1987

Incidence of poverty among elderly men and women

Yuko Nakayama Iijima

Iowa State University

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Incidence of poverty among elderly men and women

Iijima, Yuko Nakayama, Ph.D.

Iowa State University, 1987
Incidence of poverty among elderly men and women

by

Yuko Nakayama Iijima

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY

Department: Sociology and Anthropology
Major: Sociology

Approved:

Members of the Committee:

Signature was redacted for privacy.
In Charge of Major Work
Signature was redacted for privacy.
For the Major Department
Signature was redacted for privacy.
For the Graduate College

Iowa State University
Ames, Iowa

1987
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CHAPTER 1. INTRODUCTION

The incidence of poverty among the elderly has traditionally been higher than for any other age group in the United States (James, 1972; Moon, 1979; Schiller, 1980). However, expanded welfare programs since the 1960s and cohort shifts have lowered the poverty rate among the elderly. The poverty rate among the elderly dropped from 35.2% in 1959, at the onset of the War on Poverty, to 12.4% in 1984 (U.S. Bureau of the Census, 1986b). The reduction of poverty among the elderly is perhaps the greatest achievement of the War on Poverty (Warlick, 1985). Thanks to price indexing of social security benefits, the elderly are no more vulnerable to inflation than other age groups in the wake of recent welfare cutbacks (Clark and Sumner, 1985; Cook and Kramek, 1986; Hill, 1985; Ruggles and Moon, 1985; Uehara et al., 1986).

The elderly have become as well-off as the nonelderly on a per capita basis (Birdsall and Hanksins, 1985; Danziger, et al., 1984; Hurd and Shover, 1985). Compared to the 1984 poverty rate of the total population, 14.4%, the elderly's rate of 12.4% was even lower (U.S. Bureau of the Census, 1986b). There is no doubt that the elderly's economic well-being has been improved substantially during last two decades.
Unfortunately, improvement in economic status has not been shared by all of the elderly. Despite the improved economic status of the elderly as a whole, subgroups of elderly still experience severe economic hardships. The elderly's economic status has been ameliorated least in the poorest segments (Crystal, 1982).

Labelling those aged 65 and over as the "elderly," statistics and research often fail to show the internal diversity in this category. For example, the U.S. official statistics provide income information on people 65 and over as one group. Even when research is especially addressed to the economic problems of the elderly, they are often treated as one group (e.g., Danziger et al., 1984). As Torrey (1985) points out, the elderly are economically more diverse than the nonaged. This can be seen in a larger disparity between median and mean income of the elderly compared to that of the nonelderly (Radner, 1985). Averages do not tell the whole story about the elderly. Inequality among the elderly is now a greater problem than inequality between the elderly and the nonelderly (Crystal, 1986). "The major problem with income for the elderly is not in its average but in its dispersion" (Crystal, 1982:16).

The poverty problem is particularly acute for the very old, minorities, and elderly women who live alone (Warlick, 1985). There exists an inverse relationship between the
seriousness of the problems and the amount of resources the elderly have (Hess and Waring, 1983). "Those with the gravest problems are typically those with the fewest personal and social resources" (Hess and Waring, 1983:232), such as the very old, the widowed women, and the minority aged.

Torrey (1985) emphasizes the need to distinguish old-old from young-old in research on economic status of the elderly and calls the old-old the "invisible aged" since their situation, which is worse than that of the elderly as a whole, cannot be seen in the official statistics. Age and sex are highly correlated among the elderly population. Most of the elderly are, "not incidentally" (Carballo and Bane, 1984:xxiii), women. Women are especially overrepresented among the old-old age group due to longevity differences. Of all the persons 65 and over, almost 60% are women and the percentage rises to 70% when counting only the persons aged 85 and above (Rix, 1984). Because of this, the problem of poverty "has come and will continue to be largely a woman's problem" (Crystal, 1982:26).

In 1984, the overall poverty rate among the elderly was 12.4%, while that of male elderly was 8.7% and of female elderly was 15.0%. The poverty rate among the black elderly was 31.7%, with 26.0% for black male elderly and 35.5% for black female elderly (U.S. Bureau of the Census, 1986b).
The racial differences have widened during years of declining poverty among the elderly. In 1959, black elderly were a little less than twice as likely as whites to be in poverty, and they were more than two and half times as likely in 1984 (U.S. Bureau of the Census, 1986b).

There is also evidence that the recent welfare cutbacks widened income differentials between elderly men and women (Moon, 1986). Of all the elderly either living alone or with nonrelatives, 78% are women, and the poverty rate among them is 25.2%. According to Rix (1984), households headed by elderly women represented 43.5% of all households in which the householder was 65 and over in 1982. Nevertheless, the households headed by elderly women accounted for: 65% of all elderly households in which one or more members were food stamp recipients; 56% of all elderly households in which one or more members were covered by Medicaid; 75% of all elderly households living in assisted housing. Women are apparently overrepresented among the poor elderly.

The Research Problem

Why do so many elderly women suffer from economic hardships? Why do so many of them live in poverty in their late years? Despite the prevailing poverty among the
elderly women, little research has been done about causes of older women's inferior economic situation. This research explores factors determining economic status of the elderly, especially of elderly women.

Two trends are suggested as related to special problems of income maintenance facing women in later life (O'Rand and Henretta, 1982). One trend is the persistent and widening differential life expectancy between the sexes. Whereas there were more older men than older women in 1900, the sex ratio among the elderly has reversed throughout this century. Today, there are 67 men per 100 women of age 65 or over and 43 men per 100 women when the age limit is raised to 85 (Hess, 1985). Besides this differential life expectancy by sex, the fact that most men marry younger women results in a number of wives outliving their husbands. The cost of living longer includes the greater incidence of poverty, which is the characteristic of older single women.

A second trend suggested by O'Rand and Henretta (1982) is the variable labor force participation of women across the life span. Women, especially older women today, do not have continuous labor force experience. Most of them either have never worked or have had interrupted labor force participation. Such labor force patterns influence the level of retirement income. Interrupted work patterns make it difficult to achieve social security and also private
pension coverage.

Economic status of the elderly is a reflection of economic status of their earlier days. It also reflects old age insurance policies since most of the elderly live on their old age insurance benefits rather than on market earnings. The economic status of workers reflects the social structure in which they are located. Thus, economic well-being of the elderly should be considered in the larger context of prevailing social and economic structures and values (Walker, 1980).

There has been a tendency among sociologists to view late life status as the accrued result of individual characteristics, along the lines of the status attainment model. Research done by Henretta and Campbell (1976) is a typical example. They analyze the effect of aging on the relation of status variables to income by comparing a cohort before and after most of its members have retired. They find little change in the pattern of status variables' effects on income before and after retirement. Education, occupation, and marital status are found to have direct effects on income.

Economic well-being of the elderly, however, cannot be explained solely by individual characteristics such as educational attainment and work experience. Not only individual characteristics, but also "the nature of the
distinctive qualities of the social relations growing out of the economic organization of the parallel systems” (Hendricks and McAllister, 1983:280) must be taken into account.

This is especially true when considering older women’s situation. In spite of the fact that social security is a major source of older women’s income, social security is not a gender-neutral system. Women who have never worked can receive half of their husband’s social security benefits as a dependent spouse. Women who have worked and paid social security tax long enough to be eligible for their own benefits may be better off by receiving 50% of their husband’s benefits as a dependent. This happens because of women’s lower wages.

To examine the elderly women’s economic status naturally brings attention to sexual earnings gap of current workers. Full-time year-round women workers earn only 60% of what their male counterparts earn (Beller, 1985; England, 1981; Treiman and Hartmann, 1981). The earnings gap by sex is traditionally seen as a reflection of lower human capital investments by women. However, failure to explain sex differences in income by the use of human capital investments alone leads researchers to examine structural discrimination in the work place.

The above argument coincides with the general trend in
studies of income differentials by both sociologists and economists. In the extensive literature of income differentials, explanations tend to come from two theoretical perspectives. One perspective argues that the income differentials result from the personal characteristics of the worker. The other perspective argues that the determinants of income lie in the structural arrangements of the socioeconomic system. The former emphasizes the effects of supply-side characteristics and the latter emphasizes those of demand-side characteristics on income determination. The former perspective is reflected in the status attainment theory in sociology and the human capital theory in economics; the other in the segmented labor markets research by sociologists and the institutional economics by economists.

This research attempts to incorporate the two perspectives of income differentials to explain the economic status of elderly men and women. To empirically explore the factors determining economic well-being of the elderly, data from the Panel Study of Income Dynamics (PSID) will be analyzed. The PSID is an ongoing, national representative survey of 5,000 families. The data from four points, 1968, 1973, 1978, and 1983 are utilized for this study. These four points are chosen because they are evenly spaced and far enough apart to permit change. A subsample of white
households headed by those aged 47 and over in 1968 are followed over time. Nonwhite households are excluded from the data analysis to avoid seemingly complicated relationships of race with other factors.

Organization of the Dissertation

This dissertation is composed of seven chapters. Following the introductory chapter, Chapter 2 reviews theories and measures of poverty. Chapter 3 describes the current economic situation of the elderly in the United States, using statistics from the Census. It also discusses the main sources of income for the elderly in order to clarify how the elderly's economic well-being is woven in the prevailing social structure. Chapter 4 reviews two major theories of income differentials, human capital and dual labor market theories. The study's hypotheses are presented in this chapter. Chapter 5 includes a description of the data set, measures of concepts, and statistical procedures. Findings from the empirical analysis and interpretation of the findings are presented in Chapter 6. The last chapter, Chapter 7, provides a summary and a discussion of the study.
CHAPTER 2. POVERTY

When a person is said to be in poverty, what does it usually mean? Although the word "poverty" is frequently used in our everyday life, the definition of "poverty" is far from the agreement among the researchers. This chapter briefly reviews theories and measures of poverty, and discusses the poverty measure utilized in this study.

Theories of Poverty

There are two major conceptualizations and explanations of poverty among American sociologists. One is known as the cultural perspective and the other as the situational perspective. The cultural perspective assumes the causes of poverty lie mainly in an individual. Poverty is regarded as the natural result of individual defects in aspiration or ability. Poor people have distinctive patterns of behavior and values which are characteristically different from those of the dominant society and culture, and those patterns are transmitted intergenerationally. This is called the "culture of poverty". These distinctive characteristics are the main barriers for the poor to fully participate in society and to be integrated into society. This view is based on an assumption that individuals have a pervasive
opportunity to participate fully in society and have access to resources if they are a part of core culture (Davidson, 1985; Schiller, 1980).

In contrast, the causes of poverty are regarded as lying external to the individuals by those who adhere to the situational perspective of poverty. They argue that unique patterns of behavior among the poor are derived not internally from their unique value system, but externally as the inevitable consequences of their inferior positions in a social structure. The poor do not differ in values and norms from the nonpoor, but they are constrained by circumstances from acting in accordance with the dominant values and norms of society (Kriesberg, 1979). Poverty thus is "an expression of the overall structure of social inequality" (Davidson, 1985:179). Some see that the source of the persistence of poverty in the U.S. is the effects of racism and sexism (Stacz, 1981).

These two different perspectives are not as totally contradictory as they appear at the first glance. Rather, they should be considered as two ends of a continuum in theorizing about the persistence of poverty in this country (Waxman, 1983). Previous research on poverty indicates that there certainly exist distinctive patterns of behavior among the poor but at the same time situational constraints should not be overlooked. Waxman (1983:98), after critically
reviewing both perspectives, describes his "relational perspective" of poverty:

...the persistence of poverty and the behavior of the poor cannot be attributed to solely internal nor external sources. Rather, they have both internal and external sources which are reciprocally related, in that the patterns and attitudes of the poor are adjustments to the stigma of poverty, and these adjustments are transmitted intergenerationally through socialization. Socialization, the internal aspect, teaches the young how to behave in situations of stress, which are the product of the external aspect, the stigma of poverty.

Oscar Lewis, who coined the term "the culture of poverty", has always been seen as most vividly expressing the cultural perspective of poverty (Davidson, 1985; Schiller, 1980; Waxman, 1983). Based on his anthropological study of the poor in Mexico City and Puerto Rico, he found a distinctive subculture of poverty and its intergenerational transmission. However, he does not seem to be the strict culturalist who denies situational aspects of poverty as usually viewed by others. He writes:

(The culture of poverty) is both an adaptation and a reaction of the poor to their marginal position in a class-stratified, highly individualized, capitalistic society. It represents an effort to cope with feelings of hopelessness and despair that arise from the realization by the members of the marginal communities in these societies of the improbability of their achieving success in terms of the prevailing values and goals. Many of the traits of the culture of poverty can be viewed as local, spontaneous attempts to meet needs not served in the case of the poor by the institutions and agencies of the larger society because the poor are not eligible for such service, cannot afford it or are ignorant and suspicious (Lewis, 1966:267).
Going through a "jungle of irreconcilable ideas" (Davidson, 1985:177) about poverty, Davidson (1985) argues that the structural constraints such as institutional policies and practices are the main source of poverty but that individual attitudes and behaviors also have some effect. On the continuum of poverty theory suggested by Waxman (1983), the pure cultural perspective on one end and the pure situational perspective on the other end, Davidson's view is closer to the situational than to the cultural end.

When examining poverty among the elderly women, the cultural perspective seems inappropriate. Although there are some older women for whom the poverty has been a lifelong experience, many elderly women fall into poverty for the first time in their lives at old age. Those who experience poverty for the first time in old age are not likely to possess special patterns of behavior and values of the poor, the culture of poverty. The elderly are economically inferior to the young because of income loss due to retirement which is a socially constructed system in industrialized societies. The elderly women are economically inferior to their male counterparts because of their short and/or interrupted work histories or no work experience during their working ages, and also because of their lower wage rate.
Two major work patterns of women, interrupted participation and nonparticipation (O’Rand and Henretta, 1982), may be viewed as specific patterns of behavior by women which create high poverty rates among older women. However, these are also structurally determined to some extent. Women may not participate into the labor force because of their "traditional" view of sex roles or maybe because of their husbands', which is acquired through socialization processes. They may have to be away from work for a while because of their responsibility to take care of home or family. Under the current systems of old age pension, these women's work patterns affect their economic status in old age. Women, who experience interrupted work patterns mainly because of family responsibility, are likely to earn less retirement income because of their lower probability of achieving pension rights and also because of their lower wages upon which retirement income is based.

Hess (1985) points out that women's income disadvantage in old age is built into the entire system of retirement income benefits which are framed in terms of the male life course, in spite of the fact that the majority of the elderly are females.
Measures of Poverty

There are two basic measures of poverty: an absolute measure and a relative measure. Theories and measures of poverty are not separate issues (Davidson, 1985). The cultural perspective of poverty gives rise to an absolute measure and the situational perspective to a relative measure.

The absolute measure of poverty emphasizes economic insufficiency for survival as the frame of reference for poverty. Poverty is defined in terms of the cost of goods and services necessary for minimal subsistence. The measure thus is usually shown as a fixed amount of money necessary to purchase minimal goods and services for human existence. The basis of conceptualization of the absolute measure is consistent with that of the cultural perspective of poverty (Davidson, 1985). The poor are poor because of their own defects, thus the society does not owe them anything more than minimal subsistence (Davidson, 1985).

In contrast, the relative measure is concerned with the extent of economic inequality. The poor thus are not defined as those who fall below a fixed level of income but as those whose incomes are considered too far from the rest of the society. One example of relative measure is based on money income. It divides the society into fifths to see
what percent of all income is controlled by each fifth. Gini coefficient is another example of relative measure which uses the cumulative percentage of family income. Gini coefficient is often used as a single summary measure for the degree of inequality in the society (Kriesberg, 1979).

Those preferring the relative standards of poverty assume that standards become so fluid that no definition of need satisfies the ever-changing expectations of modern life (Korpi, 1980; Mencher, 1967). To incorporate changing expectations of people, the relative measure of poverty is regarded as superior to the absolute measure (Holman, 1978).

The Official U.S. Poverty Line

The official U.S. poverty line is an example of the absolute measures of poverty. It is calculated based on the minimum amount of money families need to purchase a nutritionally adequate diet, assuming they use one-third of their income for food. Between 1965 and 1974, the U.S. Department of Agriculture’s (USDA) Economy Food Plan was used as the food component for determining the poverty line. Since 1974, the new Thrifty Food Plan has been used (Beeghley, 1984). The total cost of a household’s needs are reached by multiplying the food cost by three, which is based on a 1955 consumer survey which found that the average
U.S. family spent one-third of its income on food. To adjust with inflation, the Consumer Price Index has been used since 1969 to update the poverty line. In 1984, the official poverty levels were $5,400 for one person under 65 years of age, $4,979 for one person 65 years and over, $6,983 for two-person household with a householder under 65 years of age, and $6,282 for aged two-person households.

