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The impact of human capital and income supports in alleviating material hardships among low-income households

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The impact of human capital and income supports in alleviating material hardships among low-income households

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Signatures have been redacted for privacy

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ABSTRACT

This paper examines the differences in material hardships that exist among low-income households. The analysis draws on evidence from a recent survey of Iowa's Food Stamp households. The approach to measuring material hardships does not rely on income or other means testing, but on survey questions that quantify the degree of household material hardship. Three indexed measures of material hardship assess different aspects of hardship: food security, housing insecurity and economic insecurity. To understand the causes of material hardship, these indexes are used as dependent variables in ordinary least-squares regressions with three sets of explanatory variables: demographic variables, asset variables, and resource constraint/human capital variables. In this way, it is possible to determine how current demographic, asset, and resource constraint/human capital characteristics affect levels of well-being.

The analysis reveals that the intuitively plausible relationships hold: levels of human capital, assets, and other resources are inversely related to levels of material hardship, although many of these variables are not statistically significant. In contrast, one demographic variable, being female, is shown to be a significant indicator of the prevalence of material hardships in a household. The results are shown to be useful in understanding the reasons for why different types of low-income households face different kinds of material hardships.

I. INTRODUCTION

The late 1990's saw a large increase in the number of households leaving welfare and Food Stamp programs. While this movement was concurrent to large changes in eligibility requirements, it appears that a large portion of this change was due to a booming economy that had positive consequences for the low-wage job market (Jensen, Keng and Garasky, 2000). Several studies have attempted to determine how well these "program exiters" have done in the job market and in acquiring a decent "living wage." This study goes farther by using more direct survey measures to determine how well these "leavers" of the Food Stamp program in Iowa have been doing in the time since they have stopped receiving Food Stamp benefits. Instead of examining the means by which households are able to purchase needed household materials, the study focuses on measures of the level of the hardship itself.

Financial resources and the "testing of means" through the use of a poverty line do not give a clear indication of the kinds of problems that low-income households face. Receiving household income just above the poverty level, for example, may not necessarily decrease a low-income family's chances of being evicted. The ability to avoid material hardship is often a multifaceted challenge to families. This study uses three measures to approximate three different kinds of material hardship that may be present in low-income households. The three hardship indexes give a quantitative value to conditions related to food security, housing insecurity, and "economic insecurity." Then multivariate analysis is used to determine the relative impacts of demographic variables, asset variables, and resource constraint/human capital variables upon well-being.

The two sections that follow provide an overview of recent developments and research findings related to the Food Stamp program and a discussion about barriers to successful transition from welfare.

In 1999, Zedlewski and Brauner released a report entitled "Declines in Food Stamp and Welfare Participation: Is there a Connection?" They used the 1997 National Survey of America's Families to examine the connection between food stamp and welfare participation rates. The main point of the paper was to address concerns brought about by a Food and Nutrition Service report that showed that families with children on welfare (i.e., AFDC/TANF) represented the largest percentage of the decrease in the number of households on food stamps. Zedlewski and Brauner showed that while it became more difficult to be considered "eligible" for food stamp benefits, a significant portion of those who left the Food Stamp program did so despite the fact that they remained eligible for food stamp benefits.

Several program changes in the Food Stamp program that were brought about by PRWORA contributed to the decline in program enrollments. Three aspects of the legislation were particularly important to the declines in Food Stamp program participation. First, the legislation decreased the average level of food stamp benefits and eliminated the eligibility of some "near-poor" households. Second, for participants who were also receiving TANF benefits, new program rules required compliance with TANF requirements. As before, the main criterion for receiving Food Stamp benefits was to have household income below 130 percent of the household poverty line. Until the reforms of PRWORA in 1996, any decrease in the level of TANF benefits due to non-compliance was usually made up for with an equal increase in the amount of Food Stamp benefits.

Third, the new eligibility requirements figured to have an especially large impact on the demographic group known as ABAWDs (Able-Bodied Adults Without Dependents). Under the new rules, ABAWDS who are not otherwise exempt from work registration may not receive FSP assistance for more than three months within any thirty-six month period unless engaged in a work or training activity at least twenty hours a week.

These changes might be seen as detrimental to the well-being of many low-income families. Recent survey results, however, show that changes in the rules were not a driving force in the recent decline in program participation. The findings of the 1999 National Survey of America's Families (http://newfederalism.urban.org/html/nsaf/foreward.html) as discussed in Zedlewski and Brauner (1999), suggest that these eligibility changes did not affect the participation decisions of most households involved with the program. They find that thirty-five percent of those who left the Food Stamp program were above the 130 percent household income eligibility requirement. Therefore, sixty-five percent of all those who went off Food Stamp rolls in this year may have still been eligible to receive Food Stamps. Among those who left, most left because of a new job or an increase in job earnings, even though their resulting monthly income (at least in the current period) may not have been above the eligibility cut-off. Furthermore, households that were never on welfare were less likely to name a new job or increased earnings as the reason for why they left the Food Stamp program. This finding suggests that many former recipients might be under the impression that their new job or new earnings automatically disqualified them from further benefits.

A more reasonable assumption, at least for a majority of these "leavers," is that the use of food stamps is viewed as only a short-term solution. Zedlewski and Brauner note that

the historical evidence shows that the "working poor," those who are below the poverty line but are also working, have a rate of food stamp participation of only two out of five households. Blank and Ruggles (1980) examined the eligible status of women for food stamps using the 1986 and 1987 parts of the Survey of Income and Program Participation. They found that 60 percent of "exiters" were still eligible to receive benefits at the time when they left and 55 percent were still eligible one year later. They conclude that "a substantial proportion of those leaving assistance programs appear to remain eligible to participate, but apparently choose not to do so." Various studies seem to show that, in the long run, the desire of most low-income households to be self-sufficient outweighs the short-term value of receiving these benefits.

Barriers to Successful Transition from Welfare

Program data and several different surveys have found that a large number of people are leaving both "welfare" (AFDC/TANF) and the Food Stamp program. All else being equal, this large decrease in the number of participants in the Food Stamps program is certainly a positive change from the past. However, whether these "leavers" of the Food Stamp program are qualitatively better off than they were two years ago is ambiguous. The U.S. Department of Agriculture, Economic Research Service, in addition to other research groups, have devoted a substantial amount of resources to research determining the impact of these changes upon the well-being of different low-income groups.

The 1999 National Survey of America's Families (NSAF) (Urban Institute 2000) (http://newfederalism.urban.org/nsaf/foreward99.html) showed that a large number of low-income households were sharing in the gains of the healthy macro-economic environment. The report found that significant overall gains have been made in several different measures

of poverty. They found that, among all citizens, there was a significant drop in adult and poverty rates (from 13 and 21 percent, respectively, in 1997 to 11 and 18 percent, respectively, in 1999). The NSAF found an increase in the number of employed single parents (from 63 percent in 1997 to 67 percent in 1999), an increase in the number of children living with two parents, and an increase in the number of adults receiving health insurance from their employers. While these results show reason to be optimistic in how the "new federalism" has helped low-income families, other statistics are somewhat disconcerting. Although white adults could better afford housing in 1999 than in 1997, blacks had a more difficult time paying for housing in 1999 than in 1997. Also, the gap between the number of white and Hispanic adults that received employer-sponsored health insurance in 1999 increased from its former level in 1997.

Using the 1997 NSAF, Loprest and Zedlewski (1999) examined the differences in well-being of current and former "welfare" (AFDC/TANF) recipients. They attempted to identify how six different "obstacles" to work were influencing the labor participation decision of current or former welfare recipients. Interestingly, they found that, while there were significant differences among the demographic characteristics of current and former welfare participants, the variables which they had identified as "obstacles" to work did less well in explaining the labor market participation decision than they had anticipated. They found that the age distribution for current and former welfare recipients was generally the same, except for the fact that more adults who remained on food stamps fell into the highest age group (age 51 to age 65). Current welfare recipients were more likely to be Hispanic, and were less likely to be married. Also, the differences between current and former welfare participants showed that current recipients have a substantially less amount of education.

As one of the "obstacles" to work, the lack of education reflected the fact that current welfare participants have had a more difficult time in entering the work force. In addition to education, another variable that was statistically significant was the amount of job experience. Many current welfare recipients had little to no job experience, making them less marketable in the labor market. A third obstacle, having a child that received Supplemental Security Income, was actually found to be more prevalent among welfare leavers than current participants. This suggests that the "income effect" of increased income, regardless of its source, will encourage current participants to go off welfare and become economically self-sufficient. Three other "obstacles" to work were insignificantly correlated with welfare "leavers" and "stayers."

While the work of Loprest and Zedlewski showed that there were significant differences in labor force participation between current and former welfare participants, their work also showed that differences in family well-being were statistically insignificant. Based upon a single question from the 18-question Food Security Module[1], one-third of both current and former welfare participants reported the existence of hunger. Also, former recipients actually have a more difficult time in paying bills and in facing other economic problems, although the difference is not statistically significant.

While these statistics show that a large percentage of people are leaving "welfare," serious economic problems face many of these welfare "leavers." The Urban Institute calculated, based upon the 1997 National Survey of America's Families, that 35% of current welfare recipients had to cut size of meals or skip meals because of economic reasons. This was only slightly higher than the 33 percent of former recipients who had to do the same.

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[1] Question: Did you have to cut size of meal or skip meals because there wasn't enough food?

Former recipients had problems in other areas as well. Of all former recipients, 39 percent experienced time in last year when they were not able to pay mortgage, rent, or utility bills. This was insignificantly higher than the 35 percent of current recipients who experienced the same. Clearly, former welfare recipients face as many economic problems as those who are currently receiving food stamps.

One of the benefits of using a "direct" measure such as the food insecurity index is that it is able to examine how well a program such as Food Stamps is doing in meeting its stated objectives. Nord, Jamison, and Bickel (1999) examined the correlation between food stamp usage and food insecurity rates across all fifty states and the District of Columbia. As expected, they found that in states with a low food insecurity rate, the food stamp participation rate was also lower than the national average. For 1998, they reported a food insecurity rate of 7.3 percent for Iowa, lower than the national food insecurity rate of 10.1 percent. The hunger rate in Iowa was also reported to be lower in Iowa (2.0 percent) than the rest of the nation (3.5 percent).

These studies indicate that households that have left the Food Stamp program continue to face significant economic hardship. This paper will examine the incidence rates of these different types of hardships for the population in the state of Iowa that participated in the food stamp program. The next chapter will discuss research projects that have discussed how poverty and well-being are measured. This includes sections on "indirect", poverty line measures, as well as "direct" measures of well-being. The paper will then explain the methods used in the 1999 Iowa Food Stamp Leavers survey. It will give a description of the variables that were derived from this survey, and place them in a multivariate regression model. The last chapters discusses the results of this regression model, provide

interpretations for the predicted coefficients, and discuss some policy implications of the study.

II. CONCEPTS OF WELL-BEING AND MATERIAL HARDSHIP

All attempts to measure well being of households can be placed into one of two categories. The traditional approach has been to measure the "means" by which households are able to provide food, shelter, and other basic needs for themselves. The poverty line measures gross income of a household on the assumption that such a measurement will provide an accurate picture of the purchasing power of the household. Because this type of measurement only looks at the "means" by which a household can acquire basic necessities, it is often called an "indirect" measurement. The first section summarizes recent research and criticism of the poverty line as an indirect measurement of well-being.

The second approach has been to directly measure how "secure" the household feels with their current economic situation. This "security" would rely heavily on the means that are necessary for attaining human essentials, as well as other exogenous variables. The second section includes a discussion of recent work done on "direct" measures of well being concerning food security, housing security, and general economic security, and describes findings of current studies concerned with households who have recently left government programs, specifically the Food Stamp program.

"Indirect" Attempts to Measure Well-Being of Households

The "poverty line" threshold has been the primary method of measuring the well-being of the poorest United States citizens since it was proposed in 1965 by Mollie Orshansky (Orshansky 1963). Prior attempts had been made to make a consistent set of poverty thresholds (Rowntree 1901), but Orshansky's threshold was the first that was based upon "scientific" data. The method became popular because of its reliance upon two USDA studies. One study was done concerning minimum food consumption standards to meet a

nutritionally adequate diet. A second examined the share of food in the overall budget, and found that food expenditures cost the average low-income family one-third of their overall budget. Based upon these findings, Orshanksy (1963) proposed multiplying the minimum food consumption standard by three to obtain the "poverty line" threshold set for a given size family.

In order to ascertain the strength of the economy and the size of the population in poverty, it is convenient to use categorizations of the income-to-poverty index, where a household's income-to-poverty index is defined as the household's gross income divided by the poverty line threshold (for a given household size). Although useful for many purposes, this approach does not account for the purchasing power of in-kind benefits. While government programs that pay in cash have their benefits included in gross income, other in-kind benefits are not. For example, the fact that food stamp benefits and housing subsidies are excluded from a household's gross income may understate the current available means that a household has in meeting their basic human needs. Recently Iceland stated that "the way poverty is currently measured in the United States is outdated and could use further refinement." (Iceland 2000) He proposes that the definition of income needs to be updated to include "near-money" benefits, as well as "near-money" costs. The benefits include food stamps, housing subsidies, school lunch subsidies, home energy assistance, and the Earned Income Tax Credit. The expenses include income and payroll taxes, child-care costs, work-related expenses, and medical out-of-pocket costs.

The attraction of the Orshansky scale has been that it was "designed to have some 'scientific' justification." (Ruggles 1990, p.33) And at the time it was proposed, only a limited number of social assistance programs were available. A closer examination of the

methodology, however, indicates that there are a number of problems in applying the index to households. One set of problems includes those of household size and scale. In her original thresholds, Orshansky tried to incorporate economies of scale in constructing the poverty levels for different household sizes. These "household income equivalence scales" try to find the dollar value that equates similar individual purchasing power across many different household size and type. Differences may exist due to economies in food purchase or preparation (Nelson 1988; Lazaer and Michael 1980) or in needs (e.g., households with children or not) (Ruggles 1990).

