant differences in the transition probabilities for the middle and high inheritance groups for two-earner returns. Comparing the low inheritance group with the middle group, the transition probability of going from 2 to 1 earners is significantly different at the five percent level. The low and high groups are significantly different at the one percent level. Comparisons of the probabilities of going from 2 to no earners yield mixed results. The probabilities are significantly different between the high and low groups (at the ten percent level), but not between high and middle inheritance groups.

As in the case of single earners, a more appropriate test of the impact of inheritances is to look at labor force transitions as a whole. Doing so, one finds that the differences among inheritance groups are statistically significant. The null hypothesis that the labor force

behavior of one-earner families in 1982 is independent of inheritance is strongly rejected by a chi-square test -- the test statistic is 33.2 with 4 degrees of freedom. The corresponding test for two-earner families in 1982 is 15.2 with 4 degrees of freedom.

As noted earlier, Carnegie's conjecture also implies that as inheritance rises the propensity to enter the labor force should decline. The point estimates in Table 2 bear out this prediction. As we move from the low to higher inheritance groups, the transition rate from one-earner to two-earner households declines. Similarly, there is a decline in the transition from zero-earner to one-earner households. On a pairwise basis, however, not all of the differences are statistically significant. Finally, the chi-square statistic associated with the hypothesis that the three matrices in Table 2 are identical is 86.6 with 14 degrees of freedom. Thus, the differences in labor force transitions as a whole are statistically significant.[9]

The finding that substantial receipts of lump-sum income lead to reduced labor force participation is consistent with sociological research on lotteries. In his survey of 576 state lottery winners, Kaplan [1985, p. 90] found that although the relationship was not strictly monotonic, "Generally, as the size of the winning increased, so too did the number of changes. Twenty-three percent of million dollar winners quit working. At the other end of the spectrum, none who won less than $50,000 quit."

Returning again to Tables 1 and 2, an interesting feature is that labor force participation in 1982 -- *before* the inheritance is received -- varies inversely with the size of inheritance. In Table 1, participation falls from 89.9 percent in the low inheritance group, to 82.7 for the middle group, and to 75.4 for the high inheritance group. For the joint returns in Table 2, the percentage of two-earner couples falls steadily with inheritance; the figures are 55.6, 49.2, and 41.2 for the low, middle and high inheritance groups, respectively. Lastly, the percentage of joint returns with no earners in 1982 rises from 1.5 to 2.9, and reaches 3.7 for

the high inheritance group.[10] Why is labor supply lower prior to actual receipt of the inheritance? One possibility is that at least some individuals can optimize freely with respect to an intergenerational budget constraint, as suggested by Barro [1974]. However, the evidence is also consistent with the notion that individuals leave the labor force to provide greater attention to donors during the late stages of their lives, along the lines suggested by Bernheim, Shleifer and Summers [1985]. Our data do not allow us to distinguish between these hypotheses.

3.2 Some Multivariate Analyses

The discussion surrounding Tables 1 and 2 indicates that inheritance influences labor market outcomes in a way that is consistent with Carnegie's conjecture. However, an alternative story suggested by the statistics in the tables is that age rather than inheritance drives labor force transitions -- in each table, the average age of the donee increases with the inheritance class. This indicates that it might be useful to do some simple multivariate analyses to see if inheritance remains a significant determinant of labor force behavior even when age and other variables that might affect labor supply decisions are taken into account.

Recall that our age data refer to the age of the donee, and in joint returns we do not know the donee's identity. Hence, we begin with the sample of single returns where there is clear identification of age and labor force participation. We estimate a series of logit equations for the probability of being in the labor force in 1985, starting with a specification that includes on the right-hand side only a quadratic in inheritance and an indicator for labor force status in 1982. We then augment this equation with age, and with a set of other control variables. The idea is to determine whether the suggestive link between inheritance and labor force participation is attenuated by the inclusion of age and other variables.

The results are reported in Table 3. In column (1), the probability of being in the labor force in 1985 depends on a quadratic function of the size of the inheritance, and the dichotomous variable *LF'82*, which equals one if the individual was in the labor force in 1982 and zero otherwise.[11] These results echo those in Table 1 -- conditional on labor force status in 1982, an increase in inheritance reduces the probability of being in the labor force in 1985, and the effect is statistically significant. (Although the quadratic term is positive, it only dominates the linear term for inheritances that exceed the mean inheritance by more than 4.8 standard deviations.)