The official poverty line has been a target of criticisms from both conservatives and liberals. Conservatives argue that it is too high because it does not include in-kind transfers such as food stamps and health care. It takes only money income into account. For example, Danziger and Gottschalk (1983) prefer the measure in which all in-kind transfers other than medical expenditures are added at their recipient values to money income. Even those who think that adjustments for in-kind transfers are necessary, however, admit that there is still a substantial poverty problem in the U.S. which needs to be addressed by policy makers (Danziger and Gottschalk, 1983; Smeeding, 1982).

On the other hand, liberals insist that the line is too low because it is not adjusted to the rising standard of living. The food component is still the same as the one selected for the first place, which the USDA itself does not consider to be nutritionally adequate for long-term use but
only for emergency use. This implies that these food diets would be detrimental to health if used over an extended period (Schulz, 1980). A European sociologist points out that the U.S. is the only industrialized country which still uses the absolute measure of poverty (Korpi, 1980).

Beeghley (1984) notes that the U.S. poverty line is a subjective mean of counting the poor, which requires a large number of arbitrary decisions. Food as a criterion for need to determine poverty line is arbitrary, and the ratio of food to nonfood costs, one-third, is also chosen arbitrarily. Although the absolute measure appears to be objective and easy to administer at the first glance, it is a difficult task to achieve a measurable and acceptable definition of a poverty line. It is especially so when defining the poor in this one of the most affluent countries in the world. As Scott (1984:4) notes, "pure physical survival is not the main issue" in high-income societies.

Which Measure Should be Used?

The poverty rate is very sensitive to its measure. Resulting poverty rates differ greatly depending on what kind of measure is used. Moon (1979), for example, uses four absolute measures of poverty and finds four different poverty rates among the aged. When the Social Security
Administration (SSA) threshold is used, the 1971 poverty rate among the aged is 30.9%. The poverty line by Bureau of Labor Statistics (BLS) raises the rate to 42.7%. Using an expanded measure that includes such nonincome components as in-kind transfers, tax liabilities, and a share of net worth, poverty rate is 12.7% by SSA threshold and 27.4% by BLS low income line.

Davidson (1985) analyzes the poverty rate since 1959 using both the official poverty level and the half-median-income, which was originally suggested by Fuchs (1967). When the official one is used, the poverty rate dropped sharply during 1960s from 22.4% in 1959 to 12.1% in 1960, remained stable during 1970s, and rose in early 1980s. When the half-median-income which incorporates changing standards of living is used to measure poverty, however, the poverty rate remains about 20% for all fourteen years from 1959 to 1983. In general, an absolute measure of poverty is more likely than a relative one to indicate progress over time (Korpi, 1980).

Williamson and Hyer (1975) compares sixteen alternative measures of poverty and Osmond (1979) also compares eight poverty measures. Both of them find that correlations between income and welfare status, and between income and social economic status are quite low. They caution the assumption of interchangeability of alternative poverty
Although the necessity of replacing the official poverty line has been suggested by many (e.g., Chambers, 1982; Scott, 1984; Zimbalist, 1977), using the U.S. official poverty line to measure the incidence of poverty has some advantages. The biggest advantage is that it is widely used so that it is possible to compare research findings with the governmental statistics and other studies.

In this study, a poverty measure equivalent to the U.S. official level will be used in data analysis, since comparability with the official statistics and other studies are considered important. At the same time, 125% and 150% of the measure will also be used. Because the official poverty line cannot be considered as perfect, these two measures are expected to be complementary to the official line.
CHAPTER 3. ECONOMICS OF AGING

This chapter describes the elderly's economic situation using data from the Census Bureau. To grasp clearly the current economic situation of the elderly should help clarify the problems they face. The latter part of the chapter discusses the main sources of income for older people.

Economic Status of the Elderly

Economic status of the elderly, as well as of the population as a whole, has been improved dramatically in terms of percentage of people who fall below the U.S. official poverty line. Table 3.1 shows the percentages of persons below the poverty level. The elderly were more likely to be in poverty than the total population in earlier years, but the relation was reversed in recent years. Among the total population, 14.4% were in poverty, while 12.4% of the elderly were in poverty in 1984. Although households with elderly female householders were almost twice as likely to be below the poverty line compared to the elderly as a whole, their situation was better than the other female households. Comparing incomes of the aged and the nonaged, Grad (1984) finds about equal levels of average per capita
family income and about the same proportion of people below the poverty line. However, aged unrelated individuals, which consist of 33% of all aged persons, have under three-fifths of the income of nonaged unrelated individuals (Grad, 1984).

Looking at Table 3.2, which shows percentages of persons below 125% of the poverty level, however, the elderly as a whole were worse off than the total population. In 1984, 19.4% of the population and 21.2% of the elderly were below 125% of the poverty level. Comparing the 125% and 100% of the poverty level, the percentage of people falling below 125% of the poverty level is 35% higher for the total population, and 71% higher for the elderly. It is 23% higher for the total female households and 67% higher for the older female households. This suggests that many elderly have incomes just above the poverty line, if not below. As Blaustein (1982) has noted, transfer programs for the elderly have moved many of them out of poverty, from a few hundred dollars below to only a few hundred dollars above the official poverty line.

The 125% of the poverty level is equivalent to a poverty level when the "low-cost" food budget is used for calculation instead of more stringent "economy" budget, which the USDA does not consider to be nutritionally adequate for long-term use. The threshold used in Table 3.2
Table 3.1 Percentage of persons below the U.S. official poverty level, 1959-1984

<table>
<thead>
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<th>Persons in All Other Families</th>
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<td>All Persons</td>
<td>Age 65 and Over</td>
<td>All Persons</td>
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<td>22.4%</td>
<td>35.2%</td>
<td>49.5%</td>
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<td>1965</td>
<td>17.3</td>
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<td>46.0</td>
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<td>1970</td>
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<td>1984</td>
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Table 3.2 Percentage of persons below 125% of the U.S. official poverty level, 1959-1984

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<tr>
<td>1959</td>
<td>31.1%</td>
<td>- %</td>
<td>57.1%</td>
</tr>
<tr>
<td>1965</td>
<td>24.1</td>
<td>-</td>
<td>54.0</td>
</tr>
<tr>
<td>1970</td>
<td>17.6</td>
<td>33.9</td>
<td>47.0</td>
</tr>
<tr>
<td>1975</td>
<td>17.6</td>
<td>25.4</td>
<td>44.4</td>
</tr>
<tr>
<td>1980</td>
<td>18.1</td>
<td>25.7</td>
<td>42.6</td>
</tr>
<tr>
<td>1984</td>
<td>19.4</td>
<td>21.2</td>
<td>41.9</td>
</tr>
</tbody>
</table>

is not at all a luxury budget. In 1984, 125% of the poverty level was $6,224 for one person 65 and older and $7,853 for two persons 65 and older.

Table 3.3 shows the distribution of total money income of persons 65 and over. Twenty-three percent of males aged 65 to 69 and 34% of males aged 70 and over have income below $7,000. Among female elderly, 57% of those aged 65 to 69 and 61% of 70 and over have income below $7,000. Women and older people within the elderly population are more disadvantaged in terms of money income.

Table 3.4 presents the average income disparity across aged cohorts among the various subgroups of the elderly in 1980. Note that some of these subgroups overlap. The average income of people aged 85 and older is 36% less than the income of people aged 65 to 69. Aged men and also aged couples experience the biggest difference in income from ages 65 to 69 years to 85 and over. These groups experience a greater decline in income because they are the two groups that are most likely to be in the labor force in 65 to 69 years cohort (Torrey, 1985). The smallest income difference is seen among the poor elderly. The poor may be more homogeneous across aged cohorts than the nonpoor aged since the poverty threshold and also the level of benefits are the same regardless of age.

The unmarried elderly are clearly disadvantaged
Table 3.3 1984 total money income of persons 65 and over, by sex

<table>
<thead>
<tr>
<th>Total Money Income</th>
<th>Total 65-69</th>
<th>70+</th>
<th>Male 65-69</th>
<th>70+</th>
<th>Female 65-69</th>
<th>70+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $2,000</td>
<td>5.2%</td>
<td>3.7%</td>
<td>2.4%</td>
<td>1.9%</td>
<td>7.4%</td>
<td>4.8%</td>
</tr>
<tr>
<td>$2,000-$3,999</td>
<td>13.5%</td>
<td>15.8%</td>
<td>4.9%</td>
<td>8.8%</td>
<td>20.4%</td>
<td>20.3%</td>
</tr>
<tr>
<td>$4,000-$6,999</td>
<td>23.1%</td>
<td>30.7%</td>
<td>15.7%</td>
<td>23.4%</td>
<td>29.0%</td>
<td>35.4%</td>
</tr>
<tr>
<td>$7,000-$9,999</td>
<td>15.8%</td>
<td>16.6%</td>
<td>15.8%</td>
<td>19.6%</td>
<td>15.9%</td>
<td>14.6%</td>
</tr>
<tr>
<td>$10,000-$12,000</td>
<td>10.0%</td>
<td>9.1%</td>
<td>12.5%</td>
<td>12.5%</td>
<td>8.1%</td>
<td>6.9%</td>
</tr>
<tr>
<td>$12,500-$14,999</td>
<td>7.6%</td>
<td>6.0%</td>
<td>10.9%</td>
<td>8.6%</td>
<td>4.9%</td>
<td>4.4%</td>
</tr>
<tr>
<td>$15,000-$17,499</td>
<td>5.6%</td>
<td>4.3%</td>
<td>7.9%</td>
<td>5.8%</td>
<td>3.7%</td>
<td>3.4%</td>
</tr>
<tr>
<td>$17,500-$19,999</td>
<td>4.3%</td>
<td>3.2%</td>
<td>6.1%</td>
<td>4.5%</td>
<td>2.8%</td>
<td>2.3%</td>
</tr>
<tr>
<td>$20,000-$24,999</td>
<td>5.3%</td>
<td>4.1%</td>
<td>7.8%</td>
<td>5.4%</td>
<td>3.2%</td>
<td>3.3%</td>
</tr>
<tr>
<td>$25,000-$29,999</td>
<td>2.9%</td>
<td>2.1%</td>
<td>4.4%</td>
<td>2.8%</td>
<td>1.8%</td>
<td>1.7%</td>
</tr>
<tr>
<td>$30,000 and Over</td>
<td>6.7%</td>
<td>4.4%</td>
<td>11.6%</td>
<td>6.7%</td>
<td>2.8%</td>
<td>2.9%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Median: $8,512 $7,045 $12,292 $9,407 $6,229 $5,950
Mean: $12,477 $10,415 $16,907 $12,948 $8,841 $8,781

\(^{a}\)U.S. Bureau of Census (1986a).
compared to aged couples. The average income of unmarried men are about half of that of the married couples across aged cohorts. The unmarried women have even lower income than the unmarried men. As a general trend, the older the elderly, the less money income they have, and also women have lower income than men across aged cohorts.

From the cross-sectional data, it is not clear whether this income difference of older and younger elderly is due to age effect or cohort effect. Atkins (1985) points out that it is plausible to believe that aging itself causes some erosion in income. The greater concentration of single persons in the oldest-old population appears to be responsible for the most of the difference between the income distribution of the young-old and old-old. Single elderly are heavily concentrated in low income ranges with a sharply peaked distribution, while the income distribution for elderly couples is much flatter. In contrast to the differences between singles and marrieds, the differences by age among singles and among married couples are quite small. This implies that marital status change, particularly from married to widowed, is an important factor accounting for age cohort differences in income among the elderly. More than 60% of the population aged 65 to 74 are married, while only 30% of those aged 85 and over are married. The majority of very old unmarried are widowed women.
Table 3.4 1980 average income of the aged\(^a\)

<table>
<thead>
<tr>
<th>Population (in thousands)</th>
<th>All ages</th>
<th>65-69 Years</th>
<th>70-74 Years</th>
<th>75-79 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Aged</td>
<td>$7,505</td>
<td>$8,621</td>
<td>$7,534</td>
<td>$6,923</td>
</tr>
<tr>
<td>Aged Men</td>
<td>10,245</td>
<td>11,993</td>
<td>10,029</td>
<td>8,986</td>
</tr>
<tr>
<td>Aged Women</td>
<td>5,535</td>
<td>5,756</td>
<td>5,631</td>
<td>5,557</td>
</tr>
<tr>
<td>Aged Couple</td>
<td>15,476</td>
<td>17,458</td>
<td>15,018</td>
<td>13,676</td>
</tr>
<tr>
<td>Unmarried Men</td>
<td>7,545</td>
<td>8,641</td>
<td>7,605</td>
<td>7,183</td>
</tr>
<tr>
<td>Unmarried Women</td>
<td>6,123</td>
<td>7,023</td>
<td>6,462</td>
<td>5,996</td>
</tr>
<tr>
<td>Poor Couple</td>
<td>5,702</td>
<td>5,697</td>
<td>5,736</td>
<td>5,712</td>
</tr>
<tr>
<td>Poor Unmarried Men</td>
<td>3,722</td>
<td>4,147</td>
<td>3,679</td>
<td>3,519</td>
</tr>
<tr>
<td>Poor Unmarried Women</td>
<td>2,672</td>
<td>2,720</td>
<td>2,723</td>
<td>2,683</td>
</tr>
<tr>
<td>Institutionalized</td>
<td>3,563</td>
<td>3,464</td>
<td>3,484</td>
<td>3,647</td>
</tr>
</tbody>
</table>

\(^a\)Barbara Boyle Torrey (1985:387).
<table>
<thead>
<tr>
<th>80-84 Years</th>
<th>85 years and over</th>
<th>% Difference in Average Total Money Income Between 65-69 Years of Age and 85 Years of Age and Older</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$6,381</td>
<td>$5,500</td>
</tr>
<tr>
<td></td>
<td>8,256</td>
<td>7,212</td>
</tr>
<tr>
<td></td>
<td>5,339</td>
<td>4,748</td>
</tr>
<tr>
<td></td>
<td>12,810</td>
<td>11,723</td>
</tr>
<tr>
<td></td>
<td>6,865</td>
<td>6,338</td>
</tr>
<tr>
<td></td>
<td>5,536</td>
<td>4,803</td>
</tr>
<tr>
<td></td>
<td>5,669</td>
<td>5,596</td>
</tr>
<tr>
<td></td>
<td>3,509</td>
<td>3,405</td>
</tr>
<tr>
<td></td>
<td>2,628</td>
<td>2,513</td>
</tr>
<tr>
<td></td>
<td>3,701</td>
<td>3,493</td>
</tr>
</tbody>
</table>
An alternative explanation that the younger cohorts of the elderly have earned better retirement benefits than the older cohorts is also plausible. The younger cohorts tend to have work histories fully covered by social security and also enjoyed the growth of private pension coverage in the 1950s and 1960s. They thus have much better social security benefits and are more likely to have private pensions compared to the old-old.

Sources of Income for the Elderly

There are several potential sources of income in old age: market earnings, social security, private pensions, asset income, and income programs for the poor over age 65. Table 3.5 presents percent distribution of aggregate income by income source for the elderly. Although earnings account for 28.6% of total income for all families and 44.4% for female households, they account for only small percentages of income for unrelated individuals and the poor elderly. Besides, market earnings are expected to decrease with increasing age. They should account for much smaller percentage of total income in the old-old population. Social security is the largest source of income for the elderly. It accounts for more than half of the income of the median elderly person (Crystal, 1982). Social security
Table 3.5 Percent distribution of aggregate income for 65 years and over by income source

<table>
<thead>
<tr>
<th></th>
<th>All Families</th>
<th>Female Households</th>
<th>Unrelated Males</th>
<th>Unrelated Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Below Poverty</td>
<td>Total Below Poverty</td>
<td>Total Below Poverty</td>
<td>Total Below Poverty</td>
</tr>
<tr>
<td>Earnings</td>
<td>28.6%</td>
<td>44.4%</td>
<td>13.1%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Social Security</td>
<td>31.6%</td>
<td>25.2%</td>
<td>40.6%</td>
<td>44.3%</td>
</tr>
<tr>
<td>Private Pension</td>
<td>14.3%</td>
<td>9.0%</td>
<td>17.0%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Asset Income</td>
<td>23.7%</td>
<td>16.6%</td>
<td>25.2%</td>
<td>35.1%</td>
</tr>
<tr>
<td>SSI</td>
<td>0.6%</td>
<td>2.4%</td>
<td>1.5%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Public Assistance</td>
<td>0.2%</td>
<td>0.6%</td>
<td>--</td>
<td>0.1%</td>
</tr>
<tr>
<td>Other</td>
<td>1.0%</td>
<td>1.7%</td>
<td>2.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*U.S. Bureau of the Census (1986b).*
benefits are especially important for the poor segments of the elderly. Well over half of the income for old families in poverty, and over three-quarter of the income for poor individuals come from social security. Both private pension and asset income also appear to be important sources of income for the elderly in general, but not for the poor elderly. Supplemental Security Income accounts for 10 to 16% of the income for the poor elderly, but it is not important at all for the other elderly.

