ECONOMIC AND GEOGRAPHIC MOBILITY ON
THE FARMING FRONTIER: EVIDENCE
FROM APPANOOSE COUNTY, IOWA, 1850-1870

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ABSTRACT

This paper investigates the characteristics of the early settlers on the midwestern farming frontier, the correlates of their geographic mobility, and the determinants of their wealth. Using evidence drawn from the manuscripts of the federal censuses of 1850-1870, we find average rates of growth of wealth over time that were considerably above the national average, a steeper cross-sectional relationship between wealth and age than those found for populations drawn more broadly from throughout the United States at the same time, and a substantial positive effect of early arrival on the frontier on wealth levels. These results suggest that very high levels of economic opportunity may have been a characteristic of the nineteenth-century farming frontier.

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Introduction

Since the time of Frederick Jackson Turner, many American historians have debated the causes and effects of the great westward migration of the nineteenth century. This is hardly surprising, for American economic and social history is in large part the story of the settlement of frontier areas, and it is of obvious interest to understand the experiences of the people who came to farm and build towns on the prairies. Historians have long recognized that one set of questions that is key to such an understanding concerns who went to the frontier, how they fared after they arrived, and what factors influenced their success or failure. Following the earlier investigations of frontier settlement by James Malin and Frank Owsley, Merle Curti's detailed study of the early development of Trempealeau County, Wisconsin, demonstrated the extraordinary value of the manuscripts of the nineteenth-century federal censuses in providing quantitative evidence that could help to answer these questions. Yet although 1989 marks the thirtieth anniversary of the publication of <u>The Making of an American Community</u>, with a few notable exceptions, surprisingly few historians have followed Curti's lead. Our study of another midwestern county in the same period will provide comparative evidence on many of the same variables as Curti's study, and will use multivariate statistical techniques to explore further the determinants of geographic and economic mobility on the nineteenth-century farming frontier.

Appanoose County is located in southern central Iowa. Although first organized in 1843, its borders did not become finally established until 1850, after a series of disputes between Iowa and Missouri, in the course of which the sheriff of neighboring Davis County, Iowa, had been arrested by

Missouri authorities for infringing on their lands.[1] Although not touched

by any major river, Appanoose was crossed by many streams, most of which

were skirted by timber, and its surface soil was very fertile. The earliest

significant white settlement in Appanoose had begun shortly after the

county's southern lands had been ceded to the United States by treaty with

the Sac and Fox Indians in 1842; the county was named for one of the Sac

chiefs who signed the treaty. Its early population growth was rapid, from

3,131 enumerated by the census of 1850 to 11,918 in 1860, and 16,456 in

1870. Although Appanoose's 1850 population density of 6 people per square

mile was well over the level of 2 per square mile used by both the federal

census and Turner to define the frontier, the county bordered on the

frontier, for its neighbor to the west, Wayne County, had less than one

person per square mile in that year. No large city grew up within

Appanoose; no town in the county had as many as 2,000 residents in 1870.

The county did not obtain its first railroad line until 1869. Appanoose

very early became a typical part of Iowa's corn belt, and remained reliant

on Indian corn throughout the period of this study.[2]

The Data

The evidence used in this study was drawn from the manuscript returns

of the decennial federal censuses of population of 1850-70. Initially,

samples of every fifth head of household in Appanoose County were drawn from

the censuses of 1850 and 1860.[3] The members of the 1850 sample were then

traced forward to the 1860 census of Appanoose, while the members of the

1860 sample were traced both backward to the 1850 census of the county and

forward to that of 1870. In what follows, a number of univariate results

will be reported from the samples of both the base years of 1850 and 1860, while the multivariate analyses will concentrate on the sample based in 1860, primarily because of its substantially greater size.

In drawing the samples, information on all variables of interest were collected not only for heads of households, but also for all other members of their households. Although this increased the work involved in data collection, it had several advantages. In addition to allowing consideration of household size and composition, the procedure virtually eliminated the problem of uncertainty in nominal record linkage across censuses: the extreme rarity of one-person households (less than 1 percent in both base samples) meant that a name, age, and other characteristics of at least one other family member were available to determine the accuracy of record linkage for household heads with common names.

The forward tracing of the sample members from 1850 to 1860 and from 1860 to 1870 allows the familiar comparisons between those who persisted within the county and those who failed to do so, whether due to outmigration or death. The backward tracing of the 1860 sample members to 1850 allows a somewhat less familiar comparison, between those who had been present in the county in 1850 and those who had arrived during the following ten years.[4]

Population Characteristics and Geographic Mobility

Table 1 presents summary statistics on some basic variables for the heads of households in the Appanoose County census samples of 1850 and 1860, as well as for selected subsamples of those populations. A number of interesting results appear. One is the mean ages of the heads of households: 37.5 for the sample of 1850, 37.9 for 1860. These do not

TABLE 1

SUMMARY STATISTICS FOR HEADS OF HOUSEHOLDS, APPANOOSE COUNTY, 1850-70

Population: Household heads	N	Age (years) Mean (Standard deviation)	Mean real wealth ($)	Mean personal wealth ($)	Mean children
Random sample, 1850	105	37.5 (11.8)	407		3.7
Departed, 1850-60	75	37.9 (12.4)	418		3.6
Persistent, 1850-60[1]	30	36.4 (10.1)	379		4.0
Persistent, 1850-60[2]	30	46.4	1,909	1,195	4.5
Random sample, 1860	430	37.9 (11.7)	1,131	468	3.3
Precedent, 1850-60[1]	32	36.4 (10.6)	620		3.9
Precedent, 1850-60[2]	32	46.4	2,384	608	4.6
Arrived, 1850-60	398	37.2 (11.6)	1,030	456	3.2
Departed, 1860-70	282	37.7 (12.3)	926	410	3.2
Persistent, 1860-70[2]	148	38.2 (10.5)	1,520	578	3.5
Persistent, 1860-70[3]	148	48.2	3,816	1,288	4.1

Notes
    1. 1850 values of variables
    2. 1860 values of variables.
    3. 1870 values of variables.

Definitions
  Random sample: all members of the random sample drawn from the census of the stated year.
  Departed: drawn into random census sample of earlier year, not found in census of later year.
  Persistent: drawn into random census sample of earlier year, found in census of later year.
  Precedent: drawn into random sample census of later year, found in census of earlier year.
  Arrived: drawn into random census sample of later year, not found in census of earlier year.

