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**DISSERTATION**

**A CONSUMER EXPENDITURE APPROACH TO ESTIMATING CHANGES IN THE STANDARD OF  
LIVING IN THE UNITED STATES: 1984 TO 1992**

Submitted by

**David Edward Chaplin**

**Department of Economics**

**In partial fulfillment of the requirements**

**for the Degree of Doctor of Philosophy**

**Colorado State University**

**Fort Collins, Colorado**

**Fall 2001**

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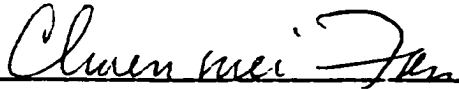
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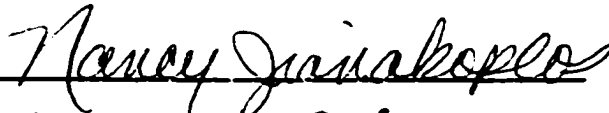
COLORADO STATE UNIVERSITY

November 5, 2001


WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY DAVID EDWARD CHAPLIN ENTITLED "A CONSUMER EXPENDITURE APPROACH TO ESTIMATING CHANGES IN THE STANDARD OF LIVING IN THE UNITED STATES: 1984 TO 1992" BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF PH.D.

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## **ABSTRACT OF DISSERTATION**

### **A CONSUMER EXPENDITURE APPROACH TO ESTIMATING CHANGES IN THE STANDARD OF LIVING IN THE UNITED STATES: 1984 TO 1992**

This dissertation employs a consumer expenditure, rather than income or wealth, approach to assess economic well-being in the United States. The inspiration for this method of analysis derives from Amartya Sen's concept of capabilities and functionings. Capabilities represent the potential for a "full life" individuals face, given their financial resources, health, age and education. Functionings are a subset of capabilities actually achieved.

The standard of living is estimated by traditional measures of economic well-being, such as income and wealth. However, to estimate functionings, the distribution of consumers' expenditures across an array of goods and services must be analyzed because of shortcomings inherent in income and wealth measures. For example, an individual with high income and/or wealth may exhibit high capabilities, yet have low functionings because of unusually high expenses for medical care.

The Consumer Expenditure Survey (CES) is the data set employed to analyze changes in the functionings estimate of the standard of living. Macro issues such as real expenditure growth across the population and the size distribution of the middle class are analyzed as well as micro issues such as: child care expenditures across households, health care expenditures, luxury expenditures by the affluent and the "burden" of expenditures on essential goods and services across households. Descriptive statistics, single and Simultaneous-Equation Tobit (SET) as well as Almost Ideal Demand System (AIDS) and Enhanced AIDS models are employed to evaluate how a representative sample of Americans and various "socioeconomic groups" fared in terms of enrichment or retraction of their expenditures over the period 1984 to 1992.

**This dissertation contributes to the literature by evaluating Senian functionings by consumer expenditure measures, expanding Amemiya's (1974, 1979, 1985) Simultaneous-Equations Tobit model to a complete system of consumer behavior and broadening the AIDS model of Deaton and Muellbauer (1980a) to account for the impact of demographic characteristics on consumer expenditure patterns, which is referred to as the Enhanced AIDS model. The descriptive and analytical evidence indicate the following: (1) consumer expenditure measures reveal standard of living estimates that vary radically from earnings, income and wealth measures and (2) the enhancement of the AIDS model to account for demographic characteristics increases its explanatory power significantly.**

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Fall 2001**

## **ACKNOWLEDGEMENTS**

Some economists are made and some are born that way; I was born that way. Ever since I questioned the marginal productivity of Juan Valdez's labor effort (the gentleman who "...[P]icks every coffee bean for Folgers Coffee by hand," as the advertisements claimed) as a boy of nine, my family knew I would become an economist.

Nonetheless, even one destined to become an economist must rely upon the encouragement, inspiration and analytical skills of their friends, family, professional cohorts and mentors. I have been richly blessed in the aforementioned arena.

The person who has had the greatest influence professionally and personally during the course of my tenure at Colorado State University is Walter Schwarm. He has offered unflagging technical support and shown tremendous interest in the project all along. Walter is a precocious talent who could hold his own against any economist I have ever known. I feel fortunate that a friendship has developed through shared academic striving and common social interests which has been profound and enduring. I may joke about being the total package, but he really is.

I would also like to thank some of the wonderful professors and mentors I have had over the years, highlighted by Michael Hutchison, John Harvey, my dissertation adviser, Robert Keller and the remaining members of my dissertation committee, Nancy Jianakoplos, Chuen-Mei Fan and Michael Lacy.

Dr. Keller has shown tremendous confidence in my teaching and research abilities from my first day at Colorado State University. He gave me the unique opportunity to teach Economic History of the United States while still a graduate student and never questioned my ability to tackle such a comprehensive and complex dissertation topic. His confidence in me gave me the strength to push through with my dissertation during its most challenging intervals.

Nancy Jianakoplos offered excellent technical advice on a host of econometric topics. Her high standards of excellence and steady pressure to bring out the best in me is greatly appreciated. Chuen-Mei Fan provided excellent insight into the applicability of Amartya Sen's framework of capabilities and functionings; furthermore, it was in her classes that I was first introduced to Sen's work, which provided the impetus for this dissertation. Last, but surely not least, Michael Lacy demonstrated unbridled enthusiasm for my dissertation topic and tremendous respect for the ambition I showed in choosing such a challenging subject.

I owe a tremendous debt of gratitude to my childhood best friend, Brian Lee Martin. He has believed in me, no questions asked. He was there for the defense of my dissertation proposal, and I owe him thanks for that. Other friends such as Jackie and Allee "Pithy" Smith, Geoffrey Shaw, Mary Underwood, Dawna Brimer, David "Big Papa" Berri and Katherine "Kace" Chalmers have also offered continuous encouragement and, much like former middleweight contender Michael "The Force" Watson, have slowly (almost imperceptibly) increased the pressure. Lastly, all of my immediate family members have been paramount in offering emotional support, and for that I am eternally grateful. Through the support of all the aforementioned, I have discovered the humbling reality that no one can truly stand alone all the time.

## **DEDICATION**

The greatest factor in shaping who I am today is undoubtedly my Irish-American Grandmother, Jewel Mace Flanagan. A tremendously gifted and occasionally volatile redhead who enjoyed a sixty-three year teaching career and success as a published poet, she was, quite simply, "the goods" -- an uncanny combination of brains, beauty and style. She taught me two things I have never forgotten: (1) that what people remember when you are long gone are your integrity and character; the things superficial are quickly forgotten and (2) that teaching changes lives in more ways than we could ever know. She passed away in 1988, so this dissertation is dedicated to her. When the question arises, "If you could have lunch with one person from history, who would it be?", it is no contest; I'd choose Grandmother every time. Wish you were here, Gran.

## TABLE OF CONTENTS

<b>Chapter</b>	<b>Page</b>
<b>CHAPTER ONE - INTRODUCTION</b> .....	<b>1</b>
<b>Sen's Capabilities and Functionings</b> .....	<b>3</b>
<b>Additional Rationales for Evaluating the Standard of Living Using CES Data</b> .....	<b>8</b>
<b>Limitations of the Consumer Expenditure Approach</b> .....	<b>9</b>
<b>Changes in Debt Burdens and Net Wealth for the Middle Class and Poor</b> .....	<b>12</b>
<b>Preview of the Dissertation</b> .....	<b>13</b>
<b>Endnotes to Chapter One</b> .....	<b>16</b>
<b>CHAPTER TWO - SURVEY OF THE LITERATURE: CHANGES IN THE STANDARD OF LIVING BY INCOME AND WEALTH MEASURES</b> .....	<b>17</b>
<b>The Changing Distribution of Income</b> .....	<b>18</b>
<b>The Changing Distribution of Earnings</b> .....	<b>19</b>
<b>The Changing Distribution of Wealth</b> .....	<b>22</b>
<b>The Shrinking Middle Class</b> .....	<b>24</b>
<b>The Changing Poverty Rate and Movements Out of the Middle Class</b> .....	<b>26</b>
<b>Endnotes to Chapter Two</b> .....	<b>28</b>
<b>APPENDIX TO CHAPTER TWO</b> .....	<b>29</b>
<b>CHAPTER THREE - CONSUMER EXPENDITURE MEASURES OF THE STANDARD OF LIVING AND SPENDING PATTERNS BY SOCIOECONOMIC AND DEMOGRAPHIC GROUPS</b> .....	<b>31</b>
<b>The Standard of Living</b> .....	<b>32</b>
<b>Inequality by Quintile Analysis</b> .....	<b>32</b>
<b>Inequality Within and Across Demographic Groups</b> .....	<b>33</b>

<b>The Middle Class</b> .....	<b>34</b>
<b>Consumer Expenditure Measures of Inequality and Poverty</b> .....	<b>35</b>
<b>Consumer Expenditure Patterns by Categories of Goods and Services</b> .....	<b>36</b>
<b>Housing</b> .....	<b>36</b>
<b>Out-of-Pocket Health Care</b> .....	<b>37</b>
<b>Child Care</b> .....	<b>38</b>
<b>Essential and Luxury Goods</b> .....	<b>39</b>
<b>The Consumer Expenditure Survey Data Set and Rationale for Time Period Chosen</b> .....	<b>41</b>
<b>The Consumer Expenditure Survey Data Set</b> .....	<b>41</b>
<b>Rationale for the Time Period Chosen</b> .....	<b>45</b>
<b>Preview of Chapter Four</b> .....	<b>46</b>
<b>Endnotes to Chapter Three</b> .....	<b>48</b>
<b>CHAPTER FOUR - ANALYZING THE CES DATA: A FIRST APPROXIMATION</b> .....	<b>49</b>
<b>The Standard of Living</b> .....	<b>49</b>
<b>Aggregate Consumer Expenditure Estimates of Changes in the Standard of Living</b> .....	<b>49</b>
<b>Changes in the Standard of Living Among Consumer Unit Groups and Across the Expenditure Distribution</b> .....	<b>50</b>
<b>The Size Composition of the Middle Class</b> .....	<b>53</b>
<b>Expenditures by Categories of Goods and Services</b> .....	<b>58</b>
<b>Out-of-Pocket Health Care (OPHC) Expenditures</b> .....	<b>58</b>
<b>Child Care Expenditures</b> .....	<b>63</b>
<b>Expenditures on Essential and Luxury Goods</b> .....	<b>65</b>
<b>Expenditures on Luxury Goods by Affluent Consumers</b> .....	<b>67</b>
<b>Preview of Chapter Five</b> .....	<b>70</b>
<b>CHAPTER FIVE - ESTIMATING COMPLETE SYSTEMS OF CONSUMER EXPENDITURES</b> .....	<b>71</b>
<b>Introduction</b> .....	<b>71</b>

<b>Rationale for Estimating Complete Systems of Consumer Expenditures</b> .....	<b>71</b>
<b>Background on the SET and AIDS Models</b> .....	<b>74</b>
<b>A SET Model of Consumer Expenditures</b> .....	<b>75</b>
<b>Specification of the SET Estimating Model</b> .....	<b>76</b>
<b>Rationale for Equation Specification within the Systems of Equations</b> .....	<b>78</b>
<b>An AIDS Model of Consumer Expenditures</b> .....	<b>86</b>
<b>Specification of the AIDS Estimating Model</b> .....	<b>87</b>
<b>The Enhanced AIDS Estimating Model</b> .....	<b>87</b>
<b>Empirical Results for the Sample Universe and Demographic/Socioeconomic Subgroups</b> . . . .	<b>88</b>
<b>Endnotes to Chapter Five</b> .....	<b>90</b>
<b>CHAPTER SIX - INTERPRETATION OF THE RESULTS BY EXPENDITURE RANKING FROM THE SYSTEMS OF EQUATIONS MODELS</b> .....	<b>91</b>
<b>The SET, AIDS and Enhanced AIDS Models for the Entire Sample, 1984</b> .....	<b>91</b>
<b>The SET, AIDS and Enhanced AIDS Models for the Entire Sample, 1992</b> .....	<b>93</b>
<b>Significant Failures and Successes of the SET, AIDS and Enhanced AIDS Models, 1984</b> . . . .	<b>94</b>
<b>Aggregative Tests of the SET, AIDS and Enhanced AIDS Models, 1984</b> .....	<b>94</b>
<b>Significant Failures and Successes of the SET, AIDS and Enhanced AIDS Models, 1992</b> . . . .	<b>97</b>
<b>Analysis of the AIDS and Enhanced AIDS Model Results, 1984 and 1992</b> .....	<b>99</b>
<b>The Enhanced AIDS Model: Inter-Year Comparisons Over the Expenditure Ranking, 1984 and 1992</b> .....	<b>101</b>
<b>The Bottom Quintile of the Expenditure Ranking</b> .....	<b>104</b>
<b>The Middle Quintile</b> .....	<b>105</b>
<b>The Top 5 and 1 Percent</b> .....	<b>106</b>
<b>Inter-Year Difference of Means Tests for Expenditure Shares</b> .....	<b>108</b>
<b>Summary of the Most Interesting Results from the Enhanced AIDS Model</b> .....	<b>110</b>
<b>APPENDIX TO CHAPTER SIX (GROUPED BY EXPENDITURE RANK)</b> .....	<b>114</b>

<b>CHAPTER SEVEN - INTERPRETATION OF THE RESULTS BY DEMOGRAPHIC PROFILE FROM THE SYSTEMS OF EQUATIONS MODELS</b> .....	<b>160</b>
<b>Intra-Year Comparisons Across Demographic Groups Within the AIDS Model</b> .....	<b>160</b>
<b>Aggregative Tests of the AIDS Models by Demographic Group</b> .....	<b>162</b>
<b>Expenditures by Consumer Unit Type: All Consumer Units with Children, Single Parents and those without Children</b> .....	<b>164</b>
<b>Consumer Units with Children</b> .....	<b>164</b>
<b>Single Parents</b> .....	<b>164</b>
<b>Urban versus Rural Consumer Units</b> .....	<b>165</b>
<b>Non-Senior, Aged 65 to 74 and 75 and Older Consumer Units</b> .....	<b>166</b>
<b>Comparing those Aged 65 to 74 with those Aged 75 and Older</b> .....	<b>167</b>
<b>Inter-Year Difference of Means Tests</b> .....	<b>168</b>
<b>Summary of the Most Interesting Results</b> .....	<b>169</b>
<b>Other Results by Category of Expenditure</b> .....	<b>170</b>
<b>APPENDIX TO CHAPTER SEVEN (GROUPED BY DEMOGRAPHIC PROFILE)</b> .....	<b>172</b>
<b>CHAPTER EIGHT - SUMMARY AND CONCLUSION</b> .....	<b>195</b>
<b>Summary of Chapters One Through Four</b> .....	<b>196</b>
<b>Summary of Chapters Five Through Seven</b> .....	<b>200</b>
<b>Significant Contributions to the Literature</b> .....	<b>207</b>
<b>Implications for Future Research</b> .....	<b>210</b>
<b>APPENDIX: SET MODEL, 1984 AND 1992</b> .....	<b>213</b>
<b>BIBLIOGRAPHY</b> .....	<b>240</b>
<b>PUBLIC DOCUMENTS</b> .....	<b>253</b>