In 1995, the Panel on Poverty and Family Assistance, established by the National Academy of Sciences (NAS), released a report entitled "*Measuring Poverty: A New Approach*" (Citro and Michaels, 1995). In this report, the panel recommended changes in the "official" poverty measurement to better approximate the true well-being of households. Among the recommended changes, the panel recommended that the income measure be changed to include the monetary value of all government benefits and in-kind benefits. In addition, the panel recommended that the income measure take account of expenses that accrue in holding a job, such as taxes, childcare expenses, and transportation expenses, and that the thresholds take account of medical out of pocket expenses for those who are not on a health insurance plan. The panel suggested also that the thresholds be adjusted across geographical areas to reflect differences in the cost of living.

Direct Measures of Well-Being

Three different types of direct measures of well-being are described here. They include food security, housing adequacy, and other measures. Each focuses on different aspects of material hardship.

Food Security Measurements

New studies in recent years have seen new and widely used "direct" measurements that attempt to measure well-being from the households themselves. Amartya Sen, winner of the Nobel Prize in Economics, argues that measuring the extent to which basic human needs are fulfilled, such as food and shelter, are more relevant than measuring the means to obtain those ends (Sen 1976).

Some work has been done in the United States using more direct measures of well being. Because the two most basic human essentials are food and shelter, early attempts to "directly" measure well being have centered around food insufficiency estimates and housing inadequacy measurements. Mayer and Jencks (1996) and Mauldon (1996) are among the first to use these direct measures of well being.

The use of a food insecurity measurement in this study is particularly relevant given that one of the objectives of the Food Stamp program is to decrease the incidence of hunger. Since 1995, the Current Population Survey (CPS) has included a supplement called the Food Security Supplement that attempts to measure the level of "food in security" and "hunger" in a household. The food security measurement methodology was developed by the Federal Food Security Measurement Project and has been used in various national and state surveys and studies around the United States. Andrews, et al.(2000) report recent national estimates from CPS data for 1995 and 1999 and show changes in food security across numerous

demographic and income types. They show a slight decrease in hunger and food insecurity between 1995 and 1999. Section IV provides more detail on the methods for estimating food insecurity based on the 18-question Food Security Module.

Rose, Gundersen, and Oliviera (1998) used data from the Continuing Survey of Food Intake by Individuals (CSFII) and the 1992 Survey of Income and Program Participation (SIPP) to look at the socio-economic characteristics of those whom they defined as "food insecure." The study was able to look at the marginal impact of food stamps and household earnings on food insufficiency rates. As expected, they found that there were significant differences in food insufficiency rates among households that differed by age, household size, race, and household income. The most important statistic, however, concerns the connection between food insufficiency rates and income measures. The study found that those in poverty were between 3.6 and 3.7 times more likely to be food insufficient than those who were not in poverty. This finding underscores the relevancy of using these direct measures in understanding implications to changes in public policy.

Their research also revealed that 41.3 percent of food insufficient households had incomes above poverty in the SIPP, and 53.3 percent of food insufficient households in the CSFII had incomes above poverty. They found that some variables that have been incorporated in earlier "indirect" measures of poverty were statistically significant predictors of food insufficiency. These measures included human capital (education, age), and household composition (e.g., parents being single or married). They suggest that their study "provides further evidence of the need to rely on more than income-based poverty measures in our understanding of deprivations such as food insufficiency." (Rose, Gundersen, and Oliveira 1998).

Housing Adequacy Measurements

In addition to looking at the food security of a low-income household, other measures of well being can be used to account for other aspects of the circumstances of low-income households. While there has been some literature published concerning food insecurity and hunger in low-income households, there has been less research done on other measures such as housing insecurity. Some recent examples include work by Whitener (2000) who introduced a new "multidimensional housing measure" that attempted to look at various ways in which a shelter might be insufficient. This measure attempted to go beyond the traditional measures of housing well being that only looked at individual physical characteristics of housing.

Whitener used survey data from the American Housing Survey to describe four different categories of housing insecurity that attempt to capture different ways in which shelter is inadequate. In order to be considered among the "housing poor," a household need only meet the criteria in one of four categories. First, a household may face excessive housing costs, which Whitener calls "economic need." This occurs whenever the total housing costs for the year, including rent, mortgage, taxes, insurance, and repairs, exceed fifty percent of the household income. Second, a household may live in a home that is physically inadequate. If a home had one of the five following kinds of problems then they were considered to live in "inadequate housing:" problems with plumbing, heating, electric, general upkeep of the private living facility, or general upkeep of the public living facilities.

Third, a household may experience "crowding" in the home. This is true if the person-per-room ratio in the household is greater than 1:1. Fourth, a household is asked about the general quality of the neighborhood in which they live (e.g., crime, noise, litter or

housing deterioration, and poor city/county services). Whitener found metro households were the most likely to be in the "housing poor," and that the economic need criterion was the driving force behind these numbers. For non-metro households, structural housing inadequacy, in addition to economic need, was a significant problem.

The work of Whitener also revealed substantial differences in the rates of housing insecurity across racial lines. Of whites, blacks, and Hispanics, whites had the smallest probability of being in any of the subcategories of housing poverty. While the most substantial problem in housing poverty for whites was the economic need subcategory, housing inadequacy was a larger problem for blacks and Hispanics. A large percent of Hispanics had problems with housing inadequacy, and reported a problem with overcrowding (14 percent). Whitener's multidimensional approach and, especially the housing inadequacy category, is used in the current study.

Mikesell (2000) used data from an earlier American Housing Survey and found that excessive housing costs, or what Whitener called "economic need", was a larger problem in urban than in rural areas. Only two percent of non-metro households reported having excessive housing costs. Instead, rural homes tended to have more physical problems. However, Mikesell uses the index of physical inadequacy to show that geographic region matters less than racial differences. While the difference between all rural households and all urban households was less than three percent, the differences among whites, blacks, and Hispanics were was much larger. Mikesell showed that Black non-metro households have a 24 percent housing insecurity rate, and being a poor black metro household increases the chances of being "house insecure" to 34 percent. Non-metro Hispanics faced a housing

insecurity rate of 17 percent, while non-metro whites faced a housing insecurity rate of only 7 percent.

Other measures of economic insecurity

In addition to the hardships that low-income households experience with food security and with housing insecurity, these households may also undergo "economic" hardships. Among families with little income, the possibility of losing shelter, the use of utilities, or access to health care coverage is very real. Several recent studies have attempted to measure this "economic" hardship.

Low-income households that rent face different sorts of problems than do households that own their home. In addition to the benefit of the household's equity in the home, homeowners do not face the turbulent price changes that have been known to occur in rented property. There is some evidence to indicate that the price that renters must pay for housing has increased in the last several years, while at the same time wages for these households remained stagnant. A study by the U.S. Department of Housing and Urban Development shows that, between 1996 and 1998, the real incomes of the lowest quarter of the income distribution dropped, while the real price of rents increased by 2.3 percent (HUD 1999). Also, the study showed that, during the same time period, 90,000 units from the available stock of low-income housing subsidized by HUD had dropped out of their contracts, and thus predicted that this shortfall in supply of low-income housing would increase prices in the face of continued high demand. These results suggest differences in outcomes for homeowners and renters.

Recent work has focused on differences in other intangible attributes of households that have been shown to lead to differences in food, housing, and economic security.

Anderson Moore and Vandivere (2000a) constructed an index to measure a child's "socio-demographic risk" of being in poverty that is based on the demographic makeup of households. The measure is the sum of four socio-demographic variables. If any household had three of the four variables, then the children in the household were considered to be at "socio-demographic risk." The variables are: single parenthood, four or more children living in the child's household, the child's parent lacking a high school diploma or GED, and being in poverty. Anderson Moore and Vanivere show several negative outcomes associated with having "socio-demographic risk," including children's school performance, children's emotional or mental problems, or families having an aggravating parent.

In another study, Anderson Moore and Vandivere (2000b) used data from the NSAF to create a "family stress index." In this work, they hoped to identify some key factors in determining what households have a high level of "family stress." In order to do this, they constructed a simple index as the sum of six questions concerning the living circumstances for the family within the last year: If a family scored two or higher on the index, then the household was considered to be living in a "stressful family environment." Table 1 includes the six components.

Table 1. Family Stress Index

1. There was a time in the last twelve months that the family was unable to pay mortgage, rent, or utility bills.
2. More than two people lived in a bedroom per household.
3. There was a time in the last twelve months when the food in the house ran out and there wasn't enough food to buy more.
4. A parent is not confident that family members can get health care if they need it.
5. A parent or parent's partner is in poor health or has a physical, learning, or mental health condition.
6. A child is in poor health or has a physical, learning, or mental health condition.

The index combines several different types of indicators of stress, including economic, housing, food and health care. One problem with this approach for the purposes of the current study, is that such a combination masks differences that may exist in the component indicators.

The work by Anderson Moore and Vandivere (2000b) shows that households considered poor under various "direct" measures are similar to those traditionally considered poor. They found that a child's chances of living in a "stressful living environment" were inversely related to the household income of the family. They found that about fifty percent of children living in families below the income line also were living in a "stressful living environment." Also, other factors known to directly affect household income were shown to correlate highly with percentages of "family stress." Children who lived with single or cohabitating parents were twice as likely to be experiencing "family stress" (37 percent versus 17 percent). Children whose parent did not have a high school diploma or GED had a 49 percent chance of experiencing "family stress," while children whose parent had a bachelor's degree had only a 7 percent chance of experiencing "family stress."

The key problem with measures of material well-being is, as noted by Beverly (2000), that the measures must meet "face validity". That is, they should measure what they intend to measure. Related to this is whether the questions asked in the survey environment are unambiguous and unbiased. While Beverly acknowledges the validity of both the 18-question food security module (used in this study), as well as the 6-question module used elsewhere, she suggests that there may be methodological problems with how housing insecurity indexes are constructed. There is a possibility that higher income households would report the existence of housing problems that are relatively less harsh than the true

conditions that the survey intended to find. That is, some households may report "inconveniences" such as "windows that didn't open," or "ants in the kitchen" as household hardships if questions are asked ambiguously. For this reason, surveys using a housing insecurity index need to be quite specific as to the presence of a particular sort of hardship within the household.

This current study views the physical adequacy of a home not only as an intrinsic measure of well-being, but also as an indication of how well the household is able to use its existing pool of resources to acquire other basic human essentials. Based upon the work of Whitener (2000) and Mikesell (2000), this study will look at the differences in well-being of demographically-dissimilar households and examine the impacts of various government programs on these households.

The studies discussed in this chapter show that direct measures are very useful in understanding the causes and consequences of poverty. Studies using food insecurity measures have been able to show that there is strong but not one-to-one correlation between families that are below the poverty line and families that are in hunger. Other studies covering housing insecurity reveal that geographic differences play less a role than do racial differences. So long as surveys are conducted without bias and ambiguous questions, it is possible to construct indexes that give a good quantitative measure of household material hardship. Based upon these measures, it is then possible to examine the relative impact of not only demographic and income variables, but program participation variables as well.

III. SURVEY METHODOLOGY

Background

Data from a 1999 survey of Iowa residents who had participated in the Food Stamp program for at least one month in 1997 provide a rich source of data for the study. The survey was funded by the U.S. Department of Agriculture Economic Research Service (USDA/ERS) in order to examine the well-being of households that had been in the Food Stamp program in 1997. The objective of the survey was to provide a better understanding of the circumstances of not only those who currently participate in the food stamp program, but also of those who left the program in 1997.

The survey design included stratifications to allow for analysis of three groups of interest. The first category identified households by likely ABAWD and non-ABAWD status. Likely ABAWD households were identified by age, having no disability claims and having no children in the household.

The second group of interest was determined by geographic area. Studies in the state of Iowa (Jensen, Garasky, and Keng, 2000) have shown that there are significant differences in program and labor force participation across the type of county that the participant lives in (e.g., metro, urban adjacent/small city and rural non-adjacent). As designated by the Office of Budget and Management in 1993, each county has a code (called a Beale Code) based upon their density of population and location relative to a metropolitan area (Butler and Beale, 1994). This study uses these county codes to make categorizations of population density and to determine how these geographic differences affect the variables of interest.

The third group of interest was identified by food stamp program participation status in 1997. The study was intended to give policy makers scientific data concerning the

outcomes of those households that had gone off food stamps. In order to approximate the household's degree of participation, all households who participated in the Food Stamp programs were divided into "leavers" and "stayers." "Leavers" are all the households that received food stamp benefits for at least one month in 1997 but did not receive food stamp benefits for at least two consecutive months between December 1996 and January of 2000. "Stayers" are all other households that received food stamp benefits for at least one month 1997.

Survey Instrument

The survey instrument was based on a pilot survey, called the Iowa Survey of Program Dynamics (ISPD), with significant modification to reflect the interest of the FSP leavers study. The FSP Leavers survey was developed with measures of well-being and self-sufficiency in order to understand the living circumstances of low-income households, and included questions concerning basic household demographics, educational level, income, non-profit program participation, and government program participation. The survey instrument also included a set of questions that are related to "direct" measures of well-being. The 18-question Food Security module was included in order to construct an index of food security and hunger. A series of questions related to the living circumstances were included to determine the quality of housing. Other questions related to labor market activity, job experience, child care, health insurance and other measures of economic security were included. All together, this survey instrument then enabled us to study the "direct" impact of various program participation and demographic characteristics on material well-being.

Sampling

The survey was targeted to all Iowa Food Stamp Program participants who received Food Stamp benefits for at least one month in 1997 and who were still living in the state of Iowa during the time of the interviews in summer of 1999. The data file of all households receiving Food Stamps between December of 1996 and January of 1998 was obtained from the Iowa Department of Human Services. The data file initially had 111,435 records. After cleaning, this number became 104,196. Each of the records corresponded to a unique individual who was the oldest member of a household that received food stamp benefits.