Sources: Manuscript schedules of federal population censuses of 1850, 1860, and 1870. See text for procedures. The Appanoose County samples are the basis for subsequent tables unless other sources are indicated.

appear to have been unusual for the midwestern farming frontier of the
period, however: in 1850, the mean age of the farmer householders in nearby
Wapello County, Iowa, was 42.3, while that of the farmer householders in
Bureau County, in northern Illinois, was 38.8. In both 1850 and 1860, more
than 70 percent of the heads of household in Appanoose County were aged 30
or above, and in both cases less than 1 percent were under 20. These
results for Appanoose clearly support Allan Bogue's generalization for the
corn belt that "the pioneer was a mature man, and the boy settler and his
child wife were rarities".[5]

The tabulation of the household heads' mean ages by region of birth
presented in Table 2 supports Bogue's finding that the farther the native-
born pioneers had travelled from their birthplaces to the corn belt, the
older they tended to be. Thus in 1860, the mean ages of those who had been
born on the eastern seaboard were generally over 40, while for the Southwest
the figure fell just under 40, and for the upper Midwest to under 35. The
relative importance of most of the regions as birthplaces of the pioneers
was similar in both years. The greatest change was the substantial increase
in the importance of the midwestern states, from one quarter of Appanoose's
household heads in 1850 to more than two-fifths in 1860; this was almost
entirely the result of an increase of the share of Indiana and Ohio, from 17
percent in 1850 to 41 percent in 1860. In both years, very few household
heads had been born in New England, the deep South, or outside the United
States. The bulk of Appanoose's early settlers who had been born outside
the Midwest came from a central tier of states that ran west from
Pennsylvania, Virginia, and North Carolina through Kentucky and Tennessee.
Together these five states accounted for 55 percent of the household heads

TABLE 2

DISTRIBUTION AND MEAN AGES OF HEADS OF HOUSEHOLDS
BY PLACE OF BIRTH, APPANOOSE COUNTY, 1850-60

Region and State	1850			1860		
	N	%	Mean age	N	%	Mean age
New England	5	4.8	40.8	7	1.6	38.0
Connecticut	1			1		
Maine	0			2		
Massachusetts	0			2		
Rhode Island	1			0		
Vermont	3			2		
Middle Atlantic	17	16.2	36.5	56	13.0	43.2
Delaware	1			2		
New Jersey	1			4		
New York	9			12		
Pennsylvania	6			38		
Southeast	24	22.9	43.5	73	17.0	41.9
Maryland	1			4		
North Carolina	8			19		
South Carolina	1			0		
Virginia	14			50		
Southwest	30	28.5	34.7	86	20.0	39.9
Alabama	0			2		
Kentucky	17			54		
Tennessee	13			29		
Midwest	26	24.8	35.8	188	43.7	33.4
Illinois	3			7		
Indiana	1			78		
Iowa	2			3		
Michigan	0			1		
Missouri	3			2		
Ohio	17			97		
Foreign	2	1.9	29.5	17	4.0	42.8
Unknown	1	0.9		3	0.7	
Total	105	100.0	37.5	430	100.0	37.9

Notes: This table includes only members of random samples for 1850 and 1860.

in 1850, and 44 percent in 1860.[6]

Family relationships were not recorded in the population censuses of 1850 and 1860, and family composition therefore cannot be known with certainty. Reasonable inferences about family relationships nonetheless can be drawn from the evidence of surnames, age, and the order in which household members were listed in the census.[7] These produce the evidence in Table 1 that points to relatively large mean numbers of children in the families of early Appanoose County.[8] The additional detail in Table 3 on the composition of families strongly supports the generalization that society on the corn belt frontier was a family society.[9] Not only were one-person households very rare, but married couples without children were also unusual: families with six or more children substantially outnumbered the childless in both years.

The evidence of Table 1 permits the calculation of persistence rates for Appanoose's household heads in two decades: 30 of 105 present in 1850 remained there in 1860, while 148 of the 430 present in 1860 were still there in 1870. The implied rates of persistence - 28.6 percent for 1850-60, and 34.4 percent for 1860-70 - are similar to those found in studies of other midwestern communities of the era. For 1850-60, Mildred Throne found that 30.6 percent of all gainfully employed men persisted in Wapello County, Iowa, and Allan Bogue found that 37.7 percent of the farmers in Bureau County, Illinois persisted there; Bogue also found persistence rates of 31.8 percent and 43.2 percent, respectively, for the same decade for farm operators within two Iowa townships.[10] For 1860-70, James Malin found persistence rates ranging from 26.0-41.6 percent for farm operators within selected Kansas townships, and Merle Curti found a persistence rate of 24.9

TABLE   3

COMPOSITION OF FAMILIES, APPANOOSE COUNTY, 1850-60

Family type	1850		1860	
	N	Percent	N	Percent
Single man	1	1.0	4	0.9
Married couple, no children	10	9.5	57	13.3
Married couple, 1 child	13	12.4	54	12.6
Married couple, 2 children	10	9.5	68	15.8
Married couple, 3 children	10	9.5	44	10.2
Married couple, 4 children	13	12.4	41	9.5
Married couple, 5 children	11	10.5	45	10.5
Married couple, 6 + children	25	23.8	85	19.8
Unmarried household head, with children	12	11.4	32	7.4
Total	105	100.0	430	100.0

Source: Appanoose County random samples.   See footnote 7 for method of
construction.

percent for all gainfully employed men in Trempealeau County, Wisconsin.[11]

The backward linkage from 1860 to 1850 yields an interesting result, shown in Table 1, which points to the economic significance of the date at which families arrived in this frontier community. Although only 7.4 percent of the household heads in the random sample of 1860 had been present in Appanoose County ten years earlier, in 1860 these men were on average nine years older than those who arrived in Appanoose after 1850, and on average their wealth was twice as great. These more established households were obviously only a small part of this frontier population, but they were concentrated in the upper portion of the wealth distribution.

Comparisons of the entries in Table 1 for the demographic characteristics of different subsamples produces an interesting result: on average there was little difference between those who persisted and departed from Appanoose over time. There were no substantively significant differences in the mean ages and family sizes of those who persisted and departed during the 1850s, and the same is true in comparing those who persisted and departed during the 1860s. For both decades, however, the variance in age was smaller for persisters than for non-persisters. Differences also appear in economic status, for although mean real wealth differed by only 10 percent between those persisting and departing during 1850-60, the mean real wealth of persisters in 1860-70 was more than 60 percent greater than of those who departed.[12]

An economic approach to the analysis of geographic mobility has formulated the migration decision as an investment problem, positing that individuals and families attempt to compare the expected costs and benefits from changing their locations.[13] This formulation leads naturally to

multivariate empirical analysis of migration, for many characteristics both of potential migrants and their environments can be considered as possible influences on the perceived advantages and disadvantages of migrating.[14] Multivariate statistical analysis can then be used both to determine which variables do appear to have been systematically associated with migration in any particular case, and to measure their relative importance.

Table 4 presents the results obtained from a series of logit analyses of the persistence of Appanoose household heads during 1860-70. The table shows both the estimated coefficients for the respective independent variables and the implied change in the probability of persisting associated with a change of one unit in the independent variable, evaluated at the mean values of all independent variables.