## LIST OF TABLES

Table 3.1: Share of Aggregate Consumer Expenditures for Each Expenditure Quintile and the Top 5 Percent of Consumer Units .....	32
Table 3.2: Share of Aggregate Income Received by Each Income Quintile and the Top 5 Percent of Households .....	33
Table 4.1: Changes in Mean Real Consumer Expenditures by Consumer Unit Type, 1984 to 1992 .....	51
Table 4.2: Changes in Mean Expenditure Ranking by Consumer Unit Type, 1984 to 1992 .....	52
Table 4.3: Changes in Real Consumer Expenditures by Expenditure Rank, 1984 to 1992 .....	53
Table 4.4: Duncan's Middle Class Thresholds Measured by Total Consumer Expenditures, Age 65 and Older and all Ages .....	55
Table 4.5: Percentage of Consumer Units Included in the Middle Class (Defined by Consumer Expenditures) .....	55
Table 4.6: Percentage of Consumer Units Included in the Middle Class (For Duncan's Measure, Defined by Consumer Unit Type) .....	56
Table 4.7: Mean Real Expenditure Growth Amongst the Middle Class, 1984 to 1992 .....	56
Table 4.8: Middle Class Status Amongst Seniors .....	57
Table 4.9: Out of Pocket Health Care Expenditures (OPHC) in 1984 .....	60
Table 4.10: Out of Pocket Health Care Expenditures (OPHC) in 1992 .....	61
Table 4.11: Expanded Out-of-Pocket Health Care Expenditures (Including Health Insurance Coverage) in 1984 .....	62
Table 4.12: Expanded Out-of-Pocket Health Care Expenditures (Including Health Insurance Coverage) in 1992 .....	62
Table 4.13: Child Care Expenditures in 1984 .....	65
Table 4.14: Child Care Expenditures in 1992 .....	65
Table 4.15: Essential Goods Expenditure Shares by Expenditure Rank .....	67
Table 4.16: Relative Luxury Expenditures by Affluent Consumers, 1984 .....	68

<b>Table 4.17: Relative Luxury Expenditures by Affluent Consumers, 1992</b> .....	<b>69</b>
<b>Table 5.1: Definitions of Variables in SET Model</b> .....	<b>78</b>
<b>Table 6.1: SET Model: Statistically Significant Variables in 1984</b> .....	<b>95</b>
<b>Table 6.2: AIDS Model: Statistically Significant Variables in 1984</b> .....	<b>96</b>
<b>Table 6.3: Enhanced AIDS Model: Statistically Significant Variables in 1984</b> .....	<b>97</b>
<b>Table 6.4: SET Model: Statistically Significant Variables in 1992</b> .....	<b>98</b>
<b>Table 6.5: AIDS Model: Statistically Significant Variables in 1992</b> .....	<b>98</b>
<b>Table 6.6: Enhanced AIDS Model: Statistically Significant Variables in 1992</b> .....	<b>99</b>
<b>Table 7.1: AIDS Model: Statistically Significant Variables in 1992</b> .....	<b>162</b>
<b>Table 7.2: AIDS Model: Statistically Significant Variables in 1992</b> .....	<b>163</b>

## **CHAPTER ONE**

### **INTRODUCTION**

The discipline of economics has traditionally used income and wealth statistics to ascertain the standard of living. The most popular research employing income and wealth measures of inequality to emerge in recent years has been that of Edward Wolff (1994, 1995a, 1995b, 1998). Wolff found that the increase in income and wealth inequality in the 1980s was practically unprecedented in United States' history (comparable only to 1922-1929). Wolff's findings of increased income and wealth inequality during the 1980s have been supported by Freeman and Porterba (1993) and Auerbach and Slemrod (1997). Weicher's (1995) analysis of wealth inequality in the United States indicated that wealth inequality during the 1980s was sensitive to a number of factors, such as how broadly wealth is defined and whether or not data for individual households is adjusted for consistency with national balance sheet data.

There is substantial evidence that wealth and real income growth during the 1980s accrued to the upper classes. The primary factors for rising inequality are said to be the increase in stock prices relative to housing prices during the 1980s (as homeownership is much more widely-distributed than stock ownership), lower rates of inflation and changing demographics.

Along with finding of increased income and wealth inequality in the United States, pronouncements of a shrinking middle class became in vogue during the mid-1980s. Nearly all research found conclusive evidence of a reduction in the middle class by income measures. An intriguing explanation of this phenomenon is "positive assortative mating." The idea is that those with similar earnings potential tend to marry each other to a greater degree now than in the past (Thurow, 1984; Cutler and Katz, 1991; Weicher, 1995; Johnson and Shipp, 1996; Welch,

1999). Blackburn and Bloom (1991) provide evidence that the correlation between husbands and wives' earnings increased between 1979 and 1987. One implication of positive assortative mating is that two middle income earners who pool resources through marriage could elevate themselves from the middle class into a position of upper class status (Thurow, 1984; Cancian, 1993; Furchtgott-Roth, 1995).

Wolff's (1995b) evidence of increased income and wealth inequality implies that prosperity was not widely-shared between 1983 to 1989. For example, of total real income gains over this period, 37.42 percent accrued to the top one percent of the income distribution, while 38.93 percent accrued to the next 19 percent of the income distribution and the lowest 80 percent of the income distribution received an increment of only 23.7 percent. The distribution of real financial wealth<sup>1</sup> became even more skewed over this time, as 66.2 percent of real gains accrued to the top one percent of the wealth distribution, 36.8 percent to the next 19 percent and the lowest 80 percent actually suffered a real wealth loss of 3 percent. For comparison, between 1962 and 1983, 34 percent of wealth gains accrued to the top one percent, 48 percent to the next 19 percent and 18 percent to the bottom 80 percent of the wealth distribution. Wolff's (1995b) most telling implication of increased wealth inequality is that the United States was transformed from having one of the most equitable wealth distributions in the industrialized world to having the most inequitable by the late 1980s (Wolff, 1995b, p. 21). This widening rift between the "haves" and "have nots" in the United States raises important questions about the opportunity for those in the lower and middle segments of the income and wealth distributions to share in the benefits of improved macroeconomic performance. Thurow (1984) views a healthy and sizeable middle class as necessary for preserving democracy. A highly-skewed distribution of income, he postulates, sows the seeds for a Marxian revolution in which the poor revolt, destroy capitalism and establish communism. The concomitant reduction in the broad base of purchasing power that the middle class provides creates an increasingly risky economic milieu, such as that experienced in the United States during the 1920s.

## **Sen's Capabilities and Functionings**

Although income and wealth distributional measures provide insights into the standard of living, they are incomplete measures. Amartya Sen's concept of capabilities and functionings (1987, 1992, 1999) presents a comprehensive framework for evaluating the standard of living. Capabilities represent the opportunities all individuals face given their financial resources, health, age and position in the labor market. Functionings are a subset of capabilities; they represent those capabilities actually realized. For example, an individual may have the income, job flexibility and health to travel extensively (a capability), but may not attain this functioning because past health problems require large current payments on accumulated medical bills. In a case such as this, the individual's capabilities or "opportunity set" may be quite large, but her functionings (attainments) are constrained due to past misfortunes. Sen defines the ability to "enjoy a full life" in terms of expansive capabilities and functionings. When one struggles to provide the bare essentials of life, there is little hope of planning for retirement, providing a college education for their children and taking vacations.

Within the context of capabilities and functionings, poverty or affluence may be delineated as either an absolute or relative concept. That is, certain capabilities, such as Adam Smith's (1976) famous example of the ability to appear in public without shame (which required wearing a linen shirt in late-eighteenth century London), are absolute. If they are desirable at all, they are desirable for all (Sen, 1987). The capability to appear in public without shame, while absolute, is defined relative to cultural norms and social customs. Presently, young males growing up in South Central Los Angeles may feel it is necessary to wear a pair of \$160 high-top basketball shoes<sup>2</sup> to be accepted by their peers. While the prior example is quite specific, in an affluent nation such as the United States the "commodity bundle" required to participate in the mainstream of society is quite large and varied. For those living in affluent nations, attaining basic absolute social functionings such as the ability to appear in public without shame embodies a greater need for goods and services than is necessary in poor nations (Sen, 1992, p. 115).

It is by designating the appropriate "space" in which poverty or affluence is to be estimated that Sen cleverly bridges the gap between the thoroughgoing absolutist or relativist measures which have divided economists for decades. If one is relatively deprived in the space of income or consumer expenditures, he is likely to be absolutely deprived in the space of basic functionings such as appearing in public without shame, having self-respect or avoiding early mortality.

On the issue of early mortality resulting from relative deprivation in the income space, Otten, et al., (1990) provide evidence that African-American males aged 35 to 55 have 2.3 times the mortality rate of Whites and that those living in Harlem, New York have less chance of reaching the age of 40 than the men of Bangladesh (McCord and Freeman, 1990). Since those living in Harlem have higher incomes, on average, than the average Bangladeshi has, the higher probability of early mortality that Harlem males suffer is due to the relative deprivation they suffer in the income space, and negative attributes such as violent urban crime, inadequate health care and poor diet. In terms of merely "getting about town," nations (or regions within nations) where virtually everyone owns an automobile are likely to have underdeveloped systems of public transportation, which creates absolute deprivation for those without automobiles in these areas that would not be suffered by those in poorer areas.

Since information about all of the aforementioned enhancing or mitigating factors that individuals have working in their favor is unavailable, characteristics such as income, wealth and consumer expenditure patterns may be used as proxies for individuals' potential for self-fulfillment in both an absolute and relative sense. While income and wealth serve as an approximation of the capabilities individuals face, it is expenditure patterns that approximate functionings, i.e., how individuals with varying needs and wants allocate their expenditures in order to maximize their well-being (Sen 1987, 1992; McGregor and Borooah, 1992; Mayer and Jencks, 1993).

Consumer expenditure measures are a proxy for functionings because they represent capabilities realized. Furthermore, analyzing functionings within a consumer expenditure

framework allows one to distinguish functionings-enhancing expenditures from those which are defensive in nature. Defensive expenditures are those taken to prevent a reduction in functionings rather than to increase them. Cobb, et al., (1995) refer to defensive expenditures as "...[T]he money people spend to prevent erosion in their quality of life or to compensate for misfortunes of various kinds" (p. 1). Halstead (1996) captures the essence of defensive expenditures with the following broad statement: "Funds spent to maintain a given level of service, without increasing the amount of service received are treated as 'defensive expenditures' (i.e., costs)..." (p. 2). Cobb, et al., Halstead and Johnson and Smeeding (1995) view medical expenses as the *sine qua non* of expenditures which are defensive in nature, but recognize that medical expenditures may have a discretionary and functionings-enhancing nature as well (such as plastic surgery to remove "crows feet"). They also view factors such as the material costs of automobile accidents, commuting costs, crime prevention mechanisms and the cost of pollution control devices as defensive expenditures.

Although this dissertation does not rigorously test Senian capabilities and functionings, the consistency between consumer expenditure measures of well-being and Sen's concept of functionings will be examined in detail. As Sen mentions, data limitations make a quantitative analysis difficult: "Ideally, the capability approach should take note of the full extent of freedom to choose between different functioning bundles, but limits of practicality may often force the analysis to be confined to examining the *achieved* functioning bundle only. This is obviously more of a problem when we use the capability approach to assess *freedom* rather than the actual *well-being* attained, but even for the latter, data limitations can be -- for reasons already mentioned -- a substantial drawback" (1992, p. 53). Consumer expenditure data are advantageous because they are an *ex post* measure of consumer behavior consistent with Sen's concept of functionings, and they allow for a more detailed analysis of the standard of living than income and wealth measures. Whereas income and wealth measures typically restrict their analysis to broadly aggregated households (Wolff, 1995b), consumer expenditure measures allow research to

categorize by expenditure ranking or by demographic characteristics, such as the elderly, single parents and urban or rural residents.

While Sen's conceptual framework is too complex to capture quantitatively in a rich and robust manner, consumer expenditure measures appear to embody the spirit of Senian functionings. We are warned that: "The value of the living standard lies in the living, and not in the possessing of commodities, which has derivative and varying relevance" (Sen, 1987, p. 25). That is, commodities provide a means to an end, for example, social acceptance, and are not a way of life or end in themselves (Chaplin, 1992; Paim, 1995). To value commodities for their own sake is to fall into the trap Marx (1887) referred to as "commodity fetishism," i.e., to regard goods as inherently valuable rather than viewing their value in the context of how they help people attain functionings. With the "end" (i.e., one's functionings) proving to be such an elusive concept to quantify, however, the researcher must step back and draw inferences of functionings from the means (consumer expenditures) they employ to attain them.

Traditional estimates of consumers' standard of living, in addition to income and wealth measures, include approaches such as basic needs, minimum level of resources measures and utility. The basic needs approach estimates whether an individual or household has the opportunity to fulfill primary biological requirements (generally restricted to food, clothing, shelter, health care) relative to some predetermined minimum standard. Historically, policymakers in the United States have viewed poverty as an inability to provision for basic needs, and have therefore derived targeted programs that provide the goods and services that meet basic needs directly to the individual (food stamps, housing vouchers, Medicaid). An alternative viewpoint of poverty is that it reflects a level of economic resources (generally measured as income), which is below an acceptable minimum. This view of poverty is consistent with a policy that guarantees some minimum level of income to all households. Lastly, the utility approach to the standard of living views personal happiness or "desire fulfillment" as an individual's ultimate goal. Since the level of utility one can attain is based on consumption (with potential consumption defined by

real income), the utility view is essentially a representation of the economic resources view of economic well-being.

Sen views the basic needs, economic resources and utility theories of poverty or the standard of living as inherently problematic. Despite Sen's dissatisfaction with the basic needs approach, he does view it as a step in the right direction because, "The net impact of the emergence of these approaches has been to draw attention, in an immediate and powerful way, to the importance of the type of life that people are able to lead" (1987, p. 24). However, Sen believes the basic needs approach falls short of being formulated in line with capabilities and functionings. Sen identifies the limitation of the basic needs approach succinctly in the following passage: "If the objects of value are functionings and capabilities, then the so-called 'basic' needs in the form of commodity requirements are *instrumentally* (rather than intrinsically) important" (1987, p. 25).

Viewing poverty or low living standards as the result of an inadequate level of economic resources is insufficient according to Sen since this approach limits the analysis to the resources an individual commands, while ignoring their capabilities and functionings, which are defined by choices (opportunities) and achievements. The fundamental flaw with employing resource measures to infer economic well-being is that personal and social characteristics vary greatly across individuals, which can lead to significant interpersonal variations in the conversion of resources into achievements (Sen, 1992, p. 38).