In the following sections, two sources of income in old age, social security and private pension are discussed separately.

**Social security: how it works**

The Social Security Act of 1935 established a federal old age pension program (OAI) and a federal-state system of unemployment insurance. The OAI was enacted in the midst of the Great Depression to provide the minimum level of well-being to the elderly who were most affected by the Depression (Rich and Baum, 1984). The major motivating force behind the passage of the act was, however, the creation of jobs for younger workers by encouraging the elderly to leave or remain out of the labor force (Schulz, 1980).

Although the original legislation was rather limited,
it has been amended and expanded over the years. Survivors' and dependents' benefits were added in 1939 (OASI), and disability insurance in 1956 (OASDI). In 1965 Medicare was added, establishing a health program for the elderly (OASDHI). Automatic benefits adjustment for inflation was legislated in 1972 and begun in 1975. Indexing of earnings was legislated in 1977. Originally uninsured groups of workers were successively brought into the system over the years: certain farm and domestic workers (1950), most of the self-employed (1954), members of the uniformed services (1956), Americans employed by foreign governments or international organizations (1960), physicians (1965), and ministers (1967). In 1974, the railroad retirement program was integrated with the social security system.

To be eligible for retirement benefits under the OASI, a worker must have worked in covered employment for the required number of quarters. Benefits are based on average indexed monthly earnings (AIME), the average of covered earnings between age 21 (or 1950, if later) and age 62, with the five lowest years of earnings dropped. A worker's earnings subject to the tax are indexed so that they are increased by the average increase in earnings of all workers.

The retired-worker benefit for which a person is eligible at 65 is the primary insurance amount (PIA) and is
equal to some proportion of the AIME. The proportion is set in such a way to favor the low-income worker. Higher-income earners have a lower proportion of their AIME replaced and thus a lower return on their past contributions than do low-income earners. The end result is a replacement rate of slightly over 50% for a low-income worker, 42% for a worker with lifetime average wages, and about 30% for a high-income worker (Rich and Baum, 1984).

Social security formulas thus represent a "compromise between adequacy and proportional-return-on-contributions' considerations" (Crystal, 1982:108). The intent of the system, to achieve two contradictory goals of "individual equity" and "social adequacy" in one program, is criticized as not being fulfilled efficiently (Kutza, 1981).

The PIA is payable at age 65. If a worker chooses to receive social security benefits at an earlier age --- the minimum age is 62 --- benefits are reduced permanently at the rate of .555% per month. Benefits thus are reduced by 20% if a worker retires at 62. The benefits are increased by .25% per month if acceptance is postponed past age 65 up to a maximum of 15%. The retirement test reduces or eliminates social security benefits if an eligible recipient had earnings above an exemption ceiling. The retirement test no longer applies for those over age 70.

Social security benefits are also granted to dependents
of a retired, disabled, or deceased worker. In most cases these are spouse over age 62, widow/widower over age 64, children under 18, and disabled children over 18. When one member of a couple receives retired-worker benefits, the other member may receive 50% of the former’s PIA as a spouse benefit. If a spouse also works and becomes qualified for her/his own benefits, s/he receives either the dependent benefit based on spouse’s PIA or the PIA based on her/his own work history, whichever is greater. This provision which prohibits multiple benefits is called dual-entitlement provision.

Survivors of an insured worker are eligible for a survivor benefit based on the past earnings of the deceased worker. For aged widows and widowers, this is generally equal to the worker’s PIA. A divorced spouse may receive 50% of the former spouse’s retired-worker benefit, and the divorced widow 100% if their marriage have remained intact for at least ten years. Either spouse or divorced-spouse benefits can be received only after the insured worker has started to draw benefits.

**Women and social security**

One of the most controversial issues concerning social security is the treatment of women and men. By the 1939 amendments to the Social Security Act, noncontributory
supplemental security benefits came to be paid to wives and widows of covered workers. (Noncontributory, supplemental benefits were not extended to husbands of female workers until 1950.) Although supplemental and noncontributory benefits to the spouse were proportionate to the benefits of the husband so that a link between earnings and benefits were maintained. The supplemental benefits provided family protection and accounted for differences in the expected lifespans of men and women (Burkhauser and Holden, 1982). The introduction of supplemental and noncontributory benefits to wives and widows was recommended by the 1937-1939 Advisory Council in the "socio-economic milieu of that period" (Wolff, 1984:6). In those days, family structure and division of work within a family were very different from those of today. The typical family consisted of male primary breadwinner and female homemaker. In 1939, only 25% of women were in the labor force and only 15% of households had both husband and wife employed outside the home at the same time.

To avoid the overlapping benefits problem of working wives, the dual-entitlement provision was introduced in conjunction with supplemental benefits to wives and widows. According to the dual-entitlement provision, a woman could receive only the higher of her own retirement benefits or dependent spousal benefits. This is similar to means tested
income assistance programs in which benefits are reduced as other income increases. The dual-entitlement rule was not controversial in light of the demographic characteristics of 1930s.

The one-earner model of the household, however, is no longer typical for the present situation of the American society. In 1985 about 54% of all women aged 16 and over participated in the labor force, and both husband and wife worked in about 54% of all married couples. As married women increased their labor force participation, so did the number of women who were qualified for both retired worker benefits and spousal benefits. The dual-entitlement provision implicitly penalizes working wives. A nonworking married woman can receive dependent spousal benefits without any extra cost, whereas a working married woman receives dependent spousal benefits at a cost equal to her total social security contribution, or retired worker benefits at a cost equal to her dependent spousal benefits. Moreover, because of changes in work and marriage patterns among men and women over time, two-earner couples rather than one-earner family are now more likely to be among the low-income people, which is contradictory to the 1937-1939 Advisory Council's assumption that one-earner elderly couples were more likely to have low per capita income relative to needs (Burkhauser and Holden, 1982).
In addition to inequal treatment of working and nonworking married women, the noncontributory, supplemental benefits generate inequities across different household types, depending on marital status and the division of earnings within the household. A two-earner household with equal earnings receives lower combined benefits relative to one-earner household when the combined earnings of the two-earner household is less than the taxable maximum for a single-earner. On the other hand, a two-earner household receives higher benefits than a one-earner household if their combined earnings are greater than the taxable maximum for a single earner, although the two-earner couple pays more contributions to receive the higher benefits (Wolff, 1984).

Another inequality generated by the supplemental and noncontributory spousal benefits lies between single and married workers. They are treated equally on the contribution side so that single and married workers with the same level of earnings pay the same amount of contribution. However, they are treated unequally when receiving benefits; only the married household is eligible for dependent benefits, but not a single person.

The increasing dissatisfaction with the current social security provisions have resulted in many proposals for change. Two major proposals are earnings sharing system and
double-decker system. Based on a community-property notion of family earnings, half of the couples' earnings is credited to each under the earnings sharing system. The double-decker system provides two tiers of protection with universal protection for all recipients and an earnings-related benefits. Although everybody agrees on the need to change the social security system to the one fit to the current family system, no consensus has been reached on how to change it.

It now becomes apparent that social security is a very inefficient way of helping those with low incomes (Burkhauser and Holden, 1982; Moon, 1974). Social security certainly aids the poor, but as Moon (1974) points out, viewing social security as a mean of raising more people out of poverty is an indirect approach.

**Private pension**

Private pension is another major source of income for the elderly. Unlike the social security, however, coverage by the private pension plans is not universal for workers. Among full-time private workers, 55% of males and 40% of females were covered by the private pension plans in 1979 (Beller, 1981). Beller (1981) also finds that the coverage rate is positively related with the tenure in the job, the size of establishments, and the level of earnings. Coverage
rate for unionized workers are twice as high as the rate for nonunionized workers (Beller, 1981). It is important to note that not all of the covered workers have vested status: only 48% of plan participants, thus only about a quarter of full-time private workers have vested status (Rogers, 1981). According to Thompson's study (1978), many who have been covered at one time never receive a benefit —— 28% of covered men and 45% of covered women.

In general, private pensions are received by workers with long continuous service in jobs that have private pension plans. These turn out to be higher income, relatively skilled positions, and the long-term workers in these jobs are mostly white males (Crystal, 1982). In other words, those who are less in need are more likely to receive private pension after retirement. The retired workers with the high primary insurance amount (PIA) under the social security are more likely to have income from private pensions (Irick, 1985). Married retirees are more likely to receive private pensions than nonmarried at all PIA levels (Irick, 1985). Grad and Foster (1979) find that 39% of married and 20% of nonmarried have both social security benefits and private pension. The likelihood of receiving more than one pension is progressively higher in each succeeding age group (Grad and Foster, 1979).

O’Rand and MacLean (1986) explore the link between firm
characteristics and pension programs by examining 165 firm pension plans. They find that major predictors of workers' location in firm with pension plans are race, education, public sector, core private sector, unionization, large firm size, and full-time worker status. Core sector location increases benefits between 22 and 39%. It is also found that male concentrated sectors have higher pension participation rates.

Coverage under private pension plans increased rapidly during 1950s and 1960s. In 1940, only 15% of the private, nonagricultural labor force were covered, while 49% were covered in 1975 (Crystal, 1982). The growth in coverage has stagnated in recent years, since the "smokestack America" (Crystal, 1982:114) sector of economy, in which private pensions are more typical, has not been growing compared to service sector economy. The coverage rate is not expected to rise substantially in the future under existing circumstances.

Crystal (1982) points out that private pensions exaggerate the division of work force into an advantaged and disadvantaged sectors. In relation with the increased labor force participation by women, Treas (1981) expects that a higher proportion of households will enjoy a second or third pension by virtue of women's job tenure. This may result in greater income disparities within the older population
because private pensions do not favor the low income worker as social security and also because women who will qualify for second pensions are likely to be skilled employees and likely to have husbands with private pensions, if married (Treas, 1981).

Private pension plays an important role in supplementing elderly's money income. However, it is likely to aid the more advantaged elderly, but not those who are most in need.
CHAPTER 4. THEORETICAL FRAMEWORK

In pursuit of causes of income differentials, both economists and sociologists appear to rely on two major theoretical perspectives: human capital theory and dual labor market theory. This chapter discusses the two perspectives, especially in relation to the earnings gap by sex, which affects economic well-being in later life as well as in the working years. In this study, the two theories are not seen as competing and contradictory as they usually are, but as complementary. Based on the review of theories, hypotheses are derived at the end of the chapter.

Human Capital Theory

The human capital theory is derived from the neoclassical economic theory of wages and posits that the equilibrium wages are just equal to the marginal revenue product of labor. This means that workers will be paid an amount exactly equal to the value of their economic contribution to a firm (Treiman and Hartmann, 1981). Productivity is estimated indirectly by assuming that differences in productivity among workers derive from differences in their stock of human capital.

Income differentials thus are seen as the result of
different levels of human capital investments. This view is clearly expressed by Becker.

Some activities primarily affect future well-being. ... This study is concerned with activities that influence future monetary and psychic income by increasing the resources in people. These activities are called investments in human capital.

The many forms of such investments include schooling, on-the-job training, medical care, migration, and searching for information about prices and incomes. ... All these investments improve skills, knowledge, or health, and thereby raise money or psychic incomes (Becker, 1975:9).

The basic proposition is that income differentials reflect differences in the productive capacity of workers as a result of their training, abilities, and training opportunities (Sorensen and Kalleberg, 1981).

Human capital theory assumes that workers are economically rational, that they have perfect information about jobs, and that workers are always ready to migrate, thus equalizing income differentials across the occupational structure (Bibb and Form, 1977). These assumptions are often criticized as the principal weaknesses of the theory (Berch, 1982; Bibb and Form, 1977).

To explain women's lower wage, which has been documented as about 60% of men's for full-time year-round workers, the advocates of human capital theories emphasize women's intermittent career patterns. Although women are as well educated as men, they often have intermittent work patterns because of family responsibilities, which result in
their lack of work experience and on-the-job training.
Women lack experience and consequently earn less than men with similar educational attainment.

Mincer and Polachek (1974) found that about one-half of the wage gap by sex was explained by sex differences in the amount of work experience. This study was repeated by Sandell and Shapiro (1978) using different coding from Mincer and Polachek's. They found that sex differences in years of experience explain only about 25% of the earnings gap. Corcoran and Duncan (1979) decomposed sex differences in wages by utilizing extensive variables such as years of formal education, years out of the labor force, years of work experience prior to one's current job, years with current job, years of training completed on current job, the proportion of working years that were full time, and time lost at work due to illness of self or others. All these variables explain 44% of the wage gap between white men and women. McNeil and Salvo (1985) find that only 12% of earnings gap is explained by work experience and interruption differences by sex. After reviewing research done on earnings gap by sex, England and Farkas (1986) conclude that somewhere between one-quarter and one-half of the sex gaps in pay have their source in sex differences in work experience.

The theory's assumption that marital responsibility
often prevents women from fully participating in the labor force thus resulting in women’s lower earnings compared to men should be examined with caution. In a cross cultural study, Roos (1983) finds that never married women are more similar to men in labor force behavior, but they fail to translate their advantageous position to higher occupational prestige or wages. Although single women earn substantially more than married women, they earn much less than men (Treiman and Terrell, 1975). Women’s economic disadvantage relative to men cannot be attributed solely to gender differences in marital responsibilities.

Occupational sex segregation has been documented as accounting for 35-40% of sex gap in earnings (Reskin and Hartmann, 1986). Occupational sex segregation is so extensive that over 60% of the females (or males) would have to change jobs to eliminate the overrepresentation of women in certain occupations and their corresponding underrepresentation in others (Beller, 1984; Blau and Hendricks, 1979).

In regard to occupational sex segregation, human capital theory hypothesizes that women, who are likely to have intermittent work patterns because of family responsibilities, tend to choose jobs with relatively low penalties for intermittent employment (Polachek, 1979). The theory thus explains occupational sex segregation and
resulting income differentials by sex as the result of women's rational choice.

This explanation is attacked by several researchers. Blau and Jusenius (1976) argue that women's lower expected lifetime labor force participation explains only the greater tendency of women to be in jobs requiring low skill, but not the concentration of women in a small number of female occupations within each skill type. Empirical analysis found that wage growth is not significantly lower in female than in male jobs (Corcoran et al., 1983). Women with more continuous experience are no more likely to be in predominantly male occupations than women who have been employed less continuously (Corcoran et al., 1984b; England, 1982). The occupational differences between men and women do not seem to be consistent with optimizing behavior on the part of women (Blau, 1984). "The theory of human capital may explain many things, but occupational sex segregation is not among them" (England, 1984:742).

The human capital theory is also criticized as dependent on "tastes" to explain why women choose to enter a particular occupation or to remain in unpaid labor (Blau and Jusenius, 1976). Despite its dependence on women's choice, the theory does not provide an adequate explanation of this choice. Tastes and preferences have some effects on differential earnings between men and women. Young men and
women prefer different occupational roles and these differences account for one-third to two-thirds of the sex gap in hourly earnings three years after their college graduation (Daymont and Andrisani, 1984). The omission of tastes and personality from sexual earnings gap studies has led to an overestimation of labor market discrimination against women (Filer, 1983). Admitting the effects of tastes and preferences, however, Daymont and Andrisani (1984) note that the higher payoff to traditionally male preferences and college majors could represent a form of labor market discrimination.

A substantial part of the earnings gap cannot be explained by factors assumed to measure productivity differences by sex. Granovetter (1981) argues that the human capital theory pays nearly exclusive attention to supply-side factors such as characteristics and decisions of individuals. Not only supply-side factors but also other factors are supposed to be at work. Demand-side factors such as institutional barriers and discrimination are considered as possible sources of the earnings gap by sex.

Dual Labor Market Theory

Sociologists have increased their interests in labor market analysis, especially in incorporating institutional
and structural variables in the model of socioeconomic achievement. This partly may be attributed to the recognition that the orthodox economic theory has not explained persistent poverty, discrimination, and income inequality (Kalleberg and Sorensen, 1979).