The specification of equation (1) considers the effects of the age and wealth of the household head on the probability of persisting. The estimated coefficients of age and the square of age show that the probability of persisting rose with age until 40, then declined at older ages. The initial increase in residential stability is not surprising, for young adults typically migrate more than the middle-aged.[15] This is consistent with the investment view of migration, for with other things (including moving costs) equal, the young have a longer expected time over which to enjoy the benefits of migration, and therefore more to gain by moving than their elders. The decline in persistence among older adults implied by equation (1) is probably due to the increased mortality of the elderly as well as migration. Equation (1) furthermore shows that wealth - both real and personal - significantly affected the probability of persisting. The magnitudes of the two effects were considerable: for both types of wealth,

TABLE 4

LOGIT ANALYSES OF PERSISTENCE IN APPANOOSE COUNTY, 1860-70

Equation Independent Variable	Estimated Coefficient	Significance level	$\frac{\partial p}{\partial x_i}$
(1) Age	.140	.03	.016
Age squared	-.00178	.02	-.00020
Real wealth	.00015	.06	.000017
Personal wealth	.00057	.04	.000064
Intercept	-3.633		
-2 Log Likelihood	529.06	.0001	
N = 430	Percent predicted correctly = 64.5		
(2) Age	.139	.03	.016
Age squared	-.00177	.02	-.00020
Total wealth	.00022	.0009	.000025
Present in 1850	.149	.71	.017
Intercept	-3.529		
-2 Log Likelihood	530.72	.0001	
N = 430	Percent predicted correctly = 64.4		
(3) Age	.152	.05	.017
Age squared	-.00192	.04	-.00022
Total wealth	.00022	.0008	.000025
Present in 1850	.158	.69	.018
Family size	-.016	.76	-.085
Intercept	-3.708		
-2 Log Likelihood	530.63	.0003	
N = 430	Percent predicted correctly = 64.4		
(4) Age	.137	.04	.016
Age squared	-.00175	.03	-.00020
Total wealth	.00021	.002	.000024
Present in 1850	.160	.69	.018
Farmer	.392	.32	.044
Professional	.658	.25	.074
Unskilled	.308	.51	.035
Intercept	-3.824		
-2 Log Likelihood	529.20	.001	
N = 430	Percent predicted correctly = 64.5		

Notes: Dependent variable = 1 for household heads from 1860 sample of
Appanoose found in the county in 1870, or 0 if not found.

Omitted category for occupational dummies = craftsmen.

Table includes only members of 1860 random sample.

an increase from the mean of two standard deviations increased the probability of persistence by about 5.5 percentage points. The result found here is consistent with the finding in other studies of nineteenth-century communities that the wealthy were more likely to persist than the poor.[16]

Equation (2) adds to these age and wealth terms a variable indicating whether the individual had been present in Appanoose County in 1850. The effect fails to be statistically significant. That residents who had been in Appanoose a longer time were not more likely to persist than were more recent arrivals who were alike in other respects, including wealth, might appear surprising; some aspects of this result will be considered in the discussion of economic mobility later in this paper.

Equations (3) and (4) reveal an absence of statistically significant effects on persistence of family size and occupational category, respectively.[17] Family size might have been expected to affect the cost of migration, while occupational categories might have been expected to represent differing degrees of specificity of investments in experience and knowledge of the locality, but neither is found to have affected the probability of persistence in early Appanoose. Since both are believed to have affected persistence in older nineteenth-century communities, the absence of any effects found here may point to a characteristic of a frontier community, as in Curti's conclusion for Trempealeau County that "the striking fact is of turnover among all groups."[18]

Economic Mobility

A central problem facing settlers on any frontier involves the accumulation of wealth, both in the form of real estate - unimproved and

improved acreage and buildings - and personal property - including livestock, farm equipment, and consumption goods. The sources of the capital America's nineteenth-century pioneers used to establish farms on the midwestern frontier has long been of interest to historians. The evidence available in the population censuses of 1850-70 makes it possible to examine the levels of wealth possessed by the settlers, and consideration of the correlates of wealthholding gives important hints about the sources of their capital.[19]

Table 1 shows a substantial increase over time in the mean value of the real estate of household heads in Appanoose, from $407 in 1850 to $1,131 in 1860 - an average rate of growth of more than 9 percent per year after allowing for changes in the price level.[20] Much of the increase in the average was due to the high wealth of the county's many new settlers of the 1850s. Yet their mean real estate in 1860, of $1,030, was actually less than half that of the much smaller number of household heads in 1860 who had already been present in 1850. The latter realized an increase in mean real estate from $620 in 1850 to $2,384 in 1860, an average annual increase of more than 13 percent, again after allowing for price level change.

In 1850, the mean real estate of Appanoose's adult men was only 35 percent of the national average, and 42 percent of the mean for the northwest. During the following decade wealth in Appanoose grew at rates considerably above the national average, and by 1860 the county's mean real estate had risen to 63 percent of the national and 74 percent of the northwestern averages. In part, the differences between Appanoose and the national figures were due to the youth of the county's population. Thus while in 1860 Appanoose's adult males had on average only 52 percent as much

total wealth as a national sample, Appanoose men in their twenties were
closer to their national counterparts (60 percent), and the county's men in
their thirties were closer still to the national average for men in the same
age group (84 percent).[21]

As wealth increased in Appanoose, several changes occurred in the
distribution of wealth among households. Table 5 shows that wealth holding
in the county became considerably more widespread between 1850 and 1860; the
share of household heads with no real estate fell from 43 percent in 1850 to
28 percent a decade later. At the same time, the share of total real estate
held by the wealthiest decile increased slightly.

Table 6 provides a basis for comparing the distribution of total
wealth among property owners in Appanoose with Trempealeau County and an
aggregation of eleven Vermont townships for which Curti also provides data.
While the mean level of total wealth in Appanoose was very close to that of
Trempealeau, and substantially lower than that of the Vermont towns, the
concentration of wealth holding in Appanoose was similar to that of the
Vermont towns, and somewhat greater than in Trempealeau. The lowest decile
of property owners held 0.6 percent of total wealth in Appanoose and 0.5
percent in the Vermont towns, compared to 1.5 percent in Trempealeau.
The wealthiest 40 percent of property owners in Appanoose held 80 percent of
the county's wealth, compared to 79 percent in the Vermont towns, and 74
percent in Trempealeau. In view of the fact that his comparison of
Trempealeau's wealth distribution with that of the Vermont townships led
Curti to reject the hypothesis that any conditions favorable to a more
"democratic" property structure had made a visible impact on that Wisconsin
frontier, the evidence examined here appears to yield an even stronger

TABLE 5

DISTRIBUTION OF REAL ESTATE, ALL HOUSEHOLD HEADS,
APPANOOSE COUNTY, 1850 AND 1860

Decile	% of total real estate	
	1850	1860
1	0	0
2	0	0
3	0	0.1
4	0	2.7
5	1.6	4.7
6	6.0	7.0
7	11.1	9.6
8	18.2	14.1
9	23.4	20.5
10	39.8	41.3
Total	100.1	100.0

Note: Table includes only members of random samples.