The utility approach to the standard of living also poses conceptual limitations relative to the Senian framework because it pays no direct attention to the importance of freedom (the capability) to pursue well-being or any other objective. An even more limiting aspect of the utility approach, according to Sen, is the problem of entrenched inequalities. For example, those individuals facing situations of persistent adversity and deprivation tend to reconcile themselves to their circumstances and resist pining for the improbable or impossible (Sen, 1987, 1992). The problem with the utility approach in the presence of these entrenched inequalities is that the disadvantaged may not appear so badly off in terms of desire fulfillment. Sen punctuates his case

powerfully with the statement: "The extent of a person's deprivation may be substantially muffled in the utility metric, despite the fact the he or she may lack the opportunity to be adequately nourished, decently clothed, minimally educated or properly sheltered" (1992, p. 6).

### **Additional Rationales for Evaluating the Standard of Living Using CES Data**

The case for using consumer expenditures to estimate changes in the standard of living within the context of Sen's capabilities and functionings will be developed in more detail. Auxiliary justification will be provided by Friedman's (1957) Permanent Income Hypothesis as well as persuasive arguments by McGregor and Borooah (1992) and Slesnick (1994) that consumption is a better measure of well-being than income since it more closely conforms to economists' concept of utility.

Despite the limitation of such measures purported by Sen, utility theory is the most common basis for evaluating the standard of living among economists. Simply put, utility theory states that individuals gain utility (or satisfaction) from the goods and services they consume. Since the capacity for consuming goods and services is dependent upon income and wealth, it is usually these latter variables which are used to draw inferences about the utility individuals enjoy.

While no one measure of well-being can accurately describe the economic environment in which individuals operate, much of the literature on the standard of living exhibits a preference for consumer expenditure measures. Volumes of research encouraged by Milton Friedman's (1957) permanent income hypothesis (PIH) have shown that current income is a poor proxy for the consumption of goods and services that individuals enjoy. For example, households in the lower tail of the income distribution are disproportionately represented by those with temporary reductions in income and typically exhibit high ratios of consumption to income in an effort to maintain a standard of living to which they have become accustomed (Cutler, 1991; Slesnick, 1993; U.S. Department of Labor, 1995). That is, consumption is less subject to large year-to-year variations than is current income (Deaton, 1992). As well as being consistent with the PIH, it has been argued that consumption is a more appropriate indicator of well-being because utility is

derived from the consumption of goods and services (McGregor and Borooah, 1992; Slesnick, 1994).

Due to the data limitations of trying to estimate capability (opportunity) sets, Sen (1992, p. 53) and others operating within a Senian framework (Martinetti, 2000, p. 210) have argued that researchers may be restricted to estimating functionings. These achieved functionings are best estimated by consumer expenditures. Information about income or wealth are generally inadequate for drawing inferences achieved functionings. For example, an individual who earns \$200,000 annually, yet has enormous out-of-pocket medical expenses may actually be worse off than an individual with no out-of-pocket medical expenses and an annual income of \$75,000. McGregor and Borooah (1992) confirm the validity of the Senian framework by comparing two measures for statistical consistency in representing economic well-being. These consist of an expenditure-based *direct* measure (the standard of living) with an income-based *indirect* measure (the level of resources at one's disposal), which is also referred to as an entitlement measure. The authors categorize the two concepts as follows: "The standard of living is a measure of the outcome of the participation of the individual (or family or household) in economic activity and its use reflects a concern for individual circumstances that extends beyond kinship to each member of a society...In contrast to the approach centered on outcomes, the notion of entitlement views an individual's participation in society as being conditional upon having a minimum level of resources (p. 54)." Due to the consistent picture of economic well-being that the expenditure measure provides vis-a-vis the income measure, the authors conclude that: "Here the evidence suggests that the expenditure measure is superior" (p. 67).

### **Limitations of the Consumer Expenditure Approach**

While there are great benefits in using a consumer expenditure measure of well-being for particular "groups" in the economy, such as the very poor (who often receive income in-kind and are believed to severely under-report income [Jencks and Edin, 1990; McGregor and Borooah, 1992]) and those with unusual nondiscretionary out-of-pocket expenses (such as enormous

medical or child care expenses), it is hardly a panacea. For example, it seems that income and wealth measures are more appropriate for the very wealthy, as both their high-level of consumption and high savings rates tend to expand both the functionings and capabilities they have available at the present and into the future. If money "lulls our disquietude", as John Maynard Keynes once stated, then wealth is functionings-enhancing for the security that it provides its possessor unlike that which is implied by one's yearly consumer expenditure patterns. Furthermore, it may be beneficial to emphasize income and wealth as measures of well-being for the elderly, who have often greatly reduced their nondiscretionary expenditures by this stage of their lives.

Other complications arise from using consumer expenditure measures to assess the standard of living when the analysis is broadened to account for: (1) changes in debt and wealth accumulation; (2) inter-temporal economic well-being and (3) human capital investment. In analyzing the impact of changes in wealth and debt accumulation on intertemporal well-being, annual consumer expenditures do not provide information as to how those expenditures are financed. A household with a disposable income of \$40,000 per year that saves \$15,000 is accumulating wealth which enhances their intertemporal functionings, because wealth accretion allows for greater future consumer expenditures or bequests. However, a household with a disposable income of \$18,000 per year that spends \$25,000 is either dissaving or accumulating debt. The reduction of net wealth incurred by the latter household diminishes intertemporal functionings as future consumer expenditures and bequests will be lower due to their spending in excess of current income. While both households are equally well-off when annual aggregate consumer expenditures are compared, their implications for future functionings differ dramatically.

Aggregated consumer expenditures are limited because they do not distinguish those expenditures on pure consumption goods or services from those which increase productivity. For example, the expenditure of \$10,000 on a motorboat has very different implications for intertemporal functionings than the same expenditure for college tuition, as the former is designed

for recreation while the latter is expected to increase productivity (and therefore earnings) over the student's lifetime.

To integrate these limitations of the consumer expenditure approach into a single anecdote, imagine a student working full-time toward her Ph.D. in Computer Science without any financial stipend. According to the Permanent Income Hypothesis, she will engage in dissaving and/or debt accumulation during graduate studies due to her expectations of future income. Therefore, consumer expenditures measures would provide a more accurate picture of her standard of living over a short period of time, such as a year, because her reported income would be zero. However, due to the limitation of the CES data in terms of wealth and debt data (Consumer Expenditure Survey Tapes, 1984-1985 and 1992-1993; Mayer and Jencks, 1991), there is not sufficient information to determine how consumer expenditures in a given year are financed (from current income, unreported transfers from friends and family, dissaving or debt accumulation). This limitation prevents consumer expenditures from painting a complete picture of the standard of living because, for example, the burden of excessive student loans to finance current spending can limit future functionings in a manner that spending out of current income does not.

The fact that a consumer expenditure measure of the standard of living is superior for the Ph.D. student under consideration has been established. Furthermore, the importance of how she has financed her consumption has also been underscored, since this has implications for future functionings. However, the issue of human capital investment has not been scrutinized. While income, wealth or consumer expenditure measures may imply low levels of functionings for this student during her time as a Ph.D. student, she has willingly taken-on these sacrifices for the opportunity of enhancing future functionings. Completing the Ph.D. in Computer Science and securing a tenure-track position in academia would lead to: (1) a dramatic increase in income; (2) increased status by title and employment and (3) the potential for job security and meaningful, gratifying employment. These limitations of income, wealth and consumer expenditure survey data as single sources for inferring the standard of living highlight the need for a comprehensive

survey capable of capturing the impact that changes in savings, wealth, debt accumulation and human capital investment have on intertemporal functionings.

### **Changes in Debt Burdens and Net Wealth for the Middle Class and Poor**

Although consumer expenditure measures for the poor and middle class between 1984 and 1992 show improvement, evidence indicates that these groups became worse off over a comparable time period by income and net wealth measures. For example, mean financial wealth for the middle quintile of the wealth distribution decreased from \$10,000 to \$9,000 over the period 1983 to 1995. while the bottom 40 percent of the wealth distribution suffered a reduction from -\$5,000 to -\$9,000 (Keister, 2000, p. 111). In their recent book, *The Fragile Middle Class: Americans in Debt*, Sullivan, et al., (2000) analyze members of the middle class who have filed for bankruptcy and determine that..."some of our laid-off debtors may have spent themselves further into debt in an effort to maintain their middle class lifestyle until they got back on their feet" (p. 30). In a study of credit card debt in the United States, Yoo (1998, p. 23) found that those in the fortieth to fiftieth decile of the income distribution had an average annual increase in their total credit card balances of 12.0 percent while those in the fiftieth to sixtieth decile had an average annual increase of 14.3 percent over the period 1983 to 1992.

This behavior of increasing debt and reducing net worth, of course, may be completely rational within the context of the Permanent Income Hypothesis, as a short-run interruption to income is not likely to result in serious cuts in expenditures. However, perfectly rational behavior, such as spending to sustain a middle class lifestyle if one believes their employment set-back is only temporary or taking student loans in the previous example of the Ph.D. student, can have burdensome consequences if foresight is not accurate. For example, the student earning a Ph.D. in a field of low demand may get frustrated after years of rejection on the job market and settle for a lesser-paying job that does not take advantage of her substantial human capital investments. Sullivan, et al., (2000) appear to support the case that scenarios such as this are not uncommon in the statement, "The long-term effects of student loans may be an important and growing source

of middle class financial strain that is only beginning to become apparent. Of course, this emerging threat to the middle class may simply be the one most visible to those of us who work in academe" (p. 252).

Keister (2000) found that the poor incurred greater losses to their net worth between 1983 and 1995 due to higher unemployment rates and greater reductions in real wages for this group than any other during the 1980s (Blank, 1993). These higher unemployment rates and declining real wages have decreased saving among low-income households and gradually increased the debt these families held, particularly credit card debt and other liabilities that are intended to be short-term debt (Keister, 2000, p. 119). Yoo (1997, p. 7) confirmed that average credit card indebtedness of low-income households increased more rapidly than the average credit card debt of upper-income households over the period 1983 to 1992.

In summary, it appears that focusing only on consumer expenditures misses important economic consequences for the poor and middle class, namely their reductions in net worth and greater debt accumulation during the 1980s and 1990s. The consumer expenditures sustained by the poor and middle class have come at the price of mitigated future functionings. These limitations highlight the need for: (1) segmenting consumer expenditures into productivity-enhancing and pure consumption goods and services and (2) collecting reliable consumer expenditure and income and wealth data within one source to evaluate households functionings within an intertemporal context.

### **Preview of the Dissertation**

The advantages of using Consumer Expenditure Survey (CES) data, in addition to income and wealth, are that they allow a closer examination of significant socioeconomic and demographic issues, such as: (1) how those at the top of the consumer expenditures ranking have been spending their discretionary income; (2) the changing size distribution of the middle class as measured by consumer expenditures; (3) the burden of housing, health care and child care expenditures and (4) expenditure patterns by socioeconomic and demographic characteristics.

Detailed analysis of consumer expenditure patterns such as these will provide insight into these and many other socioeconomic changes over the period 1984 to 1992.

Chapter Two surveys the income and wealth literature and the evidence for a shrinking middle class. The chapter concludes with an analysis of migration out of the middle class and the changing poverty rate during the 1980s. Chapter Three presents a justification for employing consumer expenditure measures to estimate changes in the standard of living and uses CES data to provide inequality estimates by consumer expenditure measures. Categories of expenditure are developed, with goods and services grouped into "defensive expenditures," "essential expenditures" and "luxury expenditures." The chapter concludes with a rationale for using the 1984 to 1992 time period and a description of the Consumer Expenditure Survey and the data set. Chapter Four presents descriptive statistics on essential and luxury expenditures and single-equation Tobit regression results for out-of-pocket health care and child care expenditures. A sensitivity analysis of middle class status is then performed using consumer expenditure measures. Lastly, changes in real consumer expenditures and changes in consumer units<sup>3</sup> ranking in the expenditures distribution are analyzed by consumer unit composition. The Simultaneous-Equations Tobit (SET), Almost Ideal Demand System (AIDS) and Enhanced AIDS models are developed in detail in Chapter Five, and rationales are provided for each model's, and their respective variables, inclusion in the study.

In Chapter Six, each model is evaluated for the sample universe and by expenditure ranking. Significant failures and successes of each model are discussed. The chapter concludes with an evaluation of each model when consumer units are grouped by their expenditure ranking. The dissertation's focus shifts from socioeconomic characteristics, the expenditure ranking, to demographic characteristics, such as urban or rural residence, age and composition of the consumer unit in Chapter Seven.

The concluding chapter is divided into two sections, with results from the descriptive analyses and their policy implications presented in Section One and the analytical results from the systems

of equations models and their policy implications presented in Section Two. The chapter ends with a discussion of the most interesting implications of the dissertation for future research.

## **ENDNOTES TO CHAPTER ONE**

<sup>1</sup>Wolff defines financial wealth (FW) as net worth minus net equity in owner-occupied housing, making it a more "liquid" concept of wealth, since one's home is difficult to convert into cash in the short term (Wolff, 1994, p. 151).

<sup>2</sup>Full retail price on July 26, 2001 for highest-priced Nike Air Jordan's. Priced at Foot Locker, Cheyenne, Wyoming.

<sup>3</sup>The CES defines the consumer unit (cu) as consisting of any of the following: (1) related family members living together; (2) persons living alone and (3) two or more unrelated individuals living together and pooling their incomes to make joint expenditure decisions.

## **CHAPTER TWO**

### **SURVEY OF THE LITERATURE: CHANGES IN THE STANDARD OF LIVING BY INCOME AND WEALTH MEASURES**

In this chapter, a thorough review of the literature on income and measures of the standard of living is provided. The review is divided into the following five components: (1) the changing distribution of income; (2) the shifting distribution of earnings; (3) the rising inequality of wealth holdings; (4) the shrinking middle class and (5) changing poverty rates and movements from the middle class.

In a series of studies which have revitalized interest in issues of income and wealth inequality, Wolff (1996, 1998) found wealth inequality increased dramatically between 1983 and 1989. Using a net worth<sup>1</sup> estimate of wealth, Wolff observed that the share of wealth accruing to the top 1 percent of the wealth distribution increased from 33.8 percent to 37.4 percent, the top 5 percent increased their share of wealth from 56.1 percent to 59.0 percent, and the top 20 percent increased their share from 81.3 percent to 83.5. Conversely, the middle quintile's share of wealth declined from 5.2 percent to 4.8 percent and the bottom 40 percent also suffered a loss from 0.9 to -0.7 over this time (Table A2.2, Appendix to Chapter Two). Using a narrower definition of wealth than net worth, financial wealth, Wolff (1995b) revealed that the increase in wealth inequality over the period 1983 to 1989 was almost unprecedented in United States history. The only period of comparable increasing wealth inequality was 1922 to 1929.

Wolff's findings of increased income inequality have been supported by much of the literature. For example, Auerbach and Slemrod (1997) found that the Tax Reform Act of 1986 was the dominant factor in increasing post-tax income inequality between 1985 and 1988. However, there

are exceptions. Using different data sources, Cutler and Katz (1991) and Mayer and Jencks (1993) find that income inequality was quite stable between 1983-84 and 1989.