Column (2) augments the inheritance variables with a quadratic function of age. Two important results emerge: First, the probability of exiting the labor force does indeed depend on age -- although the linear and quadratic terms are individually insignificant, jointly they add significantly to the explanatory power of the equation. (The chi-square statistic associated with the hypothesis that the coefficients on *AGE* and AGE^2 are zero is 28.2 with 2 degrees of freedom.) Second, although age is significant, its inclusion has little effect on the inheritance variables -- the coefficients fall somewhat in absolute value, but they remain statistically significant and continue to imply a negative effect for all but very large inheritances. Thus, our interpretation of the results in Table 1 is not an artifact of the exclusion of age effects.

Next, in column (3) we introduce the 1982 values of the individual's earned income, dividend and interest income, and number of dependents. Interpreting earnings as a measure of the opportunity cost of leaving the labor force leads one to expect that individuals with higher earnings will be more likely to stay in the labor force. This prediction is borne out in column (3), as the coefficient on earnings is positive and significant. The other results suggest that the probability of being in the labor force increases with the number of

dependents and decreases with unearned income. But for our purposes the key result is that the coefficients and standard errors of the inheritance variables are once again little changed.

How important is inheritance from a quantitative point of view? To gain a feel for the implications of the logit estimates and how they compare to the results from the transition matrices, recall from Table 1 that the mean inheritance rises by roughly $350,000 between the low and high inheritance groups. At the same time, the proportion of individuals in the labor force in 1985 falls from 0.954 to 0.819, or by 0.135. Next, we use the coefficients presented in column (3) of Table 3 to simulate the effects of receiving the same $350,000 inheritance. Specifically, we employ the coefficients to calculate the probability of being in the labor force in 1985, assigning all the right-hand-side variables their mean values. We then recompute the probability after increasing inheritance by $350,000, *ceteris paribus*. The estimated probability falls from 0.892 to 0.773, or by 0.119. Thus, whether we look at the tabulations in Table 1 or the multivariate analysis, the outcome is about the same -- receipt of a "large" inheritance reduces the labor force participation rate by 12 or 13 percentage points.

We next turn to a similar examination of inheritance and the labor force behavior of married couples. Given that the family's labor force status in 1985 falls into one of three naturally-ordered categories (zero, one, or two people in the labor force), the ordered logit statistical model discussed by Maddala [1983, pp. 46-49] provides a sensible framework for the analysis. The results are reported in Table 4. The first column shows how the probability of having a greater number of participants in the labor force in 1985 varies with inheritance, conditional on the number of people in the labor force in 1982. According to Carnegie's conjecture, inheritance should have a negative effect. This expectation is borne out by the estimates in column (1), which is no surprise given the results in Table 2. The key question in this context is whether the result continues to hold after the inclusion of other variables

that might affect labor force participation. As before, in column (2) we augment the set of right-hand-side variables with a quadratic in age, and in column (3), we add the number of dependents, earned income, and the sum of dividends and interest.[12] The point estimates and standard errors of the inheritance variables are basically unchanged as we move across the table.[13] The finding that inheritance has a negative impact on the labor force participation of couples appears to be robust. (Using a multinomial logit statistical model does not alter this conclusion.)

As with single individuals, it is useful to assess the quantitative implications of the multivariate analysis for married couples, and compare them with those of the relevant transition matrices. As before, the mean inheritance rises by roughly $350,000 between the low and high inheritance groups in Table 2. Comparing these groups, the proportion of couples with zero labor force participation rises by 0.054, the proportion with one worker in the labor force rises by 0.142, and the proportion with both individuals working falls by 0.196. Using the estimates of the ordered logit model in column (3) of Table 4, evaluating the right-side variables at their means, and then recomputing with inheritance increased by $350,000, indicates that the increase in inheritance raises the probability of having zero workers by 0.013, raises the probability of having one worker by 0.128, and decreases the probability of having two workers by 0.141. Thus, Tables 2 and 4 suggest the same conclusion: a large inheritance received by a family greatly reduces the probability that both spouses will participate in the labor market, and increases the probability that neither of them will participate.

In summary, the multivariate analyses in Tables 3 and 4 reinforce the message of the simple transition matrices. For both singles and married couples, labor force participation falls as the size of the inheritance rises.