TABLE 6

DISTRIBUTIONS OF TOTAL WEALTH AMONG PROPERTY OWNERS, 1860

Decile	(1) Appanoose County		(2) Trempealeau County		(3) Vermont Townships	
	Mean	% total	Mean	% total	Mean	% total
1	$ 88	0.6	$ 223	1.5	$ 134	0.5
2	193	1.3	352	2.4	350	1.3
3	336	2.2	482	3.3	654	2.4
4	510	3.4	695	4.7	1,090	4.0
5	777	5.2	850	5.9	1,463	5.3
6	1,058	7.0	1,164	8.1	2,036	7.4
7	1,435	9.5	1,250	8.6	2,690	9.8
8	2,018	13.4	1,646	11.4	3,590	13.1
9	2,922	19.8	2,288	15.3	5,140	18.7
10	5,553	37.6	5,610	38.8	10,360	37.7
Total	1,501	100.0	1,446	100.0	2,753	100.0

Source: (1) Appanoose County random samples.

(2) and (3) Curti, The Making of an American Community, Table 9, p. 78.

rejection of the same hypothesis for this early Iowa settlement.[22] Overall,

however, the difference between Appanoose and Trempealeau was probably not

of substantive significance, and the distribution of wealth was similar in

these rural areas.[23]

To consider the correlates of wealth holding in more detail, Table 7

presents the results obtained from estimating a regression equation in which

the natural logarithm of the total wealth of household heads in Appanoose in

1860 was expressed as a function of their ages, occupations, and whether

they had been in Appanoose in 1850.[24] The estimated coefficients of the age

variables indicate that, controlling a man's occupation and the duration of

his previous residence in Appanoose County, wealth increased with age to a

peak at age 50, then declined thereafter. The implied rate of increase of

wealth with age fell from 8.9 percent per year at 20 to 5.9 percent at 30,

and to 3.0 percent at age 40. It is of interest to compare this age-wealth

profile with those obtained by two earlier studies based on evidence drawn

from the 1860 census. The first of these was done by Jeremy Atack and Fred

Bateman, who analyzed a sample of rural households located throughout the

north.[25] Their estimated age-wealth profile reached a maximum at 51, only

one year later than that for Appanoose, but it rose less steeply than that

for Appanoose: its annual rate of increase at age 20 was 6.3 percent, and

4.2 percent at age 30.[26] The second of the studies was done by Richard

Steckel, who used a random sample of households drawn from throughout the

United States.[27] The age-wealth profile he estimated peaked later, at age

60, and rose somewhat less steeply than that for Appanoose at younger ages,

with rates of increase of 7.7 percent at age 20 and 5.8 percent at 30. In

the absence of other parallel studies for the time, it would be dangerous to

TABLE 7

REGRESSION ANALYSIS OF TOTAL WEALTH, APPANOOSE COUNTY, 1860

Independent variable	Estimated coefficient	Standard error	Significance level
Intercept	2.191	0.563	.0001
Age	0.1479	0.0285	.0001
Age squared	-0.00148	0.00033	.0001
Farmer[a]	1.512	0.159	.0001
Professional[b]	1.621	0.273	.0001
Craftsman[c]	0.891	0.226	.0001
Present in 1850[d]	0.378	0.161	.020

R^2 = 0.306
F = 33.255
n = 460

Notes: Dependent variable is $\ln$ (total wealth + $1). Method of estimation is ordinary least squares. The sample analyzed includes the random sample for 1860 and the persistent members of the 1850 sample (see Table 1 for definitions of these categories).

a. Excluded category for occupational variables is unskilled, which includes day laborer, farm laborer, teamster, well digger, no occupation given.

b. Professional includes attorney, clergyman, druggist, grocer, lawyer, merchant, physician, teacher, etc.

c. Craftsman includes blacksmith, carpenter, miller, millwright, tailor, tanner, wagon maker, etc.

d. Present = 1 if individual was found in 1850 census of Appanoose County, and 0 otherwise.

place much interpretative weight on these comparisons. Yet it is tempting
to suggest that the rich farm lands of central Iowa and the low initial
wealth of its population combined to produce relatively high rates of wealth
accumulation with age among the early settlers of Appanoose county.[28]

The estimated coefficients of the occupational variables in Table 7
indicate a clearly defined hierachy by wealth. Farmers and professionals
were the wealthiest, as members of both groups had on average more than
4 1/2 times the wealth of unskilled laborers with other things equal.
Craftsmen were below these highest two groups but still significantly above
the unskilled, with average wealth nearly 2 1/2 times that of laborers.

The coefficient of the final variable shown in Table 7, which denoted
whether the individual had been found in the 1850 census Appanoose County,
is both considerable in magnitude and strongly statistically significant.
It indicates that holding constant age and occupation, in 1860 men who had
already been in Appanoose in 1850 were on average nearly one and a half
times as wealthy as men alike in other respects who had arrived there during
the 1850s. The coefficient suggests that even as early as 1860 there had
begun to be economic rewards for an early arrival in Appanoose County,
perhaps in the form of capital gains on the land chosen by early settlers.[29]

To examine this latter possibility more closely, Table 8 presents the
results of a regression restricted to real estate alone, estimated on the
subsample of men listed as farmers in the 1860 census. In addition to age
and its square, and an intercept dummy indicating whether the farmer had
been in Appanoose in 1850, the equation includes an interaction term that
takes the value of the farmer's 1850 real estate if he was present in
Appanoose County in that year, and is set equal to zero if he was not

TABLE 8

REGRESSION ANALYSIS OF REAL ESTATE OF FARMERS,
APPANOOSE COUNTY, 1860

Independent variable	Estimated coefficient	Standard error	Significance level
Intercept	-1.328	1.667	.43
Age	.3002	.0811	.0003
Age squared	-0.0029	.0009	.002
Present in 1850	-.615	.675	.36
Present - real wealth interaction[a]	.294	.129	.02

$$R^2 = .102$$
$$F = 9.135$$
$$n = 326$$

Notes: Method of estimation is OLS. Dependent variable is $\ln$ (real estate + \$1). The sample analyzed includes all farmers in the random sample of 1860 and the persistent members of the 1850 sample who were listed as farmers in 1860.

a. Variable defined as the product of present in Appanoose County in 1850 (present = 1, not found = 0) and $\ln$ (real estate in 1850 + \$1).

present in 1850. The intercept dummy is statistically insignificant, whereas the estimated coefficient of the interaction variable is positive and statistically significant.[30] What this means is that the 1860 real wealth of an Appanoose farmer who had owned any real wealth in the county in 1850 was greater on average that that of a farmer of the same age who had arrived later, with a wealth advantage in 1860 positively related to the value of the real estate he had owned in the county ten years earlier.[31]