### **The Changing Distribution of Income**

In a study of increasing pre-tax income inequality in the United States, Wolff (1995b) found that while the top one percent of income earners increased their share of real income from 13 to 17 percent of total income, real income remained unchanged for earners in the 81st through 99th percentile of total income (39 percent of total income) and fell from 48 to 45 percent of total income for the bottom 80 percent of income earners. During the twentieth century, income inequality, when measured by the share of total income flowing to the top 5 percent of families, peaked at 25.1 percent in 1929, declined steadily during the Great Depression and World War II, remained flat between the late 1940s and 1981, but rose from 15.4 to 17.9 percent over the period from 1981 to 1989 (Wolff, 1995b, p. 28).

Not surprisingly, Wolff (1995b) finds that the poorest quintile of the income distribution became worse off during the period 1983 to 1989. For example, he finds that average yearly household income (in current dollars) actually fell for this quintile from \$7,000 to \$6,000 and average household financial net worth also declined from -\$6,000 to -\$18,000. Slesnick (1993) also found that a substantial percentage of the income-poor engage in significant dissaving. The fact that total expenditures exceed before-tax income for the poor in all years between 1961 and 1989 implies access to some form of credit or a systematic under-reporting of income and income-in-kind.

Wolff used the Survey of Consumer Finances for his comparisons of pre-tax income inequality, and speculated that post-tax income inequality likely increased by an even greater amount than pre-tax inequality during the period 1983-1989 (1994, pp. 172-173). An analysis of the Tax Reform Act of 1986 by Auerbach and Slemrod (1997) confirms Wolff's hypothesis. Since the broadest measure of the response to lower marginal tax rates is the amount of income that is subject to tax, the authors analyzed time-series regressions by Slemrod (1996) in which the

dependent variables are both the high-income shares of Adjusted Gross Income (AGI) and the major components of income against measures of concurrent, lagged and anticipated marginal tax rate changes. They reached two major conclusions. Although they estimate that 41.1 percent of the taxpaying population experienced no marginal tax change by 1988 (p. 600), tax changes became predominant in explaining the high-income share of wages and salaries and, with less success, AGI over the period 1986 to 1990. During the period 1954 to 1985, it was the wage-inequality variable that explained much more of the changes in these income variables. In a tangential study, Freenberg and Porterba (1993) found that the share of AGI received by the top 0.5 percent of income recipients rose dramatically from 7.7 percent in 1985 to 12.1 percent by 1988.

Other economists, however, have found mixed evidence about increasing inequality over this period of time. For example, Mayer and Jencks (1993, p. 147) find virtually no change in household income inequality over the period 1984-1985 to 1988-1989. This may be attributed, in part, to the different data sources and time periods involved in the studies by Wolff (Survey of Consumer Finances [SCF]) and Mayer and Jencks (Current Population Survey [CPS]). Wolff (1994, pp. 148-149) concedes that mean household income in 1982 was 14.3 percent higher in the SCF than in the CPS, which is to be expected due to the inclusion of a high-income supplement in the SCF that provides greater coverage of income at the top of the distribution. Using CPS data over the same period of time, Cutler and Katz (1991, pp. 24-25) reach conclusions similar to those of Mayer and Jencks for overall changes in income inequality. That is, they find that family income inequality increased between 1963 and 1983, yet remained quite stable between 1983 and 1989.

### **The Changing Distribution of Earnings**

Since wage and salary earnings provide the bulk of income for most workers, earnings inequality is an important determinant of income inequality. Levy and Murname (1992) confirm the conventional wisdom that earnings and income inequality increased during the 1980s.

Using data from the CPS published by the U.S. Bureau of the Census, the authors reach several revealing conclusions. First, while real disposable income per full-time male worker increased 2.45 percent per year from 1947 to 1973, it only increased 0.67 percent per year from 1973 to 1988. Second, male earnings inequality was relatively stable in the 1970s but increased rapidly in the 1980s. Increased inequality, combined with stagnant real wage growth, means that the proportion of men with earnings below \$20,000 and above \$40,000 (in 1988 dollars) have both increased. This phenomenon has attracted a great deal of public attention because increasing inequality around a stagnant mean implies that the rich are getting richer and the poor are getting poorer. Third, inequality within groups defined by age, education and gender has grown steadily since 1970; however, between-group inequality was stable during the 1970s, yet increased during the 1980s. Slesnick (1994) confirms these findings, and goes on to state: "More recently, the rise in earnings inequality has been the dominant effect resulting in the observed reversal in the trend of income dispersion" (p. 677).

Bishop, et al., (1991) attribute the changing distribution of income during the 1980s to structural changes in the labor market. When ranked by mean earnings, government jobs are the highest-paying, manufacturing jobs are second, service jobs are third and agricultural/forestry jobs rank last. The authors find that between 1982 and 1986 the percentage of the labor force employed in the service sector increased by 6.1 percent, and declined in the other three sectors. The service sector employs a smaller percentage of full-time family heads (86 percent compared to 95 percent in manufacturing and 96 percent in government); therefore, distributional shifts into the service sector from manufacturing and government jobs have caused what the authors refer to as "...[A]n unambiguous deterioration in the overall earnings distribution" (p. 431). A study by the U.S. Census Bureau (1998) showed an increase in the share of aggregate family income going to the top quintile of the income distribution has continued to increase while the shares going to the bottom and middle quintiles had fallen between 1984 and 1992 (Table A2.1).

In summary, the following theories have been postulated regarding the recent trend in earnings inequality. First, due to substantial deindustrialization, the U.S. economy has had difficulty producing middle-class jobs (Bluestone and Harrison, 1986; Bishop, et al., 1991; Levy and Murname, 1992). Second, while the education premium for a four-year college degree or higher fell during the 1960s and 1970s, it increased during the 1980s and 1990s. The real earnings premium for a four-year college degree increased from 13 percent in 1979 to 38 percent in 1987 (Levy and Murname, 1992). Weinberg, et al., (1999) found that men with a four-year college degree earned two and a half times those with less than a ninth-grade education in 1958, but that this education premium had grown to a magnitude of nearly four by 1997. Even more amazing are the authors' findings that real incomes of men declined between 1958 and 1997 in all education groups except those with a college education (p. 20). Lastly, during the 1980s, the service sector continued to expand at the expense of the manufacturing sector while the government and agricultural sectors have remained quite stable. This phenomenon, per se, has led to increased earnings inequality because wages and salaries are less equally distributed in the service sector than in any other sector of the economy, with high-powered professionals such as lawyers and surgeons at the high end and hamburger-flippers and cashiers at the low end.

Even within the manufacturing sector, there has been an increase in inequality. Increased opportunities for outsourcing have mitigated union power in domestic manufacturing, driving down the wages of unskilled workers, or left firms with only the tasks of marketing and financial activities. Since these tasks generally require a college education, there has been a tremendous increase in the percentage of college graduates employed in manufacturing. Among males aged 25 to 34, the percentage of college graduates employed in manufacturing increased 34 percent from 1979 to 1987 and the number of high school graduates employed in manufacturing over the same period increased by only 6 percent.

Since wage and salary earnings provide the bulk of income for most workers, earnings inequality is an important determinant of income inequality. However, some important distinctions

must be made between these two inequality measures. One feature of increased income inequality is the rise in the share of non-labor income accruing to households since 1969 (Cutler and Katz, 1991; U.S. Department of Labor, 1995). Cutler and Katz (1991) found that market-based pre-tax income fell from 80.3 percent of total income in 1979 to 76.0 percent in 1989 due to the growth of capital income relative to wage income. The authors warn, however, that increased family income inequality is largely associated with increased wage inequality (particularly for primary earners), rather than these shifts in the compensation accruing to the factors of production. This may explain why, despite the trend of growing ratio of capital-to-wage income between 1979 and 1989, Cutler and Katz found overall income inequality to be quite stable between 1983 and 1989.

### **The Changing Distribution of Wealth**

Wolff stated that the increase in wealth inequality over the period 1983 to 1989 was unprecedented in United States history except for the 1920s (1995b). Wolff found that although households in the top 20 percent of the wealth distribution enjoyed financial wealth gains, the bottom 80 percent of households experienced a decline over the period 1983 to 1989 (1995b, p.12).

Like Wolff (1994, 1995b), Weicher (1995) utilizes a time frame of 1983 to 1989 to determine if the distribution of income and/or wealth became more unequal. For Weicher, the period chosen was no coincidence; it was designed to correspond with the macroeconomic expansion that began in November of 1982 and ended in June of 1990. Although Weicher found that the wealth Gini coefficient increased from .414 to .431, the inference that wealth inequality increased over this period of time is quite sensitive to factors such as how broadly wealth is defined, how households are weighted and whether or not wealth data for individual households is adjusted to be consistent with national balance sheet data. Weicher's general measure of wealth differs from Wolff's preferred measure, which is classified as net worth, in that Wolff's measure excludes miscellaneous assets and the value of automobiles. Although Weicher's estimate of increased

inequality of wealth varies according to the definition wealth employed, he concludes that the broader the definition of wealth, *ceteris paribus*, the more unequal is its distribution in either 1983 or 1989.

Wolff (1994, 1995a, 1995b, 1998) and Weicher (1995) have provided several plausible explanations of increasing inequality of wealth in the United States over the period 1983 to 1989. Throughout the 1980s, a number of forces combined to increase wealth inequality. They attribute much of the increase in wealth inequality to an increase in stock values relative to home values. During the period 1983 to 1989, stock prices increased relative to housing prices (Wolff 1995b). Stocks are held primarily by the affluent, while home ownership is distributed much more evenly across the population. Wolff found that 21 percent of the increase in wealth concentration between 1981 and 1989 was attributable to the increase of stock prices to housing prices (p. 78). Weicher (1995) found that stock prices (in the Standard and Poor 500) increased 101 percent in nominal terms over this period while the value of owner-occupied housing increased only 27 percent in nominal terms over this period.

As mentioned earlier, Wolff postulates that increasing income inequality and relatively slow inflation over this period have also contributed to increased wealth inequality. Weicher's research, however, reveals that demographic changes within the United States are the greatest contributor to increased wealth inequality from 1983 to 1989. The most significant demographic change in the United States during the 1980s was the relative decrease in the White population and a corresponding relative increase in the Hispanic, Asian and Pacific Islander and American Indian population.

To demonstrate the effect of changing demographics on inequality, Weicher uses data from the SCF in 1983 and 1989. In 1983, Whites constituted 82.3 percent of the sample population whereas, in 1989, Whites only constituted 75.4 percent of the sample population. The author states that a changing racial and ethnic landscape in the United States has helped contribute to increased wealth inequality because: "All minority groups have mean wealth that is (further) from

the overall U.S. mean than the large White majority, so the growth of minority households should also increase inequality" (1995, p. 16).

In his most recent research on the shifting distribution of income and wealth in the United States, Wolff (1998) incorporates data from the 1992 SCF into his analysis and presents "...[E]vidence of sharply increasing household wealth inequality between 1983 and 1989, followed by a modest attenuation in 1992; though the level of wealth concentration was still greater in 1992 than in 1983" (p. 132). For example, the percentage share of net worth accruing to the top 1 percent of the wealth distribution increased from 33.8 percent in 1983 to 37.4 percent in 1989 before moderating slightly to 37.2 in 1992. Table A2.2 presents detailed data on the concentration of both net worth and financial wealth in the United States between 1983 and 1992.

### **The Shrinking Middle Class**

During the 1980s, a voluminous literature emerged which provided evidence of a shrinking middle class. This section illuminates the implications of different definitions of the middle class and examines the consistency of findings on middle class status in the United States.

It is difficult to find two authors who define the middle class in the same way. For example, Thurow (1984) defined the middle class as those within a 75 to 125 percent range of median household income. Blackburn and Bloom (1985) defined the middle class in a range bounded by 60 to 225 percent of median household income. Duncan, et al., (1991) used the dollar values of both the 20th and 90th percentile of the income distribution and 2 to 6 times the official poverty level (adjusted for family size) when defining the middle class.

Irrespective of the definition used, major studies confirm a shrinking middle class. Using equivalence-adjusted income as a ratio of median income, economists at the Bureau of the Census (1991, p. 3) found that the group of those with "middle relative incomes"<sup>2</sup> fell from 69 percent in 1984 to 63.3 percent in 1989. Those with middle relative incomes have equivalence-adjusted incomes between 0.5 and 2.0 of median equivalence-adjusted income for the population. That is, the percentage of those with incomes less than half or greater than two times the median

increased, while the percentage of those in the middle relative income category decreased during this time. This reduction in the middle class was divided evenly between increases in the groups with low and high relative incomes.

Using a measure of household income of \$20,000 to \$55,999 (in 1986 dollars) to define the middle class, Horrigan and Haugen (1988) found that the number of middle class households declined from 60.2 percent in 1969 to 53.0 percent in 1986. However, Horrigan and Haugen found that most of the households moving out of the middle class were moving into the upper class.

Using data from the Panel Study of Income Dynamics, Duncan, et al., (1991, 1992) found that a much larger percentage of middle income adults aged 25 to 55 dropped into the lower class over the period 1980 to 1987 than during the period 1968 to 1979. Furthermore, within the period 1980 to 1987, fewer households ascended out of the middle class than descended into the lower class. The authors define the middle class as those with an income (unadjusted for family size) between the 20th and 90th percentile of the income distribution. This translates into a household income between \$18,000 and \$55,000 in 1987 dollars.

In a study focusing on the changing share of income accruing to the middle class, rather than the more common analysis of the percentage of the population residing in the middle class over time, Phillips (1993) found that the share of income accruing to the middle quintile of the income distribution declined from 15.1 percent in 1985 to 14.7 percent in 1989. The shares accruing to the bottom two quintiles also fell, while the top one percent of income earners saw their share increase from 11.6 to 13.0 percent.

It is clear that while all researchers mentioned previously find evidence of a shrinking middle class since as early as the late 1960s, whether or not more households "descended into" the lower class or "ascended out of" the middle class and into the upper class is sensitive to both the time period under analysis and the definition of the middle class employed. Economists and sociologists have often connected the phenomenon of favorable moves within the income distribution to changing cultural mores. With the pool of highly-skilled professional single women

growing rapidly over the past few decades, there is now a much greater tendency for professional men to marry women with comparable income-generating ability. Two unmarried middle or upper-middle class individuals who pool their resources through marriage will often be elevated to upper class status (Duncan, et al., 1992; Furchott-Roth, 1995; Johnson and Shipp, 1996). Indeed, Levy and Murnane (1992) found that the higher education levels of professional couples in relation to less-educated couples, singles and single parents accounted for most of the change in earnings inequality during the 1980s. However, the U.S. Department of Labor (1995), while acknowledging the increase in the number of married couple households in which both individuals earn relatively high wages, do not find this phenomenon to be quantitatively important in explaining the rise in family income inequality (p. 73).

### **The Changing Poverty Rate and Movements Out of the Middle Class**

There is a great deal of controversy about the percentage of the population that is poor and the direction and magnitude of migration from the middle class. Slesnick (1993) estimated that poverty fell during the period 1983 to 1989 whether before-tax income or consumer expenditure measures are used. Using the official measure of poverty developed in 1965 by the Social Security Administration, which utilized the Department of Agriculture's Economy Food Plan<sup>3</sup> of 1961, Slesnick found that the percentage of the population living in poverty in the United States fell from 15.2 percent in 1983 to 12.8 percent in 1989.