Of course, the estimates reported in Tables 3 and 4 do not embody an exhaustive list of variables that could influence labor force behavior. Might any remaining factors negate the effect of inheritance that appears to be evident in our transition matrices? In particular, could failure to control for changes in the after-tax wage rate alter the apparent impact of inheritance within each inheritance class or the differential impact across inheritance classes?

With respect to the impact within inheritance classes, it is useful to note that econometric studies have indicated that the labor force behavior of primary earners is essentially independent of wage rates, while that of secondary earners responds positively to changes in the net wage. (See Pencavel [1986, p. 94] and Killingsworth [1983, p. 205].) Now, in part due to the cyclical recovery, before-tax real wages in the United States rose by 1.05% between 1982 and 1985.[14] At the same time, overall federal marginal tax rates on the individuals in our sample barely changed from 1982 to 1985 -- on the joint returns the average marginal tax rate went from 29.7 percent to 28.1 percent, and on the single returns from 24.2 percent to 24.5 percent. Therefore, the small increase in before-tax wage rates was not mitigated by tax rate changes. Thus, if one takes the econometric results cited above at face value, to the extent there were wage effects, they were tending to *increase* labor force participation. This suggests that the negative effects of inheritance found in our tables would have been even more pronounced if wage effects had been taken into account.[15]

We turn now to the question of possible biases in our estimates of the differential impact across inheritance classes. One might argue that between 1982 and 1985, real net wage rates for the high inheritance group fell at a much higher rate than the real net wage rates for the low inheritance groups, and this, not the effect of inheritances, is being reflected in Tables 1 and 2. This line of reasoning strikes us as far-fetched for two reasons.

First, our information suggests that it is unlikely that the three groups would have experienced radically different wage rate changes between 1982 and 1985. As indicated in the tables, the average ages across inheritance groups are not very different. Moreover, before tax earnings across the three inheritance groups did not differ greatly in 1982 -- average earnings in the low inheritance group were $35,298, in the middle group were $34,412, and in the high group were $38,741.[16] There is thus no evidence that the distribution of skills and occupations differs dramatically across our three groups. Neither were marginal income tax rate changes across groups very different: each group experienced small (less than two percentage points) changes in their average marginal tax rates. Hence, there is no reason to believe that substantial differential changes in net wages were generated by taxes.

Second, as noted above, even if there were differential changes in real after-tax wage rates, what we know about the relevant behavioral elasticities suggests that it is unlikely that wage rate effects could account for the observed differences across groups. In short, while it clearly would have been desirable to take wage effects into account if the data had allowed it, we do not think that our inability to do so seriously undermines the basic message conveyed by Tables 1 and 2.

Another possible source of misspecification arises from the fact that we cannot distinguish between anticipated and unanticipated inheritances. Of course, there is no direct way to decompose an inheritance into its anticipated and unanticipated components. However, it is possible that children of a decedent are more likely to anticipate their inheritances than other relations. Hence, comparing the labor supply responses of children with other recipients might shed some light on this issue. We therefore defined a dichotomous variable that equalled one if the donee was a child of the decedent and zero

otherwise, multiplied it by *INH*, and augmented the equations in the third columns of Tables 2 and 3 with this interaction term.[17]

The interaction term was statistically insignificant in both samples, with a t-statistic of 0.424 in the single return data and 1.058 in the joint return data. Moreover, the other coefficients were essentially unchanged. If we take the interaction term seriously as a proxy for the extent to which the inheritance is anticipated, this result suggests that anticipated and unanticipated inheritances have the same impact on labor supply behavior. Such a phenomenon is consistent with the presence of liquidity constraints preventing prospective donees from borrowing against their future inheritances. However, one must take this observation with a grain of salt, since we have no evidence that the interaction variable adequately reflects the extent to which the inheritance is anticipated.

3.3 Earnings Changes

So far our focus has been on the impact of inheritance on participation rates. However, some donees might stay in the labor force but reduce their hours of work and hence have lower earnings, *ceteris paribus*. Accordingly, in this section we examine how inheritance affects earnings, conditional on staying in the labor force. Before presenting the results, we stress that some caution is required in their interpretation. First, all the problems of isolating the independent effect of inheritance discussed above are still present. In addition, the interpretation in terms of Carnegie's conjecture is more difficult due to the fact that earnings is the product of hours worked and the wage rate. Suppose that earnings fall as the size of inheritance increases. One possibility is that hours of work have fallen, the outcome that Carnegie presumably would have predicted. Alternatively, hours could have stayed the same, and the wage rate fallen. The decline in the wage rate might be due to the

fact that with higher wealth, individuals may choose jobs with more "desirable" characteristics that pay lower wage rates. However, we are aware of no empirical evidence that this phenomenon exists.