The samples analyzed in this investigation contained a total of 49 farmers who appeared in the Appanoose County censuses of both 1850 and 1860. There was considerable diversity in their experiences. Six of the men began in 1850 with real estate greater than the national average in that year, of $1,001; five of these remained above the national average of $1,492 in 1860. Fifteen men were below the national averages in both 1850 and 1860. Perhaps the most striking, however, is the experience of the remaining 28 of the 49 men - 57 percent of the total - all of whom had less than the national average level of real wealth in 1850, and all of whom were above the national average level ten years later. This group experienced an increase in mean real estate in those ten years from $426 to $2,939, an average annual increase of more than 20 percent even after allowing for change in the price level. While the sources of the changes in the wealth of these men cannot be identified from this evidence, the startlingly high rates of increase make it appear likely that rising land values played a significant role in their success.[32] Paul Gates noted that "a combination of events in the fifties ... produced a rush for the public domain that surpassed anything in previous history," and that this rush focussed most intensively on the prairie lands of Iowa and Illinois.[33] Many early settlers in

TABLE 9

REGRESSION ANALYSIS OF TOTAL WEALTH, APPANOOSE COUNTY, 1870

Independent variable	Estimated Coefficient	Standard error	Significance level
Intercept	-0.007	2.277.	0.99
Age	0.239	0.092	0.01
Age squared	-0.00244	0.00090	0.008
Farmer[a]	2.417	0.574	0.0001
Professional[a]	3.195	0.653	0.0001
Craftsman[a]	1.363	0.672	0.04
Present in 1850[b]	-0.081	0.311	0.80

$$R^2 = 0.230$$
$$F = 7.523$$
$$n = 158$$

Notes: Dependent variable is $\ln$(total wealth + \$1). Method of estimation is OLS. Sample consists of members of Appanoose random samples from 1850 and 1860 who persisted to 1870.

a. Excluded category is unskilled.

b. Present = 1 if individual was found in 1850 census of Appanoose County, and 0 otherwise.

Appanoose appear to have benefited from the rush of new population, for "their acres had automatically become more valuable as land-hungry settlers poured in."[34]

Table 9 presents the results of a regression analyzing the 1870 total wealth of Appanoose household heads who had been enumerated in the county in the 1860 census. The steep age-wealth profile again suggests rapid rates of wealth accumulation during the past decade: at age 20, wealth rose by an average of 14.1 percent per year, by 9.3 percent per year at 30, and 4.4 percent at 40. The relative ranking of occupations by wealth closely resembles that for 1860, with professionals and farmers at the top, followed in descending order by craftsmen and laborers. Interestingly, however, the final variable in the equation - indicating whether the individual had been present in Appanoose in 1850 - has an estimated coefficient that is small in magnitude and statistically insignificant. With real estate values that continued to rise during the 1860s, it might appear surprising that not all the early settlers of Appanoose who had been successful in their initial purchases of land had simply remained there and continued to prosper. Yet while the majority did, this was not universal: of the 17 farmers in the sample analyzed in Table 9 who had real estate in 1860 worth more than $3,000, nine, or just over half, remained in Appanoose in 1870. Some may of course have died during the decade, though only 2 of the 8 who did not appear in the 1870 census of Appanoose would have been more than 65 years old in 1870.[35] More probably left Appanoose County during the 1860s, and in migrating again they may not have been unusual. Several historians of the farming frontier have remarked on the repeated migration even of some of those early settlers who had been successful in the land sweepstakes on the

prairies. Bogue commented that "the man who came west, bought a tract ...
and then tilled it for the rest of his life was rare indeed. The more
common picture was one of several moves or repeated purchases and sales".[36]
Curti believed that the capital gains these men realized on their land might
actually contribute to their mobility: "Even some who passed on to more
golden fields in Minnesota, Dakota, or California were able to go on because
the land _was_ good, and because in a short time they had been able to realize
enough on it to pay the expenses of further journeying."[37]

Conclusion

The population of settlers in early Appanoose County, Iowa does not
appear to have been unusual among residents of communities on the midwestern
farming frontier. It was composed of families, most quite large, headed by
men with average ages near 40. The adults in these families had travelled
to Appanoose from birthplaces distributed through the United States, but
drawn most heavily from the midwestern and southwestern states. These
migrants continued to be mobile after coming to Appanoose, as two-thirds or
more of all heads of households present in each of the census years 1850 and
1860 were not in the county at the time of the following decennial census.
Although rates of turnover were high among all groups in the population,
this mobility was not random; as in other places, the young adults were the
most likely to leave, as were poorer members of the community. Like other
settlers on the midwestern frontier, the early population of Appanoose
County was not wealthy relative to those in longer-settled parts of the
United States, and this remains true when allowance is made for their ages
and occupations.

In all these respects, the results found for Appanoose County are unexceptional and generally unsurprising. Yet several intriguing characteristics of Appanoose's population appear in the detailed analysis of wealthholding. One is average rates of growth of wealth for households over time that were considerably above the national average. Another is a cross-sectional relationship between wealth and age in 1860 considerably steeper than those found for populations drawn more broadly from throughout the United States at the same time. A third is an apparently substantial increase in the 1860 real wealth of Appanoose's farmers owing to their arrival in the county prior to 1850. While comparative studies of other communities will be needed to determine whether these features of the population of early Appanoose County were as general as the ones summarized in the previous paragraph, it will be interesting to discover whether the levels of economic opportunity they imply were commonplace on the nineteenth-century midwestern farming frontier. The rapid increase of wealth of households over time, and in cross-section with age, might have resulted from a combination of rich farm land with ambitious settlers eager to improve themselves economically through hard work and high rates of saving, while the selectively large positive effect of early arrival on the growth of real wealth might attest to the ability of many of those arriving in the first wave of settlers to choose the best farm land, which would rise most rapidly in value as the density of settlement increased. Although we need further exploration of these patterns elsewhere on the farming frontier before writing definitively this part of American economic and social history, it is difficult to resist at least a provisional conclusion that the striking successes made by many early settlers in Appanoose County were

a result, in Merle Curti's words, of circumstances "offering very unusual

stimulus and opportunity ... largely provided, we believe, by frontier

conditions."[38]

FOOTNOTES

[1] On the county's early history, see <u>The History of Appanoose County, Iowa</u> (Chicago: Western Historical Company, 1878); also L.L. Taylor, ed., <u>Past and Present of Appanoose County, Iowa: A Record of Settlement, Organization, Progress and Achievement</u> (Chicago, 1913).

Appanoose County was chosen for this initial study because it was on the frontier in 1850, it did not develop a significant urban center in the period of study, and it had few foreign-born residents. We hope to carry out a series of parallel studies in future, in which we will choose other locations that allow us separately to eliminate each of these three criteria and examine the effects on the results obtained.