Regardless of the measure used, poverty showed only a modest reduction during the sustained macroeconomic growth of the 1980s when compared to the macroeconomic expansion of the 1960s. During the macroeconomic expansion from February, 1961 to December, 1969, a strong positive relationship existed between the well-being of the poor and the growth of the macroeconomy. For example, using before-tax Census Bureau measures, poverty fell from 22.4 percent in 1959 to 12.1 percent in 1969. However, between 1983 and 1989 (the third longest macroeconomic expansion in United States' history), poverty fell 2.4 percentage points by before-tax Census Bureau measures, from 15.2 percent to 12.8 percent (Blank, 1993, p. 21; Slesnick,

1993, pp. 22-23). Furthermore, when one includes the recessions of the early 1980s and 1990s, before-tax income measures of poverty show an increase from 13.0 percent of the population in 1980 to 14.5 percent of the population in 1992 (U.S. Department of Commerce, 1995). When comparing poverty rates across time, the poverty picture is not particularly bleak. After all, both income and consumer expenditure measures exhibit a decline in the percentage of those in poverty from the early to late 1980s. However, for the average household in the middle class, it became more difficult to avoid poverty during this time (Duncan, et al., 1991, 1992; U.S. Department of Labor, 1995).

While income, earnings and wealth measures provide valuable insights into the economic resources consumer units have available, they are incomplete measures of the standard of living for two reasons for two reasons: (1) they represent an *indirect* measure of economic well-being based upon the level of resources at a household's disposal, rather than an expenditure based *direct* measure (McGregor and Borooah, 1992) and (2) they do not allow for detailed analysis of the "burden" consumer units may face in provisioning for essential goods or their opportunities for pursuing "the good life" through expenditures on non-essential goods such as vacations and college educations. Further, consumer expenditure measures allow for a richer analysis of the standard of living by providing information on demographic characteristics. The next section delineates how consumer expenditure inequality is both lower and less volatile than income or wealth inequality.

## ENDNOTES TO CHAPTER TWO

<sup>1</sup>Wolff's definition of household net worth is also referred to as marketable household wealth (HW) and is measured by the difference in value between total assets and total liabilities or debt. Total assets are defined as the sum of: (1) the gross value of owner-occupied housing; (2) other real estate owned by the household; (3) cash and demand deposits; (4) time and savings deposits, certificates of deposit and money market accounts; (5) government bonds, corporate bonds, foreign bonds and other financial securities; (6) the cash surrender value of life insurance plans; (7) the cash surrender value of pension plans, including IRAs and Keogh plans; (8) corporate stock, including mutual funds; (9) net equity in unincorporated businesses and (10) equity in trust funds. Total liabilities are the sum of: (1) mortgage debt; (2) consumer debt and (3) other debt.

<sup>2</sup>Relative income is defined as equivalence-adjusted income (income adjusted to take into account greater income needs as family size increases) divided by the median income of the sample population. Those with middle relative incomes have equivalence-adjusted incomes between 0.5 and 2.0 of median equivalence-adjusted income.

<sup>3</sup>The Economy Food Plan of 1961 was identified by the Department of Agriculture as the level of subsistence required to avoid the risk of malnutrition. This concept was employed in 1965 by Mollie Orshansky of the Social Security Administration to determine official poverty thresholds. Under the assumption that food constitutes one third of total expenditures for poor households, the poverty threshold is defined to be three times the expense for the Economy Food Plan.

**APPENDIX TO CHAPTER TWO**

**Table A2.1**

**Share of Aggregate Income Received by Each Quintile of Households,  
1984 to 1992**

Year	Bottom Quintile	Second Quintile	Third Quintile	Fourth Quintile	Top Quintile
1984	4.1	9.9	16.4	24.7	44.9
1985	4.0	9.7	16.3	24.6	45.3
1986	3.9	9.7	16.2	24.5	45.7
1987	3.8	9.6	16.1	24.3	46.2
1988	3.8	9.6	16.0	24.3	46.3
1989	3.8	9.5	15.8	24.0	46.8
1990	3.9	9.6	15.9	24.0	46.6
1991	3.8	9.6	15.9	24.2	46.5
1992	3.8	9.4	15.8	24.2	46.9

Source: U.S. Department of Commerce, Bureau of the Census, "Measuring 50 Years of Economic Change Using the Current Population Survey," Current Population Reports Series P60-203 (Washington, D.C.: U.S. Government Printing Office, 1998, p. C-36).

**Table A2.2**  
**Percentage Shares of Net Worth or Financial Wealth: 1983, 1989 and 1992**

Percentage Share of Net Worth*	1983	1989	1992	Change in Percentage Share, 1983 to 1992
Top 1%	33.8	37.4	37.2	Increase
Top 5%	56.1	59.0	60.0	Increase
Top 20%	81.3	83.5	83.8	Increase
Middle 20%	5.2	4.8	4.4	<i>Decrease</i>
Bottom 40%	0.9	-0.7	0.4	<i>Decrease</i>
Percentage Share of Financial Wealth**	1983	1989	1992	
Top 1%	42.9	46.9	45.6	Increase
Top 5%	68.0	70.8	70.6	Increase
Top 20%	91.3	93.4	92.3	Increase
Middle 20%	1.7	1.7	1.5	<i>Decrease</i>
Bottom 40%	-0.9	-2.4	-1.1	<i>Decrease</i>

\*Calculated by dividing total net worth holdings by groups in the wealth distribution by total wealth holding across all households. \*\*Calculated by dividing total net worth holdings by groups in the wealth distribution by total wealth holding across all households. Source: Wolff, E. "Recent Trends in the Size Distribution of Household Wealth," Journal of Economic Perspectives, Vol. 12, No. 3 (summer, 1998), pp. 131-150.

## **CHAPTER THREE**

### **CONSUMER EXPENDITURE MEASURES OF THE STANDARD OF LIVING AND SPENDING PATTERNS BY SOCIOECONOMIC AND DEMOGRAPHIC GROUPS**

Although income and wealth measures have traditionally provided the framework for evaluating the standard of living, research emerged during the 1990s which favored consumer expenditure measures for the following reasons: (1) consumer expenditure measures provide greater insight into functionings than income and wealth measures (McGregor and Borooah, 1992); (2) consumer expenditure measures conform more closely to the concept of utility than income and wealth measures (Slesnick, 1993; Rogers and Gray, 1994); (3) consumer expenditure measures of inequality are better-suited to provide insight into the inequality of economic outcomes rather than inequality of resources (McGregor and Borooah, 1992, U.S. Department of Labor, 1995; Johnson and Shipp, 1995, 1996; U.S. Department of Commerce, 1999) and (4) the Consumer Expenditure Survey (CES) is the only annual survey of expenditure behavior in the United States that allows the researcher to group consumer unit by demographic characteristics, such as single parents, dual-income, no kids (DINKS) or the elderly (Garner, et al., 1989; Jacobs and Shipp, 1993). A survey of the literature that employs consumer expenditures to estimate the standard of living is presented below. Subsequently, the types of expenditures and socioeconomic and demographic groups which will be analyzed in this dissertation are discussed. The chapter concludes with a description of the data set employed and rationale for the time period chosen.

## The Standard of Living

### **Inequality by Quintile Analysis**

An advantage to grouping by expenditure ranking is that it allows for comparisons with income and wealth patterns by quintiles. In a study of economic well-being and inequality in the U.S., Slesnick (1994) finds that the share of aggregate expenditures by quintile was very stable over the period 1984 to 1991. This is in stark contrast to the income and wealth literature that concludes inequality increased significantly. Table 3.1 shows that the poorest quintile of the expenditures distribution actually enjoyed a slight gain, while the second through fourth quintiles incurred 0.1 to 0.3 percentage point losses to their share of aggregate expenditures. The fifth quintile and top 5 percent of the expenditures distribution experienced 0.4 to 0.6 percentage point increases in their share of aggregate expenditures. In the case of income (Table 3.2), only those in the top quintile enjoyed an increase in their share of aggregate income between 1984 and 1991 (a 1.6 percentage point increase). The greatest loss in share of aggregate income was suffered by the third and fourth quintiles (a decrease of 0.5 percentage points).

**Table 3.1. Share of Aggregate Consumer Expenditures for Each Expenditure Quintile and the Top 5 Percent of Consumer Units**

Year	Bottom Quintile	Second Quintile	Third Quintile	Fourth Quintile	Top Quintile	Top 5%
1984	6.9	12.8	17.5	23.5	39.3	13.8
1985	6.7	12.5	17.5	23.6	39.6	13.8
1986	6.7	12.4	17.2	23.4	40.3	14.5
1987	7.0	12.4	17.2	23.5	39.9	14.1
1988	7.1	12.6	17.3	23.7	39.4	14.2
1989	7.0	12.6	17.3	23.7	39.5	14.2
1990	7.1	12.6	17.2	23.4	39.7	14.3
1991	7.0	12.5	17.4	23.4	39.7	14.4

Source: Slesnick, D. "Consumption, Needs and Inequality," International Economic Review Vol. 35, No. 3 (August, 1994), p. 693.

**Table 3.2. Share of Aggregate Income Received by Each Income Quintile and the Top 5 Percent of Households**

Year	Bottom Quintile	Second Quintile	Third Quintile	Fourth Quintile	Top Quintile	Top 5%
1984	4.1	9.9	16.4	24.7	44.9	16.5
1985	4.0	9.7	16.3	24.6	45.3	17.0
1986	3.9	9.7	16.2	24.5	45.7	17.5
1987	3.8	9.6	16.1	24.3	46.2	18.2
1988	3.8	9.6	16.0	24.3	46.3	18.3
1989	3.8	9.5	15.8	24.0	46.8	18.9
1990	3.9	9.6	15.9	24.0	46.6	18.6
1991	3.8	9.6	15.9	24.2	46.5	18.1

Source: U.S. Department of Commerce, Bureau of the Census, "Measuring 50 Years of Economic Change Using the Current Population Survey," Current Population Reports Series P60-203 (Washington, D.C.: U.S. Government Printing Office, 1998, p. C-36).

### **Inequality Within and Across Demographic Groups**

Johnson and Shipp (1996, 1997) expanded their analysis of consumption inequality to evaluate the changes within and between different demographic groups, i.e., segmented by family type, education level and the interaction between these characteristics. The authors decomposed consumption expenditure inequality into "within group," inequality, i.e., inequality among those with the same family type or educational attainment and "between group" inequality, i.e., inequality across those with different family types or educational attainment. Their findings revealed that within group inequality accounted for 80 percent of the change in consumption inequality between 1981 and 1987; however, between 1987 and 1994, within group consumption expenditure inequality actually decreased while between group consumption inequality increased. In a study spanning 1972-73 to 1993, the U.S. Department of Labor (1995, p. 87) found that within group consumption inequality accounted for approximately 90 percent of overall inequality by family type and it accounted for approximately 80 percent of overall inequality by educational attainment. Within group inequality was found to be largest for college graduates, which the authors attribute to the large income (and therefore consumption) dispersion for this group,

ranging from educators at the low end to lawyers and doctors at the high end. Furthermore, the authors found that (for all education levels) the probability of belonging to the top quintile of equivalence-adjusted consumer expenditures fell while the probability of belonging to the bottom quintile increased over the period 1972-73 to 1993.

### **The Middle Class**

A great deal has been written in recent years about the shrinking middle class when estimated by income measures (Thurow, 1984; Blackburn and Bloom, 1985; Horrigan and Haugen, 1988; U.S. Bureau of the Census, 1991, Duncan, et al., 1991, 1992). These authors and many others found the middle class to have diminished as a percentage of all households during the 1980s. However, no researcher has undertaken the task of estimating changes in the middle class when measured by consumer expenditures...until now.

The shrinking American middle class became a "stylized fact" during the 1980s and early 1990s. However, this "fact" was predicated on income measures, which are a limited measure of economic well-being. Consumer expenditures provide a richer insight than income into how consumer units provision for their needs. To estimate if consumer expenditure measures are consistent with income measures of a shrinking middle class, a sensitivity analysis was performed using measures from Thurow (1984), Duncan, et al., (1991) and the U.S. Bureau of the Census (1991). The measure by Duncan, et al., that the middle class is comprised of those with equivalence-adjusted incomes 2 to 6 times the poverty level is used here.

Though Duncan, et al., (1991) use equivalence-adjusted measures of income to arrive at equivalent income measures, the authors also offer a caveat concerning the viability of equivalence-adjusted measures: "If the addition of children (through birth or adoption) could legitimately be considered 'consumption goods', then the addition of a child does not necessarily reduce economic well-being" (p. 18). Townsend (1979, p. 248) offers a direct case against equivalence-adjustments by arguing that they make implicit assumptions about the "equivalence" of mean income for each household type where no formal theory of intra-household distribution

has been established. Sen (1992) appears to echo the sentiment of Townsend when he states, "Indeed, in the context of intra-household divisions, it is not easy to split up the total household income into the incomes going to respective members of the family" (p. 122).

### **Consumer Expenditure Measures of Inequality and Poverty**

As was the case with income and wealth, consumer expenditure measures of inequality have also exhibited an increase throughout the 1980s and early 1990s. Using the equivalence scales implicit in the official U.S. poverty thresholds (U.S. Department of Labor, 1995), which indicate that the consumption of a two-person household must be 28 percent greater than that of a one-person household to attain the same standard of living, Johnson and Shipp (1996) found that equivalence-adjusted "consumption expenditures inequality" was 22 percent higher in 1994 than in the first quarter of 1981 for the entire population. Income inequality was found to be more volatile and twice as high, on average, than consumption expenditures inequality. Using both income and consumption measures of inequality, an increase in unemployment increases inequality because unemployment reduces income of the unemployed. Conversely, an increase in the rate of inflation decreases inequality because "demand-pull", is associated with increases in labor demand and simultaneously increases wages and places downward-pressure on the unemployment rate. The authors find that a slowing-down of the rate of inflation during the 1980s was the most significant determinant of both income and consumption inequality during this period. Although not quantified precisely, Wolff (1994, 1995b) also attributes increased income inequality between 1983 and 1989 in part to a slowing-down of the rate of inflation.

Real consumer expenditure measures paint a rosier picture of poverty over the period 1983 to 1989 than the income measures mentioned previously. Using Jorgenson-Slesnick equivalence scales<sup>1</sup>, which measure the relative expenditure (defined across all commodity groups) necessary to attain a given level of utility as household characteristics change, the poverty rate fell from 10.3 to 8.4 percent. When Census Bureau equivalence scales<sup>2</sup> are used for real consumer expenditures, the poverty rate was reduced from 10.2 to 9.7 percent.