The three-fold objectives of the study necessitated a stratified random sample of cases to be selected. These three variables cut the entire frame of 104,196 into eighteen strata. These eighteen strata were the product of two FS "Leaver-Stayer" levels, three household composition levels (related to ABAWD status), and three population density levels. These are defined below:

1. Food Stamp Leaver-Stayer levels
   - Leaver: received Food Stamp benefits for at least one month in 1997, and then went without receiving Food Stamps for at least two consecutive months between December 1996 and January 1998. Data for February of 1998 was included to determine whether those who received benefits during December of 1997 had "left" the program.
   - Stayer: received Food Stamp benefits for at least one month in 1997, and then either received food stamp benefits for all months or only went one nonconsecutive month without receiving food stamps.
2. Household Composition levels

- ABAWD: Case head is between eighteen and forty-nine years of age, has no current disabilities, and has no children in household
- Family: Case head has at least one child in household, or is currently pregnant.
- Non-ABAWD: Household does not fit into one of other two categories.

3. Population Density levels
   - Metro: This is the most populated areas. For a household to be considered a "metro" household, their Beale Code must be either 2 or 3.
   - Adjacent to Metro: This is a less populated area, but is in proximity to a larger metropolitan area. A household must have a Beale code of 4,6,or 8 to be considered "adjacent to metro."
   - Nonadjacent to Metro: This is a less populated area that is not in proximity to a larger metropolitan area. A household must have a Beale code of 5,7,or 9 to be considered "nonadjacent to metro."

The survey was made up of 735 households that were categorized in the fashion described above. Because of a particular interest in ABAWD food stamp "leavers," a disproportionate amount of potential respondents were drawn from this subpopulation.

Survey Implementation

This survey was conducted over the telephone with case heads. Details on the survey procedures are available in "The Iowa Food Stamp Leavers Survey Methodology Report" (Nusser, Anderson, and Anderson, 2000). The households that were randomly drawn from these categorizations were first sent a letter introducing the study. These letters included a telephone number that fielded any questions with the study that the respondents had. For a

few households that did not have a telephone, letters were sent with business reply envelopes to update contact information. A second attempt was made to contact all households from the random draw that did not reply after the initial attempt.

The Iowa State University Statistical Laboratory Survey Section staff conducted the data collection. All cases from the random draw were rotated through a minimum of twelve call attempts. These calls were done at varying times, including nights and weekends. Those households selected who did not have a current phone number and/or address were placed in a tracking lineup, and when current information was found, were placed back into the interviewing lineup. Proxy interviews were completed for households that could not speak English or were otherwise not competent. A $25 gift certificate for a nearby grocery store was given to respondents upon completion of the interview.

The Laboratory staff used computer-assisted telephone interviewing software that included edit checks to detect illegal values and logic errors for responses that were entered into the computer during the interview. In cases of ambiguous or unclear responses, the interviewer clarified the responses. Corrections were made to the data by the supervisory staff when open-ended answers or other problems were found.

The interviews took place between May and September of 1999. Of the entire sample, 1,271 were located for a possible interview. This decreased by 199 for those who were either deceased, living in another state, or claimed that they never participated in the FS program in 1997. Of the remaining 1,072 cases, 735 households were interviewed. The data concerning the household composition strata shown earlier came from administrative data. Using these classifications, 472 of the 735 respondents were determined to be "likely ABAWD," meaning that, at the time of the interview, these households appeared to be able-

bodied adults without dependents. However, it was also determined that about one-half of these households considered to be likely ABAWD were not ABAWDs in 1997 when they "left" the program or in December 1997 if they were a "stayer." Therefore, only about one-third (31.2 percent) of the completed interviews were classified as being an ABAWD. In order to account for how the sample was representative of the total Food Stamp program population, weights were calculated to adjust for unequal selection probabilities and non-response. Due to the fact that ABAWDs were over-sampled in comparison to the population, weights were larger for Non-ABAWD households.

Variable Definitions

After collection, the data were further categorized according to conventions used in studies of program participation. This section will explain how the variables that will be used in the empirical analysis are defined. These variables are of two types: binary (0,1) variables and other discrete or continuous value variables.

Binary Variables

Table 2 lists the binary variables that were drawn from the survey data. All households were classified based upon the type of county (Beale code) in which they lived at the time of the interview. While the survey was stratified by geographical location according to a three-part categorization, in the reporting of results and in the use of the multivariate analysis all households are classified as either "urban" or "rural". Based on results from earlier work (Jensen, Keng, and Garasky) all households considered Metro and Urban Non-Metro were placed in the "urban" category. All households considered Rural Adjacent and Rural Non-Adjacent to Metro were placed in the "rural" category.

Table 2. List of Binary Variables

Variable (Affirmative Response)	Negative Response (=0)
Female	Male
Married at time of interview	Not Married at time of interview
Have one child < 6 years old	Do not have a child < 6 years old
6 years old <= Have one child < 12 years old	6 <= Do not have one child < 12
12 years old <= Have one child < 18 years old	12 <= Do not have one child < 18
Black	Non-Black
Hispanic	Non-Hispanic
Urban	Rural
Do not own a car	Own a car
Own home	Do not own home
Received Job training	Have not received Job training
Has HS diploma or GED only	Does not have HS diploma or GED only
Has some post-sec. Education	Does not have post-sec. Education
Considers oneself in poor health	Does not consider oneself in poor health

All households were identified by other demographic factors. A dichotomous variable (0,1) was constructed for families who were headed by a female in 1997, as well as for families that had married adults at the time of the interview in 1999. Identifying the presence of children within each household was done for children of varying ages. Three binary variables identified whether, at the time of the interview, the household included any children less than the age of six, between the ages of six and twelve, and between the ages of twelve and eighteen.

All households were classified according to racial and ethnic background. A dichotomous variable (0,1) was constructed for the racial background of the household. Those that were headed by a black respondent received a value of 1. Another dichotomous variable (0,1) was constructed for the ethnic background of the household. Those households that were headed by a Hispanic respondent received a value of 1. These racial and ethnic variables are defined so that they are not mutually exclusive.

The survey also attempted to determine the level of human capital in the household. The survey asked for the respondent to give the highest level of education for each adult in the household. Each adult was identified by one of three mutually exclusive categories based upon his/her highest level of education: less than a high school or GED degree, only a high school or GED degree, or some post-secondary education. Note that this survey does not ask for the respondent to make a distinction between receiving a GED or a high school degree. In addition to these variables, another dichotomous variable was created to measure whether or not the respondent has received any job training for their current job.

The ownership of various assets was also measured by the survey. A dichotomous variable was constructed for whether or not the respondent currently owned a car. Another variable signified whether the respondent currently owned the living space in which they resided at the time of the interview.

An important factor in determining the well-being of any household is the health of household members. The survey asked several questions related to health. Specifically, one of these questions asked the respondent to rate their "overall health" since January 1, 1999, on a scale from one to five, one being excellent, and five being poor. If the respondent replied that they were either a five, in "poor" health, or a four, in "fair" health, then this household was given a value of 1 for the binary variable, "poor health".

Discrete and Continuous Variables

Continuous variables were created from the survey data as well. These are listed in Table 3.

Each respondent was asked to give several pieces of information about their household. A variable counting the number of adults was created, where an adult is

Table 3. List of Other Variables

Variable
Number of adults in household
Number of children < 6
≤ 6 Number of children < 12 years old
≤ 12 Number of children < 18 years old
Age
Age^2
Age * HS diploma or GED only
Age * some post-sec. education
Age * job training
Other household earnings and all non-wage income
Child support received

considered to be anyone in the household who is at least eighteen years of age. Three more variables were created to count the number of children in the household. These three variables counted the number of kids between the ages of zero and less than six, six and less than twelve, and twelve and less than eighteen.

Based upon the respondent's birthday, a variable for the respondent's age (in years) at the time of interview was created. Because of the possibility that a non-linear relationship exists between human capital and age, the age variable was squared to create an "age squared" variable. A number of interaction variables were also created to further examine the link between education and age. The two educational level variables, "high school diploma only" and "some post-secondary education" were both multiplied times age to examine the return of different types of education in the future. Another interaction term was made by multiplying age and job training variables.

The survey asked a series of questions concerning the amount and origin of non-earnings income. Also, the survey asked if the household had received a particular type of support within the last month, and if they had, the amount of the benefits connected to that

support. These sources would include, but are not limited to, child support, social security income, supplemental security income, veteran's payments, survivor benefits, disability income, worker's compensation, or unemployment compensation. In many cases, respondents did not have a figure for this variable, and so gave a rough estimate for how much the household received. These estimates may be biased based upon the interview date or the characteristics of the household. For this study, the reporting bias is assumed to be insignificant.

All households were also asked a series of questions concerning their involvement in the Family Investment Program (FIP). As was done with all non-earnings income, the respondent was asked to give the amount of the benefit that the household had received within the last month, if the household was involved in the program.

The survey also asked the respondent to give the monthly earnings of all other people in the household. This included both part-time and full-time earnings from spouses, roommates, and children. For cases in which a respondent did not have a figure available, they were asked to estimate how much the household had received in earnings from all people in the household except for themselves. Unfortunately, the survey did not ask the respondent to distinguish between the earnings totals of each of the members of the household. While this variable is called "second adult earnings," it includes the earnings of all other members of the household besides the respondent.

A variable was created to measure the amount of income that would be available to the household in the absence of any labor market participation on the part of the respondent. This variable was the sum of three separate variables. First, all non-earnings income is included from the previously mentioned sources, including social security income,

supplemental social security income, veteran's payments, etc. Second, this measures includes all FIP benefits. Third, this measure includes the "second adult earnings" variable. This total is a variable called "Second Adult Earnings and Non-Earnings Income" (SAENEI).

A significant percentage of single parents who have been on Food Stamps in the past have also received child support benefits. The "Child Support Benefit" variable gives the amount of child support that the household received in the current month.

Finally, recall that Leavers are households that, after receiving Food Stamps for at least one month, went at least two consecutive months without receiving any Food Stamp benefits. Stayers are all other households not considered to be a leaver. This categorization will be used in Chapter VI to explain how differences in program participation impact the levels of material hardships in low-income households.

IV. THEORETICAL FRAMEWORK

Theoretical Approach

Ever since the mid-1960's, research concerning the well-being of households in the United States has used the poverty line as the primary method of analysis. Although there may be good reasons for using such a measure in certain circumstances, this study will not use the "poverty line" for two reasons. First, several studies within the last twenty years have shown the numerous problems that occur when trying to use a nominal measure such as the poverty line to approximate the purchasing power of a household. The literature review in Chapter I details how several studies have shown the problems with the "poverty line" methodology.

Second, the poverty line is focused upon the means by which households are able to avoid "poverty," and not on whether they are actually able to avoid hunger, homelessness, and other attributes commonly associated with poverty. The "poverty line" measurement is based upon the assumptions that all households are somewhat homogeneous in need, and that market coordination will always allow for a decrease in the incidence of material hardship after an increase in the amount of disposable income in the hands of the hungry.

However, many changes in the well-being of the household are not coupled with changes in the household's nominal income or wealth. A low wage-earning employee may start to receive health insurance for her and her family without receiving a pay increase, or a marginally poor couple may be paying a mortgage instead of rent. The poverty threshold method does not account for these differences in well-being.

Three direct measures of material hardship can be used to assess the multi-dimensional aspects of scarcity and hardship that households face. These measures include hunger or food insecurity; housing insecurity; and the ability to make ends meet. While we may assume that the avoidance of these conditions increases utility, it is not possible to say *a priori* exactly what sort of relationship exists between income and these hardship measures. Obviously households that have a low amount of income will be the households that suffer the most from these hardships. However, there is no reason to suggest that there is a clear linear relationship between income and the incidence of material hardships. This paper explores other variables, in addition to income, which influence the level of well-being in households. A structural model can be used to explain how other, non-income differences within households can explain disparities in these "direct" measures of well-being.

A Resource Constraint Model

Without making any normative statements concerning the "rights" of Americans to receive universal health coverage or to avoid food insecurity, this paper assumes that households consider the avoidance of these conditions associated with poverty to be "goods." That is, an increase in food, housing insecurity, or health care coverage (if it were possible to measure continuously) would increase utility.

If food insecurity (measured continuously) = f_s, then

$\delta U/\delta f_s > 0$.

If housing insecurity and security (measured continuously) = h, then

$\delta U/\delta h > 0$.

If economic insecurity (measured continuously) = c, then

$\delta U/\delta c > 0$.

But households also purchase other goods, and so utility must not be a function of only these three measures of well-being. All households will spend a percentage of their income on other goods, denoted x. The degree to which money income is spent on x rather than f_s, h, or c will depend upon the taste parameter v.

$$U = U(f_s, h, c, x, v)$$

For this analysis, it is assumed that all four variables, f_s, h, c, and x are normal goods such that with an increase in real income I, more of each type of good will be demanded. This means that

$$\delta f_s^{\,h}/\delta I > 0,$$

$$\delta h^h/\delta I > 0,$$

$$\delta c^h/\delta I > 0,$$

and $\delta x^h/\delta I > 0$

where the supercript ^{h} indicates the measure for household h.

While it is possible to assume in neoclassical economics that an increase in income always leads to an increase in utility, the extent of the marginal impact cannot be fully realized without some additional constraints. Empirically we know that there can be differences in utility coming from the same income budget constraint. It order to account for these differences, it is necessary to introduce differences in human capital as an explanatory variable for differences in well-being and therefore utility.

Based on Becker's household capital approach (Becker and Michael 1976), this paper introduces a set of variables to capture the differences in "human capital" across households. These differences are seen in two different areas: the marginal productivity within the labor market (assumed to equal wage earned), and the marginal productivity within the household

in completing household tasks. If levels of human capital were perfectly known, then it would be possible to set up a relationship between utility and the level of human capital. Assuming that being more productive and having more income increases utility, it is possible to say that an increase in human capital increases utility.

If human capital (measured perfectly and continuously) = *hc*, then $\delta U/\delta hc > 0$.