With these caveats in mind, we analyzed the statistics on percentage change in earnings for those families in which the number of earners is the same in 1982 and 1985. In terms of the matrices in Table 1, these are the individuals in the lower right-hand cell. In Table 2, these correspond to the cells on the diagonal for families with one earner each year and with two earners each year. (These computations used a slightly different sample from that employed above in order to minimize the impact of returns with extremely large percentage changes in earnings due to very low earnings in 1982. Specifically, we eliminated single returns with earnings under $2,500 and joint returns with earnings under $5,000.) The results suggested that generally, the larger the size of the inheritance, the smaller the percentage increase in real earnings, a pattern consistent with the results from Tables 1 and 2 -- labor supply decreases with the size of inheritance. However, the earnings-growth differences were statistically significant only when comparing the extreme inheritance classes for two-earner joint returns and for single returns.

To determine if it was possible to sharpen these results somewhat, we used the same data to estimate a series of ordinary least squares regressions. To begin, for the relevant sample of single individuals, we estimated a regression of the percentage change in real earnings on the logarithm of inheritance.[18] The results are reported in column (1) of Table 5. The coefficient on the inheritance is negative and exceeds its standard error by a factor of 1.82. In column (2), we add a quadratic in age, the log of dividend and interest income, and the number of dependents. The coefficient on inheritance remains negative and is statistically insignificant. In columns (3) and (4), we repeat the exercise for earnings on joint returns. In

contrast to the results for singles, the negative coefficients on inheritance are statistically significant at conventional levels. The stronger results for joint returns may reflect reductions in hours worked by secondary earners. The relatively high responsiveness of secondary-earner labor supply to changes in family income is well documented (see Killingsworth [1983]).

Regardless of the precision with which they are estimated, the coefficients in Table 5 suggest that the elasticity of earnings with respect to inheritance is rather small. Indeed, the results in column (4) suggest that doubling the size of an inheritance from $100,000 to $200,000 would reduce a married couple's 1985 earnings by under $1,000 (in 1982 dollars). Given the qualifications mentioned above, one must necessarily be cautious in interpreting these results, but if one takes them at face value, they suggest that leisure is indeed a normal good.[19]

4. CONCLUSION

We have examined tax return generated data on the labor force behavior of people before and after they received inheritances. The results are consistent with the conjecture that Andrew Carnegie made a century ago -- the likelihood that a person decreases his or her participation in the labor force increases with the size of the inheritance received. For example, families with one or two earners who received inheritances above $150,000 were about three times more likely to reduce their labor force participation to zero than families with inheritances below $25,000. Moreover, conditional on remaining in the labor force, high inheritance families experienced lower earnings growth than low inheritance families, which is consistent with the notion that inheritance reduces hours of work.

We have tried to be conservative in terms of what we have asked of the data. In the absence of information on hours worked or wage rates, we have eschewed making the heroic imputations required to estimate a structural model of labor supply. Instead, we have focused on the qualitative effects of inheritances, and have attempted to gauge the robustness of these effects. We have not attempted to determine the extent to which observed inheritance-induced defections from the labor force are temporary or permanent. Nevertheless, the fact that labor supply effects show up two or three years after an inheritance is received suggests that Carnegie's conjecture should be taken seriously.

As noted in the introduction, this finding has implications in a number of different areas. For the field of labor economics, it indicates that the common econometric finding that leisure is an inferior good may be a consequence of the mismeasurement of unearned income or assets, rather than a fundamental inadequacy in the standard theory of labor supply. For the debate over the sources of lifetime wealth accumulation, it suggests a need to re-examine studies of the life-cycle hypothesis that assume a donee's labor supply response to inheritance is perfectly inelastic. Finally, our findings shed additional light on the debate over Ricardian equivalence. On the one hand, the inverse relation between labor force participation prior to inheritance and size of the inheritance is consistent with the notion that at least some people anticipate their inheritances, and to some extent, can adjust their behavior accordingly. On the other hand, the finding that labor supply falls after receiving the inheritance casts doubt on the validity of simple models of fiscal policy which assume that individuals freely optimize with respect to a generationally-linked budget constraint.