## **Consumer Expenditure Patterns by Categories of Goods and Services**

Grouping by demographic characteristics (such as single parents) allows for a much more detailed and enriched analysis of the standard of living because they allow researchers to narrow their focus to important issues such as: (1) the burden of out-of-pocket health care expenditures for senior citizens; (2) the difficulty single parents have in provisioning for child care; (3) comparisons across groups with different demographic profiles, such as housing burdens for urban or rural residents or health care burdens for households with or without children and (3) the luxury or necessity nature of categories of expenditure by demographic group.

### **Housing**

Housing expenses are an important category of expenditure to analyze because they represent a basic need for shelter required by all individuals and they comprise the largest budget share by far for both consumer units at the bottom of the expenditures distribution and those aged 65 and older (U.S. Department of Labor, 1984-1985 and 1992-1993). As total expenditures increase, the share allocated to housing tends to decrease, freeing-up expenditures for more discretionary items. This is a phenomenon well-documented by Housing and Urban Development (H.U.D.) who consider any household spending more than 30 percent of gross income and rent to be "housing burdened" and those spending 50 percent or more of gross income on rent to face an "extreme housing burden" (U.S. Department of Housing and Urban Development, 1998). Households that spend more than 30 percent of gross income are referred to as "burdened" because it is believed that households do not willingly take-on such a high income share for housing, but rather must allocate a high percentage of their gross income to obtain adequate shelter. The implication of an abnormally high income share being absorbed by housing is that it leaves the household with less income to provision for other essential goods such as food and health care and mitigates their ability to enjoy more functionings-enhancing goods and services, such as entertainment, education and leisure travel. Rubin and Koelln (1996) use the share of total expenditures allocated to "necessities" (which they classify as food, housing and health care)

as a proxy for relative economic welfare of elderly and non-elderly consumer units between 1980 and 1990. They state that the higher the percentage of expenditures allocated toward necessities reduces a consumer unit's welfare, *ceteris paribus*, because "...[P]oorer households invariably have minimal spending discretion, having to allocate most of their expenditures to necessities" (p. 24).

The phenomenon of a decreasing share of income or total expenditures allocated to housing is well-documented by other government entities (U.S. Bureau of the Census, American Housing Survey, 1995) as well as researchers estimating complete systems of demand. Deaton and Muellbauer (1980a, p. 319) find that housing's expenditure share is a decreasing function of a percentage increase in total expenditures. In a study employing the dollar value of housing expenditures as the dependent variable, Barnes and Gillingham (1984) found that housing expenditures increase at a slower rate than total expenditures.

#### **Out-of-Pocket Health Care**

The issue of health care burdens for senior citizens has been a popular topic of analysis within the consumer expenditure literature and it has been used to support policy recommendations for health care administration in the United States (Hitschler, 1993; Amble and Stewart, 1994; Rubin and Koelln, 1996). Expenditures for health care are of particular concern to economists and policymakers because they are "defensive" in that they are designed to maintain rather than enhance one's level of functioning. Cobb, et al., (1995) refer to defensive expenditures as "...[T]he money people spend to prevent erosion in their quality of life or to compensate for misfortunes of various kinds" (p. 1). Although medical expenses are viewed as classic case of defensive expenditures, researchers in this field also view expenses for the material costs of automobile accidents, commuting costs, crime prevention mechanisms and the cost of pollution control devices as defensive (Cobb, et al., 1995; Halstead, 1996).

Health care for senior citizens absorbed a greater mean share of total expenditures than for any other socioeconomic or demographic group. It increased from 11.2 percent to 13.4 percent for

those aged 65 to 74 and from 13.4 percent to 16.1 percent for those aged 75 and older between 1984 and 1992 (U.S. Department of Labor, Consumer Expenditure Survey). These high and increasing expenditure shares allocated to health care for those aged 65 to 74 and 75 and older were confirmed in a study by Hitschler (1993) over the period 1980 to 1990 and by Sabelhaus and Schneider (1995), who observed that approximately half of the increase in consumption for those aged 65 and older over the past thirty years has been towards medical expenses. In a study of consumer expenditure patterns of senior citizens between 1984 and 1997, Paulin (2000) found that the budget share allocated to health care was both highest and the most volatile for consumer units aged 75 and older than for any other age group.

Although a study by Acs and Sabelhaus (1995) confirms that out-of-pocket health care expenditures increased from 1980 to 1992, they did not find these higher costs to have a substantial impact on the health care expenditure share of non-elderly consumer units (under the age of 65). Across the entire sample of non-elderly consumer units and those categorized by income, race and family type, they find that health care costs escalated yet had only a modest impact on these groups' budgets over this time, as government and business absorbed the bulk of this cost increase (particularly over the period 1990 to 1992). The authors conclude: "...[H]owever, similarities in health-care budget composition across groups in the population suggest that the impact (of escalating health care costs) was fairly uniform, in the sense that no obvious crowding of other expenditures seems evident" (p. 43).

### **Child Care**

The ability to provision for child care has received a great deal of attention in both the consumer expenditure literature and in broad studies of important socioeconomic issues (O'Connell and Bachu, 1992; Lino, 1994; Edin and Lein, 1997; Presser and Cox, 1997). Child care expenditures are postulated to be positively associated with increments to total expenditures for several reasons: (1) couples with a stay-at-home parent who enters the work force will simultaneously receive greater income due to the additional earner and incur higher child care

costs; (2) child care costs are often incurred voluntarily for the simple purpose of "getting a break from the children;" (3) there is a range in the cost of child care services for different consumer units; whereas the poor may use low-cost babysitters from the neighborhood, the more affluent are likely to hire a nanny or a more experienced (and expensive) domestic care-giver.

Ultimately, whether consumer units' child care expenditures are an increasing or decreasing function of a percentage increase in total expenditures depends upon a combination of their demographic profile (single parents, dual income-earners with children), work schedule (Presser and Cox, 1997) and lifestyle choices, such as partaking of "evenings out" regularly, which generally require additional child care expenses. Research in the field of provisioning for child care by single mothers has found that widespread use of informal child care arrangements with friends or family limits the capability to predict how child care expenses relate to income or expenditures (Cattan, 1991; Lino, 1994; Edin and Lein, 1997). In analyzing single mothers below the income-defined poverty level, Cattan (1991, p. 7) found that single parents face a far more restricted range of child care options than their non-poor counterparts because far fewer of them could realistically consider paying for child care.

### **Essential and Luxury Goods**

The first approximation used for expenditures on essential goods include spending on food, housing (rent or principal, interest, taxes and insurance), utilities and what the Consumer Expenditure Survey defines as "household operations," (e.g., pest control, repair of household appliances, lawn and garden care), apparel and health care. This broadens the common classification of "essential expenditure" as food, housing and health care (Rubin and Koelln, 1996) by adding an apparel component. Uusitalo (1980) refers to consumption beyond that which is necessary for survival as "variosity in consumption," reflecting an enrichment of one's consumption bundle beyond provisioning for essentials. For purposes of this research, such expenditure beyond provisioning for essentials is referred to as "luxury expenditure," which is defined in greater detail below. In a modern industrialized nation such as the United States,

however, much in the way of expenditures fall between the polar extremes of essential goods and luxury consumption. Virtually any category of expenditure will embody elements of both essential and luxury components because, for example, apparel serves as protection and also represents economic status.

Luxury expenditure does, however, arise from a unique set of motives, such as: (1) "displays of affluence" whereby the members of a higher class consume expensive goods and services to distinguish themselves from members of a lower class (Veblen, 1917) and (2) "pecuniary emulation" whereby a member of the lower class consumes conspicuously so that he will be thought of as a member of a higher class (Veblen, 1917; Bagwell and Bernheim, 1996). In his discussion of conspicuous consumption and leisure, Veblen provides the following terse explanation of what motivates the display of affluence: "Both are methods of demonstrating the possession of wealth, and the two are conventionally accepted as equivalents." (1917, p. 85). Maintaining the Veblenian tradition, Galbraith (1998, p. 74) provides further insight into this matter: "Moreover, wealth has never been a sufficient source of honor in itself. It must be advertised, and the normal medium is obtrusively expensive goods." Veblen encapsulates the concept of pecuniary emulation in the following statement: "...[T]he end sought by accumulation is to rank high in comparison with the rest of the community in point of pecuniary strength" (1917, p. 31). Therefore, expenditures of this type should be measured by a different metric than expenditures which merely exceed some minimum necessary for survival.

While the poorest quintile's expenditures serve as a benchmark for categorizing essential goods, these essential goods categories are likely to have greater elements of functionings enhancement for those in the higher strata of the expenditure rank. The white-collar members of the middle and upper classes often feel pressure to maintain a "proper lifestyle" by employers and others with whom they are in frequent contact (Duesenberry, 1952; Suranyi-Unger, 1977). Maintenance of this lifestyle often requires expenditures on luxury consumption goods and services. Suranyi-Unger (1977, p. 53) argues further that, "the professionals are locked into a

tighter set of institutional lifestyle constraints than are blue-collar consumers." While there are certainly blue-collar individuals who comprise the upper four quintiles of the expenditures distribution and white-collar individuals with expenditure patterns representative of the lowest quintile, this appears to be the best approximation available for estimating expenditures on essentials.

### **The Consumer Expenditure Survey Data Set and Rationale for Time Period Chosen**

#### **The Consumer Expenditure Survey Data Set**

The Consumer Expenditure Survey (CES) provides a fruitful data set for comparing economic well-being by consumer expenditure with income and wealth measures and it is the only annual data set in the United States that can relate consumer expenditures to demographic characteristics (Garner, et al., 1989). Since consumer units (consisting of related family members living together, persons living alone and two or more unrelated individuals living together and pooling their incomes to make joint expenditure decisions) can be grouped by their expenditure quintile within the CES data, they can readily be compared with Wolff's (1994, 1995a, 1995b, 1996, 1998) findings of increased income and wealth inequality and sluggish real income growth for all households but those in the top 20 percent of the income distribution between 1983 and 1989. Luxury expenditures by affluent and super affluent consumers are also analyzed. Another interesting application of the CES data which will be pursued is a sensitivity analysis of middle class status by consumer expenditures. Without exception, research on the middle class using income measures found that it diminished during the 1980s. However, it is revealed in Chapter Five that consumer expenditure measures provide results on shifts in middle class status which vary radically from income measures. Lastly, the ability to group by demographic characteristics is utilized. This allows for comparisons with past studies employing such groupings (Boyle, 1989; Acs and Sabelhaus, 1995; Rubin and Koelln, 1996) and enriches the analysis by providing the opportunity to analyze expenditure patterns across different demographic groups within a year and between cohorts over time.

The Consumer Expenditure Survey (CES) is published by the Bureau of Labor Statistics and offers the most comprehensive data source on consumer expenditure patterns in the United States. Ever since 1980, when the CES was first employed on an annual basis, use of CES data in socioeconomic analysis has gained momentum. The CES provides detailed expenditure information on 5,000 consumer units each quarter. This expenditure information is then grouped by characteristics such as age, income, total expenditures, expenditure ranking, geographic region, occupation and size of consumer unit. Although income and expenditures have historically been the most popular categorizing variables in CES research, a number of important studies have categorized groups by demographic characteristics.

The CES is the most detailed and up-to-date combined source of data available on the expenditures, income and demographic characteristics of Americans (Garner, et al., 1989; Jacobs and Shipp, 1993). It is the only annual national survey that can relate family (consumer unit) expenditures to demographic characteristics (Garner, et al., 1989). This unique feature allows for the much more in-depth analyses of the standard of living employed here than conventional surveys such as the Current Population Survey which is limited to analyzing trends in income and uses rankings in the income distribution as the categorizing variable.

As mentioned previously, the CES reduced the sample universe from the entire noninstitutionalized United States population to only the urban population from October, 1979 to December, 1983. Over the sample period chosen for this research, however, both urban and rural dwellers are included, i.e., data are collected in 88 urban and 16 rural areas representative of the United States population (U.S. Department of Labor, 1994). The sample is designed to represent the actual U.S. population as closely as possible, so a consumer unit that resides in a single-family home in downtown Seattle or an isolated mobile home in Lusk, Wyoming (population 1,504, 1990 United States Census) has an opportunity to be surveyed over this period. This is important because the composition of expenditures tends to vary significantly between urban and rural dwellers (Caplovitz, 1963; Rogers, 1988).

The CES is comprised of two components, the interview and diary survey. The interview survey obtains data on expenditures which respondents can be expected to recall for a period of three months or longer. These would include relatively large expenditures, such as real estate, automobiles or major appliances and those expenditures which take place on a regular basis, such as food, utilities and rent or mortgage payments. It is estimated that approximately 95 percent of expenditures are covered in the interview survey. The diary survey obtains expenditure data on small, frequently purchased items which are normally difficult for respondents to recall, such as nonprescription drugs, housekeeping supplies and personal care and services (Branch, 1994). The CES uses integrated data from the interview and diary surveys to provide a complete accounting of consumer expenditures and income (U.S. Bureau of Labor Statistics, 1996).

Different consumer units are surveyed over a given period of time for the interview and diary components of the CES. In the interview survey, data are collected from 5,000 consumer units over a 13 month period. The first interview, based on a one-month recall, is used to "bound" the interview and prevent misreporting of expenditures in the wrong time period in subsequent interviews (Johnson and Shipp, 1996). The second through fifth interviews collect expenditures for the previous three months. For example, a consumer unit visited in January, 1993 would report expenditures for October, November and December of 1992 (Bureau of Labor Statistics, 1995). The sample for the interview survey is selected on a rotating panel basis and each quarter 20 percent of the panel sample is dropped and replaced by an equal number of consumer units (Gamer, et al., 1989). For the diary survey, 5,000 consumer units are sampled independent of the interview survey each quarter. Each of these consumer units maintains a diary for only two one-week periods. Since the objective of this research is in evaluating the well-being of groups of consumer units over time rather than total expenditures on individual goods and services for the entire sample universe, only the interview survey is used. It would be inappropriate to use information from the diary survey, since different consumer units are included in the interview and diary surveys. Ranking consumer units (by income, expenditures, age of reference person<sup>3</sup> or

geographic region) is only possible when all expenditures by individual consumer units are available (Bureau of Labor Statistics, 1994; Rogers and Gray, 1994). Due to the highly seasonal and volatile nature of quarterly expenditures (Garner, 1989; Moehrl, 1994b), only consumer units who reported expenditures over all four consecutive quarters in 1984 and 1992 were included in this study. When only those who reported expenditures for all four quarters of 1984 and 1992 were included, there were 6,878 consumer units in the 1984 data set and 7,511 consumer units in the 1992 data set.

Within the complete system of demand approach in Chapter Five, consumer units are analyzed by their expenditure shares and segmented into six categories<sup>4</sup>: housing, out-of-pocket health care, food, apparel, child care and miscellaneous goods and services, where the miscellaneous budget share represents a residual of one minus the sum of all other shares. The inclusion of the miscellaneous goods and services share, therefore, ensures the adding up property (the axiom that all expenditure shares must sum to one) is satisfied. However, this share is a highly aggregated "catch-all" and includes such diverse expenses as transportation, alcohol and tobacco, vacations, computers and college educations. Therefore, care should be exercised in interpreting the marginal impacts changes in the logarithm of total expenditures have on this share or its mean value, because it is not clear if these expenditures are "sin goods", such as alcohol and tobacco, pure leisure goods such as vacations or goods and services that can increase an individual's productivity, such as computers and college educations. Disaggregation of the miscellaneous category is beyond the scope of this research, but appears to be an interesting and important topic for future research.