The level of human capital is a constraint on productivity the same way that nominal income is a constraint on the household's expenditures. We can therefore posit that, so long as our measures of well-being are normal goods, well-being should not decrease with an increasing amount of human capital. This means that

$\delta f_s^{\,h}/\delta hc >= 0$,

$\delta h^h/\delta hc >= 0$,

$\delta c^h/\delta hc >= 0$,

and $\delta x^h/\delta hc >= 0$.

This paper uses differences in human capital in the context of a resource constraint model to predict the well-being of households.

Where *hc* = human capital, and *I* = all sources of income, *z* = tastes, and *v* = other variables, then $f = f(hc, I, z, v)$, $h = f(hc, I, z, v)$ and $c = f(hc, I, z, v)$.

This paper sets out to test three different hypotheses touched upon in this section. First, this paper attempts to determine if these measures are correlated with each other. If they are, to what degree do households substitute between these measures, and can nominal income alleviate each of these types of material hardship with equal effectiveness? Second, is it indeed true that these measures of well-being are normal "goods"? That is, to what extent does well-being improve with an increase in nominal income? Third, are measures of

well-being "normal" with respect to an increasing amount of human capital? Is this a significant relationship? The following chapters attempt to address these questions through the use of cross-tabulations and regression analysis. The answers to these questions are of tremendous benefit in understanding the reasons for why different groups of the Food Stamp population face different kinds of material hardship problems.

V. EMPIRICAL METHODOLOGY

This paper sets up three separate analyses to study how demographic, asset, and resource/constraint variables may affect three different measures of material hardship. In each of these three analyses, the hardship measure is set up as the dependent variable in an ordinary least squares regression. One of the independent variables in all three regressions is a natural log of an hourly wage constructed through the use of demographic variables taken from survey data. This paper therefore includes two sets of regressions: first, a regression determines the coefficients in a wage construction equation, and second, a set of regressions is run to determine the relative impact of several sets of variables on levels of material hardship.

This chapter explains the methods used for determining whether the hypotheses posed in the prior chapter are true. First, this chapter explains the methods for constructing each of the material hardship indexes of food insecurity, housing insecurity, and economic insecurity. Second, this chapter will describe the variables created from the survey data, categorizing them as either a demographic, asset, or human capital/resource constraint variable. Third, this chapter will describe the methodology for creating the "imputed log wage." It will describe the regression techniques by which an hourly wage was created for all those in the survey sample. Finally, this chapter will describe the statistical packages and the procedures used in determining the coefficients of the explanatory variables.

Outcome Measures

Food Insecurity Measurement

Food Insecurity is considered a material hardship that is based upon a lack of household resources to meet basic human needs. It is measured through the use of survey

questions. In order for this method of measurement to be valid, it is assumed that the questions are unambiguous and unbiased. This study used the USDA's 18-question "Core Food Security Module" of the Current Population Survey (1995-1999) to measure hunger. The measure is based upon answers to questions concerning conditions that have been shown to exist among households that are considered "food insecure." All households answering this 18-question survey are then ranked based upon their affirmative responses.

The ranking is based on a number of key assumptions that have been shown to be true in cross-sectional data. The behavior of the respondents usually follows a specific sequence as food insecurity becomes a larger problem. First, household members will worry about not having enough food. Second, they will sacrifice other necessities or change purchasing habits in some way. Third, they will decrease the variety and quality of everyone's meals so that the household can still afford a proper level of caloric intake. Fourth, they will cut the size and frequency of adults' meals. Finally, they will cut the size and frequency of children's meals.

The responses to all these questions have been scored using the Rasch method, a statistical method that has been used mostly in educational testing (see Bickel, Carlson, and Nord, 2000 for more explanation). This scoring was done using BIGSTEPS software. Rasch analysis is possible in this setting because the questions are dichotomous and assumed to be independent of one another. Based upon the frequency of affirmative answers, a severity score for each question is given. The BIGSTEPS software also calculated a severity score for each household based upon both the number of questions answered affirmatively and the severity score of these affirmative answers. As an example of the range of severity scores, Bickel, Carlson, and Nord, (2000) give an ordering of these questions that has been shown to

be consistent throughout various survey settings. Bickel, Carlson, and Nord's results to the "Rasch" ordering of the questions are listed in Table 4, where the conditions are listed in decreasing severity,

In order to provide a qualitative interpretation of these severity scores, this study ranks all households into one of four mutually exclusive categories. In order of increasing severity, they are food secure, food insecure without hunger, food insecure with moderate hunger, and food insecure with severe hunger. Often the last two categories are combined to yield a third category: food insecure with hunger. Table 4 lists the ranked 18 questions and the assigned four-part food insecurity categories. Again, this study is less concerned with this four-part categorization than it is with the severity scores accompanying each household.

The second column lists the "adjusted Rasch" score, which is a liner transformation of the "Rasch" severity scores. This transformation was done to allow for easier interpretation. Notice that although the original Rasch scores had a higher variation, the "adjusted Rasch scores" are converted to range from zero (for least severe) to ten (for most severe). The household is then assigned a "food insecurity score" that equals the "adjusted Rasch score." Therefore, a household's "food insecurity" level varies in score from zero to ten. These scores are simply a ranking of households, and there is no quantitative meaning attached to the differences in the scores.

"Housing Insecurity" Measurement

This study uses a second measure of material hardship that examines differences in living conditions. As with the food insecurity measure, this measure is based upon the assumption that the survey questions are unambiguous and unbiased. The questions were asked in a way to elicit affirmative responses that represent true hardships in the households.

Table 4. Adjusted Rasch Score

Categorizations of all households into Food Security Subgroups		Question given on 18-question Food Insecurity Module		
Housholds with Children	**Households Without Children**		Rasch Score[a]	"Adjusted"[b]
Food Insecure	NA	Child not eat for whole day	6.73	10
with Severe Hunger	NA	Child skip meals, 3 or more months	3.88	7.85
	NA	Child skipped meal	2.75	7
	Food Insecure with Severe Hunger	Adult didn't eat for whole day, 3+ months	2.27	6.64
	NA	Cut size of child's meals	2.01	6.44
	NA	Child hungry but couldn't afford more food	1.72	6.22
Food Insecure with Moderate		Adult did not eat for whole day	1.59	6.12
Hunger	Food Insecure with Moderate Hunger	Respondent lost weight	0.45	5.26
	NA	Children were not eating enough	0.13	5.02
		Respondent hungry but didn't eat	-0.66	4.43
		Adult cut or skipped meals, 3+ months	-0.9	4.25
Food Insecure without Hunger	NA	Couldn't feed the children a balanced meal	-1.26	3.97
	Food Insecure without Hunger	Adult cut size of meals or skipped meals	-1.94	3.46
		Respondent ate less than felt they should	-2	3.42
		Couldn't afford to eat balanced meals	-2.54	3.01
	NA	Relied on some low-cost food for children	-3.09	2.59
Food Secure	Food Secure	Worried food would run out	-4.56	1.49
		Food bought didn't last	-4.59	1.46
		Household with no affirmative responses	-6.58	0

Note: NA Not Applicable

[a]"Rasch Score" is the question-by-question severity score determined from the 18-question Food Insecurity Module on the 1999 Iowa Food Stamp Leavers Study.

[b]"Adjusted Rasch Score" is determined using the following equation:
4.96231 + ((0.75415)*"Rasch Score")

While the general methodology for determining housing insecurity has many sources, the specific methodology for determining housing insecurity among current and former participants of the Iowa Food Stamp program is based on the Iowa Survey of Program Dynamics (ISPD). This survey is similar to Whitener's (2000) work in developing a "multidimensional" index of housing insecurity. While the other "dimensions" of Whitener's index are of some value, this study focuses on the "housing insecurity" measure.

This study uses some of the same questions as Whitener to construct a simple index of eight questions. Table 5 lists the questions concerning the current physical shape of the structure. While it may be possible that such an index can vary seasonally, respondents are less likely to remember past problems with housing insecurity if such questions were asked over a 12-month span.

Table 5. Questions Used to Construct "Housing Adequacy Index"

Does your home currently have...

1. A leaky roof or ceiling?
2. A toilet, hot-water, or other plumbing that does not work right?
3. Rats, mice, roaches, or other insects?
4. Broken windows?
5. Heating system that does not work properly?
6. Exposed wires or other electrical problems?
7. A stove or refrigerator that does not work properly?
8. Chipped or peeling paint?

The number of affirmative answers to these eight questions was summed to give a "housing insecurity" index. The "housing insecurity" of a given household can therefore vary anywhere from zero to eight. As in the case of the food insecurity index, the well being of the household is inversely related to the index score.

Because each of the identified problems represents a shortage in the amount of disposable income to fix these housing problems, a simple index provides a good way for approximating the quantitative difference in economic need between households. The index can be used as a dependent variable in a multivariate analysis that explains sources of economic need.

Economic Insecurity Measurement

The final measure is an index based upon five survey questions that relate to economic hardship. The index is a simple sum of affirmative answers to questions posed concerning conditions that are known to exist in households that face various "economic hardships." An "economic hardship" is defined to be the loss of a basic good or service[2] because of a lack of resources. As opposed to the measures of "material" hardship in this study, the "economic hardship" is more directly related to the flow of income to a household and the degree of confidence that the household has in that flow of income.

The questions for the index are listed in Table 6. In order to account for seasonal variation, the questions asked concerning economic need were asked over the scope of the previous twelve months.

The questions included in this index come from earlier studies about the circumstances of low-income households. In theory, households that cannot afford to pay for their shelter or basic health care are at a qualitatively worse level than others who can pay for these things, even those households who have a lower overall income. The first four questions deal with the ability of households to pay shelter costs. For most low-income

[2] The definition of a "basic good" is ambiguous. Here "basic good" will refer to anything that households desire such that they may give up a certain degree of food or shelter in order to continue receiving the good or service.

Table 6. Questions Used to Construct "Economic Insecurity Index"

1. In the last twelve months, has there been any time when you could not afford a place to stay or when you could not pay your (rent/mortgage)?
2. In the last twelve months, have you been evicted from your home for not being able to pay your (rent/mortgage)?
3. In the last twelve months, has your electricity or heat been turned off because you cold not afford to pay the bill?
4. In the last twelve months, has your phone been disconnected, or have you gone without a phone?
5. In the last twelve months, has there been a time when you or anyone else in your household needed to see a doctor or go to the hospital, but could not afford to go?

households, this will be the largest cost that the household will have to pay. Failing to pay for these costs is a good indication of financial problems. The fifth question is included to approximate the ability of households to pay for other non-housing costs after these housing costs have been paid.

In interpreting these indexes, we know that higher scores suggest that the household is having a consistent problem with paying bills, fixing household problems, receiving the proper amount of nutritional intake, or a combination of these hardships. The variation in the household scores allows for a good study of the marginal impacts of earnings, non-wage income, and program participation on measures of well-being.

Model Specification

This discussion will now turn from describing the hardship indexes to explaining the methodology in choosing the explanatory variables. As was mentioned in chapter IV, the model attempts to use demographic, asset, human capital, and resource constraint variables to explain differences in material hardships.

The demographic variables account for two types of differences in the needs of a household. First, household needs differ simply because of household size. The models

include a variable measuring the discrete number of adults. Also, dichotomous variables accounting for the presence of children of different three different age groups are included are included. These three variables signify the presence within the household of a child less than six years old, between six and less than twelve years old, or between twelve and less than eighteen years old. This method of measurement emphasizes how the age of any children in the household impacts the level of household need. The weighted means for these four variables over the entire survey are listed in Table 7.

Second, household needs differ because of the socio-economic makeup of the household. For example, a household's needs may differ if two of the adults are married, in which case there may be some economies from scale. The dichotomous variable of "married at time of interview" measures this affect. A household's needs may also differ if the "household head" is female. The model specification will include human capital and family variables, allowing this variable to show how the sociological circumstances of being female impact measures of well-being.

Some households may own assets such that they have a better ability than most to produce household goods and to manage short-term economic problems. A household that owns a car, while having to make payments on a depreciating asset, will have a lower cost for transporting themselves to work and for transporting food to the household. A household that owns their home may be able to use the equity in the home to alleviate short-term material hardship. In order to account for these possibilities, the dichotomous variables of "own a home" and "own a car" are included to account for differences in asset levels between households. Table 7 lists the means of these asset variables over the entire survey sample.

In order to explain differences in consumption and well-being, it is imperative to include a measure that explains differences in personal productivity. These differences in efficiency can be seen in both household and labor market productivity. The human attributes that give rise to these efficiency differences are considered "human capital." The human capital "imputed wage" is an instrumental variable constructed through the use of the age, education, gender, family, health, and geographic location variables. Essentially, these variables are regressed against wage over the population of survey respondents that did work for a wage to determine predicted coefficients for each of these variables. An "imputed wage" variable is then constructed based upon these variables and their respective coefficients. The methodology for producing this "imputed wage" is discussed in depth in the next section.

By including the "imputed wage" variable, as opposed to the respondent's total wages, the endogeneity that exists between government program benefits and total earnings is avoided. That is, respondents may make simultaneous decisions concerning the number of hours that they work and the amount of non-earnings income they attempt to receive. This regression design takes the level of human capital in the respondent as exogeneously determined, and then regresses this variable on material hardship to determine the extent that differing levels of productivity among "household heads" affects poverty. The mean log of the "imputed wage" over the entire sample is shown in Table 7.