Dual labor market theory is "directed primarily towards the specific policy problems of poverty and underemployment" (Kalleberg and Sorensen, 1979:356). The basic hypothesis is that the labor market is divided into two distinct sectors with little movement between the two. These two differ greatly in their characteristics.

The primary sector offers jobs with relatively high wages, good working conditions, chances of advancement, equity and due process in the administration of work rules, and above all, employment stability. Jobs in the secondary sector, by contrast, tend to be low-paying, with poorer working conditions and little chance of advancement; to have a highly personalized relationship between workers and supervisors which leaves wide latitude for favoritism and is conducive to harsh and capricious work discipline; and to be characterized by considerable instability in jobs and a high turnover among the labor force (Piore, 1975:126).

Efforts have been made to determine whether such characteristics as income, education, race, or sex vary by labor market sectors. Beck et al. (1978) analyze data from the General Social Surveys of 1975 and 1976 and find that the core and periphery sectors exhibit significant differences in both earnings levels and labor force composition. The real returns on human capital are greater
in core industries than in periphery industries, and there exist significant adverse race and sex effects on earnings even after controlling for human capital and occupational variables in the core sector, but not in the periphery sector. These differences do not disappear when quality of the two labor forces is controlled. Tolbert et al. (1980) also find substantial differences in income, sexual composition, and occupational prestige by the two sectors. In the study of the earnings of blue-collar workers, lowest earnings are found in economically weak sectors with unorganized occupational groups disproportionately composed of women workers (Bibb and Form, 1977).

In regard to earnings gap by sex, the dual labor market approach argues that women are disproportionately distributed into jobs in the secondary market, which are lower-paying jobs. Many women are confined to secondary jobs because employers often associate women in general with unstable work behavior (Snyder et al., 1978). Some researchers even define secondary jobs as those held mainly by minorities and women and primary jobs as those held by prime-age white males (Althauser and Kalleberg, 1981). Once placed in the secondary labor market, it becomes more difficult over time to leave due to such factors as unionization. The theory hypothesizes that:
...this is not due to a lack of demand for labor and not to deficiencies in skills or motivation but to such institutional forces as systematic discrimination by white employers and labor unions; discrimination may thus operate by assigning individuals to "bad" contexts rather than by overt means (Kalleberg and Sorensen, 1979:370).

This hypothesis corresponds to research findings. For example, Snyder et al. (1978) find that primary-sector occupations generally maintain stable, heavily male sex composition. Occupational segregation has been documented as a major source of the income gap by sex, rather than differential pay to men and women holding the same jobs (Treiman and Hartmann, 1981). When earnings by men and women are compared within occupational categories, the difference by sex is much smaller than that of the labor force as a whole (Fuchs, 1974).

Women in male-dominated occupations, while earning less than men, are likely to earn more than women in other occupations and men in female-dominated occupations, while earning more than women, are likely to earn less than men in other occupations (England et al., 1982; Sommers, 1974). Controlling for education and experience, women have higher lifetime earnings if they work in predominantly male occupations (England, 1984). Sex differences in earnings result more from rank segregation and/or discrimination in promotion rather than from wage discrimination per se within an organization (Bielby and Baron, 1984, 1986; Halaby,
Dual labor market theory is not free from flaws in accounting for income differentials by sex. O'Donnell (1984) criticizes it as too simple to lump all female jobs into the secondary labor market. She points out that it ignores the class position of a woman's family and the education associated with the position, which affects the kind of work accessible to some women. Another weakness of this theory lies in its lack of specifying the causes of labor market segmentation. Without clear specification of the causes, it remains merely a descriptive approach to occupational sex segregation. The theory also lacks an explicit conceptualization of the structure which underlies and organizes attainment of the individuals (Baron and Bielby, 1980).

Some argue that there often exists a confusion about the issue of segmentation by assuming that the firm economic sectors and labor markets perfectly overlap (Althauser and Kalleberg, 1981; Hodson, 1984; Morrissey, 1982; Wallace and Kalleberg, 1981). In reality, core firms have some secondary jobs and periphery firms have some primary jobs. Wallace and Kalleberg (1981) find that economic sectors do not correspond perfectly with labor markets, although they are substantially overlapped. The assumption of the theory, the existence of discrete labor markets, is also questioned
(Wallace and Kalleberg, 1981). It is pointed out as problematic that researchers tend to interpret a residual in income determination models as an indicator of discrimination in the workplace (Chiplin, 1979; Kalleberg and Sorensen, 1979).

Contrary to the exclusive attention to supply-side factors of the human capital theory, the dual labor market theory attributes almost everything to demand-side factors (Granovetter, 1981).

Putting Two Theories Together

The status attainment and human capital theories have guided sociological and economic research in the area for a long time, and structural theories are introduced as an alternative explanation of income differentials. Recently, there has emerged the call to combine these two perspectives to better understand income differentials among current workers (England and Farkas, 1986; Granovetter, 1981).

...the human capital and status attainment theories have taken us a long way in our sociological and economic studies of welfare, resource allocation, stratification, and distribution. These studies' recent efforts appear to be moving further and further from substantive questions however, and are becoming more and more the grist for methodologists' mills; while one can readily applaud such developments for purposes of abstract theory building, one also senses a need to move, on other fronts, to add demand-related specifications to the favored theorists' model with its

As reviewed, human capital and dual labor market theories put emphasis on different factors: the human capital theory on the productivity of individuals, and the dual labor market theory on the institutional arrangements. In regard to sex segregation in workplace, most research focuses on either worker’s preference such as the characteristics and choices of the labor supply, or employer’s preference such as gender discrimination in the labor market (Roos and Reskin, 1984), but not both.

In an attempt to examine aggregate inequality among the American states, Jacobs (1985) obtains the result consistent with both the individualistic emphasis in the neoclassical perspective and the emphasis on economic power in the sectoral perspective. He concludes that "neither position can afford to ignore explanations favored by the other" (Jacobs, 1985:177). He further notes that this omission has been most glaring on the part of human capital theory which has given exclusive focus on individual characteristics in accounting for income inequality without controlling for the institutional variables.

These two theories should be considered as complementary rather than contradictory and taken into account together to explain existing income differentials.
Neither theory alone can shed enough light on the current income disparity.

The relationship of these two theories parallels the relationship between the two perspectives of poverty discussed in Chapter 2 --- the cultural and the situational perspectives. The human capital theory and the cultural perspective of poverty emphasize individual differences, while the dual labor market theory and the situational perspective of poverty focus on structural constraints. As both perspectives of poverty are relevant in explaining the causes of poverty with emphasis on different factors, two theories of income differentials should not totally ignore each other as irrelevant.

Applying the Two Theories to the Elderly

Human capital and dual labor market theories are relevant in explaining the economic status of the elderly population as well as that of current workers. Economic well-being of the elderly is not independent of their economic status in earlier years. Rather, it is a reflection of working years and also a reflection of societal structures including old age insurance policies. To explore factors determining economic well-being of the elderly, especially factors differentiating elderly women
from elderly men, both theories of income differentials should be taken into consideration.

As reviewed in Chapter 3, social security benefits are calculated based on earnings during work years. Those elderly who have longer work experience with higher earnings are in better economic position. In other words, those who have larger stock of human capital are supposed to be economically advantaged in old age. Not only individual characteristics such as a stock of human capital, but also institutional arrangement is related to income in old age. Those working in the core sector of labor market are likely to have higher income than those in the periphery sector, and this affects the amount of social security benefits. People in the core industry are also more likely to be covered by private pension plans which contribute to elderly's money income after retirement. For both men and women, O'Rand and Landerman (1984) find that advantageous locations in the occupational structure, which include higher status jobs, higher wages, and favorable industrial contexts, have the most important influences on retirement income.

Focusing on elderly women, their unfavorable economic position, as Treas (1981:572) points out, "evolves within the social institutions of school, family, and economy." Sex socialization prior to entry into the labor market at
micro-level and also existing cultural practices including employment patterns at macro-level contribute to occupational outcomes for individuals (Marini, 1984). In case of the current older population, the fact that most women have not had continuous work patterns apparently affects their disadvantageous economic position, which derives from the human capital theory. Not only due to their lack of human capital stock, but also due to their overrepresentation in lower paying jobs, women are less likely to acquire good pension coverage. As long as women earn 60% of what men do, the increasing women's labor force participation is unlikely to influence dramatically the economic status of the elderly of the future.

The term "feminization of poverty" coined by Pearce (1978) usually refers to those societal processes through which poverty becomes concentrated among women and children, especially among female household heads with dependent children. This phenomenon has received much attention in recent years, but attention has not been extended as much to poverty among older women. Lower wages of women, between 35 to 40% of which is attributed to the segregation of the sexes into different occupations (Treiman and Hartmann, 1981), not only contribute to the feminization of poverty in general, but also to the feminization of poverty in old age (Minkler and Stone, 1985). Women's lower wage is indeed a
serious problem in the reality that most women today work for economic necessity, either as a head of household or as a spouse to earn living together with her husband (Sawhill, 1976; Sidel, 1986). Poverty among today's younger women will likely to translate into more poor older women in the future.

The reality that women are expected to live longer than men, coupled with their unfavorable economic position at the beginning, seems to make their economic situation much worse in old-old age. Widowhood is generally associated with lower income. The demographic fact that women outlive men alone creates serious income maintenance problems facing older women.

There are many factors relating to older women's inferior economic situation compared to men's. Demographic factors such as different longevity between the sexes, individual differences in work histories, and also societal structures all affect income in old age. They are interwoven with one another, which creates their complex relationships to the economic well-being of elderly men and women. Among the elderly, for example, sex is highly correlated with age and also with marital status, and all of which are related to economic status. Sex is also related to work history which affects the amount of retirement income. The relationship of work history to retirement
income is constrained by institutional arrangements of labor market and also by old age insurance policies.

Hypotheses

In this section, several hypotheses are posited in regard to the economic well-being of the elderly. Both human capital and dual labor market theories are important in exploring economic well-being of the elderly as reviewed above. The data from the PSID utilized in this study can be used directly examine the effects of human capital stock on the incidence of poverty in old age. Although the effects of segmented labor markets on income in old age cannot be examined directly, they will be examined indirectly.

This study is specifically concerned with the incidence of poverty among the elderly population rather than the other measures of economic well-being. Poverty rate is often used as a measure of economic situation of groups of people by the government and/or mass media, and it frequently catches public attention. When it is argued that the economic well-being of the elderly has become better than that of the other population groups, it usually means that the poverty rate is lower for the elderly than for others. However, this statement often neglects the internal diversity among the elderly in terms of economic well-being.
Using the probability of being below poverty line as a dependent variable, the internal diversity of the elderly population will be explored by the empirical analysis. Household is chosen as an appropriate unit of analysis for this study of poverty since the members of household unit are assumed to have the same economic situation by sharing income.

First, there arise questions concerning the relationships between the demographic characteristics of the elderly and their incidence of poverty. Specifically, when segmented by three major characteristics of age, sex, and marital status, which segments of the elderly are more likely to be in poverty? An understanding of these relationships should help grasp the heterogeneity of the elderly population which is often neglected. Although race is supposed to be closely related to the poverty status, it is not included in the analysis to avoid potentially complicated confounding effects on poverty. Only data for white households are utilized for the analysis.

One of the major assumptions of this study is that economic well-being in old age is, to a large extent, a reflection of economic status in earlier years. Old age insurance is constructed in such a way to reflect earnings before retirement. It is thus hypothesized that those elderly who have been in economically inferior positions
during their work life are also economically disadvantaged in old age. In regard to age, it is hypothesized that those households headed by older elderly are more likely to have incomes below the poverty line than those headed by younger elderly. The rationale behind this is that old-old are supposed to have lower average indexed monthly earnings (AIME), on which social security benefits are based, in the society where standard of living continues to go up. In addition, they are less likely to have private pension coverage which was much less prevalent a few decades ago. This hypothesis is more concerned with cohort effects rather than age effects.

Female elderly today are much less likely to have had continuous work pattern compared to males. If they have had, they are very likely to have occupied lower paying jobs, often in the secondary labor market. Indirectly drawing upon human capital and dual labor market theories, female households are thus hypothesized to have higher incidence of poverty than elderly male households.

Marital status is also hypothesized to be associated with poverty status in old age based on unequal treatment of married and single households by social security. In addition, private pensions are often arranged in such a way to be terminated after recipients' death regardless the presence of surviving spouse. It is hypothesized that
married elderly couples are less likely to be in poverty compared to nonmarried elderly. Among elderly households headed by nonmarried females, the incidence of poverty is hypothesized to be the highest for those headed by separated/divorced, followed by those headed by widowed, and the lowest for households headed by never-married. The rationale for this hypothesis is again related to the arrangements of social security system. Depending on the length of marriage, divorced women may not receive any social security benefits on their ex-husbands' rights, while widows are eligible for survivors' benefits. Never married women are more likely to have worked continuously and acquired their own rights for retirement benefits.

In sum, the following relationships between the demographic characteristics of the elderly households and their probability of being in poverty are hypothesized:

H1.1. a higher probability of being in poverty for older cohorts of elderly households than for younger cohorts of elderly households

H1.2. a higher probability of being in poverty for female households than for male households

H1.3. a higher probability of being in poverty for nonmarried households than for married households

H1.4. among female households, the highest probability of being in poverty for separated/divorced, next highest for widowed, and the lowest for never married
Due to flows of better-off new retirees and also due to expanded welfare programs, the poverty rate among the elderly has become lower in recent years. What happens to the poverty rate of elderly as they age? In general, the elderly after retirement are not likely to increase their economic resources. Rather, resources tend to erode over time. Although social security benefits are at least adjusted for inflation every year, most private pensions are not. The elderly often have to spend up their savings to supplement their retirement income. It is thus hypothesized that the probability of being in poverty among the elderly households increases over time.

The rate of this increase over time is expected to be higher for older cohorts of elderly households compared to younger ones. With the lower level of economic resources to begin with, the economic situation for older elderly is likely to erode faster. Nonmarried households and female households are also hypothesized to experience higher rate of increase in the probability of being in poverty over time compared to married and male households, respectively. In general, female elderly are economically inferior to male elderly. The hypothesized greater increase in the likelihood of poverty for female households is related to the phenomenon called "feminization of poverty." If the rate of increase in the incidence of poverty is found
greater for female households than for male households, poverty can be said to be feminized among the older population.

Summarizing the above, the following hypotheses are posited in regard with the change in the probability of being in poverty over time:

H2.1. an increase in the probability of being in poverty over time for the elderly households

H2.2. a higher rate of increase in the probability of being in poverty over time for older cohorts of elderly households than for younger cohorts of elderly households

H2.3. a higher rate of increase in the probability of being in poverty over time for female households than for male households

H2.4. a higher rate of increase in the probability of being in poverty over time for nonmarried households than for married households

After examining the internal diversity among the elderly households by demographic characteristics in terms of poverty situation, the analysis will shift to more direct examination of effects of human capital stock on poverty status in old age. Those households headed by persons with greater human capital investments are expected to have a lower probability of falling into poverty. Two major forms of human capital investments, years of formal education and years of work experience, will be utilized as independent variables. In addition to these two direct measures of
human capital, the effect of private pension on the poverty incidence will be examined. Since the eligibility for private pensions is associated with both the tenure and labor market sectors, it is considered as indirectly representing human capital investments and also the location of the workers in the labor market. The following three hypotheses are tested controlling for demographic variables.

H3.1. a higher probability of being in poverty for households headed by persons with fewer years of formal education than for those headed by persons with more years of education

H3.2. a higher probability of being in poverty for households headed by persons with shorter work history than for those headed by persons with longer work history

H3.3. a higher probability of being in poverty for households without private pension than for those with private pension

The next chapter focuses on research procedures. The background of the Panel Study of Income Dynamics will be reviewed first. It is followed by the description of variable measurement and then by statistical procedures employed in the data analysis.
The data set used in the empirical analysis is the Panel Study of Income Dynamics (PSID). The PSID is an ongoing, nationally representative, longitudinal survey of approximately 5,000 families which began in 1968. Interviews are conducted annually. Data from 1968 to 1983 are currently available for analysis.

The direct antecedent of PSID is a large-scale research project, the Survey of Economic Opportunity (SEO), undertaken by the Office of Economic Opportunity (OEO) in the spring of 1966. Families in a national sample of 30,000 dwellings were interviewed twice, in the spring of 1966 and again in the spring of 1967. The family living at the dwelling at the time of each visit was interviewed. Hence, no attempt was made to interview the same family in both years. These interviews were done for OEO by the Census Bureau.