Table 1*
Labor Force Transitions: Single Returns

1985

1982	1985 = 0	1985 = 1
0	35 0.473 (0.0580)	39 0.527 (0.0580)
1	30 0.0457 (0.0082)	626 0.954 (0.0082)

Inheritance < 25,000
N = 730
Mean Inheritance = \$7,747 (6,165)
Median Inheritance = \$5,000
Mean Age = 33.4 (11.9)

1985

1982	1985 = 0	1985 = 1
0	61 0.649 (0.0492)	33 0.351 (0.0492)
1	45 0.100 (0.0141)	405 0.900 (0.0141)

\$25,000 ≤ Inheritance ≤ \$150,000
N = 544
Mean Inheritance = \$69,364 (34,450)
Median Inheritance = \$58,383
Mean Age = 33.9 (11.6)

1985

1982	1985 = 0	1985 = 1
0	74 0.841 (0.0390)	14 0.159 (0.0390)
1	49 0.182 (0.0235)	221 0.819 (0.0235)

\$150,000 < Inheritance
N = 358
Mean Inheritance = \$353,087 (265,905)
Median Inheritance = \$274,878
Mean Age = 40.4 (12.2)

* In each cell, the first figure is the number of observations in the cell; the second figure is the proportion of observations in the associated row that fall in the cell; and the figure in parentheses is the standard error of the proportion. Statistics to the right of each matrix indicate the relevant inheritance range, the number of observations, the mean and median inheritance, and age. Where shown, numbers in parentheses are standard deviations.

Table 2

Labor Force Transitions: Joint Returns*

Inheritance < $25,000

N = 1,078

1982 \ 1985	0	1	2
0	11 0.688 (0.116)	5 0.313 (0.116)	0 0 (0)
1	10 0.0216 (0.0068)	314 0.678 (0.0217)	139 0.300 (0.0213)
2	5 0.00830 (0.0037)	127 0.212 (0.0167)	467 0.780 (0.0169)

Mean Inheritance = $7,726 (6,158)

Median Inheritance = $5,158

Mean Age = 39.8 (10.3)

$25,000 ≤ Inheritance ≤ $150,000

N = 994

1982 \ 1985	0	1	2
0	20 0.690 (0.0859)	9 0.310 (0.0859)	0 0 (0)
1	21 0.0441 (0.0094)	367 0.771 (0.0193)	88 0.185 (0.0178)
2	8 0.0164 (0.0057)	128 0.262 (0.0199)	353 0.722 (0.0203)

Mean Inheritance = $72,811 (35,627)

Median Inheritance = $69,063

Mean Age = 41.0 (9.9)

$150,000 < Inheritance

N = 628

1982 \ 1985	0	1	2
0	19 0.826 (0.0790)	4 0.174 (0.0790)	0 0 (0)
1	23 0.0665 (0.0134)	265 0.766 (0.0228)	58 0.168 (0.0201)
2	7 0.0270 (0.0101)	80 0.309 (0.0287)	172 0.664 (0.0293)

Mean Inheritance = $346,232 (241,776)

Median Inheritance = $269,462

Mean Age = 44.7 (9.3)

* See note to Table 1.

Table 3

Logit Analyses of Single Returns*
(Standard Errors in Parentheses)

	(1)	(2)	(3)
Constant	-0.1485 (0.1507)	0.0002771 (0.8588)	1.272 (0.8819)
INH	-4.776 (0.7769)	-3.931 (0.7877)	-3.681 (0.8017)
INH^2	2.427 (0.7976)	1.994 (0.7781)	2.069 (0.7450)
LF'82	2.915 (0.1679)	2.918 (0.1757)	2.203 (0.2056)
AGE		0.02375 (0.04990)	-0.03802 (0.05166)
AGE^2		-0.0007358 (0.0006405)	-0.00006577 (0.0006626)
EARNINGS'82			0.05749 (0.01091)
DIV + INT '82			-0.01075 (0.004479)
DEPENDENTS			0.3361 (0.1664)
Loglikelihood	-552.0	-537.9	-513.8
N	1,632	1,632	1,632

* Variables are defined as follows: *INH* = inheritance (in millions of dollars); *AGE* = donee's age in 1982; *LF'82* = 1 if individual was in the labor force in 1982, *LF'82* = 0 otherwise; *EARNINGS'82* = 1982 earnings (in thousands of dollars); *DIV + INT '82* = the sum of dividends and interest in 1982 (in thousands of dollars); *DEPENDENTS* = number of dependents claimed on return in 1982. The dependent variable = 1 if individual was in labor force in 1985, and = 0 otherwise. Summary statistics for these variables are available from the authors upon request.