Since this study examines a population that has received non-earnings income (Food Stamps) at some point in the past, it is particularly relevant to examine how this type of income affects levels of well-being. Resource constraint variables are defined here as any

Table 7. Means of Variables Used in Material Hardship Regressions

Variable	N	Mean	Std Error of Mean
Female	735	0.721	0.029
Married or living as married	735	0.333	0.033
Have at least one child less than 6 years old	735	0.32	0.032
Have at least one child between 6 and less than 12 years old	735	0.333	0.031
Have at least one child between 12 and less than 18 years old	735	0.22	0.029
Number of adults in household	735	1.577	0.041
Own a car	735	0.785	0.028
Own a house	735	0.271	0.033
Second Adult Earnings and Non-Earnings Income	735	562.7	42.72
Child Support	735	102.25	24.431
Predicted log wage	735	2.156	0.017
Housing Insecurity	735	1.106	0.121
Economic Insecurity	735	0.49	0.054

possible source of income received outside of the labor market, as well as earnings received by all adults in the household except for the person designated as "household head." While it is difficult to get an accurate picture of how households receive non-earnings income, the Iowa "leavers" survey is a rich source of data for describing these types of sources. More importantly, the survey includes information on the amounts of non-earnings income received from these many sources, as well as all earnings in the household not made by the "household head."

For this study, recall that all non-earnings sources were combined into one of two variables that measure income for the month preceding the time of the interview. One variable measured the amount of child support for the previous month. The second variable combined the total monthly earnings of all other adults in the household and all non-earnings

income (except child support). This variable is called "second adult earnings and non-earnings income" (SAENEI). The total non-earnings monthly income and other adult monthly earnings were included together to avoid endogeneity of the explanatory variables. It is also important to note that whereas the imputed wage is an "hourly" measure, these variables are over an entire month. This will be important when interpreting the regression results.

The SAENEI variable and child support variable are included to determine the marginal effect of each dollar received on material hardship. By isolating these variables, it will be possible to determine the extent to which nominal income, ceterus paribus, is able to alleviate material hardship. The mean values of SAENEI and child support over the entire survey sample are listed in Table 7.

Finally, the housing insecurity and economic insecurity indexes are included in only one of the model specifications. The purpose of setting up a specification in this fashion is to test the hypothesis that there is a degree of substitutability among these measures of well-being. In other words, because most households desire to lessen the degree of material hardship across all three "types," we would expect to find that the marginal impact of having one type of material hardship increases the severity of material hardship amongst the other two types of material hardships.

In total, there are four specifications in which differences in well-being are explained by these independent variables. The first specification measures food insecurity without the use of the other measures of material hardship as independent variables. The second specification explains food insecurity and includes the housing insecurity and economic insecurity variables as explanatory variables. The third specification explains housing

insecurity, and the fourth specification explains economic insecurity. While different households have different costs to pay, each household desires to have the same sort of basic goods and to avoid measurable material hardship. The multivariate analysis isolates these differences to see how well each group of variables does in alleviating material hardship in households.

Imputed Wage

As mentioned, the multivariate analysis includes an "imputed wage" measure that approximates the respondent's productivity. While a labor wage rate is the productivity measure we are looking for, not all the respondents in this survey reported such a rate. In order to use the entire population, and not just those who currently participate in the labor force, it is necessary to use human capital characteristics to construct a wage rate. The statistical method for building this wage rate is somewhat complex.

James Heckman makes the critical distinction between labor supply choices at the extensive margin and labor supply choices made at the intensive margin (Greene, 1995). Choices made at the extensive margin deal with whether a potential worker will participate in the labor market at all. Choices made at the intensive margin deal with how many hours a worker will work, given the fact they will indeed work. In the context of a household, there are certain demographic variables which will cause the respondent to be more productive in the labor force, while there will be other variables which will cause the respondent to be more productive in the household. In order to get a good estimate of the respondent's overall productivity, it is necessary to measure both of these sets of variables.

The Heckman selection model (Greene, 1995) is based upon these concepts. This selection model uses two different regression models that are run simultaneously. One model is a probit regression model that measures the significance of the variables impacting the respondent's decision to participate in the labor force at the extensive margin. This probit regression,

$$z_i^* = \gamma w + u.$$

says that wages will only be observed if $z_i^* > 0$. In simple terms, this regression might be thought of in terms of a market wage and a "threshold wage." The demographic variables of the household that affect the respondent's household productivity determine this "threshold wage," while human capital characteristics, such as age and experience, determine wage in the market place. If the "threshold wage" exceeds the market wage, the respondent does not work. If the market wage exceeds the "threshold wage" then the respondent enters the labor market.

For married mothers with children, this "threshold wage" is high enough such that their household productivity may exceed their labor force productivity, causing them to stay out of the labor market. However, this does not mean that they do not possess high amounts of human capital that are demanded by the labor market. The second regression explains the log of wage rate by these human capital variables. The regression equation, given that the wage is non-missing, is

$$y_i = \beta' x_i + \varepsilon_i.$$

For all households, y_i is observed whenever z_i^* is greater than zero.

The Heckman selection process solves both of these regressions simultaneously. The correlation in the error terms, u and ε_i, is measured by another value, ρ.

$\text{Corr}(u, \varepsilon_{I,}) = \rho$.

This correlation, ρ, is manipulated to determine the "selection coefficient" λ. This coefficient gives an estimate of the impact that the variables affecting the extensive margin choice (the decision of whether or not to participate) have on the wage rate. For example, we know that in the case of the married mother, her "true" level of human capital may be hidden by the fact that she is more productive at home. In other words, her reported wage is significantly impacted by her demographics. If this "selection coefficient" λ is statistically significant, then we know that significant reporting bias did exist and the researcher was justified in using a Heckman selection model. A high selection coefficient would be the case among the example of the married woman with children. Through this Heckman selection process, it is possible to impute a wage rate to all respondents that measures not only their labor force productivity, but their household productivity as well.

Now that the process for imputing the wage rate has been described, an explanation of the variables used in the regressions follows. All these variables can be categorized as either being an explanatory variable in the probit regression or an explanatory variable in the "wage" regression.

There are five explanatory variables that, along with the intercept, explain whether or not a wage is observed for a given household. Three of the five variables are discrete count variables that account for the number of kids in three different age groups. The number of kids may be a key variable in determining whether choosing household production over intensive labor force participation is advantageous. These three age groups are: kids less than six years old; kids between six and twelve years old; and kids between twelve and

eighteen years old. A fourth variable is a dummy variable to indicate whether the respondent is married. Having a married partner may increase the number of possibilities for the household to engage in either labor force or household production. Finally, the fifth variable, also a dummy variable, indicates whether or not the respondent considers himself or herself to have been in poor health during the past year. As mentioned in Chapter III, this variable is a self-reported measure that not only gives us an indication of the respondent's health, but also their attitude about their job prospects. Both of these aspects impact whether a wage is observed. All five of these variables are listed in Table 8.

Table 8. Variables Used in Imputed Wage Model

Variables explaining wage, given participation
Female
Black
Hispanic
Urban
Age
Age^2
Received Job training
Has HS diploma or GED
Has some post-sec. Education
Age * HS diploma or GED
Age * some post-sec. Education
Age * job training
Intercept
Variables explaining extensive labor market participation
Married at time of interview
Number of kids < 6
12 > Number of kids > 6
18 > Number of kids > 12
Considers oneself in poor health
Intercept

There are twelve variables that, along with the intercept, explain the variation in the log wage rate. The first four variables are all dummy variables that indicate various socio-demographic attributes that have been shown to have a significant impact on one's wage rate. First, a dichotomous variable is included to indicate whether the "household head" is female. This variable will indicate gender bias in wages. The next two variables are both dummy variables: variable number two indicates whether the respondent is black, and the third variable indicates whether the respondent is Hispanic. Note from Chapter III that these categories are not necessarily mutually exclusive. These variables will indicate if racial bias is statistically significant in this population. Finally, a fourth dichotomous variable measures whether the respondent lives in a county termed to be "urban" by the Beale Codes. This variable attempts to capture gains in productivity that accrue to workers because of urbanization. All four of these variables are listed in Table 8.

The remaining eight variables measure the qualities that are demanded in the labor market. These eight variables approximate the three most important factors in determining a wage rate: the level of education; the amount of job training received; and the age of the respondent. Concerning education, all households are divided into one of three mutually exclusive categories based upon the highest level of education attained by the respondent. Either the respondent does not have a high school or GED education, has only a high school education, or has some post-secondary education. The first two variables out of this set of eight indicate whether the respondent has a High School/GED diploma, or has some post-secondary education. Note that the base group, the variable that is omitted, is the "less than high school" education. The third variable is a dichotomous variable measuring whether the

respondent has received job training. Note that the "job training" variable and the educational variables are not mutually exclusive.

The next three variables are the product of these first three dichotomous variables with age (age times high school/GED graduate, age times post-secondary education, and age times job training). The final two variables, age and age squared, allow for the possibility of a non-linear relationship between wage and age. All eight of these variables are listed in Table 8.

The Heckman selection procedure was completed using the Stata (Stata Reference Manual, 1997) statistical package. This process involved two steps. First, Stata's "Heckman" command determined the coefficients over all 735 households for all the explanatory variables in the log wage equation. This command was able to account for the stratification and weighting scheme that will be discussed in the next section. Second, these estimated coefficients were used in Stata's "predict" command to find the predicted wage rates for all 735 households, once again taking into account the 18-part stratification of this survey. These "predicted" values of the log wage for the full sample were then transferred to the statistical package , WesVar, used in the multivariate analysis. Due to the fact that this earnings variable is an instrumental variable based upon demographic and human capital variables, it can be assumed that correlation errors with other earnings numbers have been avoided.

Multivariate Analysis Methodology

As previously discussed in Chapter III, the households were drawn randomly from within a specified population. This sampling was designed to over-sample a specific

demographic of the Food Stamp population. The result of this is an 18-part stratification based upon the two-part categorization of FS "leavers," the three-part categorization of county codes, and the three-part categorization of household type. As such, the survey is considered a complex survey design because of these stratifications.

In order to account for complex survey designs of this kind, a technique called replication is generally used to provide a method for estimating variances. This technique chooses repeated sub-samples, calculates the needed statistic from this sub-sample, and then uses the variability among the sub-samples to determine the variance of the full sample. These sub-samples, called replicates, and the statistics calculated by this method, called replicate weights, are determined in one of several fashions.

In order to account for the complex survey design when estimating coefficients in a multivariate analysis, this study used the Wesvar package and the Jackknife One method (JK1). The Jackknife One method is used whenever a sample design uses systematic sampling, even if the stratification is not explicit. The replicate weights are formed by first specifying G subsets of primary sampling units. In this case, there are eighteen primary sampling units. To form the replicate weights, each of these eighteen strata are systematically omitted, while the remaining subsets have their weights multiplied by the factor (G/G-1). By the Jackknife One method, there were eighteen replicate weights formed.

The use of Jackknife One on Wesvar gives the best possible approximation of the standard errors of the variables in the model. While the parameter estimates are the same regardless of which method is used, the standard errors are slightly higher under this method than under a Taylor Series expansion method. Therefore, the fact that this survey had a

complex sample design actually decreases the t-statistics and the explanatory power of some of the individual variables in the model.

All of the data for this study were initially created on the SAS statistical package. The predicted log wage rates from Stata, as well as the rest of the data from SAS, was moved into the Wesvar package. The procedure in Wesvar involved two steps. First, the replicate weights were created after inputting the eighteen strata into the "replicate weights" procedure. Second, the all eighteen regressions were performed in the "regression" procedure, which took into account these replicate weights. In this fashion, Wesvar was able to produce output that accounted for the sampling design.

VI. CORRELATIONS OF MATERIAL HARDSHIPS

In order to determine if these different types of material hardships are correlated, all households are placed in one of three categories based upon how their level of material hardship compared to the average values of the rest of the survey respondents. Due to the fact that slightly over one half of the respondents reported to having a "zero" score for the housing insecurity and economic insecurity indexes, the lower two quartiles were added together to form one category that makes up fifty percent of the total households. The other two categories measure roughly the next twenty-five percent and then the highest twenty-five percent.

The median food insecurity score is 3.01, and the seventy-five percentile score is 4.43. Therefore, households that scored less than 3.01 were placed in quartiles "1 and 2," households that scored between 3.01 and 4.43 were placed in quartile 3, and households that scored more than 4.43 were placed in quartile 4. Similarly, the median economic insecurity score was 0. Therefore, all households that reported a score of 0 for this index were placed in quartiles "1 and 2." The seventy-fifth percentile score for economic insecurity is 1, and so any household reporting a score of 1 was placed in quartile 3. A household with a score greater than 1 was placed in quartile 4. A similar method was used for the housing insecurity quartiles. The quartile values are listed in Table 9.

Table 9. Quartile Ranges for Material Hardship Indexes

		Material Hardships		
		Food Insecurity	Housing Insecurity	Economic Insecurity
Quartile Ranges	1 and 2	0-<3.01	0	0
	3	3.01-4.43	<= 2	1
	4	>4.43	> 2	>1

Based upon these quartiles, cross-tabulation tables were made for these three measures of material hardship. These tables are simple cell percentages of the entire survey sample, and were calculated by SAS while incorporating the stated weighting scheme. A weighted Pearson product-moment correlation was calculated using SAS to determine the correlation between the quartiles of each hardship. The calculation incorporated the weighting scheme. This value, called ρ, is calculated through the equation:

$\rho = [\text{cov}(m_i, m_j)]/ [\text{sq root } (\text{var}(m_i)*\text{var}(m_j))]$ where $m_{i,j}$ is the measure of hardship i, j, $i \neq j$.

Table 10 shows the cross-tabulation between food insecurity and housing insecurity, Table 11 shows the cross-tabulation between economic insecurity and housing insecurity, and Table 12 shows the cross-tabulation between economic insecurity and food insecurity. The correlations are all positive and statistically significant. Based upon these findings, it is possible to accept the stated hypothesis that these hardship measures are correlated in households.