It became clear to the research staff of the OEO that time series data such as the SEO could shed but dim light on the dynamics of well-being though it was valuable for estimating the numbers of poor with various demographic characteristics. The necessity of conducting the panel
study was discussed among the staff. In the process, it soon became apparent that conducting the panel survey would require commitment by a highly trained and specialized staff. It also became obvious that the kind of research OEO wished to undertake could involve politically sensitive matters, such as attitudes toward governmental policies. Thus, a decision was reached to solicit an arrangement with an academically-based survey research organization to conduct a panel study. The study paper was sent to organizations believed to have the staff required to conduct a panel of all the persons in 5,000 families. Based on three proposals received by OEO, the Survey Research Center of the University of Michigan was selected.

The sample for the PSID combined a representative cross-section sample of nearly 3,000 families in the coterminous United States, selected from the Survey Research Center's master sampling frame, and a subsample of about 1,900 families interviewed previously by the Bureau of the Census for the Office of Economic Opportunity.

The sample of newly selected 3,000 families by the Survey Research Center was a multistage area probability sample of dwellings. The primary sampling units (PSUs) were counties, county groups, or Standard Metropolitan Statistical Areas (SMSAs). From each of 74 homogeneous strata, one PSU was selected. The units of selection of the
second stage were cities, towns, census tracts, minor civil divisions, and rural areas. Three to ten units with average of five were selected for each PSU. The third stage of selection consisted of blocks, census enumeration districts, chunks, and city directory pages. One block per expected cluster of four dwelling units was selected for 3,000 interview survey. At the first three stages, selection were done with probabilities proportionate to size. At the fourth stage, six to twenty segments of four dwellings units per PSU were selected with equal probability which resulted in 3,000 households.

The original OEO-Census sample utilized 357 sampling units design and consisted of two parts: (1) a cross-section sample of about 18,000 households, designated E1; (2) a nonwhite supplement of about 12,000 households (E2) located in 1960 enumeration districts with specified proportions of nonwhite population, the proportions varying with geographical locations and degree of urbanization. The E1 sample was by itself a national cross-section sample of about 18,000 households selected at the over-all rate of 1/3158. The E2 sample was not a national sample, but a probability sample of about 12,000 households selected from the nonwhite stratum of enumeration districts. The sampling fractions ranged from 1/258 to 1/755. The sample was weighted to form a national cross-section sample of 30,000
households.

The subsample of 1,900 families drawn from the OEO-Census study was limited to families that had the following characteristics:

1. Their income in 1966 was less than twice the official poverty line.
2. The head of the family was not over 60 years of age in the spring of 1967.
3. The family gave permission to the Census Bureau to release the information it supplied to OEO.

At the same time, the selection process was built upon the Survey Research Center's national sample stratification in order to make maximum use of the SRC sample areas and to maintain a probability sample from a definable universe. For further information on sampling design, see A Panel Study Of Income Dynamics: Study Design, Procedures, and Forms (Morgan and Smith, 1969).

The original PSID sample size interviewed in 1968 was 4,802 families. The overall response rate was 76% in 1968. Although 24% of the originally selected sample were not interviewed in the first year, panel losses in subsequent years have been very small. When a member of an original panel family forms a separate household, that entire household is added to the sample. Because the number of split-offs exceeds the panel losses, the number of households has continued to increase. A total of 6,852
households were interviewed in 1983. The overall response rate was 89% in 1969, and has remained at 97% for the subsequent years.

The main content of the PSID is an annual measurement of a set of items that indicate changes in income sources, family composition, employment, earnings, and hours spent working, commuting, doing housework (Corcoran et al., 1984a). The PSID also contains extensive background information about the head and some about other members of household including spouse. The PSID, thus, provides excellent information for examining the effects of work history and also changes in marital status over time on economic well-being of the aged.

A subsample of households headed by men and women age 47 and over in 1968 is used in this analysis. Although race usually has significant effects on economic well-being, only whites are included in the sample of this study to avoid seemingly complex relationships of race with other variables. The white subsample is followed over 15 years for which data are available, thus heads of households were age 62 or older in 1983. Because the PSID followed the families, there were changes in household heads over time, either by death, marriage, or marital dissolution. Since the purpose of this study is to follow the changes of household economic well-being over time, those households
whose heads do not fall into this age range in the subsequent years are also included in the analysis. However, age of heads of households in 1983 is restricted to over 47. This procedure results in 773 households available for the analysis.

For the analysis, data from four points --- 1968, 1973, 1978, and 1983 --- are used to examine changes over the 15 year period. These four points are chosen because they are evenly spaced and far enough apart to allow observation of changes.

Measurement of Variables

**Poverty status: ratio of income to needs**

When measuring the family's economic status, it is necessary to compare family's income with some measure of its needs. The PSID provides a convenient measure of this relationship by a ratio of family income to family needs. Total family money income, which is the total of all family members' earnings, transfers, and capital income, is divided by a family needs standard.

The needs standard used to calculate a ratio of family income to its needs is the Orshansky-type poverty threshold based on an annual food needs standard. The annual needs standard is derived from the weekly food cost for each
person, according to age and sex at 1967 prices (income data collected in 1968 are 1967 income). The weekly food cost for each family is multiplied by 52 to estimate annual food needs and is adjusted for economies of scale. To obtain the needs standards, the annual food needs are then multiplied by three to adjust for other needs for families with three or more persons. To adjust for diseconomies of small households (in rent, etc.), the annual needs are not multiplied by three, but by 4.89 for single persons and 3.70 for two-person units. Besides the adjustments above, special adjustments are also made where people moved in and out of the family during the year. Finally, total family income is divided by the annual needs standards, and for the few farmers, it is multiplied by 1.25 to adjust for their presumably lower costs of living.

The Orshansky-type needs standards used in the PSID, however, are not the same as those used by the Census Bureau with its Current Population Survey. They differ from those used by the Census in the following ways: (1) The food needs in the PSID used the "low-cost" food budget rather than the more stringent "economy" budget used by the Census. Although these two budget plans originally used separate menus, currently the economy budget is simply assumed to cost 80% as much as low-cost budget. The food needs in the PSID is thus 25% higher than that used by the Census; (2)
The PSID food needs are not adjusted for inflation as those of the Census, but are based on the 1967 prices.

To make the ratios of income to needs in the PSID comparable to the Census income/needs, the following two adjustments are made: (1) multiply the income/needs ratio by 1.25 each year to make it based on the "economy" level rather than the "low-cost" level; (2) multiply the income/needs ratio by a price-deflating factor based on changes in the Consumer Price Index. Table 5.1 presents the Consumer Price Index, the price-deflator, and the single factor which combines the two adjustments described above.

Table 5.1 Adjustment factors for income/needs ratio to achieve approximate comparability with Census income/needs

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumer Price Index</th>
<th>Price Deflator</th>
<th>Combined with 1.25 Adjustment to Economy Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>100</td>
<td>1.000</td>
<td>1.25</td>
</tr>
<tr>
<td>1972</td>
<td>125.3</td>
<td>.799</td>
<td>1.00</td>
</tr>
<tr>
<td>1977</td>
<td>181.5</td>
<td>.551</td>
<td>.69</td>
</tr>
<tr>
<td>1982</td>
<td>289.1</td>
<td>.346</td>
<td>.43</td>
</tr>
</tbody>
</table>

*Since respondents are asked to report their previous year’s income at the survey, consumer price index of 1967, 1972, 1977, and 1982 are used to adjust income/needs ratio with inflation.*
There are two other minor ways in which the PSID needs standards and income/needs variables differ from those used by the Census. The PSID reduces the needs to .80 for farmers, while the Census uses .85. In calculating the needs standards, the Census uses a different rule for single individuals over 65, taking 80% of the two-person standard and keeping it the same for men and women in spite of different estimated food needs. For the empirical analysis of this study, no adjustment is made for the above two minor differences between the PSID and the Census income/needs.

Based on the ratio of income to needs calculated as above, the elderly households whose income/needs is below 1.00 are defined as being in poverty. Besides this poverty measure which is equivalent to the U.S. official poverty line, two additional measures will be used as dependent variables. Those households whose income/needs fall below 1.25 and 1.50 are classified as poor in additional analyses. This is equivalent to using 100%, 125%, and 150% of the official poverty threshold to classify people as poor or nonpoor.

Time

To explore the change over time in the probability of falling into poverty among the elderly households, data from four points of time are examined. Four points of time, 1968
(Time 1), 1973 (Time 2), 1978 (Time 3), and 1983 (Time 4) are included in the analysis. The selection of these four points makes maximum use of the PSID currently available. Besides, these four points are evenly separated with five year range and apart enough for examination of changes over time.

**Sex-marital status**

Because the unit of analysis of the study is the household, an independent variable which combined sex and marital status of household heads is formulated to account for differences among households, not among individuals. This procedure is necessary since almost all the female household heads in the sample are, not surprisingly, nonmarried.

Five categories of sex-marital-status are formulated for the analysis. These five are:

1. households with married couples
2. households headed by nonmarried males
3. households headed by never married women
4. households headed by widowed women
5. households headed by separated/divorced women

**Cohort**

Cohort is categorized by dividing the sample households into seven age groups based on age of household heads in
1968. Because of the nature of the PSID to follow the families over years, household heads may change over time due to death, marriage, or marital resolution. Age of household head in the subsequent years does not necessarily correspond to the age range of the cohort in which the household is categorized based on 1968 age. However, it is assumed that age of household head in 1968 represents the household's status in terms of age pretty well even in the subsequent years in order to account for economic status. Among the total sample of 773 households, 507 had no change in the head or wife in 15 years. Out of the remaining 266, 60 have had the same head but the wife has left/died and/or head has a new wife, the wife from previous years became head in 171 cases, or the female head got married and the husband became head in 35 cases. Thus, 567 households, i.e., 73% of the sample, did not have any change in the head. Besides the majority of widows are only a few years apart from their deceased husbands. In the instance of widows, the age of the deceased husband may be more closely related to their income in widowhood if their income is based on the deceased husband's vested pension rights.

Each cohort has a five-year age range. Age ranges of the seven cohorts for four points in time are presented in Table 5.2.
Table 5.2 Age ranges of seven cohorts

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>47-51</td>
<td>52-56</td>
<td>57-61</td>
<td>62-66</td>
</tr>
<tr>
<td>2</td>
<td>52-56</td>
<td>57-61</td>
<td>62-66</td>
<td>67-71</td>
</tr>
<tr>
<td>3</td>
<td>57-61</td>
<td>62-66</td>
<td>67-71</td>
<td>72-76</td>
</tr>
<tr>
<td>4</td>
<td>62-66</td>
<td>67-71</td>
<td>72-76</td>
<td>77-81</td>
</tr>
<tr>
<td>5</td>
<td>67-71</td>
<td>72-76</td>
<td>77-81</td>
<td>82-86</td>
</tr>
<tr>
<td>6</td>
<td>72-76</td>
<td>77-81</td>
<td>82-86</td>
<td>87-91</td>
</tr>
<tr>
<td>7</td>
<td>77+</td>
<td>82+</td>
<td>87+</td>
<td>92+</td>
</tr>
</tbody>
</table>

Human capital investments

Two direct measures of human capital investments will be used in the data analysis: the number of years of formal education and the number of years worked full time for most or all of the year since age 18. Another variable, private pension is reported as amount of pensions received by household heads in the previous year of the survey.

Statistical Procedures

The statistical procedure used in this study is a logit model, and the unit of analysis is the household. A logit
model is a special class of log-linear models which can be used to examine the relationship between the dichotomous dependent variable and one or more categorical independent variables.

A logit model is similar to a linear regression model in the sense that it explores the relationship between a dependent variable and one or more independent variables (Knoke and Burke, 1980). The essential difference is that a linear regression model assumes continuous and interval measurement of variables, while a logit model allows researchers to examine the relationship of a dichotomous dependent variable with categorical independent variables. Regression estimates with a qualitative not quantitative dependent variable can lead to serious errors in inference (Aldrich and Nelson, 1984). A logit model is designed to analyze a dichotomous dependent variable, which is often a target of social science research.

The dependent variable in a logit model is expressed in terms of the natural log of the odds of being in one category as opposed to the other. An odd thus is the ratio between the frequency of being in one category and the frequency of not being in that category. The categorical independent variables in a logit model affect the odds of the dependent variable. Parameter estimates in a logit model can be interpreted as additive coefficients. Positive
logit coefficients suggest that the independent variable increases the odds of the dependent variable, whereas negative logit coefficients decrease the odds.

The dependent variable in this study is the natural log of the odds of having money income below the poverty line, as opposed to not being in poverty. For the first step, effects of three categorical variables --- time, sex-marital status, and cohort --- are examined. To examine the effects of time and changing sex and marital status of household heads with the panel data from four points in time, a special procedure is taken before fitting the logit models. From each case, four separated cases are created for each of four time periods, thus, increasing sample size for the logit models by four times. Since the unit of analysis of the study is the household, it is necessary to take this preliminary procedure to examine the effects of different demographic characteristics of household heads at four different times on the poverty incidence and also to examine the change over time. In the analysis, the data on four points of time from the same household are treated as if they were independent. This approach is similar to that used in the log-linear analysis of occupational mobility. Good treatments of the appropriateness of these general models may be found in Hauser et al. (1975) and Rosenfeld (1978). This approach may also be viewed as a special class
of the types of event history models in Tuma and Hannan's work (Tuma and Hannan, 1984).

With four observations from each case, the sample size for the logit model is 3,092 (773 multiplied by four). Distribution of 3,092 observations in terms of time, sex-marital status, and cohort are presented in Table 5.3.

For the second part of analysis, effects of private pension, education, and work experience on the poverty incidence are examined using the data from the 1983 wave of the PSID. Only those households with retired heads are included in the analysis to examine the effects of private pension. Households headed by nonmarried males are excluded from this part of the analysis. This results in the sample size of 574 elderly households. Along with the above three variables, age and sex-marital status of household heads are included in a logit model with the same dependent variable used for the first part of the data analysis. All the variables are categorized as dichotomous variables. These dichotomous variables are presented in Table 5.4 with the distribution of the sample households for each of five variables.

For each logit model, both the likelihood ratio chi-square and the Pearson chi-square will be presented to assess the goodness-of-fit of the model. Although the two chi-square estimates are asymptotically equivalent, the
Table 5.3 Distribution of 3,092 cases by Time, Sex-marital status, and Cohort

<table>
<thead>
<tr>
<th></th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3,092</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
</tr>
<tr>
<td>1 (1968)</td>
<td>773</td>
</tr>
<tr>
<td>2 (1973)</td>
<td>773</td>
</tr>
<tr>
<td>3 (1978)</td>
<td>773</td>
</tr>
<tr>
<td>4 (1983)</td>
<td>773</td>
</tr>
<tr>
<td><strong>Sex-marital status</strong></td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>1,901</td>
</tr>
<tr>
<td>Other male households</td>
<td>164</td>
</tr>
<tr>
<td>Never-married female households</td>
<td>81</td>
</tr>
<tr>
<td>Widowed female households</td>
<td>808</td>
</tr>
<tr>
<td>Separated/divorced female households</td>
<td>138</td>
</tr>
<tr>
<td><strong>Cohort</strong></td>
<td></td>
</tr>
<tr>
<td>1 (47-51 years old in 1968)</td>
<td>756</td>
</tr>
<tr>
<td>2 (52-56 years old in 1968)</td>
<td>684</td>
</tr>
<tr>
<td>3 (57-61 years old in 1968)</td>
<td>680</td>
</tr>
<tr>
<td>4 (62-66 years old in 1968)</td>
<td>472</td>
</tr>
<tr>
<td>5 (67-71 years old in 1968)</td>
<td>300</td>
</tr>
<tr>
<td>6 (72-76 years old in 1968)</td>
<td>136</td>
</tr>
<tr>
<td>7 (77+ years old in 1968)</td>
<td>64</td>
</tr>
</tbody>
</table>
Table 5.4  Distribution of 574 cases by Sex-marital-status, Age, Private pension, Education, and Length of full time work experience

<table>
<thead>
<tr>
<th></th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>574</td>
</tr>
<tr>
<td>Sex-marital-status:</td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>284</td>
</tr>
<tr>
<td>Nonmarried female households</td>
<td>290</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
</tr>
<tr>
<td>-74 years</td>
<td>353</td>
</tr>
<tr>
<td>75+ years</td>
<td>221</td>
</tr>
<tr>
<td>Private pension: Yes</td>
<td>277</td>
</tr>
<tr>
<td>No</td>
<td>297</td>
</tr>
<tr>
<td>Education: 12+ years</td>
<td>284</td>
</tr>
<tr>
<td>0-11 years</td>
<td>290</td>
</tr>
<tr>
<td>Length of full-time work experience:</td>
<td></td>
</tr>
<tr>
<td>36+ years</td>
<td>292</td>
</tr>
<tr>
<td>0-35 years</td>
<td>282</td>
</tr>
</tbody>
</table>
behavior of likelihood ratio chi-square in large sparse multinomial structures requires serious attention (Fienberg, 1980). When assessing the goodness-of-fit, the adverse effects of small expected frequencies on the chi-squared approximation are generally less severe for the Pearson statistic than for the likelihood ratio statistic (Koehler, 1986). When comparing the fit of log-linear models for large sparse contingency tables, however, both of the chi-square estimates can be used with the usual chi-square reference distributions (Haberman, 1977). Since the main concern of this study is comparing logit models which differ by parameters, the likelihood ratio chi-square will be given more attention in the findings chapter.
CHAPTER 6. FINDINGS

Changes in the Ratio of Income to Needs

Table 6.1 presents ratios of income to needs at four points of time. Since they are adjusted for inflation, they are comparable to one another. The income/needs for the total sample increases from 1968 to 1973 and decreases after 1973. This trend over time is similar for both males and females, an increase at first then a decrease. This curvilinear trend may be due to the fact that the sample includes quite a few relatively young respondents. The youngest reach age 62 in 1983, at which age people may choose to retire with reduced social security benefits. Their income is very likely to keep increasing through the 15 year time span, which may result in an increasing income to needs ratio.