[2] Allan G. Bogue, _From Prairie to Cornbelt: Farming on the Illinois and Iowa Prairies in the Nineteenth Century_ (Chicago: University of Chicago Press, 1963), pp. 220-23.

[3] The 1850 sample contained a total 631 people, of whom 325 (51.5%) were males; the 1860 sample contained 2430 people, of whom 1261 (51.9%) were males.

[4] These statements should of course properly be qualified to allow for the inevitably incomplete enumeration of the censuses. For a discussion of the biases that can be introduced by underenumeration, see David W. Galenson and Daniel S. Levy, "A Note on Biases in the Measurement of Geographic Persistence Rates," _Historical Methods_, Vol. 19, No. 4 (Fall, 1986), pp. 171-79.

[5] Bogue, _From Prairie to Cornbelt_, p. 22. Curti reports that the mean age of farm operators in Trempealeau County in 1860 was 38, while that of businessmen was 36, of artisans 32, and farm laborers 25; _The Making of an American Community: A Case Study of Democracy in a Frontier County_ (Stanford: Stanford University Press, 1959), p. 56.

[6] These results are very similar to those found for Wapello County, Iowa, in 1850; Bogue, _From Prairie to Cornbelt_, p. 23. Also see F.I. Herriott, "Whence Came the Pioneers of Iowa?," _Annals of Iowa_, 3d Series, Vol. VII, No. 5 (April 1906), pp. 367-79; Vol. VII, No. 6 (July 1906), pp. 446-65.

[7] These figures were calculated by assuming that individuals listed in a given household in the census were children of the head of that household if they had the same surname as the head and were more than 18 years younger than the head. A woman was assumed to be the wife of a male

head of household if listed immediately after the head, with the same surname, and within 18 years or less of his age.

In 1850, the 105 households sampled also contained 7 individuals who had the same surname as the household head but were not identified as wives or children by the above definition; in 1860 the 430 households contained 30 such individuals. The 1850 sample also included 37 individuals with surnames different from the household head; in 1860 there were 159 of these individuals.

[8]The ratio of children aged 0-9 to women aged 20-49 in Appanoose County from the 1860 random sample was 2.28. This is higher than the ratios reported for 1860 for farm households in all the "settlement class" categories defined by Richard A. Easterlin, George Alter, and Gretchen A. Condran, "Farms and Farm Families in Old and New Areas: The Northern States in 1860," in Tamara K. Hareven and Maris A. Vinovskis, eds., Family and Population in Nineteenth-Century America (Princeton, 1978), Table 1-13, p. 36.

[9]Bogue, From Prairie to Cornbelt, p. 25.

[10]Mildred Throne, "A Population Study of an Iowa County in 1850," Iowa Journal of History, Vol 57, No. 4 (October 1959), p. 310; Bogue, From Prairie to Cornbelt, p. 26. John Mack Faragher reported a persistence rate of 22.2 percent for household heads in a rural Illinois community during 1850-60; Sugar Creek: Life on the Illinois Prairie (New Haven, 1986), p. 249, n. 14.

[11]James C. Malin, "The Turnover of Farm Population in Kansas," Kansas Historical Quarterly, Vol. IV, No. 4 (November 1935), pp. 365-67, p. 68; Curti, The Making of an American Community, p. 68. Since these earlier

studies' persistence rates were calculated exclusively for farmers, it might be noted that the persistence rates for those household heads listed in the census of Appanoose as farmers were 25.3 percent for 1850-60, and 36.3 percent for 1860-70. It is not surprising that these are close to the rates calculated for all household heads, for farmers made up 83 percent of the total in 1850, and 71 percent in 1860.

[12]The difference in 1850 real wealth for those who departed and persisted during 1850-60 is statistically insignificant at conventional levels. The difference in 1860 total wealth - as well as that in real wealth - between leavers and stayers during 1860-70 is statistically significant at the .01 level.

It is possible that this result observed for Appanoose, in which a positive association between wealth and persistence appeared or grew stronger after an initial period of settlement, may have been common to other frontier communities. For example see Michael P. Conzen, <u>Frontier Farming in an Urban Shadow: The Influence of Madison's Proximity on the Agricultural Development of Blooming Grove, Wisconsin</u> (Madison, 1971), p. 128; D. Aidan McQuillan, "The Mobility of Immigrants and Americans: A Comparison of Farmers on the Kansas Frontier," <u>Agricultural History</u>, Vol. 53, No. 3 (July 1979), pp. 589-94.

[13]E.g., see Larry A. Sjaastad, "The Costs and Returns of Human Migration," <u>Journal of Political Economy</u>, Vol. LXX, No. 5, Part 2, Supplement (October 1962), pp. 80-93; Jacob Mincer, "Family Migration Decisions," <u>Journal of Political Economy</u>, Vol. 86, No. 5 (October 1978), pp. 749-73.

[14]For a discussion of a multivariate empirical approach to the analysis of persistence, see J. Morgan Kousser, Gary W. Cox, and David W. Galenson, "Log-Linear Analysis of Contingency Tables: An Introduction for Historians with an application to Thernstrom on the 'Floating Proletariat'," Historical Methods, Vol. 15, No. 4 (Fall, 1982), pp. 152-69.

[15]E.g. see G.J. Lewis, Human Migration: A Geographical Perspective (London: Croom Helm, 1982), p. 83.

[16]For findings of a positive association between wealth and persistence in nineteenth-century communities, see e.g. Throne, "A Population Study of an Iowa County," p. 321; Curti, The Making of an American Community, p. 75; William L. Bowers, "Crawford Township, 1850-1870: A Population Study of a Pioneer Community," Iowa Journal of History, Vol. 58, No. 1 (January 1960), pp. 22-23; Stephan Thernstrom, Poverty and Progress: Social Mobility in a Nineteenth-Century City (Cambridge: Harvard University Press, 1964), pp. 89-90; Conzen, Frontier Farming in an Urban Shadow, p. 128; Michael B. Katz, The People of Hamilton, Canada West: Family and Class in a Mid-Nineteenth-Century City (Cambridge, MA, 1975), pp. 130-31; Hal S. Barron, Those Who Stayed Behind: Rural Society in Nineteenth-Century New England (Cambridge: Cambridge University Press, 1984), p. 81; Jon Gjerde, From Peasants to Farmers: Migration from Balestrand, Norway, to the Upper Middle West (Cambridge, 1985), pp. 161-62; Kenneth J. Winkle, The Politics of Community: Migration and Politics in Antebellum Ohio (Cambridge: Cambridge University Press, 1988), pp. 117-19.