Table 4

Ordered Logit Analyses of Joint Returns*
(Standard Errors in Parentheses)

	(1)	(2)	(3)
Constant	-0.7466 (0.2829)	-4.420 (0.8325)	-3.979 (0.8854)
INH	-2.683 (0.4324)	-2.353 (0.4326)	-2.365 (0.4352)
INH^2	1.259 (0.3866)	1.0794 (0.3724)	1.087 (0.3726)
LF1'82	3.995 (0.3093)	3.853 (0.3303)	3.764 (0.3337)
LF2'82	6.196 (0.3135)	6.071 (0.3346)	5.985 (0.3398)
AGE		0.2315 (0.03963)	0.2078 (0.04372)
AGE^2		-0.003139 (0.0004779)	-0.002854 (0.0005296)
EARNINGS'82			0.001964 (0.001613)
DIV + INT'82			-0.0006123 (0.001091)
DEPENDENTS			0.03711 (0.04144)
Loglikelihood	-1768.0	-1727.1	-1725.4
N	2700	2700	2700

* Variables are defined in note to Table 3. In addition, *LF1'82* = 1 if the family had one earner in the labor force in 1982 and zero otherwise, and *LF2'82* = 1 if the family had two earners in the labor force in 1982 and zero otherwise. The dependent variable measures the probabilities of having 0, 1, or 2 earners in the family in 1985.

Table 5

Ordinary Least Squares Analyses of Earnings Changes*
(Standard Errors in Parentheses)

	Single Returns		Joint Returns	
	(1)	(2)	(3)	(4)
Constant	0.2565 (0.1276)	0.9264 (0.3218)	0.3407 (0.08012)	0.2457 (0.2736)
ln (INH)	-0.02281 (0.01256)	-0.01330 (0.01279)	-0.03596 (0.007635)	-0.02449 (0.007748)
AGE		-0.03123 (0.01710)		0.01643 (0.01402)
AGE^2		0.0002770 (0.0002191)		-0.0003886 (0.0001699)
ln DIV + INT'82		-0.005142 (0.007512)		-0.002961 (0.004992)
DEPENDENTS		-0.05225 (0.04176)		0.006502 (0.01230)
$\bar{R}^2$	0.0022	0.026	0.0086	0.059
N	1033	1033	2434	2434

* Dependent variable is percentage change in real earnings between 1982 and 1985. Variables are defined in the note to Table 3.

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Endnotes

1. Barro [1974] and Bernheim [1987] provide two opposing views.

2. The $300,000 cutoff corresponds roughly to the threshold for filing an estate tax return during this period. The actual threshold was $225,000 in 1982, $275,000 in 1983, and $325,000 in 1984.

3. Returns that changed filing status (about 400) were dropped from the sample.

4. For 1982, the deduction was 5 percent of earned income.

5. For purposes of Schedule W, earnings includes wages and salaries, income from a sole proprietorship (Schedule C), and income from a partnership (Schedule E). Income from a partnership may be more indicative of tax shelter activity than participation in the labor force, so returns with partnerships were deleted. However, when partnership returns are included, none of the substantive results reported below change.

6. The cutoffs were chosen to provide an adequate number of observations in each range, and the substantive results are not sensitive to minor changes in the inheritance ranges. The ranges reflect net receipts of inheritances by the beneficiaries. We have no information on state inheritance taxes paid by donees, but this is irrelevant for our purposes. In general, on estate tax returns one receives a dollar for dollar credit for inheritance taxes paid to states. The median ratios of inheritance to 1982 Adjusted Gross Income in the low, middle, and high inheritance groups are 0.473, 4.16, and 13.5, respectively.