Households with female heads have lower income/needs than male households at all four points. Note that the number of male households decreases over time, while that of female households increases. This is because a surviving female spouse becomes a head of the household after a male head deceases. The number of households headed by females almost doubled in 15 years.

When each sex is broken down by marital status, it is
Table 6.1 Ratio of income to needs, 1968-1983\(^a\)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3.74 (773)</td>
<td>4.08 (773)</td>
<td>3.91 (773)</td>
<td>3.49 (773)</td>
</tr>
<tr>
<td>Male</td>
<td>4.02 (594)</td>
<td>4.53 (541)</td>
<td>4.56 (483)</td>
<td>4.15 (428)</td>
</tr>
<tr>
<td>Female</td>
<td>2.84 (179)</td>
<td>3.04 (232)</td>
<td>2.82 (290)</td>
<td>2.67 (345)</td>
</tr>
</tbody>
</table>

**Male: Marital Status**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MAR</td>
<td>3.97 (565)</td>
<td>4.53 (506)</td>
<td>4.65 (440)</td>
<td>4.28 (371)</td>
</tr>
<tr>
<td>NEV</td>
<td>5.16 (12)</td>
<td>4.65 (15)</td>
<td>4.26 (12)</td>
<td>4.54 (12)</td>
</tr>
<tr>
<td>WID</td>
<td>6.98 (6)</td>
<td>4.06 (13)</td>
<td>2.91 (22)</td>
<td>4.54 (31)</td>
</tr>
<tr>
<td>DIV</td>
<td>3.90 (9)</td>
<td>8.04 (3)</td>
<td>5.25 (6)</td>
<td>3.81 (9)</td>
</tr>
<tr>
<td>SEP</td>
<td>1.81 (2)</td>
<td>2.78 (4)</td>
<td>2.45 (3)</td>
<td>1.43 (5)</td>
</tr>
</tbody>
</table>

**Female: Marital Status**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MAR</td>
<td>2.50 (6)</td>
<td>3.43 (5)</td>
<td>1.88 (5)</td>
<td>2.26 (3)</td>
</tr>
<tr>
<td>NEV</td>
<td>3.71 (19)</td>
<td>4.09 (20)</td>
<td>4.13 (21)</td>
<td>3.65 (21)</td>
</tr>
<tr>
<td>WID</td>
<td>2.76 (122)</td>
<td>2.85 (176)</td>
<td>2.69 (228)</td>
<td>2.65 (282)</td>
</tr>
<tr>
<td>DIV</td>
<td>3.03 (27)</td>
<td>3.40 (28)</td>
<td>2.87 (32)</td>
<td>2.27 (37)</td>
</tr>
<tr>
<td>SEP</td>
<td>1.20 (5)</td>
<td>3.36 (3)</td>
<td>4.11 (4)</td>
<td>3.34 (2)</td>
</tr>
</tbody>
</table>

\(^a\)Increases in the number of never-married may reflect changes in household heads.

\(^b\)MAR: married; NEV: never-married; WID: widowed; DIV: divorced; SEP: separated.
Table 6.1 (continued)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male: Cohort</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3.75 (153)</td>
<td>4.70 (150)</td>
<td>5.51 (142)</td>
<td>5.12 (137)</td>
</tr>
<tr>
<td>2</td>
<td>4.05 (133)</td>
<td>5.24 (123)</td>
<td>4.83 (117)</td>
<td>4.09 (107)</td>
</tr>
<tr>
<td>3</td>
<td>4.81 (125)</td>
<td>4.98 (112)</td>
<td>4.14 ( 96)</td>
<td>3.33 ( 82)</td>
</tr>
<tr>
<td>4</td>
<td>4.64 ( 9)</td>
<td>3.79 ( 79)</td>
<td>3.53 ( 71)</td>
<td>3.74 ( 62)</td>
</tr>
<tr>
<td>5</td>
<td>2.88 ( 60)</td>
<td>3.04 ( 55)</td>
<td>3.62 ( 43)</td>
<td>2.65 ( 31)</td>
</tr>
<tr>
<td>6</td>
<td>2.74 ( 22)</td>
<td>3.53 ( 17)</td>
<td>3.29 ( 13)</td>
<td>5.25 ( 9)</td>
</tr>
<tr>
<td>7</td>
<td>2.38 ( 12)</td>
<td>3.00 ( 5)</td>
<td>6.12 ( 1)</td>
<td>- ( 0)</td>
</tr>
<tr>
<td>Female: Cohort&lt;sup&gt;C&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2.86 ( 36)</td>
<td>3.28 ( 39)</td>
<td>3.43 ( 47)</td>
<td>3.19 ( 52)</td>
</tr>
<tr>
<td>2</td>
<td>2.77 ( 38)</td>
<td>3.30 ( 48)</td>
<td>2.84 ( 54)</td>
<td>2.41 ( 64)</td>
</tr>
<tr>
<td>3</td>
<td>3.00 ( 45)</td>
<td>3.16 ( 58)</td>
<td>3.08 ( 74)</td>
<td>2.98 ( 88)</td>
</tr>
<tr>
<td>4</td>
<td>2.72 ( 29)</td>
<td>2.65 ( 39)</td>
<td>2.52 ( 47)</td>
<td>2.52 ( 56)</td>
</tr>
<tr>
<td>5</td>
<td>3.84 ( 15)</td>
<td>3.85 ( 29)</td>
<td>2.93 ( 32)</td>
<td>2.86 ( 44)</td>
</tr>
<tr>
<td>6</td>
<td>2.14 ( 12)</td>
<td>1.90 ( 17)</td>
<td>1.57 ( 21)</td>
<td>1.50 ( 25)</td>
</tr>
<tr>
<td>7</td>
<td>1.10 ( 4)</td>
<td>2.09 ( 11)</td>
<td>2.04 ( 15)</td>
<td>2.17 ( 16)</td>
</tr>
</tbody>
</table>

<sup>C</sup>See Table 5.2 for actual age ranges of each cohort for each time period.
not surprising that the majority of male households fall into the married category and the majority of female households into the widowed category. In the instance of male households, other marital status categories than married have so few cases that it does not seem very useful to make comparisons among different marital status groups. Separated male households look noticeably worse off than others at all points of time and widowed male households at two later points. These findings, however, cannot be extended to other population groups due to very small sample sizes. Widowhood becomes an increasingly dominant marital status of female households over time, with 82% of female households headed by widows in 1983. Never-married females are relatively well off compared to other females, but not as well off as married male households in terms of income to needs ratio.

Each sex is also broken down by age cohort. The sample is collapsed into seven age cohorts on the basis of age of household head in 1968. The income/needs ratio tends to be lower for older age cohorts than for younger cohorts and lower for female households than for male households. Note that females are relatively evenly distributed into seven age cohorts while the distribution of male households are very skewed. Males die, and surviving female spouse still has a long life to live after her husband's death. People
in the oldest age cohort in 1983 are the oldest-old, those over age 92. About 40% of the female sample were 77 years or older in 1983, while only 24% of males were 77 years or older.

In sum, elderly households with female heads, nonmarried households, and older households are disadvantaged in terms of income to needs ratio. From Table 6.1, it does not seem that income/needs ratio erodes over time for this panel of 773 households. Income/needs ratio looks fairly stable over time. It increases for some age cohorts and decreases for others over time. Overall, no clear-cut change in income/needs is seen from the data presented.

Table 6.1 does not tell much about how changes in marital status affect income/needs ratio. Married elderly households for a given year in Table 6.1 include those which remain in that status through 15 years and also those whose marriage ends with the spouse's death. Similarly, the widowed category includes those who were married in the previous year and those who were already widowed.

Table 6.2 reports income/needs ratio at four points of time for the households remained married for 15 years, and eventually widowed households. These eventually widowed households are disaggregated by year of widowhood. Of 155 eventually widowed households, 42 became widowed between
1968 and 1972, 62 between 1973 and 1977, and 51 between 1978 and 1982. Those households widowed in 1983 are excluded from the analysis because income reported in 1983 is the income earned in 1982. Table 6.2 reveals the effects of the transition from marriage to widowhood on the ratio of income to needs.

Intact married households have higher income/needs ratio than eventually widowed households at all four points. When 155 eventually widowed households are disaggregated by year of widowhood, all three categories show a decline in the ratio of income to needs with widowhood. Although the decline is not very large for those widowed between 1968 and 1972, the decline is relatively large considering that income/needs of the total sample increased from 1968 to 1973 as shown in Table 6.1. The households widowed between 1978 and 1982 show quite a large decline in income/needs with widowhood.

Although income/needs ratios for eventually widowed households are much lower than for intact married households, changes in income/needs associated with widowhood are not as large as expected. This result may be due to the length of time between the observation years. Reporting changes in poverty rates among the elderly over ten years at two-year intervals, Holden et al. (1986) find that the economic situation of widowed shows recovery after
Table 6.2 Ratio of income to needs of intact married households and eventually widowed households, 1968-1983

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>4.42</td>
<td>3.16</td>
<td>2.61</td>
<td>2.97</td>
<td>3.84</td>
</tr>
<tr>
<td>1973</td>
<td>4.93</td>
<td>3.12</td>
<td>2.44*</td>
<td>2.89</td>
<td>3.97</td>
</tr>
<tr>
<td>1978</td>
<td>4.78</td>
<td>2.94</td>
<td>2.40</td>
<td>2.75*</td>
<td>3.60</td>
</tr>
<tr>
<td>1983</td>
<td>4.26</td>
<td>2.64</td>
<td>2.17</td>
<td>2.77</td>
<td>2.86*</td>
</tr>
</tbody>
</table>

| N | 322 | 155 | 42  | 62  | 51    |

*Starred year marks ratio of income to needs for the first reported survey year.

A sharp decline associated with widowhood. The five-year intervals used in Table 6.2 may be too long to catch the real decline with widowhood given the evidence reported by Holden et al. (1986).

Changes in Poverty Rates

Table 6.3 reports distribution of income/needs by sex of household head for four time periods. Not surprisingly, female households are disadvantaged in terms of income/needs.
ratio to male households. Compared to 6.9% of poverty rate for male households in 1968, 14.0% of female households fall below the poverty level. Female households are almost twice as likely to be in poverty than male households. This relationship continues until the last point of time, 1983.

Quite a few households, especially female households, have incomes just above the official poverty line. About 10% of female households in 1968 have incomes between 100% and 125% of the official poverty threshold. This means that if the official poverty line is raised by 25%, about a quarter of female households in 1968 would be categorized as poor. If it is raised by 50%, a third of female households would be defined as being in poverty. Looking at the highest income/needs category, about three-fourths of male households have income more than twice the poverty threshold, compared to about half of female households.

Poverty rates of intact married households and eventually widowed households are presented in Table 6.4. Poverty rates among the households remained married for 15 years are much lower than those among the eventually widowed households. Compared to intact married households, eventually widowed households show higher poverty rates even when they are still married. However, changes in poverty rates associated with widowhood do not appear significant except for those first widowed between 1973 and 1977. The
results are basically the same when 125% and 150% of the official poverty level are used to define poverty. When 150% of the official poverty level is used, the poverty rate for those households first widowed between 1968 and 1972 even declines with widowhood. These findings may again be due to relatively long intervals between the survey years reported.

Table 6.3 Distribution of ratio of income to needs by sex of household head, 1968-1983

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1.00</td>
<td>6.9%</td>
<td>14.0%</td>
<td>4.3%</td>
<td>11.2%</td>
<td>5.0%</td>
<td>14.1%</td>
<td>6.5%</td>
<td>11.0%</td>
</tr>
<tr>
<td>1.00-1.25</td>
<td>2.7%</td>
<td>10.1%</td>
<td>4.1%</td>
<td>6.0%</td>
<td>3.5%</td>
<td>8.6%</td>
<td>4.4%</td>
<td>11.3%</td>
</tr>
<tr>
<td>1.25-1.50</td>
<td>5.7%</td>
<td>9.5%</td>
<td>3.3%</td>
<td>6.0%</td>
<td>5.4%</td>
<td>9.3%</td>
<td>4.7%</td>
<td>11.3%</td>
</tr>
<tr>
<td>1.50-1.75</td>
<td>3.9%</td>
<td>8.4%</td>
<td>4.6%</td>
<td>9.9%</td>
<td>4.1%</td>
<td>6.9%</td>
<td>6.5%</td>
<td>9.3%</td>
</tr>
<tr>
<td>1.75-2.00</td>
<td>5.4%</td>
<td>7.8%</td>
<td>4.8%</td>
<td>3.9%</td>
<td>4.1%</td>
<td>9.7%</td>
<td>5.6%</td>
<td>7.5%</td>
</tr>
<tr>
<td>2.00&lt;</td>
<td>75.4%</td>
<td>50.2%</td>
<td>78.9%</td>
<td>63.0%</td>
<td>77.9%</td>
<td>51.4%</td>
<td>72.3%</td>
<td>49.6%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>N</td>
<td>594</td>
<td>179</td>
<td>541</td>
<td>232</td>
<td>483</td>
<td>290</td>
<td>428</td>
<td>345</td>
</tr>
</tbody>
</table>
Table 6.4 Poverty rates of intact married households and eventually widowed household, 1968-1983

<table>
<thead>
<tr>
<th>Survey year</th>
<th>Intact married households</th>
<th>Eventually widowed households</th>
<th>First widowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% of the official poverty line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>4.66%</td>
<td>10.12% 9.52% 16.13% 5.88%</td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>3.11</td>
<td>5.95 7.14* 6.45 5.88</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>3.42</td>
<td>9.52 9.52 14.52* 5.88</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>4.04</td>
<td>7.74 7.14 11.29 5.88*</td>
<td></td>
</tr>
<tr>
<td>125% of the official poverty line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>6.21%</td>
<td>14.29% 16.67% 19.35% 9.80%</td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>5.28</td>
<td>14.29% 16.67* 17.74 11.76</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>6.21</td>
<td>16.07 19.05 20.97* 11.76</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>7.76</td>
<td>18.45 21.43 22.58 15.69*</td>
<td></td>
</tr>
<tr>
<td>150% of the official poverty line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td>9.32%</td>
<td>22.62% 33.33% 24.19% 17.65%</td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>7.76</td>
<td>18.45 21.43* 22.58 15.69</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>10.56</td>
<td>26.19 26.19 32.26* 25.49</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>11.80</td>
<td>28.57 30.95 35.48 25.49*</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>322</td>
<td>155 42 62 51</td>
<td></td>
</tr>
</tbody>
</table>

*Starred year marks poverty rate for the first reported survey year of widowhood.
Logit Analysis of the Probability of Being Below the Poverty Level

First, logit models are estimated to calculate relative odds of being in poverty across categories of four time periods, five sex-marital status categories, and seven age cohorts. A model without any interaction among three independent variables shows a good fit to the data with the likelihood ratio chi-square of 56.92 with 126 degrees of freedom (p=1.000).

Table 6.5 presents the result of this logit model. The logit coefficients are translated into multiplicative odds, with the first row of each independent variable as a reference category. This procedure makes it easier to compare the likelihood of being below the poverty line across different categories. Its significance is measured as a departure from the value 1.00. Contrary to the hypothesized direction by H2.1, elderly households are less likely to be in poverty at later points of time controlling for sex-marital status and age cohort. Using Time 1 as a reference category, the likelihood of being in poverty is .675 at Time 2, .856 at Time 3, and .769 at Time 4.