The following table provides some additional detail on the relationships among age, wealth, and persistence for Appanoose heads of households, 1860-70:

| Age | Persisters | | Non-persisters | | Persistence rate |
	n	mean total wealth	n	mean total wealth	
20-29	36	$1150	86	$678	29.5%
30-39	48	2348	88	1401	35.3
40-49	41	2453	51	1614	44.6
50-59	18	2362	38	1792	32.1
60-69	4	3350	15	2603	21.1

As in Table 4, the rate of persistence rises with age to a peak in the 40s, then declines. The ratio of the wealth of non-persisters to that of persisters also rises with age in this sample; adding an age-wealth interaction term as an independent variable in equation (2) of Table 4 yielded an estimated coefficient that was negative but statistically insignificant, without affecting the magnitudes of the other coefficients.

[17]A number of other variants of these equations were estimated without changing these basic results. For example, when family size was removed from equation (3) and replaced by two other variables - number of boys per family, and number of girls - the estimated coefficients of both were substantively and statistically insignificant.

[18]Curti The Making of an American Community, p.69; also see p. 76. On older communities, e.g. see Barron, Those Who Stayed Behind, pp. 81-87; Stephan Thernstrom, The Other Bostonians: Poverty and Progress in the American Metropolis (Cambridge: Harvard University Press, 1973), pp. 39-40.

[19]In the analysis of wealth in this paper, the estimates of individuals' wealth are those reported in the population census manuscripts. This source of information on wealth has been used in many investigations of the nineteenth-century economy, most extensively by Lee Soltow. Yet some

historians continue to question the reliability of these data. Some research currently in progress has begun to investigate this issue. Specifically, data sets constructed for Utah contain both the reported wealth from the 1870 manuscript federal census and the wealth listed on the state tax rolls for 1870 for 1568 households. The correlation coefficient between census wealth and tax assessment wealth of households is .66. A regression between the two yields Ln(census wealth) = 1.77 + .787 Ln(tax assessment wealth), with a standard error of .022 on the coefficient, and an R^2 of .44. Clearly the two estimates of household wealth are highly correlated, with tax assessment wealth averaging about 60 percent of census wealth. The obvious incentive to lower tax payments would explain why tax assessment wealth would be lower than actual wealth.

Since the wealth estimates from the census are often used, as in this paper, to estimate the effect of variables such as age and occupation on wealth accumulation, the differences in wealth among sources may not be as important as the estimated differences in the relative influences on wealth of the various explanatory variables. Estimation of two regressions, in which wealth was specified as a function of age, age^2, duration in Utah, occupation, foreign birth and rural residence for both census wealth and tax assessment wealth, produces very similar coefficients. More work is needed to test the accuracy of census wealth estimates, but this preliminary comparison of wealth listed in the federal census and Utah tax rolls is reassuring. A full treatment of the comparison for Utah will be presented in a forthcoming study by Clayne Pope.

[20]Price level adjustments throughout the paper were done using the series presented in Lance E. Davis et.al., American Economic Growth (New York: Harper & Row, 1972), p. 364.

[21]The comparisons are to Lee Soltow, Men and Wealth in the United States, 1850-1870 (New Haven: Yale University Press, 1975), Table 3.3, p. 76, and Table 3.5, p. 81. The mean real estate of Appanoose men aged 20 and above in 1850 was $352, and $944 in 1860; the mean total wealth of Appanoose adult men in 1860 was $1,347.

[22]Curti, The Making of an American Community, p. 78. Wealthholding patterns were similar in Utah, but with a higher degree of inequality. In Utah, the share of household heads with no real estate fell from 34 percent in 1850 to 25 percent in 1860. In 1870, however, the households with no real estate comprised 40 percent of all households. The increase was probably due to the influx of immigrants from Europe and the increase in female-headed households. The richest decile in Utah owned more of the real estate wealth--52 percent in 1850 and 55 percent in 1860--than the rich owned in Appanoose or Trempealeau County.

[23]The distribution of wealth in Appanoose County was much less unequal than in the United States as a whole. Thus for example in 1860 the wealthiest 10 percent of adult males in Appanoose owned 40 percent of total wealth, compared to shares for the highest decile of adult males of 68 percent of total wealth in the North, and 73 percent in the whole US; Lee Soltow, Men and Wealth in the United States (New Haven: Yale University Press, 1975), p. 99. Soltow notes that rural areas generally had considerably less inequality of wealth than cities; ibid., p. 108.

[24]One dollar was added to the wealth of all household heads in order to eliminate the problem posed by men without wealth in using the logarithmic transformation. It might be emphasized here that the precise slope of the relationship between age and wealth will vary with the treatment of these sample members with no reported wealth - e.g. it will change if they are excluded from the sample, or if values other than one dollar are assigned to them when they are included. The treatment used here is the same as that used by the studies cited below, by Atack and Bateman, Steckel, and Pope, and is therefore useful for comparative purposes.

[25]Jeremy Atack and Fred Bateman, "Egalitarianism, Inequality, and Age: The Rural North in 1860," Journal of Economic History, Vol. LXI, No. 1 (March 1981), p. 87.

[26]The figures in the text were calculated from the results reported in ibid. for all sample members (first row of Table 1, p. 87). The profile reported there for farmers only is in turn less steep, with rates of growth of 5.5 percent at 20, and 3.5 percent at 30 (fourth row of Table 1).

[27]Richard Steckel, "Poverty and Prosperity: A Longitudinal Study of Wealth Accumulation, 1850-1860," (unpublished paper, Ohio State University, 1987), Table 6.

[28]The age-wealth patterns in Utah are also of interest for the comparisons made here. In 1850, shortly after settlement of Utah had begun, real estate wealth was virtually invariant with respect to age, especially between ages 30 and 60. This flat age-wealth profile was probably a result of the heavy migration costs to Utah. By 1860, however, age-wealth profiles in Utah were similar to those found by Atack and Bateman for their northern rural sample. The peak in the age-wealth profile for 1860 in Utah was about

53 years of age, with an annual rate of increase of 6.5 percent at age 20, falling to 4.6 percent at age 30 and 2.7 percent at age 40. The fact that the rates of annual increase are lower for Utah than Appanoose County suggests that the high rates of accumulation in Appanoose were not simply due to low initial wealth, since Utah households were on average less wealthy than the Appanoose households; see J.R. Kearl, Clayne L. Pope, and Larry T. Wimmer, "Household Wealth in a Settlement Economy: Utah, 1850-1870," Journal of Economic History, Vol. XL, No. 3 (Sept., 1980), pp. 477-496, and Clayne L. Pope, "Households on the American Frontier: The Distributions of Income and Wealth in Utah, 1850-1900," in David W. Galenson, ed., Markets in History: Economic Studies of the Past (Cambridge: Cambridge University Press, forthcoming 1989).