Table 10. Distribution of Food Insecurity Quartiles by Housing Insecurity Quartiles

		Quartiles of Housing Insecurity			
		1 and 2	3	4	
Quartiles of	1 and 2	32.44	14.54	5	51.98
Food	3	9.47	6.36	7.55	23.38
Insecurity	4	12.15	6.73	5.76	24.64
		54.07	27.62	18.31	100
	Rho = .1856				

Table 11. Distribution of Economic Insecurity Quartiles by Housing Insecurity Quartiles

		Quartiles of Housing Insecurity			
		1 and 2	3	4	
Quartiles of	1 and 2	42.82	15.6	6.57	64.99
Economic	3	6.77	8.16	8.46	23.39
Insecurity	4	4.47	3.87	3.28	11.62
		54.07	27.62	18.31	100
	Rho = .3246				

Table 12. Distribution of Economic Insecurity Quartiles by Food Insecurity Quartiles

		Quartiles of Food Insecurity			
		1 and 2	3	4	
Quartiles of	1 and 2	40.79	13.45	10.75	64.99
Economic	3	6.65	7.49	9.26	23.39
Insecurity	4	4.54	2.44	4.63	11.62
		51.98	23.38	24.64	100
	Rho = .2901				

VII. INCIDENCE RATES OF MATERIAL HARDSHIPS BY HOUSEHOLD TYPE

In order to further examine the characteristics of households experiencing material hardship, it is helpful to make categorizations of these households based upon their level of government program participation. The regression analysis will determine which explanatory variables have the largest impact on the level of material hardship. However, by first examining the differences in incidence rates of these explanatory variables across this categorization, it will be possible to get a better understanding of these explanatory variables for different types of low-income households.

"A Study of Iowa's Food Stamp Leavers" (Jensen, et al., 2001), uses the leavers and stayers and ABAWD and Non-ABAWD categorizations to describe how well different groups are faring. This chapter summarizes results of the explanatory and dependent variables across these two types of categorizations. The explanatory variables found to be significant across the leaver versus stayers and ABAWD versus Non-ABAWD distinctions are being female, the number of adults in a household, the asset characteristics of a household, the labor market earnings of "other adults," non-earnings income, and child support received. Tables 13, 14, 15 and 16 first give the means for the entire survey sample, then show the differences between leavers and stayers and ABAWDs and Non-ABAWDs for the key variables.

While many of these differences in demographics are not statistically significant, a significant difference exists in the percentage of households "headed" by a female respondent between "leavers" and "stayers." While 79 percent of "stayers" are female, only 63 percent of "leavers" are female. This indicates that females are more likely to have prolonged participation in the food stamp program.

Table 13. Demographics of Population, Stayers and Leavers

	Survey Mean	N = 735 Std Error of Mean	"Stayer" Mean	N = 187 Std Error of Mean	"Leaver" Mean	N = 548 Std Error of Mean	T-Statistic
Incidence (%) of Variable in population	-	-					
Female	0.720	0.029	0.789	0.046	0.633	0.032	4.580
Black	0.067	0.018	0.043	0.027	0.098	0.021	-2.548
White	0.872	0.025	0.879	0.041	0.863	0.024	0.623
Hispanic	0.034	0.014	0.034	0.024	0.035	0.012	-0.075
Married at time of interview	0.333	0.033	0.283	0.053	0.397	0.034	-3.111
Household has at least one child < 6 years old	0.320	0.032	0.281	0.050	0.371	0.033	-2.559
Household has at least one child >= 6 and < 12 years old	0.333	0.031	0.334	0.050	0.331	0.031	0.108
Household has at least one child >= 12 and <18 years old	0.220	0.029	0.218	0.047	0.222	0.029	-0.124
Live in urban area	0.690	0.022	0.705	0.037	0.670	0.020	1.596
Own home	0.271	0.033	0.265	0.053	0.279	0.031	-0.418
Rent housing	0.650	0.034	0.701	0.055	0.584	0.033	3.233
Own a car	0.785	0.028	0.770	0.047	0.806	0.024	1.363
Variable average per household	-	-					
Number of kids < 6	0.468	0.055	0.448	0.089	0.493	0.051	-0.757
6 < Number of kids < 12	0.489	0.057	0.523	0.093	0.445	0.050	1.340
12 < Number of kids < 18	0.323	0.050	0.334	0.082	0.308	0.045	0.507
Number of adults in household	1.576	0.041	1.424	0.061	1.771	0.051	-6.285
Age of respondent	40.375	0.770	42.267	1.256	37.962	0.707	1.884

Table 14. Demographics of Population, ABAWDs and Non-ABAWDs

	Survey Mean	N = 735 Std Error of Mean	"Non-ABAWD" Mean	N = 506 Std Error of Mean	"ABAWD" Mean	N = 229 Std Error of Mean	T-Statistic
Incidence (%) of Variable in population							
Female	0.720	0.029	0.739	0.031	0.531	0.035	5.723
Black	0.067	0.018	0.050	0.015	0.243	0.034	-5.578
White	0.872	0.025	0.893	0.025	0.659	0.035	6.599
Hispanic	0.034	0.014	0.037	0.016	0.010	0.004	6.616
Married at time of interview	0.333	0.033	0.345	0.036	0.213	0.033	3.896
Household has at least one child < 6 years old	0.320	0.032	0.344	0.034	0.076	0.031	8.223
Household has at least one child >= 6 and < 12 years old	0.333	0.031	0.351	0.033	0.144	0.005	31.632
Household has at least one child >= 12 and <18 years old	0.220	0.029	0.215	0.031	0.273	0.009	-6.117
Live in urban area	0.690	0.022	0.677	0.024	0.824	0.013	-11.095
Own home	0.271	0.033	0.268	0.034	0.303	0.032	-1.063
Rent housing	0.650	0.034	0.661	0.036	0.528	0.035	3.627
Own a car	0.785	0.028	0.817	0.028	0.456	0.035	-10.000
Variable average per household							
Number of kids < 6	0.468	0.055	0.502	0.058	0.118	0.061	5.946
6 < Number of kids < 12	0.489	0.057	0.522	0.061	0.148	0.008	31.631
12 < Number of kids < 18	0.323	0.050	0.327	0.054	0.284	0.012	2.850
Number of adults in household	1.576	0.041	1.568	0.043	1.661	0.087	-1.046
Age of respondent	40.375	0.770	40.649	0.762	37.558	0.569	2.687

Table 15. Earnings and Income in last month for Population, Stayers and Leavers

Variable	Survey Population			"Stayer"			"Leaver"			T-Statistic
	N	Mean	Std Error of Mean	N	Mean	Std Error of Mean	N	Mean	Std Error of Mean	
Worked for pay[a]	735	0.590	0.028	187	0.535	0.043	548	0.659	0.032	-2.324
Respondent's earnings for all respondents[b]	724	239.299	19.397	185	205.782	27.877	539	272.970	26.145	-1.758
Respondent's earnings for only those who worked[b]	438	404.724	27.518	93	391.313	43.442	345	418.524	33.455	-0.496
Respondent's work hours in last week	735	20.775	1.109	187	18.264	1.668	548	23.977	1.356	-2.658
Another person in household worked for pay	735	0.284	0.030	187	0.199	0.047	548	0.391	0.033	-3.322
Other adult's earnings for only those who worked[c]	237	831.661	106.590	45	856.355	191.993	192	815.610	123.928	0.178
Other adult's earnings for all respondents[c]	710	258.921	56.984	183	170.827	58.780	527	325.908	56.156	-1.908
Total Earnings of Household[d]	702	566.781	48.625	181	423.840	70.540	521	751.418	64.148	-3.436
Receive child support	735	0.168	0.045	187	0.168	0.046	548	0.168	0.025	0.010
Amount of child support, if received	49	609.029	114.148	12	509.701	178.348	37	736.116	125.164	-1.039
Receive FIP benefit	735	0.129	0.003	187	0.139	0.041	548	0.125	0.024	0.297
Amount of FIP benefit, if received	65	350.373	22.189	17	330.421	67.779	48	307.763	21.268	0.319
Other non-earnings income	735	283.453	19.733	187	326.406	29.632	548	228.670	24.244	2.553
Receive Rent subsidy	735	0.255	0.033	187	0.327	0.055	548	0.164	0.026	2.668
Total Household Income[e]	690	1005.345	56.895	178	882.014	85.252	512	1162.837	70.220	-2.543
Households below poverty line[e]	690	0.673	0.035	178	0.706	0.056	512	0.631	0.035	1.143
Earned percentage of income[e]	690	0.502	0.022	178	0.429	0.034	512	0.595	0.027	-3.848

See Footnotes on page 63

Table 16. Earnings and Income in last month for Population, ABAWDs and Non-ABAWDs

	Survey Population			"Non-ABAWD"			"ABAWD"			T-Statistic
Variable	N	Mean	Std Error of Mean	N	Mean	Std Error of Mean	N	Mean	Std Error of Mean	
Worked for pay[a]	735	0.590	0.028	506	0.579	0.030	229	0.703	0.035	-2.724
Respondent's earnings for all respondents[b]	724	239.299	19.397	500	237.058	21.007	224	214.651	21.428	0.747
Respondent's earnings for only those who worked[b]	438	404.724	27.518	276	412.412	30.138	162	325.957	22.670	2.292
Respondent's work hours in last week	735	20.775	1.109	506	20.344	1.197	229	25.214	2.205	-1.941
Another person in household worked for pay	735	0.284	0.030	506	0.293	0.033	229	0.186	0.033	2.295
Other adult's earnings for only those who worked[c]	237	831.661	106.590	172	851.007	112.412	65	518.291	60.262	2.609
Other adult's earnings for all respondents[c]	710	258.921	56.984	492	251.541	44.952	218	98.791	16.365	3.193
Total Earnings of Household[d]	702	566.781	48.625	488	582.105	52.569	214	383.067	26.334	3.385
Receive child support	735	0.168	0.045	506	0.180	0.030	229	0.047	0.000	4.401
Amount of child support, if received	49	609.029	114.148	47	604.229	115.042	2	798.965	0.000	-1.693
Receive FIP benefit	735	0.129	0.003	506	0.145	0.028	229	0.012	0.005	4.724
Amount of FIP benefit, if received	65	350.373	22.189	56	321.521	41.065	9	265.465	53.194	0.834
Other non-earnings income	735	283.453	19.733	506	285.836	21.194	229	258.914	36.164	0.642
Receive Rent subsidy	735	0.255	0.033	506	0.258	0.035	229	0.227	0.033	0.641
Total Household Income[e]	690	1005.345	56.895	482	1026.814	61.095	208	746.881	54.269	3.426
Households below poverty line[e]	690	0.673	0.035	482	0.670	0.037	208	0.707	0.040	-0.682
Earned percentage of income[e]	690	0.502	0.022	482	0.500	0.024	208	0.528	0.029	-0.767

See Footnotes on next page

The level of assets in a household may be correlated with the degree of program participation. Table 13 shows that while there is no statistical difference in the percentage of leavers and stayers who own a home, there is a slight difference in the percentage of stayers and leavers who a car.[a] While 77 percent of stayers own a car, 81 percent of leavers own a car. The difference between ABAWDs and Non-ABAWDs for this variable is quite significant.

Many studies incorporate the differences among households that give rise to differences in the true, "real" cost of a good. The "real cost" of food would fully incorporate the transportation costs in acquiring food goods. In a less densely concentrated state such as Iowa, it is possible that many households face large "real costs" for food because of the distance from the home to the market. In the event that a low-income household would lose their mode of transportation, this "real cost" for food may become even more expensive. Therefore, there may be an increase in the level of food insecurity that would be attributable to not owing a car.

The variable measuring the respondent's current marital status has statistically significant percentage differences between "leavers" and "stayers." Only 28 percent of "stayers" are married or living as married, while 39.65 percent of "leavers" are married or living as married. This indicates that those with a second adult in the household are indeed better off.

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[a] Only households that reported having worked at least one hour were considered to have "worked for pay" Respondents who reported to having worked, but to have "worked" zero hours, were included as "working" in other tables, but not here.
[b] Eleven households were excluded for not reporting respondent's earnings.
[c] Twenty-five households were excluded for not reporting other adult's earnings.
[d] Thirty-three households were excluded for not reporting either respondent's earnings or other adult's earnings.
[e] Forty-five households were excluded for not reporting either household earnings or other income.

As expected, there is also a statistically significant difference between "leavers" and "stayers" concerning the number of adults in the household. As opposed to Food Stamp "leavers", which average 1.77 adults per household, "stayers" only average 1.42 adults per household. This analysis of reveals that those who were financially well enough to leave Food Stamps had significantly more adults in the household. Therefore, the earnings of the second adults in leaver households is more than the increased costs in material hardship that the second adult brings to the household.

Table 15 shows that among households that "left" food stamps, other adults had monthly average earnings of $318.96. This is significantly higher than the $170.66 average monthly earnings of second adults in households that "stayed" on food stamps. For those who "left" food stamps, second adults are able to earn enough in the labor market such that they are able to alleviate material hardships in the household.

The analysis of "second adult earnings" describes one of the two pieces of the "Second adult and non-earnings income" variable used in the multivariate analysis. The bivariate analysis shows that, for the other half of this variable, non-earnings income, the opposite relation holds. Table 15 shows that stayers households receive $372.45 in non-earnings income, while "Leavers" receive only $268.71. Those who have a higher rate of participation in the Food Stamp program would also have a higher rate of participation in other government "safety net" programs.

These tables show that there are three key variables that are good predictors for a household's chances of leaving the Food Stamp program. However, it is not a certainty that households that leave Food Stamps will be ubiquitously better. Based upon this analysis, it appears that the relative weight of non-earnings income within the SAENEI measure is

relatively small for "leavers." Leavers are more likely than current program participants to use a larger "second adult earnings" amount to alleviate food insecurity. On the other hand, leavers are less likely to receive other program benefits. This lower level of benefits may increase the level of household material hardship. In order to examine the degree to which this disparity in government program participation affects material well-being, Table 17 shows the differences in averages of these material hardships between "leavers and stayers."

Within this table, there are two relevant differences that may be important in understanding the well-being of "ABAWDs." First, leavers have a significantly lower level of food insecurity. The lower level of government program benefits received and seen in non-earnings income is either inconsequential to their food insecurity situation, or it is made up for in a higher level of second adult earnings.