Married households are better off than any other sex-marital status category. Compared to married households, other male households are 3.037 times more
Table 6.5 Logit analysis of probability of being below the poverty level by time, sex-marital status, and seven cohorts

<table>
<thead>
<tr>
<th></th>
<th>Logit Coefficient</th>
<th>Multiplicative Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>-1.762</td>
<td>.046</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (1968)</td>
<td>.203</td>
<td>1</td>
</tr>
<tr>
<td>2 (1973)</td>
<td>-.190</td>
<td>.675</td>
</tr>
<tr>
<td>3 (1978)</td>
<td>.048</td>
<td>.856</td>
</tr>
<tr>
<td>4 (1983)</td>
<td>-.060</td>
<td>.769</td>
</tr>
<tr>
<td><strong>Sex-marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>-.889</td>
<td>1</td>
</tr>
<tr>
<td>Other male households</td>
<td>.222</td>
<td>3.037</td>
</tr>
<tr>
<td>Never-married female households</td>
<td>.158</td>
<td>2.851</td>
</tr>
<tr>
<td>Widowed female households</td>
<td>-.113</td>
<td>2.173</td>
</tr>
<tr>
<td>Separated/divorced female households</td>
<td>.623</td>
<td>4.538</td>
</tr>
<tr>
<td><strong>Cohort</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (47-51 years old in 1968)</td>
<td>-.641</td>
<td>1</td>
</tr>
<tr>
<td>2 (52-56 years old in 1968)</td>
<td>-.230</td>
<td>1.508</td>
</tr>
<tr>
<td>3 (57-61 years old in 1968)</td>
<td>-.520</td>
<td>1.128</td>
</tr>
<tr>
<td>4 (62-66 years old in 1968)</td>
<td>-.044</td>
<td>1.817</td>
</tr>
<tr>
<td>5 (67-71 years old in 1968)</td>
<td>.057</td>
<td>2.010</td>
</tr>
<tr>
<td>6 (72-76 years old in 1968)</td>
<td>.736</td>
<td>4.072</td>
</tr>
<tr>
<td>7 (77+ years old in 1968)</td>
<td>.640</td>
<td>3.598</td>
</tr>
</tbody>
</table>

Likelihood ratio chi-square: 56.92 (df=126)  p=1.000
Pearson chi-square : 101.51 (df=126)  p= .947

^Logit coefficients are effect coded with the reference category included in the data.

^Multiplicative odds are calculated by first selecting reference category for each independent variable and then taking anti-log of logit coefficients (Evers et al., 1979; Fennessey, 1968).
to be in poverty, never married female households 2.851 times, widowed female households 2.173 times, and separated/divorced female households 4.538 times. This gives support for both H1.2 and H1.3. It is surprising that widowed female households are better off than other male and never-married female households, which contradicts H1.4. This may be because widowed females are likely to be older than others, which results in their lower multiplicative odds after controlling for age cohorts. While the relationship is not perfectly linear, it clearly shows that the older age cohorts have the greater probability of being below the poverty level as hypothesized by H1.1. People in the oldest category of Cohort 7 are 3.598 times more likely to be in poverty compared to those in Cohort 1.

There exist too many cells with small expected frequencies when the sample is collapsed by dichotomous poverty status by four time periods by five sex-marital status and by seven cohorts to estimate such a logit model as presented in Table 6.5. Thus, dichotomous age cohorts are used for the subsequent analysis to avoid the adverse effects of small expected frequencies on the chi-squared approximation. Dichotomous cohort 1 includes people in cohorts 1 through 3 whose age range is 47 through 61 at Time 1 and becomes 62 through 76 at Time 4. Dichotomous cohort 2 covers all others belonging to cohorts 4 through 7.
Several logit models are estimated to test the significance of interaction terms among three independent variables. None of three-way and only one of two-way interactions are found to contribute significantly to the probability of being in poverty. Compared to the saturated model which includes all the possible interactions, a model without three-way interaction increases the likelihood ratio chi-square only by 5.91 with an increase of degrees of freedom by 12. After eliminating the three-way interaction from the model, the significance of each two-way interaction is examined. First, a logit model which does not include an interaction between time and cohort is estimated. This model provides a likelihood ratio chi-square of 6.78 with 15 degrees of freedom. Thus, the interaction between time and cohort increases the likelihood ratio chi-square only by 0.84 with an increase of degrees of freedom by three, comparing to a model with all three two-way interactions.

In the instance of a logit model without an interaction between time and sex-marital status, a likelihood ratio chi-square is 12.23 with 24 degrees of freedom. The increase in the chi-square by this interaction is only 6.29 with accompanying increase in the degrees of freedom of 12.

Although the above two two-way interactions are not significant, an interaction between sex-marital status and cohort is found significant in accounting for the
probability of poverty incidence in old age. The interaction term increases the likelihood ratio chi-square by 9.88 with an increase of degrees of freedom by four, comparing to a model with all three two-way interactions but three-way interaction. This 9.88 increase is significant at p=.05. However, a logit model without any interaction provides a good fit with a likelihood ratio chi-square of 22.60 with 31 degrees of freedom (p=.863). This more parsimonious model is presented in Table 6.6.

Insignificant interaction terms indicate that the pattern of change in the poverty incidence over time is the same for different sex-marital status households, and also the same for young-old and old-old households. The results are contrary to the hypotheses 2.2, 2.3, and 2.4. There is no evidence to indicate a higher rate of increase in the probability of being in poverty over time for older, female, and nonmarried households compared to their counterparts. The effect of age cohorts on poverty is, however, dissimilar to each other for five categories of sex-marital-status.

The results for the unsaturated logit model without interaction terms are presented in Table 6.6. The probability of falling below the poverty level does not increase over time for this panel controlling for sex-marital status and cohort. Rather, it decreases at first and shows an increase later, but it does not increase
Table 6.6 Logit analysis of probability of being below the poverty level by time, sex-marital status, and dichotomous cohort

<table>
<thead>
<tr>
<th></th>
<th>Logit Coefficient</th>
<th>Multiplicative Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.045</td>
<td>.055</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (1968)</td>
<td>.215</td>
<td>1</td>
</tr>
<tr>
<td>2 (1973)</td>
<td>-.193</td>
<td>.665</td>
</tr>
<tr>
<td>3 (1978)</td>
<td>.020</td>
<td>.823</td>
</tr>
<tr>
<td>4 (1983)</td>
<td>-.042</td>
<td>.773</td>
</tr>
<tr>
<td><strong>Sex-marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>-.785</td>
<td>1</td>
</tr>
<tr>
<td>Other male households</td>
<td>.236</td>
<td>2.775</td>
</tr>
<tr>
<td>Never-married female households</td>
<td>-.077</td>
<td>2.028</td>
</tr>
<tr>
<td>Widowed female households</td>
<td>.070</td>
<td>2.350</td>
</tr>
<tr>
<td>Separated/divorced female households</td>
<td>.556</td>
<td>3.821</td>
</tr>
<tr>
<td><strong>Cohort</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (47-61 years old in 1968)</td>
<td>-.289</td>
<td>1</td>
</tr>
<tr>
<td>2 (62+ years old in 1968)</td>
<td>.289</td>
<td>1.783</td>
</tr>
</tbody>
</table>

Likelihood ratio chi-square: 22.60 (df=31)  p= .863
Pearson chi-square: 28.65 (df=31)  p= .588
to the level of Time 1. Compared to the poverty situation in 1968, the sample households are better off at later periods in terms of incidence of poverty. The hypothesized relationship between time and poverty by H2.1, an increase in the probability of being in poverty over time, is not upheld by the data.

As expected, married households have the lowest probability of being in poverty among five sex-marital status categories. Translated into multiplicative odds with the married as a reference category, other male households are 2.775 times more likely to be in poverty, never married female households 2.02 times, widowed female households 2.350 times, and separated/divorced female households 3.821 times. Never married female households are relatively better-off than other female categories, probably reflecting their longer and more continuous work experiences. Other male households are worse off than never-married female and widowed female households. Households in the older cohort are 1.783 times more likely to be in poverty than those in the younger cohort.

Referring to the hypotheses stated in Chapter 4, hypotheses 1.1 through 1.4 are supported. Older, female, and nonmarried households show a higher probability of being in poverty than younger, male, and married households, respectively. Among female households, the highest
probability of being in poverty is found for separated/divorced, next highest for widowed, and the lowest for never-married. With seven age cohorts (Table 6.5), never-married female households are more likely to be in poverty than widowed female households, while the relationship between the two is reversed in Table 6.6 with dichotomous age cohort. This may be related to the fact that widowed are likely to be overrepresented in older age groups.

The same logit model is estimated using 125% and 150% of the U.S. official poverty level as a threshold. The results are reported in Tables 6.7 and 6.8. An unsaturated model without interaction terms among three independent variables shows acceptable fit for both poverty measures. A likelihood ratio chi-square is 20.75 with 31 degrees of freedom (p=.918) for the model using 125% of the official poverty line, and 24.43 with 31 degrees of freedom (p=.793) when 150% of the poverty level is used. None of the interactions including one between sex-marital status and cohort is found significant for these two models. The pattern of change in the poverty incidence over time does not differ for different age, sex, and marital status households. The results of logit models again do not give support for the hypotheses 2.2, 2.3, 2.4.

The pattern of effects by the independent variables on
Table 6.7 Logit analysis of probability of being below 125% of the poverty level by time, sex-marital status, and dichotomous cohort

<table>
<thead>
<tr>
<th></th>
<th>Logit Coefficient</th>
<th>Multiplicative Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>-1.541</td>
<td>.088</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (1968)</td>
<td>.110</td>
<td>1</td>
</tr>
<tr>
<td>2 (1973)</td>
<td>-.179</td>
<td>.749</td>
</tr>
<tr>
<td>3 (1978)</td>
<td>-.008</td>
<td>.889</td>
</tr>
<tr>
<td>4 (1983)</td>
<td>.077</td>
<td>.967</td>
</tr>
<tr>
<td><strong>Sex-marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>-.738</td>
<td>1</td>
</tr>
<tr>
<td>Other male households</td>
<td>.157</td>
<td>2.448</td>
</tr>
<tr>
<td>Never-married female households</td>
<td>-.291</td>
<td>1.563</td>
</tr>
<tr>
<td>Widowed female households</td>
<td>.284</td>
<td>2.779</td>
</tr>
<tr>
<td>Separated/divorced female households</td>
<td>.588</td>
<td>3.765</td>
</tr>
<tr>
<td><strong>Cohort</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (47-61 years old in 1968)</td>
<td>-.261</td>
<td>1</td>
</tr>
<tr>
<td>2 (62+ years old in 1968)</td>
<td>.261</td>
<td>1.686</td>
</tr>
</tbody>
</table>

Likelihood ratio chi-square: 20.75 (df=31)  p = .918
Pearson chi-square : 23.16 (df=31)  p = .843
Table 6.8 Logit analysis of probability of being below 150% of the poverty level by time, sex-marital status, and dichotomous cohort

<table>
<thead>
<tr>
<th></th>
<th>Logit Coefficient</th>
<th>Multiplicative Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.074</td>
<td>.142</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (1968)</td>
<td>.143</td>
<td>1</td>
</tr>
<tr>
<td>2 (1973)</td>
<td>-.276</td>
<td>.658</td>
</tr>
<tr>
<td>3 (1978)</td>
<td>-.024</td>
<td>.888</td>
</tr>
<tr>
<td><strong>Sex-marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>-.721</td>
<td>1</td>
</tr>
<tr>
<td>Other male households</td>
<td>.124</td>
<td>2.328</td>
</tr>
<tr>
<td>Never-married female households</td>
<td>.445</td>
<td>1.318</td>
</tr>
<tr>
<td>Widowed female households</td>
<td>.309</td>
<td>2.800</td>
</tr>
<tr>
<td>Separated/divorced female households</td>
<td>.733</td>
<td>4.278</td>
</tr>
<tr>
<td><strong>Cohort</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (47-61 years old in 1968)</td>
<td>-.300</td>
<td>1</td>
</tr>
<tr>
<td>2 (62+ years old in 1968)</td>
<td>.300</td>
<td>1.821</td>
</tr>
</tbody>
</table>

Likelihood ratio chi-square: 24.43 (df=31) p= .793
Pearson chi-square : 31.77 (df=31) p= .428
poverty incidence is similar to the one obtained by the logit model using 100% of poverty level, which is presented in Table 6.6. The probability of being below 125% and 150% of the poverty level is lower at later points of time than the initial year of 1968, which again rejects H2.1. The probability of being in poverty is higher for nonmarried households than for married, and higher for older cohort than for younger cohort, supporting H1.1, H1.2, and H1.3. Among female headed households, never-married households are the least likely to be in poverty, widowed are the next least, and separated/divorced are most likely to be in poverty, supporting H1.4.

Although the probability of being below 125% and 150% of poverty level is lower at later time periods, multiplicative odds at Time 4 are very close to 1.0, which is higher than .773 at Time 4 in Table 6.6. This indicates that the poverty rate would not have been lowered as much as the official statistics shows for this panel of elderly households, if the poverty threshold is raised only by 25%.

The level of multiplicative odds for never-married female households in Tables 6.7 and 6.8 is lower than that in Table 6.6. However, the multiplicative odds for widowed female households are larger in Table 6.7 and 6.8 than in Table 6.6. This indicates that the difference in poverty rate between never-married and widowed female households
would become larger if the official poverty level is raised either by 25% or by 50%. The only difference in the pattern from the results shown in Table 6.6 is that widowed female households are worse off than other male households.

The constant term, of course, varies when different poverty measures are used to estimate a logit model, because the probability of poverty incidence varies by different poverty measures. Tables 6.6 through 6.8 provide different constant values but basically similar pattern and values of multiplicative odds for three independent variables. The results, thus, imply that time, sex-marital status, and cohort have similar effects on poverty incidence even when three different levels of poverty measure are used.

Effects of Human Capital Investments on Poverty: A Logit Analysis

Effects of human capital investments on the incidence of poverty in old age are analyzed using a logit model with the natural log of the odds of having money income below the poverty line as a dependent variable. Along with dichotomous variables of sex-marital status and age, three dichotomous variables of education, full-time work experience, and private pension are included in the model. Data from the white households with retired heads in 1983 are utilized for this part of the analysis. An acceptable
likelihood ratio chi-square of 7.72 (df=26, p=1.000) is obtained by an unsaturated logit model without any interaction among the five independent variables.

The results are presented in Table 6.9. Compared to Table 6.6, sex-marital status and age are not as significant in accounting for the incidence of poverty among the elderly households. When the variables measuring human capital investments are introduced into the analysis, sex-marital status and age lose their salience. Nonmarried female households are only 1.246 times more likely to be in poverty than married households, and older households are less likely to be in poverty than younger ones. Age per se does not appear to be a significant factor in explaining the poverty incidence in old age. This implies that old-old are economically inferior to young-old largely due to cohort effect rather than age effect.

The effects of human capital investments on the poverty incidence are quite significant. The households without private pension are 3.165 times more likely to be in poverty than those with pensions, supporting H3.3. The results are also consistent with the hypothesis in regard with the relationship between education and poverty (H3.1). The households headed by persons without a high school diploma are 4.914 times more likely to be in poverty compared to those headed by persons with more education. The households
Table 6.9 Logit analysis of probability of being below the poverty level by sex-marital status, age, private pension, education, and length of full-time work experience

<table>
<thead>
<tr>
<th></th>
<th>Logit Coefficient</th>
<th>Multiplicative Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-2.862</td>
<td>0.010</td>
</tr>
<tr>
<td>Sex-marital-status:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>-0.110</td>
<td>1</td>
</tr>
<tr>
<td>Nonmarried female households</td>
<td>0.110</td>
<td>1.246</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-74 years</td>
<td>0.024</td>
<td>1</td>
</tr>
<tr>
<td>75+ years</td>
<td>-0.024</td>
<td>0.953</td>
</tr>
<tr>
<td>Private pension:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-0.576</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>0.576</td>
<td>3.165</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12+ years</td>
<td>-0.796</td>
<td>1</td>
</tr>
<tr>
<td>0-11 years</td>
<td>0.796</td>
<td>4.914</td>
</tr>
<tr>
<td>Length of full-time work experience:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36+ years</td>
<td>-0.290</td>
<td>1</td>
</tr>
<tr>
<td>0-35 years</td>
<td>0.290</td>
<td>1.786</td>
</tr>
</tbody>
</table>

Likelihood ratio chi-square: 7.72 (df=26) p=1.000
Pearson chi-square: 18.44 (df=26) p= .859
headed by persons with shorter full-time work experience are 1.786 times more likely to be in poverty than those headed by persons with longer work experience. Although the direction of the effects is the same as hypothesized in H3.2, the effects of the length of the full-time work experience are less significant than private pensions and education. These findings indicate that the length of work experience is not as significant as the context of work in which workers are located in explaining the poverty situation in old age.