[29] The returns to early arrival have been documented for Utah in Kearl, Pope, and Wimmer, "Household Wealth in a Settlement Economy;" J.R. Kearl and Clayne Pope, "Choices, Rents and Luck: Economic Mobility of Nineteenth-Century Households," Stanley L. Engerman and Robert E. Gallman eds., Long-Term Factors in American Economic Growth (Chicago: University of Chicago Press, 1986), pp. 215-260; and Pope, "Households on the American Frontier." Each year's duration in Utah increased a household's wealth by 6.7 percent in 1860. Not all of the effect of duration in Utah was a rent or capital gain on land since duration also had a positive effect on income holding wealth constant.

[30] The results shown in Table 8 were obtained after eliminating two individuals from the 1860 sample, Jacob and John Coffman. Jacob Coffman's real wealth fell from $1,200 in 1850 to $0 in 1860 (he was 60 years old in 1860). In 1850, his son John, aged 22, was a member of Jacob's

household, and reported no real wealth; in 1860, John was the head of his own household, and reported real wealth of $4,800, plus personal wealth of $1,500. Because both the decline in Jacob's wealth and the increase in John's were probably due in part to a transfer, it was not deemed appropriate to include them in this analysis individually. In alternative versions of the equation in which the two men were treated as a single observation, the estimated coefficient of the present-real wealth interaction remained unchanged by more than .01 (in sequential specifications, the age was used as the father's, then the son's).

[31]It might be argued that the large coefficient of the present-in-1850 variable in Table 8 could be due not to an increase over time in the wealth of farmers who had remained in Appanoose during 1850-60, but might rather indicate that those who arrived before 1850 were wealthier at their time of arrival than was the case for men who arrived after 1850. This was probably not true, however. The mean 1850 real wealth of the 27 farmers from the 1860 sample who had been in Appanoose in 1850 was $649; the mean 1860 real wealth of the same men was $2,614. In comparison, the 1860 mean real wealth of the 279 Appanoose farmers who had not been present in 1850 was $1,207 (or approximately $1,090 in 1850 dollars). The latter group therefore had on average considerably more real wealth in 1860 than the earlier arrivals had had in 1850, and the mean ages of the two groups in the respective years were quite similar (the mean age of the early arrivals in 1850 was 36 years, while that of the later arrivals in 1860 was 38 years).The rapid increase during 1850-60 in the mean real wealth of the farmers who had been present in Appanoose in 1850 points to a substantial accumulation of real wealth by these men during their time in the county.

[32]For a study of rates of return to land ownership in Appanoose in a period that includes the decades considered here, see Robert P. Swierenga, Pioneers and Profits: Land Specualtion on the Iowa Frontier (Ames: Iowa State University Press, 1968), especially pp. 192-99. On rising land values as the cause of increasing wealth on the frontier, see William H. Newell, "The Wealth of Testators and Its Distribution: Butler County, Ohio, 1803-65," in James D. Smith, ed., Modeling the Distribution and Intergenerational Transmission of Wealth (Chicago, 1980), pp. 102-09.

In a study of wealth accumulation in the frontier states of Texas and Arkansas in 1860, Donald F. Schaefer also found that with other characteristics constant, the settlers who had already been present in 1850 had greater average wealth than those who had arrived during the 1850s; "A Model of Migration and Wealth Accumulation: Farmers at the Antebellum Southern Frontier," Explorations in Economic History, Vol 24, No. 2 (April 1987), pp. 130-57. He argued that the difference was the result of larger initial endowments of the earlier arrivals, the cost of migration, and relatively rapid price appreciation of land on the frontier. Considering Appanoose County, the first of these does not appear to have been the case; in fact, as discussed in footnote 27, the typical initial endowments of earlier arrivals appear to have been lower than those of later ones. The second of Schaefer's factors appears problematic logically for Appanoose, for all settlers on the Iowa frontier had to bear the costs of migrating there, regardless of their date of arrival. Schaefer's third factor does appear relevant to Appanoose County, in view of the evidence of Tables 7 and 8, which suggest the presence of economic rents on real property for earlier arrivals. Another factor, not discussed by Schaefer, might also have been

important: settlers might have raised their incomes substantially by moving
to the frontier. Even if they had continued to save the same fraction of
income as they had before migrating, their wealth would then have risen more
rapidly after arriving on the frontier, and this would contribute to the
observed correlation between wealth and duration of residence on the
frontier. In addition, higher incomes on the frontier might have permitted
the settlers to save a higher proportion of their incomes, and this would
further strengthen the correlation.

[33]Paul W. Gates, The Farmer's Age: Agriculture, 1815-1860 (New
York: Holt, Rinehart and Winston, 1960), p. 80.

[34]Curti, The Making of an American Community, p. 163.

The 30 members of the 1850 sample who persisted in Appanoose
until 1860 enjoyed an annual increase in the mean value of their real estate
of 16 percent, after adjusting for price level changes. The 148 members of
the 1860 sample who persisted to 1870 saw their mean real estate increase by
6 percent annually, and their mean total wealth by 5 percent annually, again
adjusted for price level change. The Civil War was of course one of many
factors that could have produced the lower rates of wealth increase during
the 1860s. A historian of Iowa agriculture concluded that while the war had
both positive and negative economic effects on the state's farmers, on
balance it probably hurt more of them than it helped; Earle D. Ross, Iowa
Agriculture: An Historical Survey (Iowa City, 1951), Chapter 4, especially
pp. 59-60. Also see Emerson D. Fite, "The Agricultural Development of the
West During the Civil War," Quarterly Journal of Economics, Vol. XX,
(February 1906), pp. 259-78.

[35]The expected number of survivors of the eight farmers not found in the 1870 census in Appanoose Country can be estimated from their ages by employing a model life table; see Ansley J. Coale and Paul Demeny, <u>Regional Model Life Tables and Stable Populations</u>, (Princeton, N.J.: Princeton University Press, 1966). If one assumes that mortality experience on the frontier can be represented by a model west life table, level 12, then the expected number of survivors would be 5.63. If one assumes level 14, then the expected number of survivors is 5.87. It therefore appears unlikely that most of these men had died by 1870.

[36]Bogue, <u>From Prairie to Cornbelt</u>, p. 51; also see William J. Petersen, "Population Advance to the Upper Mississippi Valley, 1830-1860," <u>Iowa Journal of History and Politics</u>, Vol. 32, No. 4 (October 1934), pp. 316-17; Gates, <u>The Farmer's Age</u>, pp. 80-85; and Stanley Lebergott, "The Demand for Land: The United States, 1820-1860," <u>Journal of Economic History</u>, Vol. XLV, No. 2 (June 1985), pp. 195-97.

[37]Curti, <u>The Making of an American Community</u>, p. 163. This discussion is not intended to imply that considerable gains in wealth invariably led to migration - as shown earlier, for Appanoose the correlation between wealth and persistence was positive - but rather that it was not only the less successful who moved. On this point see also Throne, "A Population study of an Iowa County," p. 321.

[38]Curti, <u>The Making of an American Community</u>, p. 446.