Although data on income, wealth and debt are reported in the CES, there are difficulties inherent in drawing meaningful conclusions from these data. In terms of income, the following make CES data incomparable with more conventional measures of income. First, in-kind sources of income, such as food stamps and housing vouchers, are included in the CES but not in other recorded income data, as a general rule. Second, the CES only includes income consistent with

the economic theory of "permanent income," i.e., transitory income such as proceeds from a personal injury lawsuit or lottery winnings are excluded. This is not the case with more traditional income statistics. Since "consumption smoothing" ensures that consumer expenditure measures are consistent with the concept of permanent income, they render the more narrow definition of income passe. Lastly, since the focus of the CES is upon consumer expenditures, those consumer units designated as "incomplete income reporters" are included with the data set; therefore, more meaningful statistics are likely to be rendered by the consumer expenditure data than the income data.

### **Rationale for the Time Period Chosen**

Both 1984 and 1992 represent years of early macroeconomic expansion following a recession and they run nearly parallel to the cross-sectional studies of income and wealth (1983 to 1989 and 1992) by Weicher (1995) and Wolff (1995b). The National Bureau of Economic Research declared a recession between July, 1981 and November, 1982 and July, 1990 and March, 1991.<sup>5</sup> Therefore, the years 1984 and 1992 are between 14 and 21 months after the end of a recession. However, economic conditions between the two periods are not identical, as the recession of 1981-1982 was far more severe and its recovery was faster and more robust than that of the 1990-1991 recession. For example, real GDP declined 1.9 percent over the period 1981-1982 but only 0.2 percent for 1990-1991. Between 1983-1984, however, real GDP increased at a very impressive rate of 7.3 percent, while real GDP growth was a far more modest 3.3 percent between 1991-1992. Despite very different recession-recovery patterns, the civilian unemployment rate was identical at 7.5 percent in 1984 and 1992. Nonetheless, the difference in the pattern of recession and recovery as well as a significant difference in economic variables such as the real interest rate on three-month Treasury bills, 5.05 percent in 1984 vis-a-vis 0.45 percent in 1992 (Tregarthen and Rittenberg, 2000) do indicate different economic milieus over the two periods, which could be exerting differential impacts on consumer behavior. For example, the

higher real interest rates of 1984 would tend to dampen consumer expenditures on durable goods and encourage savings, possibly biasing downward the total expenditures figures during this time.

Another rationale for choosing the years 1984 and 1992 for a cross-sectional study was due to a reduction in population sample universe in the years prior to 1984. From October, 1979 to December, 1983, the CES reduced the sample universe from the entire noninstitutionalized United States population to only the urban population (those residing in areas of 2,500 or more) due to budgetary constraints.<sup>6</sup> Since cross-sectional comparative analyses of urban and rural residents have provided compelling results in the literature (Rogers, 1988; Banta, 1989) and is a topic of interest for this study, use of the period in which rural consumer units were excluded is not desirable.

#### **Preview of Chapter Four**

In Chapter Four, descriptive statistics are employed from the CES to analyze the following topics: (1) aggregate consumer expenditure estimates of changes in the standard of living; (2) changes in the standard of living across the expenditure distribution and consumer unit types; (3) the size composition of the middle class; (4) out-of-pocket health care and child care expenses; (5) expenditures on essential goods and (6) luxury expenditures among affluent consumers.

Initially, descriptive statistics are employed to provide an overview of changing living standards by consumer expenditure vis-a-vis income and wealth measures. The important topic of changing middle class status by consumer expenditure measures is then analyzed. Previous studies, which employed an income-based found that the middle class declined in size during the 1980s, but this does not hold by consumer expenditure measures over the period 1984 to 1992. Next, a simple single-equation Tobit model is used to evaluate patterns in health care (OPHC) and child care expenditures across the entire sample for 1984 and 1992. OPHC expenditures are first modeled as a function of the size of the consumer unit, total expenditures, the age of the reference unit, and urban or rural status. Later, a categorical variable for health care is introduced to test for

consistency with previous findings in the literature that having insurance, *ceteris paribus*, tends to increase total expenditures allocated toward health care (Rubin and Koelln, 1996). OPHC expenditures are particularly important to analyze because they are largely defensive and absorb a large share of total expenditures for those aged 65 and older (Smeeding and Straub, 1987; Acs and Sablehaus, 1995; Rubin and Koelln, 1996). Child care expenditures also are analyzed, with total expenditures and categorical variables of single parenthood and single earner status employed as independent variables. Previous studies have shown that problems with the availability and expense of child care create substantial obstacles to work (Littman, 1989; Cattan, 1991) and that dual earner consumer units typically face significantly greater child care expenses than single earner consumer units (Jacobs, et al., 1989).

Lastly, "burden" consumer units face in provisioning for essential goods and expenditures on luxury goods and services by affluent consumers are measured. As expected, essential goods are found to absorb a very large percentage of total expenditures for consumer units in the lower strata of the expenditures distribution. Surprisingly, expenditures on luxuries goods among affluent consumers are found to be relatively modest.

### ENDNOTES TO CHAPTER THREE

<sup>1</sup>Jorgenson-Slesnick equivalence scales are defined as the ratio of the expenditure required for a particular household to attain a given level of welfare at fixed prices to the expenditure needed by a reference household to achieve the same level of well-being at the same prices (Slesnick, 1994, p. 680).

<sup>2</sup>Census Bureau equivalence scales are designed to take into account the economies of scale that result from individuals living together. That is, the equivalence scale measures the amount by which a family's income must increase to maintain the same standard of living as the number within the family increases or decreases. The Census Bureau uses the equivalence scales implicit in the official U.S. poverty thresholds (U.S. Department of Labor, 1995, p. 55).

<sup>3</sup>The reference person of the consumer unit is the first member mentioned by the respondent when asked to, "Start with the name of the person or one of the persons who owns or rents the home." It is with respect to this person that the relationship of the other consumer unit members is determined (U.S. Department of Labor, 1994, p. 4). Therefore, when a consumer unit is referred to as being "over sixty-five years of age," for example, it is the age of the reference person which is being alluded to; it does not necessarily mean that all members in that consumer unit are over the age of sixty-five.

<sup>4</sup>The expenditure shares include the following: The definition of housing is the broadest employed by the CES and includes rent, mortgage principle and interest, taxes and interest utilities, remodeling costs, purchase and rental of furniture, and household maintenance such as lawn care and appliance repair. However, this figure excludes lump-sum amounts such as closing costs or down-payments for owned homes. The health care share is designed to capture all health care costs directly incurred by the consumer unit, such as prescription drug costs, dental care, physician's visits, hospital stays, insurance premiums and insurance co-payments. The food share includes all food expenses incurred by the consumer unit: food at home, food purchased on trips and dining out. In the case of apparel, all clothing purchases as well as clothing rental, maintenance (such as dry cleaning and shoe repair) and accessories such as watches and jewelry are included. The child care figure captures both in-home babysitting and day care centers and nursery schools (including tuition). As mentioned earlier, the miscellaneous share serves as a "catch-all" for expenditures not captured within the other five categories. Since it is the residual share of total expenditure, it serves further to ensure that the adding-up property is satisfied.

<sup>5</sup>Conversation with Victor Zarnawicz, Foundation for International Business Cycle Research at Columbia University, November 26, 1998.

<sup>6</sup>Conversation with Thomas Moehrl, CES Economist, November 9, 1995.

## **CHAPTER FOUR**

### **ANALYZING THE CES DATA: A FIRST APPROXIMATION**

In this chapter, expenditure characteristics of various consumer units will be analyzed. The types of expenditures and groups of consumer units considered are as follows: (1) aggregate consumer expenditure estimates of changes in the standard of living; (2) changes in the standard of living across the expenditure distribution and consumer unit types; (3) the size composition of the middle class; (4) out-of-pocket health care and child care expenses; (5) expenditures on essential goods and (6) luxury expenditures among affluent consumers.

Essential and luxury expenditure are defined in the broadest sense in this chapter, with essential goods referring to the following categories of goods: housing, health care, food and apparel. Luxury goods are defined as those subject to luxury taxes consistent with the real prices of goods specified in the Omnibus Budget Reconciliation Act of 1990 (United States Statutes at Large, 101st Congress, Second Session, 1990).

#### **The Standard of Living**

##### **Aggregate Consumer Expenditure Estimates of Changes in the Standard of Living**

Using yearly data grouped by expenditure quintile offers some interesting insights into changes in the standard of living. These changes based on consumer expenditures are, in most cases, similar to the findings of Wolff, et al., who have used income and wealth measures to estimate changes in the standard of living. For example, from 1984 to 1992 average real total expenditures increased by the following amounts for each expenditure quintile (ranked from lowest to highest): 12.7 percent, 10.2 percent, 11.1 percent, 9.8 per cent and 0.7 per cent. The top 5 percent of the expenditure distribution, "affluent consumers," saw their real expenditures increase by 0.5 percent, while the top 1 percent of the expenditures distribution, "super affluent

consumers," enjoyed real expenditures growth of 10.3 percent during this time. It is of interest that the increase in real expenditures is similar for all groups except the top 20 percent and 5 percent of the expenditures distribution whose figures may be biased-downwards by substantial increments to their rates of saving. There is evidence that appears to suggest that the significant growth in real expenditures by the middle and lower quintiles is being supported to some extent by dissaving or debt accretion (Keister, 2000).

The increase in real income for the bottom two quintiles (Wolff, 1995b) was comparable to growth in real expenditures across the expenditures distribution, increasing 11 percent for the lowest quintile (12.7 percent for expenditures) and 10 percent for the second quintile (10.2 percent for expenditures). However, Wolff found real income increased by 27 percent for the top five percent of the income distribution over the period 1983 to 1989. If the same households were in the top 5 percent of the income and consumer expenditures distributions, then the huge disparity between real consumer expenditure increases and real income growth for the top 5 percent reflects substantial savings out of income.

#### **Changes in the Standard of Living Among Consumer Unit Groups and Across the Expenditure Distribution**

As mentioned previously, much has been written about the changing distribution of income and wealth and the shrinking middle class which occurred during the 1980s and early 1990s. However, consumer expenditure data allows one to investigate the changing fortunes of various socioeconomic "groups" within the economy, e.g., single mothers, husband and wife households with children under 18 years of age, singles and the rapidly expanding segment of co-habitants.

Two methods for assessing changing economic circumstances are to analyze growth trends in real consumption expenditures by socioeconomic groups and middle class participation rates by Duncan's (1991) standard of measure. Table 4.1 below shows changes in real consumer expenditures for various socioeconomic groups over the period 1984 to 1992.

**Table 4.1. Changes in Mean Real Consumer Expenditures by Consumer Unit Type, 1984 to 1992**

Consumer Unit Type	Percentage Change in Real Consumer Expenditures
H/W Children Under 6	13.8
H/W Children 6-18	17.1
Single Fathers	-14.1
Single Mothers	-5.2
H/W No Children	15.1
H/W Children Over 18 at Home	16.3
H/W with Other Than Own Children at Home	10.8
Singles	34.3
Co-Habitants	37.7
Aged 65-74	18.4
Aged 75 and Older	55.7

While the period 1984 to 1992 dealt a particularly harsh blow to single parents, singles and co-habitants enjoyed significant real expenditure growth during this time. Another interesting insight to be gained from analyzing data on groups of consumer units is their changing relative position over time. This can be accomplished by comparing their respective mean expenditure ranking over time (i.e., their position in the array of the expenditure ranking, from zero to one). These data are presented in Table 4.2.

**Table 4.2. Changes in Mean Expenditure Ranking by Consumer Unit Type, 1984 to 1992**

Consumer Unit Type	Mean ERANK Percentage, 1984	Mean ERANK Percentage, 1992	Change, 1984 to 1992
H/W Children Under 6	72.6	68.8	<i>Decrease</i>
H/W Children 6-18	66.5	75.7	Increase
Single Fathers	51.1	47.7	<i>Decrease</i>
Single Mothers	39.9	37.4	<i>Decrease</i>
H/W No Children	52.5	56.1	Increase
H/W Children Over 18 at Home	70.0	80.0	Increase
H/W with Other Than Own Children at Home	62.0	69.8	Increase
Singles	30.0	29.8	<i>Decrease</i>
Co-Habitants	45.3	49.0	Increase
Aged 65-74	38.0	40.2	Increase
Aged 75 and Older	22.0	29.6	Increase

All husband and wife couples (with the exception of those with children under six years of age) improved their expenditure ranking between 1984 and 1992. Singles and single parents all saw a deterioration of their expenditure ranking, while co-habitants saw a healthy increase in their expenditure ranking.

Lastly, it is of interest to analyze changes in real expenditures across the expenditures distribution. This allows for comparisons with Wolff's research on income (1995b), which shows much smaller shares of real income growth across the lower 80 percent of the income distribution than the upper 20 percent between 1983 and 1989. It must be noted, however, that increments to consumer expenditures may be financed by dissaving or borrowing. As mentioned in Chapter One, these phenomena tend to bias-upward the consumer expenditures of low and middle income consumers. For example, Keister (2000, p. 111) found that financial wealth fell for the bottom 40 percent of the wealth distribution between 1983 to 1995. In a study of credit card debt, Yoo (1997, p. 23) found that average credit card indebtedness of low-income households

increased more rapidly than average credit card debt for upper-income households over the period 1983 to 1992. In Yoo's subsequent study (1998, p. 23), households in the fifth and sixth deciles of the income distribution had average annual increases in total credit card balances of 12.0 and 14.3 percent, respectively, from 1983 to 1992. Changes in real consumer expenditures by expenditure ranking are presented in Table 4.3 below.

**Table 4.3. Changes in Real Consumer Expenditures by Expenditure Rank, 1984 to 1992**

Expenditure Rank	Average Real Expenditure Growth, 1984 to 1992
Bottom Quintile	12.7%
Second Quintile	10.2%
Third Quintile	11.1%
Fourth Quintile	9.8%
Top Quintile	0.7%
Top 5%	0.5%
Top 1%	10.3%
Sample Population	8.9%

It is clear that expenditure growth over the period 1984 to 1992 was far more evenly distributed across the expenditure distribution than income growth over the period 1983 to 1989, according to Wolff's findings.

What is missed by the data on expenditure rankings is the tremendous gain in real expenditures by the elderly during this time. Average real expenditures for consumer units aged 65 to 74 increased 18.4 percent and for those aged seventy-five and older, they increased 55.7 percent between 1984 and 1992. Sabelhaus and Schneider (1995) substantiate these findings by confirming that consumer expenditures for those aged 65 and older outpaced those for the rest of the population over the last few decades.