Second, there is a large difference in economic insecurity between leavers and stayers among the ABAWD population. The larger mean in economic insecurity index for ABAWD leavers indicates that the lack of non-earnings income is felt in the "leaver's" inability to pay

Table 17. Differences in Material Well-Being by Food Stamp Participation

Food Insecurity	Leaver		Stayer		T-Statisitic
ABAWD	2.760	0.246	3.785	0.066	-4.038
Non-ABAWD	2.967	0.186	3.065	0.270	-0.299
Housing Insecurity					
	Leaver		Stayer		T-Statisitic
ABAWD	1.154	0.135	1.058	0.027	0.705
Non-ABAWD	1.000	0.106	1.186	0.215	-0.780
Economic Insecurity					
	Leaver		Stayer		T-Statisitic
ABAWD	0.598	0.075	0.251	0.017	4.522
Non-ABAWD	0.541	0.062	0.465	0.091	0.687

bills. As was discussed earlier, the food stamp eligibility changes targeted the ABAWD population. A good percentage of the ABAWDs may have left the program for eligibility reasons. Differences in the "insecurity" measures suggest that the eligibility requirements for food stamps may not result in an adverse affect in terms of food insecurity, but that the ABAWD household's decrease in income may result in an increase in economic insecurity.

This chapter has discussed a number of differences between the populations of interest. The socio-demographic circumstances of female respondents results in rates of program participation that are statistically higher than male "headed" households. While owning a home is not significant, ABAWDs have a much lower rate of car ownership. This may have consequences on the food insecurity levels of ABAWDs. A very important difference between these populations was the average number of adults per household. This variable is especially important because it is correlated with another significant variable, which is the level of "other adult" earnings. Finally, it was shown that ABAWD leavers are leaving the Food Stamp program when they have a lower level of food insecurity than those who are currently on the program. However, the "income effect" of being without these benefits causes them to have a level of economic insecurity that is higher than those who stayed on the program. The significance of all these variables are examined more closely in the next few sections. The final chapter interprets the results of the regressions in terms of the ABAWD and non-ABAWD populations.

VIII. RESULTS

This section addresses each of the hypotheses posed in chapter IV. First, this chapter examines the results from the Heckman selection model that give a "predicted wage" for each household. Second, this chapter discusses the statistical significance of each of the independent variables and interprets the meaning of the results in light of the hypothesis posed in chapter IV.

Imputed Wage

The imputed wage for the respondent is estimated through the use of a Heckman selection model that was run on the Stata statistical package. The results from running this selection model are listed in Table 18, and include the estimated wage equation and probit equation.

As was discussed in Chapter V, variables on demographics and health are included to explain the impact of demographic household variables on the extensive labor market decision of the respondent. Interestingly, the results show that being married or having younger children is insignificant in predicting z*, labor market participation. While the decision to work is not ambiguous for single-parent families, it appears that many households with married adults would achieve similar levels of productivity from either within the household or from the labor market. While not being statistically significant, the coefficients for the presence of children do increase in magnitude, suggesting that in this population, respondents do increase their labor market participation as their children grow older.

The one probit explanatory variable that turns out to have a relatively large effect is the "poor health" variable. Those in poor health are less likely to participate in wage work. Recall that this variable does not indicate whether the respondent is considered legally

disabled or has some other health problem affecting their labor market participation, but rather, it indicates whether or not the respondent "feels" that they are in poor health. There are two reasons for choosing this type of variable. First, using a variable indicating "current disability" would cause correlation error, as all those who would claim current disability would not be working. Second, the "poor health" variable, in addition to picking up physical disabilities and other health reasons for not working, might also account for differences in the respondent's willingness to participate in the labor market in the future.

Recall that the first four variables in the wage part of the process are dummy variables of socio-demographic interest: gender, race, ethnic/Hispanic status and location. Interestingly, the only variable that turns out to significantly alter the wage rate is the gender of the worker. From these data, there does not appear to be any statistical difference in the impact of race, ethnicity, or geographical location on wages.

The next eight variables on age, job experience, and education are interacted in order to examine how human capital levels impact wage levels at different points in the life cycle. While the age and age squared variable are regressed over the entire sample, the coefficients are impacted by the fact that only two of the three educational groups are placed into an interaction term with age. Therefore, the age and age squared only pick up the returns to age for the base group, which are the respondents who have less than a high school or GED degree.

The quadratic specification for age allows for the determination of a "threshold age." This is the age in which the marginal impact on one's wage due to their level of human

Table 18. Imputed Wage Model for First Adult

Full Name	Coefficient	Std. Err.	z	P>z
Log (Respondent's Wage)				
Female	-0.225	0.045	-5.008	0.000
Black	-0.059	0.078	-0.759	0.448
Hispanic	0.111	0.116	0.959	0.338
Urban	-0.007	0.045	-0.157	0.875
Age	0.017	0.014	1.214	0.225
Age^2	0.000	0.000	-2.243	0.025
Received Job training	0.561	0.362	1.550	0.121
Has HS diploma or GED	-0.264	0.205	-1.289	0.197
Has some post-sec. Education	-0.263	0.230	-1.145	0.252
Age * HS diploma or GED	0.012	0.006	2.212	0.027
Age * some post-sec. Education	0.016	0.006	2.547	0.011
Age * job training	-0.013	0.009	-1.409	0.159
Intercept	2.074	0.275	7.547	0.000
Probit Variables				
Married at time of interview	0.108	0.110	0.988	0.323
Number of kids < 6	0.001	0.080	0.011	0.992
12 > Number of kids > 6	0.016	0.087	0.185	0.853
18 > Number of kids > 12	0.156	0.109	1.436	0.151
Considers oneself in poor health	-0.804	0.100	-8.037	0.000
Intercept	0.522	0.081	6.452	0.000
/athrho	-0.547	0.214	-2.566	0.010
/lnsigma	-0.732	0.059	-12501	0.000
rho	-0.498	0.161		
sigma	0.481	0.028		
lambda	-0.240	0.089		

capital switches in sign. The estimated effect of age is nonlinear, first increasing (positive) then decreasing (negative for age squared). Based upon the coefficients of age and age squared, the age at which not having a high school education is no longer beneficial is age 21. The data shows that high school guidance counselors are right; the only time it "pays" to have dropped out of high school would be during the high school and college age years. The "threshold ages" for the other educational groups are also intuitively plausible. Having only a high school education will add to the imputed wage at an increasing rate only after age 21. Interestingly, having some post-secondary education will add to the imputed wage beginning at age 16.

The significance of the lambda variable indicates that there was selection bias in the wage rates and that the use of the Heckman selection model was justified. Based upon these coefficients, predicted log wage rates were constructed for every household. These predicted log wage wages can be assumed to be independent of other adult earnings, non-earnings income, and child support payments. These predicted log wage rates are then used as the level of human capital in a household.

Measures of Well-Being

This section interprets the coefficients of the independent variables with respect to the hypotheses posed in the theoretical framework. The regression results show some interesting relationships in estimating the three measures of well-being. Table 19 gives the values of the coefficients and the corresponding standard errors for all four specifications. As noted in the methodology section, the standard errors will be relatively high due to the use of replicate weights to account for the sampling method. The table places bold and italic font on

coefficients that are significant at the ten percent and twenty percent confidence levels, respectively.

This section reviews each of the variables of interest. First, being female is a significant explanatory variable in the last two models. The coefficient in the third specification is statistically significant at the ten percent confidence level, and the coefficient in the last specification is significant at the twenty percent confidence level. In interpreting this finding, recall that the imputed wage instrumental variable included gender. Therefore, the difference in hardship measures accounted for in the gender of the respondent can be attributed to demographic differences that might occur due to family situation, household responsibilities, or other factors that may have occurred in the past year, holding wage constant.

The next variable, being married or living as married is not a statistically significant explanatory variable for any of these hardships. Looking ahead, we see that the number of adults in the household is positively significant in the economic insecurity regression and quite large in the food insecurity regression. Additional adults, holding constant marital status, place strains on household resources. Whether or not the adults are actually married or living together does not affect the level of material hardship.

The next three variables are dichotomous variables indicating the presence of children. These variables are generally not statistically significant. The only significant coefficient comes from the economic insecurity model, where the presence of a child between the ages of six and twelve decreases the economic insecurity index by 0.174. It appears that the presence of children is less important than the family context in which they are placed. However, there does appear to be a clear relationship between the age of the

Table 19. Results of Multivariate Analysis

	Food Insecurity Models				*Housing Insecurity*		*Economic InSecurity*	
	ONE		TWO					
	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Error	Coefficient	St. Error
Dep. Variable = Adjusted Rasch Score								
Intercept	3.641	6.117	4.04	3.114	0.780	0.657	0.447	0.515
Independent Variables								
Female	0.66	1.101	0.857	1.604	***0.377***	***0.165***	**0.146**	**0.085**
Married at time of interview	0.108	0.583	0.078	1.446	0.022	0.289	-0.048	0.166
Have one child less than 6 years old	-0.357	0.906	-0.536	0.716	-0.289	0.279	-0.155	0.160
Have one child between 6 and less than 12	0.235	1.565	0.188	1.876	0.278	0.311	**-0.174**	**0.113**
Have one child between 12 and less than 18	-0.298	0.435	-0.231	1.654	0.046	0.315	0.073	0.109
Number of adults in household	0.18	0.365	0.379	1.319	0.050	0.144	***0.277***	***0.096***
Own a car	-0.869	2.992	-0.758	1.614	-0.329	0.273	***0.286***	***0.109***
Own home	-0.142	1.146	0.008	1.701	***1.155***	***0.304***	***-0.231***	***0.109***
Imputed Log Wage Earnings for first adult	-1.096	3.373	-1.152	3.392	-0.179	0.240	-0.098	0.207
SAENEI (x1000)	-0.332	1.059	-0.452	1.356	-0.120	0.100	***-0.130***	***0.040***
Child Support payments (x1000)	0.289	2.339	-0.144	4.021	0.210	0.400	0.130	0.200
Housing Security Index	0.263	0.315						
Economic Security Index	0.695	1.47						
R-square	**0.085**		**0.07**		**0.141**		**0.089**	

Bold indicates significance at 20% level
Italic indicates significance at 10% level

children and the cost of caring for these children. In all four specifications, the coefficients generally increase in correlation with the age of the children. This relationship is similar to the relationship among the three "children" variables in the imputed log wage regression results, where it was shown that the probability of working increases as children in the household grow older.

The final demographic variable is "number of adults in the household." This variable does not include the benefit brought to the household through the participation in the labor market by these additional adults. Instead, it merely reflects the tradeoff between the increase in household productivity that the additional adult brings and the additional costs for food, housing, and other needs. While this variable is not statistically significant in the first specification of the food insecurity model and in the housing insecurity model, all four specifications reveal a positive relationship.

The "number of adults" variable is significant in the economic insecurity regression, and positive. While many children receive public health insurance coverage, many low-income adults do not receive such coverage. Because "foregoing needed medical attention for lack of insurance coverage" is one component of the economic insecurity index, it is reasonable to assume that low-income households with more adults will have a more difficult time in receiving medical attention. The coefficient in the economic insecurity index shows this relationship.

While all but two of these demographic variables are insignificant, the two asset variables turn out to be more interesting. In the food insecurity specifications, not owning a car is positive in sign, but it is not significantly different from zero. Interestingly, a

significant relation holds in the opposite direction between not owning a car and economic insecurity.

The reason for this discrepancy may come from theories of economic geography and transportation costs. Transportation problems will increase the real cost of buying food, looking for a job, and commuting to work. In the case of food insecurity, the costs from not owning a car outweigh the "income effect" of not having to make car payments. That is, the increased amount of food that households could have purchased by avoiding the costs of owning and operating is not enough to compensate for the increased transportation costs. The opposite relation holds for the "economic insecurity" regression. Not owning a vehicle means that there is one less bill to pay, making it easier to pay other bills.

The second asset variable, owning a home, also returns some noteworthy coefficients. Interestingly, the ownership of a home is one of only two statistically significant determinants of the housing insecurity measure. The large coefficient initially seems counter-intuitive. Would not the homeowner be faster in repairing a problem with the home than a landlord? There are two explanations for this result. In most cases, renters are not responsible for fixing the problems with their own home in the event that a problem did exist. In the case of the renter, the incidence of these housing problems would be dependent upon the landlord's financial well-being, and not the renter. Even in spite of the fact that landlords take longer than homeowners in fixing a problem, these landlords are more likely to be able to afford the cost of these repairs. An alternative explanation deals with the demographics of low-income homeowners. A high percentage of the elderly own a home. Because of physical limitations, these households would have a more difficult time in making these repairs.

The regression analysis shows that imputed log wage is not statistically significant in any of the four model specifications. Based upon these findings, it is not possible to accept the hypotheses that the level of human capital is a significant factor in alleviating material hardship. Although not statistically significant, the consistently negative coefficients across all four specifications suggest that a relationship does exist in the manner described earlier: the higher the imputed wage, the less likely to incur material hardship. The next chapter will provide a detailed analysis of the interpretation of this variable.

Recall that another hypotheses set out in Chapter IV claimed that non-earnings income is significant in determining the level of household material hardship. The results show that the relationship between all income that comes from wages earned in the labor market by other adults and from non-earnings sources (SAENEI) is statistically insignificant in both food insecurity specifications and the housing insecurity regression. It is therefore possible to reject the hypothesis that non-earnings income impacts the level of housing insecurity and food insecurity, and to accept the hypothesis that non-earnings income has a significant impact on the level of economic insecurity in a household.

As mentioned previously, it is important to keep in mind that these income variables are measured over an entire month. Therefore, multiplying by a factor of one hundred or even one thousand may yield a more suitable coefficient in comparing the relative effects of these variables on material hardships. Multiplying the SAENEI and child support coefficients by one thousand, we see that this coefficient implies that a one thousand dollar increase in either SAENEI or child support would decrease the level of food insecurity by an amount (0.32) similar to one of the demographic coefficients.

A large share of the family budget for households in the Food Stamp program comes from child support. The regression results show that the child support coefficients are statistically insignificant for all the model specifications. As in the case of other adult earnings and non-earnings income, the sign of the coefficient seems to suggest that a household receiving child support will have a level of food insecurity that is lower (less insecure) than a household not receiving child support. However, its statistical significance as an explanatory variable must be rejected on the basis of the regression results.