7. As a check on the data, we computed the implied labor force participation rates in 1982. For example, the overall labor force participation rate in Table 1 is 84.3 percent. The labor force participation rates for single males and females in the 25-34 age bracket were 88.9 percent and 83.1 percent, respectively (U.S. Bureau of the Census [1986, p. 382]). The overall labor force participation rate in Table 2 is 97.5 percent. The corresponding figures for the population aged 25-34 are 97.5 percent for males and 61.8 percent for females. The participation rates in our sample, then, are of plausible magnitude.

8. The median ratios of inheritance to 1982 Adjusted Gross Income in the low, middle, and high inheritance groups are 0.181, 1.85, and 6.45, respectively.

9. An interesting question is how the transition matrices in Tables 1 and 2 would compare with those in a "control group" that received no inheritances. In this context, it is important to note that the median inheritance in our "low" groups is only about $5,000. From the point of view of labor force participation decisions over a four-year period, the "low inheritance" groups may effectively serve as "no inheritance" groups. This conjecture was confirmed when we examined analogous transition matrices computed using 1982 and 1985 data from the PSID for individuals who reported no inheritances between those two years. On a cell-by-cell basis, one could not reject the

hypothesis that the transition rates in the PSID data were the same as the corresponding rates from Tables 1 and 2.

10. After receiving an inheritance, the labor force participation rates in the low, middle, and high inheritance groups for the single returns are 0.911, 0.805, and 0.656, respectively. For the joint returns, after inheritance the corresponding proportions of two-earner couples are 0.560, 0.444, and 0.366; and the proportions with no earners are 0.0241, 0.0492, and 0.0780.

11. We also estimated the logits separately for those who were in the labor force in 1982 and those who were not, in effect, interacting *LF'82* with the other variables. The results are qualitatively similar to those reported here. Due to the smaller number of observations for each equation, however, the coefficients are not estimated with as much precision.

12. Recall that we only have the age of one spouse (the donee), and we cannot identify that spouse. Thus, if a young donee is married to an elderly person, the family is categorized as "young". If the elderly spouse retires from the labor force, the data would then suggest a misleading relation between age and labor force activity. On the other hand, to the extent that spouses are close in age, this problem may not be too severe. In any case, the *AGE* variables should be interpreted with caution.

13. Another parameter estimated in the ordered logit procedure is the shifter of the logit index, c, using Maddala's [1983] notation. As Maddala notes, a check on the suitability of the ordered logit specification is whether c is positive. In all of our equations, c is positive and exceeds its standard error by more than a factor of two.

14. Computed as the percentage change in average real hourly earnings of private, production or non-supervisory workers, using annual averages of monthly figures for 1982 and 1985.

15. Another factor that might bias downward the effect of inheritances relates to the fact that the families in our sample received their inheritances in 1982 and 1983. To the extent that those families who received their inheritances in 1982 were able to make rapid adjustments in their labor force behavior, their participation rates in 1982 may already have been lowered due to the inheritance. This effect would tend to reduce the absolute value of the calculated differences between the 1982 and 1985 participation rates.

    One way to identify the importance of this factor is to examine the behavior of those recipients who received their bequests early in 1982. Unfortunately, information on the date at which bequests are received is not available. Estate tax records, however, do reveal each decedent's date of death. Using these data, we excluded from the sample returns for which the decedent died in the first three months of 1982 -- a crude indicator of those individuals with the opportunity to adjust their labor force behavior within 1982. The results are virtually the same as those reported in Tables 1 and 2.

16. These figures are for joint returns. For single returns, the corresponding figures are $12,099, $13,354, and $11,358. For purposes of computing net earnings on Schedule C returns, we deleted depreciation allowances.

17. The proportions of donees who are children are 0.306 and 0.378 in the single return and joint return samples, respectively.

18. Augmenting the equation with the square of the logarithm of inheritance does not lead to a significant increase in the explanatory power of the equation. Wilhelm [1992] analyzes changes in hours worked before and after receipt of an inheritance using a small subsample of the PSID, and finds no relationship. However, the PSID relies on self-reported values of inheritance; Menchik [1988] has documented that such measures are subject to substantial error.

19. The figures in the table give elasticities of earnings with respect to *inheritance*, not with respect to *unearned income*. If one converts the inheritance to an equivalent annuity, computes the implied percentage change in the flow of unearned income (evaluated at the mean), and uses the estimated coefficients to calculate the percentage reduction in earnings, then the resulting unearned income elasticity is quite small, about -0.03. We are grateful to Jacob Mincer for suggesting this calculation.