The above findings, however, should be interpreted with caution. The amount of social security benefits widows receive as a survivor may not be a reflection of their human capital investments which are used for the analysis. For this cohort of elderly, it is safe to assume that most widows receive social security benefits calculated based on their deceased husbands' work histories. The variables measuring human capital stock used for the analysis are widows', but not their deceased husbands'. This may be the reason that unmarried female households are not much worse off than married households controlling for their human capital investments. The significance of the length of full-time work years may be underestimated also due to this factor. It should be noted that the category of nonmarried female households includes never-married women who are
relatively well-off.

Tables 6.10 and 6.11 present the results of logit models when 125% and 150% of the official poverty level are used as a threshold. In both cases, an unsaturated model without any interaction provides acceptable goodness-of-fit. The direction of effects by the independent variables remains the same as the one in Table 6.9. Sex-marital status, however, becomes increasingly more significant. With 125% of the poverty level, nonmarried female households are 1.958 times more likely to be in poverty than married households. The multiplicative odds increase to 2.784 when 150% of the poverty level is used as a dependent variable. This implies that many more unmarried elderly women, compared to married elderly, live with incomes just above the official poverty threshold.

In sum, human capital investments are found to be more significant than the demographic variables in explaining incidence of poverty in old age. Although the difference between old-old and young-old disappears when human capital investments are controlled, the difference between nonmarried female households and married male households still remains. This difference increases with increasing level of poverty threshold. What causes this remaining male-female difference in the poverty incidence cannot be directly investigated from the data analysis presented.
Table 6.10  Logit analysis of probability of being below 
125\% of the poverty level by sex-marital status, 
age, private pension, education, and length of 
full-time work experience

<table>
<thead>
<tr>
<th></th>
<th>Logit Coefficient</th>
<th>Multiplicative Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.988</td>
<td>.023</td>
</tr>
<tr>
<td>Sex-marital status:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married households</td>
<td>-.336</td>
<td>1</td>
</tr>
<tr>
<td>Nonmarried female households</td>
<td>.336</td>
<td>1.958</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>74 years</td>
<td>.052</td>
<td>1</td>
</tr>
<tr>
<td>75+ years</td>
<td>-.052</td>
<td>.901</td>
</tr>
<tr>
<td>Private pension:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-.568</td>
<td>1</td>
</tr>
<tr>
<td>No</td>
<td>.568</td>
<td>3.114</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12+ years</td>
<td>-.680</td>
<td>1</td>
</tr>
<tr>
<td>0-11 years</td>
<td>.680</td>
<td>3.864</td>
</tr>
<tr>
<td>Length of full-time work experience:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36+ years</td>
<td>-.234</td>
<td>1</td>
</tr>
<tr>
<td>0-35 years</td>
<td>.234</td>
<td>1.597</td>
</tr>
</tbody>
</table>

Likelihood ratio chi-square: 7.18 (df=26)  p=1.000
Pearson chi-square : 14.67 (df=26)  p= .963
Table 6.11 Logit analysis of probability of being below 150% of the poverty level by sex-marital status, age, private pension, education, and length of full-time work experience

<table>
<thead>
<tr>
<th>Logit Coefficient</th>
<th>Multiplicative Odds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.372</td>
</tr>
</tbody>
</table>

**Sex-marital status:**
- Married households: -.512 1
- Nonmarried female households: .512 2.784

**Age:**
- 74 years: .008 1
- 75+ years: -.008 .984

**Private pension:**
- Yes: -.456 1
- No: .456 2.489

**Education:**
- 12+ years: -.750 1
- 0-11 years: .750 4.482

**Length of full-time work experience:**
- 36+ years: -.178 1
- 0-35 years: .178 1.428

Likelihood ratio chi-square: 19.27 (df=25) p = .825
Pearson chi-square: 29.17 (df=26) p = .304
presented. However, it is plausible to believe that labor market factors would be partially responsible for this remaining difference as well as other factors. Significant effects of private pensions and relatively less significant effects of full-time work experience also indicate that some labor market factors are likely to create unequal resources for dealing with retirement and old age.
CHAPTER 7. SUMMARY AND DISCUSSION

This chapter provides a summary of the empirical findings presented in Chapter 6, implications of the results, and suggestions for further research. First, the results of the descriptive analysis and the logit models on the incidence of poverty among the aged will be reviewed. Then, implications of the findings for the research problem will be drawn. The findings will be discussed in relation to the theoretical perspectives and also to the economic situation of the future elderly. Finally, the limitations of the study and suggestions for a more comprehensive approach to the research problem will be discussed.

Results of the Data Analysis

The purpose of this study was to examine the incidence of poverty among elderly households, especially focusing on the difference between male and female headed households. In an initial descriptive analysis, both ratios of income to needs and poverty rates differed by sex, marital status, and age of household heads. Elderly households with female heads, nonmarried households, and older households were economically disadvantaged compared to their counterparts. The majority of nonmarried and older households were female
households, probably due to the longevity difference by sex.

The effects of change in marital status from married to widowed on the economic well-being of the elderly households were examined by comparing those households which stayed married for 15 years with eventually widowed households. Marital status change did not appear to have significant effects on ratios of income to needs and poverty rates. Five-year intervals between two reported survey years were probably too long to catch the change associated with widowhood. Interestingly, however, eventually widowed households were economically inferior to intact married households even before the widowhood. It is usually found that the longevity is positively related to socioeconomic status. This positive relationship could be the reason for the inferior economic situation of the eventually widowed households even before widowhood, because it is known that those with high socioeconomic status live longer.

Contrary to the hypothesis, the economic situation of the elderly did not erode over time as the elderly in the sample became older. Rather, measured by the ratios of income to needs and poverty rates, it was basically stable with a little fluctuation. Even among older cohorts of elderly, the ratios of income to needs did not change greatly over time, although their income/needs ratios were lower than those of younger elderly at all four time
periods.

In the second part of the analysis, logit models were estimated with the natural log of the odds of being below the poverty line as a dependent variable. When the three independent variables of time, sex-marital status, and cohort were included in the logit model, sex-marital status and cohort affected the probability of being in poverty significantly, but not time. Only one of the interactions among the three independent variables was found significant. The pattern of over-time change in the incidence of poverty was the same for different sex-marital status households and also the same for young-old and old-old households. However, the effect of age cohorts on poverty was not the same for five categories of sex-marital status.

Despite the significant interaction between cohort and sex-marital status, the unsaturated logit model without any interaction still showed a very good chi-square fit to the data. Thus, the pattern of change in the poverty incidence over time was the same for different sex-marital status households and for both young-old and old-old households. Contrary to the hypotheses, older, female, and nonmarried households did not experience any different pattern of over-time change in the probability of being in poverty compared to younger, male, and married households, respectively.
Married households were better off than nonmarried controlling for time and cohort. Among female-headed households, never-married households had the lowest probability of being in poverty, widowed the second lowest, and divorced/separated the highest. However, the difference between never-married and widowed female households was not as large as expected when the official poverty line was used as a poverty threshold.

Compared to older households, younger households had lower probability of being in poverty controlling for time and sex-marital status. Effects of time on the incidence of poverty were not statistically significant. The results were basically the same when the different levels of poverty threshold were used for the analysis.

The fact that the sample included relatively young households whose heads reached age 62 at the last time period might have affected the change in the probability of being in poverty over time. Those young households were likely either to keep or increase their income levels over the 15-year time span, which might have resulted in the declining probability of poverty incidence over time controlling for sex-marital status and cohort.

To examine the effects of human capital investments on the probability of having money income below the poverty line, logit models were estimated using the data from a
sample of white elderly households headed by a retired person in 1983. The three dichotomous variables of private pension, education, and the length of full-time work years were included in the model along with sex-marital status and age of household heads.

Sex-marital status and age were not as significant when the variables of human capital investments were introduced. Controlling for the human capital variables, the old-old were even slightly better off than young-old in terms of the poverty incidence. Although not significant, the difference between married male households and nonmarried female households still remained after controlling for human capital investments. This difference increased when the level of poverty threshold was increased.

The insignificant effects of sex-marital status and age might be related to the human capital variables used in the analysis. Human capital variables used for the analysis were widows' and not those of the deceased husbands'. For this cohort of elderly, however, social security benefits that widows received were more likely to be based on their deceased husbands' work experience. No measure of deceased husband's work experience was included in the logit models.

The households without private pensions showed a higher probability of being in poverty than those with private pensions. The households headed by persons without a high
school diploma were more likely to be in poverty than those headed by persons with more education. The length of full-time work years was not as significant as the other two human capital variables. The context of work in which the elderly had been located before retirement seemed to be more significant than the length of work experience in accounting for the poverty situation in old age.

When human capital variables were not controlled, economic situation of old-old was inferior to that of young-old. However, the effects of age on poverty were insignificant after controlling for human capital variables. The findings indicate that the inferior economic situation of old-old, in comparison with young-old, is likely to be the result of a cohort effect rather than an age effect. Compared to the younger elderly, the old-old are economically disadvantaged because they have less economic resources from the beginning, not because their economic situation erodes over time. They are less likely to have higher education and also less likely to have income from private pensions. Because of the general rise of wage level over time, the old-old are likely to have lower lifetime earnings which is the base used to calculate social security benefits.
Implications of Results

This study attempted to shed light on the internal diversity among the elderly in terms of economic situation. Despite the overall improvement in the economic status of the elderly, subgroups of the elderly still suffer from severe economic hardships. Although the poverty rate among the white elderly households in the sample was not very high, the economic status of the sample households were rather diverse depending on sex, marital status, and age of their heads. As Crystal (1986) suggests, an important issue now is not an inequality between the elderly and the nonelderly, but an inequality among the elderly.

Contrary to the hypothesis, the results did not indicate over-time erosion in the elderly's economic well-being as they became older. In addition, the pattern of change over time for older elderly was not different from that of younger elderly. Consequently, the inferior economic situation of old-old did not appear to be related to aging process itself. This longitudinal study revealed that the difference in the economic well-being between older and younger elderly is largely due to a cohort effect rather than an aging effect.

Additional support for the significance of cohort effects over those attributed to aging on the poverty
incidence was provided by the result that age lost its significance when human capital variables were controlled. It is not age but human capital investments which caused the difference between young-old and old-old. This result does not totally reject Atkins' (1985) argument that aging itself causes some erosion in income. Because aging process certainly creates widows, and their economic situation was found inferior to the married in this study. Social security, a major source of income for the elderly, is constructed in such a way to be reduced after widowhood. However, cohort effect seems to have much more significant effects on the income difference between older and younger elderly.

Although there was a substantial difference in the poverty incidence between elderly male and female households, feminization of poverty in old age was not evidenced in the data analysis. The economic situation of female elderly did not deteriorate over time. No difference was found in the pattern of change over time between male and female households. Although the economic situation of female households remained inferior to that of married male households, the difference between these two did not increase as the elderly became older. Consequently, poverty was not feminized among the elderly households in the sample.
Two major theories of income differentials --- human capital and dual labor market theories --- were extended to account for the income differentials among the elderly. Human capital investments were found very significant in accounting for the poverty incidence in old age. Among the three human capital variables utilized for the analysis, education and private pension were quite significant, but the length of full-time work experience was not as significant as the other two.

Although the magnitude of labor market effects could not be separated in this study, labor market segmentation, as well as human capital investments, seemed to have some effects on the economic situation of the elderly. After controlling for human capital investments, age lost its significance in explaining the poverty incidence among the elderly, but differences by sex and marital status still remained. Male-female differences increased when the level of poverty threshold was increased. As suggested by Chiplin (1979) and also by Kalleberg and Sorensen (1979), it is problematic to interpret the remaining difference as an indicator of sex discrimination in the workplace alone. However, human capital variables alone were not enough to explain the difference. Human capital investment variables reduced the male-female difference in the poverty incidence in old age, but they did not eliminate it. It would not be
unreasonable to speculate that labor market factors are partially responsible for this difference.

In comparison with the length of full-time work experience, effects of education and private pensions on the poverty incidence were much more significant. This difference in the significance could be suggesting the effects of labor market segmentation on the elderly's economic well-being. Both education and the length of work experience could be considered as solely representing human capital investments. However, private pensions should rather be considered as a combination of human capital investment and labor market segmentation, as evidenced by O'Rand and MacLean (1986). Paralleling the findings by O'Rand and Landerman (1984), advantageous locations in the occupational structure appeared to have great influences on retirement income.

This study provided results consistent with both the human capital and dual labor market theories in accounting for the poverty incidence in old age. Even though the retired elderly are not currently in the labor market, their retirement income surely reflects their whole working life. As suggested by Granovetter (1981), Jacobs (1985), and England and Farkas (1986), the two perspectives should be combined to better understand income differentials.

The results may be seen as indicating a better picture
for the future elderly who are more prepared for retirement in terms of human capital stock. It is true that the future elderly in general will have more human capital investments than the current elderly. However, it is not true for every individual. For example, a larger proportion of future elderly are expected to be separated/divorced women, whose economic situation was not found very good in this study. Although this study did not find feminization of poverty among the elderly population, growing feminization of poverty among the younger population (Pearce, 1978) could have serious effects on the economic situation of the future elderly women.

Smith (1984) suggested two recent developments which have contributed to the growth of women’s poverty. One is the growing number of women household heads, and the other is the nature of jobs available to these women. Most available new jobs are in the service sector which offer workers little chance to climb out of poverty. Even if they work for long hours, their work is not likely to provide high wage or good fringe benefits (Scott, 1984). Based on the significance of the work context on the elderly’s economic situation found in this study, old age does not look very bright for younger women currently in poverty and also for those women who are captured in the secondary labor market.
Economic status of an elderly person is not independent of economic status of his/her younger years. Considering the significant effects of human capital investments on poverty in old age found in this study, it is necessary to help young people plan for old age in order to reduce poverty among the elderly in the future. Although social security system should be changed to the one fit to the current family system, reforming social security itself is not likely to dramatically decrease poverty among the elderly.

Suggestions for Further Research

The results of this study could be generalized to other white population. The data used for the analysis were taken from the large, national representative, longitudinal survey. The longitudinal nature of this study was helpful in revealing that the income difference between young-old and old-old was largely due to a cohort effect rather than an age effect. In the study of aging where age becomes a very important factor, the use of longitudinal data is very desirable. Cross-sectional data are not able to separate out cohort, age, and period effects from one another. Despite the availability of large longitudinal data sets, they have not been fully utilized among social
gerontologists. For future research on the economic situation of the elderly, the use of longitudinal data is highly recommended.

This study has some limitations. First, black households were not included in the analysis in spite of the fact that poverty is a greater problem for them than for white households. Thus, the findings cannot be generalized to the United States population. To fully understand poverty in old age in the United States, research on the minority elderly is needed.

Another limitation is related to the unit of analysis of the study. The household rather than individual seems to be a very appropriate unit of analysis when studying the economic situation. At the same time, however, there arises a problem in dealing with changes in the family members if households are followed over time as in the instance of this study. People die, marry, divorce, leave home, and also join the family.

The current study explored the poverty situation of elderly households many of which were widowed. To investigate the effects of work history on the economic situation of the household in old age, full information on both husbands and wives is required even if one is deceased. It then becomes possible to draw a more comprehensive picture of the economic situation of the older households,
which really reflects their earlier days. Using the information on the current household heads only, as was done in this study, may distort the results. More detailed study would be necessary to conduct this kind of research.

The five-year intervals used for the analysis appeared too long to catch the change in the economic situation associated with widowhood. Different results might have been obtained if the data from every wave of the Panel Study of Income Dynamics had been analyzed. Logit models used in this study are not very suited to analyze the effect of time on the probability of poverty using the data from every 15 wave. Event history analysis would be more appropriate to conduct this kind of analysis.

In a rapidly changing society, today's truth is not necessarily true tomorrow. Future cohorts of elderly may be very different from the elderly today. Especially, with increased instability of marriages and changing roles of women, continuing research on the topic is needed to see the effects of women's labor force participation on their economic resources in old age. As suggested by Walker (1980), economic well-being of the elderly should be considered in the larger context of social and economic structures. Not only an individualistic perspective, but also a structural perspective is necessary for the study of economic well-being of the elderly.
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