In comparison to the results of child support in the food insecurity regressions, the sign for the child support coefficient for housing insecurity and economic insecurity, seems to suggest that receiving child support may make a family worse off. Although the child support payments increase the amount of disposable income that the household can spend on bills or on fixing household problems, households receiving child support have certain socio-demographic characteristics that may actually decrease housing insecurity and increase economic insecurity. The regression analysis reveals that the overall effect of child support on housing insecurity and economic insecurity is insignificant.

IX. INTERPRETATION OF RESULTS

This chapter discusses the results of the multivariate analysis with respect to the material hardship indexes. First, the estimated coefficients for the demographic and asset variables are interpreted in terms of the differing levels of the material hardships. Next, the elasticities of all three material hardships with respect to the explanatory variables are calculated and interpreted in this section. Finally, the chapter discusses the empirical evidence from this paper for how households substitute between these levels of material hardship.

Demographic and Asset Variables

Only one of the coefficients corresponding to a demographic variable indicates a large impact on levels of well-being. There is a large and negative impact of being female on housing insecurity. All else equal, being female increases the predicted value of the housing insecurity by 0.3. This means that simply being female increases the number of aspects of the home that are in need of physical repair by 0.3 units. As suggested in the prior chapter, this large difference in gender cannot be explained by productivity differences, since human capital has already been incorporated in the imputed wage. Rather, these differences must be explained by the family circumstances of the female respondent.

The coefficient for adults in the second food insecurity model specification shows that the introduction of another adult in the household will increase food insecurity by about 0.4 units. As we would expect, this is slightly higher than the marginal cost of adding a child between the ages of twelve and eighteen. It can be assumed that an adult has nutritional needs that are costlier to meet than a child. Similar to the effect of the introduction of another child into the household, the introduction of another adult, without considering

possible benefits from the labor market, may move the household to a higher level of food or economic insecurity.

The regression analysis shows that assets decrease some levels of hardship in households. Owning a home is the most important factor in determining the extent of a household's housing insecurity hardship. All else being equal, owing a home means that the household will suffer at least one more specified physical deterioration than those who do not own a home. Practically speaking, a homeowner will have a broken window (or another specified problem) that would have been fixed if he or she were living in rented housing.

Elasticities

Using the mean values for the independent variables listed in Table 7 and the mean values for the hardship indexes, it is possible to use the coefficients listed in Table 13 to determine elasticities of these hardships. The elasticity of the material hardships, m, with respect to the variable of interest, w, is

$\in_{mw} = (\delta m/\delta w)*(w^m/m^m)$, where w^m and m^m are the mean of the variable of interest and the mean of the hardship index, respectively.

These elasticities measure the percentage change in the dependent variable (the hardship measures) with respect to a percentage change in the independent variable (the explanatory variable of interest). Table 20 lists these elasticities.

The imputed wage has very little effect on hardship measures. The elasticities of hardships with respect to imputed wages although negative, are very small. For the elasticity of food insecurity (model one) with respect to wage, a one percent increase in wage will only result in a decrease in food insecurity of 0.027 food insecurity units. The percentage wage increase needed to cause a substantial change in the level of material hardship is

Table 20. Elasticities of Hardships with Respect to Economic Variables

	Change in...			
	Food Insecurity Index		***Housing***	***Economic***
	Model One	*Model Two*	***Insecurity***	***Insecurity***
with respect to..				
Imputed Log Wage Earnings for first adult	-0.027	-0.025	-0.004	-0.003
SAENEI	-0.062	-0.083	-0.061	-0.137
Child Support Payments	0.010	-0.005	0.019	0.044
Housing Insecurity Index	0.096			
Economic Insecurity Index	0.112			

unreasonable. These figures give further evidence that the level of human capital is not a good predictor for the level of material hardship in a household in the Iowa sample.

For three of the four specifications, second adult earnings and non-income earnings (SAENIE) and child support are small and statistically insignificant. While the predicted marginal effect on hardships of one additional dollar gained through non-earnings income is inconsequential, recall from Table 7 that the mean level of SAENEI was more than $560 per household. A household with only the mean level of SAENEI would see a decrease in their food insecurity of 0.15 units. An amount of SAENEI larger than the average would be required in order to move the household out of any given food insecurity category.

In comparison to the food insecurity categories, the elasticities of SAENIE and child support with respect to housing insecurity and economic insecurity demonstrate increasing these measures may help. A one percent increase in SAENIE will decrease the level of economic insecurity by about fourteen percent. These coefficients agree with the differences in marginal propensities to consume out of these two different types of income. In addition

to the coefficients, the elasticities take account of the average level of income. Therefore, even though the child support coefficient is larger than the SAENIE coefficient, the larger average value of SAENIE causes the elasticity value for second adult earnings and non-earnings income to be higher than child support income.

The coefficients estimated in this regression analysis can be given a clearer interpretation by imputing to each variable an "hedonic price." The SAENIE and child support variables are measured in dollar terms. Therefore, the corresponding coefficients are the marginal effects on hardships of one additional dollar received. By dividing the estimated coefficients of all other explanatory variables by the SAENIE and child support coefficients, "implicit (hedonic) prices" are determined for each explanatory variable. These prices may be thought of as the amount of either child support or second adult earnings non-earnings income that is needed to get rid of the effect that each individual variable has on measures of material hardships. These "prices" are estimated using both the SAENIE as well as the child support coefficients as denominators. Notice that because the numerator is expressed in terms of hardship units per demographic units, and the denominator is expressed in terms of hardship units per dollars, the resulting value is expresses in terms of "dollars per demographic unit." The results are listed in Table 21.

Measuring the substitutability of hardships

Recall that the first hypothesis set out in Chapter IV was that these measures of material hardship are correlated with one another. Based upon the findings in Chapter VI that these hardships are highly correlated, it is possible to suggest that households are able to substitute these hardships for each other. In order to measure the magnitude of this substitutability, this section examines the results of the first specification of the food

Table 21. Dollar Estimates of Explanatory Variables

a. Food Insecurity Models

	Model Number One Coefficient	Estimates SAENEI	CS
Second Adult Earnings and Non-Earnings Income	-0.00033	1	1
Child Support payments received	0.00029	1	1
Female	0.660	-$1,987.18	$2,287.44
Married at time of interview	0.108	-$325.39	$374.56
Have one child < 6	-0.357	$1,075.20	-$1,237.66
6 < Have one child < 12	0.235	-$707.73	$814.67
12 <= Have one child < 18	-0.298	$897.70	-$1,033.35
Number of adults in household	0.180	-$541.64	$623.48
Do not own a car	0.623	-$1,875.60	$2,159.00
Own home	-0.139	$417.89	-$481.03
Housing Insecurity Index	0.247	-$744.64	$857.15
Economic Insecurity Index	0.695	-$2,092.17	$2,408.29

	Model Number Two Coefficient	Estimates SAENEI	CS
Second Adult Earnings and Non-Earnings Income	-0.00045	1	1
Child Support payments received	-0.00014	1	1
Female	0.857	-$1,894.55	-$5,951.67
Married at time of interview	0.078	-$172.42	-$541.64
Have one child < 6	-0.536	$1,184.77	$3,721.92
6 < Have one child < 12	0.188	-$415.43	-$1,305.06
12 <= Have one child < 18	-0.231	$510.58	$1,603.97
Number of adults in household	0.379	-$837.44	-$2,630.81
Do not own a car	0.758	-$1,675.78	-$5,264.43
Own home	0.008	-$17.69	-$55.56
Housing Insecurity Index			
Economic Insecurity Index			

Table 21. (cont.)

b. Housing Insecurity and Economic Insecurity Models

Housing Insecurity Model			
Coefficient	Estimates		
	SAENEI	CS	
Second Adult Earnings and Non-Earnings Income	-0.00012	1	1
Child Support payments received	0.00021	1	1
Female	***0.3774***	***-$3,145.00***	***$1,797.14***
Married at time of interview	0.02243	*-$186.92*	*$106.81*
Have one child < 6	-0.28852	*$2,404.33*	*-$1,373.90*
6 < Have one child < 12	0.27813	*-$2,317.75*	*$1,324.43*
12 <= Have one child < 18	0.04562	*-$380.17*	*$217.24*
Number of adults in household	0.0499	*-$415.83*	*$237.62*
Do not own a car	0.32902	***-$2,741.83***	***$1,566.76***
Own home	***1.15453***	***-$9,621.08***	***$5,497.76***

Economic Insecurity Model			
Coefficient	Estimates		
	SAENEI	CS	
Second Adult Earnings and Non-Earnings Income	***-0.00013***	1	1
Child Support payments received	0.00013	1	1
Female	**0.14595**	***-$1,122.69***	***$1,122.69***
Married at time of interview	-0.04815	*$370.38*	*-$370.38*
Have one child < 6	-0.15468	*$1,189.85*	*-$1,189.85*
6 < Have one child < 12	**-0.174**	***$1,338.46***	***-$1,338.46***
12 <= Have one child < 18	0.07254	*-$558.00*	*$558.00*
Number of adults in household	***0.27724***	***-$2,132.62***	***$2,132.62***
Do not own a car	***-0.28559***	***$2,196.85***	***-$2,196.85***
Own home	***-0.2314***	***$1,780.00***	***-$1,780.00***

insecurity regression model, model one, which includes both the housing and the economic insecurity indices. Table 19 shows that both the economic insecurity and housing adequacy coefficients are statistically insignificant. The results predict that for every unit increase in economic insecurity, food insecurity will increase by about 0.7 units. For every unit increase in housing insecurity, food insecurity will only increase by about 0.26 units. This difference in units is even larger if the discrepancies are normalized to take into account the sizes of the indexes. (Based on a scale of 0 to 5, the increase in housing insecurity is only (5/8)(.263) = .164 units). Based upon these results, households are most concerned about their food insecurity, and are likely to substitute "away" from having to increase the level of this hardship. When they substitute "towards" this hardship, and take on additional food insecurity, the coefficients show that the household is more likely to substitute away from economic insecurity than they are from housing insecurity.

In terms of the practical relationship between these measures, a household will be justas willing to not pay a bill and face the possibility of losing that particular service as they would be to move 0.695 units on the food insecurity index. This movement is certainly large enough to move from one qualitative "level" of food insecurity to another. It may mean, for instance, a movement from "adult cut size of meals," (food insecurity score at 3.46) to "adult cut or skipped meals at least once in last three months," (food insecurity score at 3.97). Notice that this movement places the household in the "moderate hunger" category. The results suggest that for some households, skipping entire meals for economic reasons is a necessary substitute for being able to pay the household's bills. These relationships display the difficult choices that low-income households face between economic insecurity and food insecurity.

A household would be even less likely to substitute some measure of food "security" to improve the physical quality of their home. A household will be just as willing to forgo the improvement of one aspect of their home's physical structure as they would be to lose 0.263 units on the food insecurity index. In terms of food insecurity severity, this movement is similar to "adult cut size of meals of skipped meals," (food insecurity score at 4.35) to "respondent hungry but didn't eat," (food insecurity score at 4.43). While this type of change certainly reflects a change in well-being, the magnitude of this change is not the same as was seen in the relationship to economic insecurity. Therefore, housing insecurity is not as severe a hardship to the household as economic insecurity.

The quality of the housing is a less important measure for many of these households due to their own perception that their current economic situation will be short-lived. While a decrease in the housing insecurity is certainly not desirable, it is bearable if the households believe that there is change on the horizon. Given a short-term time horizon, the solution to their utility maximization subject to a very limited budget constraint is to concentrate income on food and economic insecurity. It may be that under a different time horizon, households may make different decisions with respect to the tradeoffs between food, housing, and economic insecurity.

The results of this analysis of the substitutability of these hardship measures reveals that these households prefer to avoid food insecurity at the expense of housing insecurity first and economic insecurity later. One interpretation is that households will allow for the deterioration of up to three specified aspects of the home's structure before they view this to be more pressing than one unpaid bill. Also, households will allow for the deterioration of up to four specified aspects of the home's structure before they make a change in food

consumption that would mean a movement from "not feeding a child a balanced meal,"(3.97) to "children not eating enough" (5.02).

X. CONCLUSIONS

The study has shown that the three different kinds of material hardships studied are correlated with one another, and that there exist significant differences in the levels of material hardships across household types. Examining the leavers and stayers groups, it was found that Able-Bodied Adults without Dependents (ABAWDs) who left the Food Stamp program had a lower level of food insecurity, but a significantly higher level of economic insecurity. In order to understand how differences in demographic, asset, and human capital/resource constraint variable influence well-being, this study set up an ordinary least squares regression model.

The study found a number of variables that explain the variation in material hardship levels across households. The most significant variable in predicting the household's level of material well-being is the gender of the respondent. Second adult earnings and non-earnings income have a significant impact on alleviating economic insecurity. The magnitude of the elasticities of economic insecurity and housing insecurity with respect to these nominal income measures demonstrated that these variables also have a significant impact upon the household's well being.

The household's wage rate, as approximated through an imputed wage rate, has been shown to be statistically insignificant. The asset variables of owning a car and owning a home have opposite "income effects" of decreasing economic insecurity, while the "owning a car" variable has an insignificant impact on the level of food insecurity. The number of people in the household, both adults and children, was not a significant predictor of well-being, although the adults variable is important to the extent that it is correlated with total household earnings.

These findings show that female-headed households have the most difficult time in alleviating material hardships. The earnings potential of all adults in the low-income household was found to be a useful predictor for the level of well-being. Finally, there is a need to emphasize the differences in asset levels and transportation problems that face low-income households.

Material hardship was a problem for many of these food stamp households, and the different measures are correlated. Over half of households that experienced food insecurity experienced housing or economic insecurity. Households experiencing one form of hardship are likely to experience others. The Food Stamp program as the remaining safety net program will continue to offer important support to families in this period of welfare reform.

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