#### **The Size Composition of the Middle Class**

All of the research indicating a shrinking middle class cited previously employed an income-based approach for delineating the middle class, as that has traditionally been the most common

way of categorizing socioeconomic groups. Some recent research has used consumption measures to estimate inequality (McGregor and Borooah, 1992; Rogers and Gray, 1994; U.S. Department of Labor, 1995; Sabelhaus and Schneider, 1995; Johnson and Shipp, 1995, 1996). However, there is not any published research on how the middle class has changed by consumer expenditures measures. Through the use of variables such as "middle relative consumer expenditures" rather than the "middle relative income" measure used by the Bureau of the Census (1991), a unique measure of changes in the distribution of the economic "classes" defined by consumer expenditures will be developed.

Given a lack of consensus amongst economists on the appropriateness of making income or expenditure adjustments based upon size of the consumer unit, and to maintain consistency with previous studies, both equivalence-adjusted measures (Duncan, et al., 1991 and U.S. Bureau of the Census, 1991) and unadjusted measures (Thurow, 1984) are used to estimate the sensitivity of middle class measures to equivalence scales. However, due to the persuasive arguments by Townsend (1979) and Sen (1992), all other comparisons between consumer units are performed using non equivalence-adjusted consumer units.

Since the measure by Duncan, et al., (1991) provides a commonly accepted middle ground (Blackburn and Bloom, 1985; Holden and Smeeding, 1990) between Thurow's very narrowly defined measure and the broad U.S. Bureau of the Census (1991) measure, it will be employed when reporting expenditure growth by socioeconomic groups in the economy. Many researchers have commented that the U.S. Bureau of the Census measure includes too many households in the middle class which are high in the income distribution (Blackburn and Bloom, 1985; Kosters and Ross, 1987; Duncan, et al., 1991). Table 4.4 provides total expenditure ranges for the middle class defined by Duncan, et al., while Tables 4.5 and 4.6 demonstrate the percent of consumer units in the middle class for the entire sample and by demographic group.

**Table 4.4. Duncan's Middle Class Thresholds Measured By Total Consumer Expenditures, Age 65 and Older and all Ages**

Age of Reference Person 65 and Older	1984	1992
CU Size:		
1	\$9,960-\$29,876	\$13,460-\$40,376
2	\$12,564-\$37,692	\$16,980-\$50,936
All Ages		
CU Size:		
1	\$10,556-\$31,668	\$14,282-\$42,846
2	\$13,524-\$40,572	\$18,264-\$54,762
3	\$16,554-\$49,662	\$22,374-\$67,122
4	\$21,218-\$63,654	\$28,686-\$86,058
5	\$25,132-\$75,396	\$33,902-\$101,706

**Table 4.5. Percentage of Consumer Units Included in the Middle Class\*  
(Using Measures by Thurow, Duncan, et al., U.S. Bureau of the Census)**

Measure of Middle Class Status	Percentage in Middle Class	
	1984	1992
Thurow	23.5%	24.9%
Duncan, et al.	35.7%	38.3%
U.S. Bureau of the Census	58.8%	64.7%

\*Defined by total consumer expenditures.

**Table 4.6. Percentage of Consumer Units Included in the Middle Class  
(For Duncan's Measure, Defined by Consumer Unit Type)**

Consumer Unit Type	Percentage in Middle Class, 1984	Percentage in Middle Class, 1992	Change in Middle Class Status, 1984 to 1992
H/W Children Under 6	49.6%	55.1%	Increase
H/W Children 6-18	42.4%	48.1%	Increase
Single Fathers	36.5%	39.3%	Increase
Single Mothers	22.8%	22.7%	<i>Decrease</i>
H/W No Children	44.4%	49.1%	Increase
H/W Children Over 18 at Home	44.5%	49.3%	Increase
H/W with Other Than Own Children at Home	29.6%	35.0%	Increase
Singles	30.2%	37.3%	Increase
Co-Habitants	33.9%	44.8%	Increase

Despite strong evidence of a shrinking middle class by income measures, the middle class grew by for every consumer unit type except single mothers (where middle class participation declined from 22.8 percent to 22.7 percent). Income data demonstrated a widening chasm between the "haves" and "have-nots", while consumer expenditure measures indicate a narrowing of this gap via greater middle class participation.

The middle class also showed real expenditure gains comparable to the population as a whole (8.9 percent, Table 4.3), as shown in Table 4.7.

**Table 4.7. Mean Real Expenditure Growth Amongst the Middle Class, 1984 to 1992**

Measure of Middle Class Status	Real Expenditure Growth
Duncan, et al.	0.7%
Thurow	12.6%
U.S. Bureau of the Census	8.9%

Middle class participation by the elderly (using Duncan's, 1991 measure) is given below. It is interesting to note that those aged sixty-five and seventy-five and older both exhibited greater increases in middle class participation than the population as a whole, as will be shown below.

This is consistent with recent evidence presented by Sabelhaus and Schneider (1995) and Johnson and Smeeding (1998), that the elderly (those aged 65 and older) have enjoyed significant economic gains over the past three decades.

**Table 4.8. Middle Class Status Amongst Seniors**

Year	Age: 65-74	Age: 75 and Older
1984	31.7%	20.6%
1992	35.9%	34.4%

Using middle class boundaries of two to six times the equivalence-adjusted poverty level, the elderly have shown great strides in enjoying middle class status in recent years. Over a shorter time frame, Hirschler (1993) and Rubin and Koelln (1996) confirm that the findings of Sabelhaus and Schneider (1995) and Johnson and Smeeding (1998) that the elderly fared better than their younger counterparts by both income and consumer expenditure measures during the 1980s. Analyzing the period 1984-1997, Paulin (2000) found that the elderly enjoyed much greater growth in real consumer expenditures than those under aged 65.

Elderly consumers exhibited large gains in real consumer expenditures between 1984 and 1992, those aged sixty-five to seventy-four enjoyed an average increase of 18.4 percent, while those aged seventy-five and older enjoyed an impressive increase of 55.7 percent (Table 4.1). Rubin and Koelln (1996) confirm these findings, with evidence that the elderly (those aged sixty-five and older) showed greater gains (by 7.3 percentage points) than the non-elderly population in real consumption expenditures over the period 1980 to 1990.

## **Expenditures by Categories of Goods and Services**

### **Out-of-Pocket Health Care (OPHC) Expenditures**

The following analyses of categories of expenditures employ an unconstrained single-equation Tobit model. That is, expenditures are not evaluated within the context of the budget constraint. In the following chapter, the budget constraint is imposed via Simultaneous-Equations Tobit (SET), Almost Ideal Demand System (AIDS) and Enhanced AIDS models.

An analysis of out-of-pocket expenditures aids in the determination of how burdened Americans are in provisioning for their health care (Acs and Sabelhaus, 1995). To estimate the impact of additional expenditures on these expenditures, a censored Tobit regression model is employed, because a large number of observations for the dependent variable are zero (Tobin, 1958; Hall, 1984; Amernia, 1984, 1985; Cebula, 1995; Paulin, 2000), i.e., since the value of the dependent variable is in share form, it cannot take on negative values (but may have many zero observations) and therefore requires a restriction (censoring) of the values it may assume at zero. Tobit combines the aspects of probability found in Probit models with those of expected value embodied in Ordinary Least Squares models. In the analysis that follows, it is the *untruncated* population which is of interest (sometimes referred to as "The Tobit Index") and the beta coefficients rendered are directly interpretable as the expected values of the underlying population of interest (McDonald and Moffitt, 1980, p. 320). The  $X^2$  statistic is reported based on its accepted superiority over the pseudo- $R^2$ .

Sribney (1998, p. 1) states the inappropriate nature of using the pseudo-R<sup>2</sup> as a measure of goodness-of-fit in Tobit models as follows:

For continuous distributions, the log-likelihood is the log of the density function. Since density functions can be greater than one, the log-likelihood can be positive or negative. Similarly, mixed continuous/discrete likelihoods like Tobit can also have a positive log-likelihood...Hence the formula for pseudo-R<sup>2</sup> (pseudo-R<sup>2</sup> = 1 - L<sub>1</sub>/L<sub>0</sub>, where L<sub>0</sub> and L<sub>1</sub> are the constant-only and full model log-likelihoods, respectively) can give answers greater than one or less than zero for continuous or mixed continuous/discrete likelihoods like Tobit. So the pseudo-R<sup>2</sup> makes no sense. For many models the pseudo-R<sup>2</sup> has no real meaning, and Tobit is one of them.

A summary of the Tobit results for 1984 and 1992 are given below in Table 4.9. All of the statistical and econometric results in this study were run using Stata Statistical Software, Release 7.1 (StataCorp, 2001).

All of the variables have both the anticipated signs and are statistically significant in this model. For each additional \$100 in total expenditure, OPHC increases by \$4.27. The addition of one person to the consumer unit increases OPHC by \$16.65, while additional years of age for the reference person increase OPHC by \$5.94. That is, for two consumers with identical characteristics other than the age of the reference person, a consumer unit with a reference person 75 years old would face annual OPHC of \$237.60 (40 X \$5.94) more than a consumer unit in which the reference person is aged 35. This phenomenon of increased health costs as age increases is supported by Rubin and Koelln (1996) who found that while the percentage increase in total expenditures for those under aged 65 was 27.6 percent between 1980-81 and 1989-90, it was 41.5 percent for those over the age of 65. The inverse relationship between urban status and OPHC is consistent with Rogers (1988) findings that health care expenditures were both higher and absorbed a larger budget share of rural than urban consumer units budgets in 1985. Rogers attributes this to rural consumers being older, on average, than urban consumers and more frequently paying the entire cost of their health insurance policies while employers more frequently paid the cost of such policies for urban consumers.

**Table 4.9. Out-of-Pocket Health Care Expenditures (OPHC) in 1984**

Dependent Variable: OPHC	Coefficient	Standard Error	T-Statistic
Independent Variables: Total Expenditures	.0427	.0012	36.07
CU Size	16.65	3.19	5.22
Age of Reference Person	5.94	.286	20.81
Dichotomous Variable: Urban Resident? 0=No 1=Yes	-38.38	14.07	-2.73*

X<sup>2</sup>: 1,556.60 with 4 D.F.

\*Statistically significant at the 5% level. All of the other variables were significant at the 1% level. The overall measure of goodness of fit, X<sup>2</sup>, is also significant at the 1% level.

The health care model demonstrates an excellent fit in 1992 as well. The most impressive differences are the more than doubling of the positive impact an additional year of age has and the negative impact urban status has on OPHC. By 1992, a consumer unit with a 75 year old reference person would face annual OPHC of \$520.00 (40 X \$13) more than a consumer unit in which the reference person is 35. Hitchler (1993) found that health care expenditures increased far more rapidly for those over aged 65 than non-seniors, as total health care expenditures only increased \$546 between 1980 and 1990 for non-seniors and \$1,160 for those over aged 65 during this time. The impact of urban status putting downward-pressure on OPHC holds in 1992, but it is much stronger (Table 4.10). This could be attributed, in part, to the substantial impact additional years of age had on OPHC during this time, since rural consumer units are older, on average, than urban ones.

**Table 4.10. Out-of-Pocket Health Care Expenditures (OPHC) in 1992**

Dependent Variable: OPHC	Coefficient	Standard Error	T-Statistic
Independent Variables: Total Expenditures	.0490	.0014	34.55
CU Size	19.32	5.61	3.45
Age of Reference Person	13.0	.5022	25.85
Dichotomous Variable: Urban Resident? 0=No 1=Yes	-86.17	25.72	-3.35

$X^2$ : 1,640.24 with 4 D.F. All of the variables were significant at the 1% level. The overall measure of goodness of fit,  $X^2$ , is also significant at the 1% level.

In Tables 4.11 and 4.12 below, the model for OPHC is expanded to test the hypothesis of Rubin and Koelln (1993), that having health insurance causes households to spend more on OPHC, *ceteris paribus*. In a study using cross-sectional data from 1986-1988, the authors find that households with insurance spent an average of \$377 more on OPHC than those without insurance, *ceteris paribus*. Rubin and Koelln (pp. 733-34) attribute this phenomenon to a combination of moral hazard and adverse selection in medical care markets. Moral hazard occurs among the insured because they face less than the full-cost price of providing health services; therefore, they are less price-conscious of medical expenses and show a greater willingness to incur those expenses than one who is responsible for her entire medical bills. Adverse selection occurs in insurance markets because those who are ill, or believe they will become ill, are more likely to purchase insurance than someone who is in good health. This model confirms Rubin and Koelln's findings for 1984, with the existence of insurance increasing OPHC by \$250.16.

**Table 4.11. Expanded Out-of-Pocket Health Care Expenditures  
(Including Health Insurance Coverage) in 1984**

Dependent Variable: OPHC	Coefficient	Standard Error	T-Statistic
Independent Variables: Total Expenditures	.0405	.0016	34.94
CU Size	18.60	3.14	5.93
Age of Reference Person	3.55	.2963	11.98
Dichotomous Variable: Urban Resident? 0=No 1=Yes	-31.08	13.83	-2.25*
Dichotomous Variable: Does the CU have Health Insurance Coverage? 0=No 1=Yes	250.16	10.70	23.23

$X^2$ : 2,038.77 with 5 D.F.

\*Statistically significant at the 5% level. All of the other variables were significant at the 1% level. The overall measure of goodness of fit,  $X^2$ , is also significant at the 1% level.

**Table 4.12. Expanded Out-of-Pocket Health Care Expenditures  
(Including Health Insurance Coverage) in 1992**

Dependent Variable: OPHC	Coefficient	Standard Error	T-Statistic
Independent Variables: Total Expenditures	.0461	.0014	32.94
CU Size	24.71	4.44	5.56
Age of Reference Person	9.05	.5157	17.54
Dichotomous Variable: Urban Resident? 0=No 1=Yes	-58.64	25.31	-2.32*
Dichotomous Variable: Does the CU Have Health Insurance Coverage? 0=No 1=Yes	479.12	19.55	24.51

$X^2$ : 2,190.52 with 5 D.F.

\*Statistically significant at the 5% level. All of the other variables were significant at the 1% level. The overall measure of goodness of fit,  $X^2$ , is also significant at the 1% level.

The greater impacts the age of the reference person and urban status had on OPHC in 1992 vis-a-vis 1984 also hold for the expanded model. Furthermore, those with insurance spent approximately twice as much on OPHC as those without in 1992 versus 1984. Interestingly, additional years of age within the range sixty-five to seventy-four do not have a predictable impact on OPHC (when additional years of age were regressed against OPHC in a univariate Tobit model). It may be that the impact of Medicare coverage helps to counterbalance the additional medical costs that result from aging. This phenomenon also resulted in both 1984 and 1992 when additional years of age for the reference person above seventy-five did not render a predictable impact on OPHC. These results support the findings in a study by Acs and Sabelhaus (1995), which revealed that a dramatic increase in Medicare payments between 1990 and 1992 helped prevent the budget share allocated to health care from rising significantly for the elderly between 1980 and 1992.

### **Child Care Expenditures**

Child care expenditures are important to analyze because they can often represent a burdensome expense for families. One must be careful in interpreting data on expenditures such as these, however, because personal choice will play a powerful role in the discretionary or non-discretionary nature of these expenses. For example, single parents without friends or relatives to subsidize their child care often incur large child care expenses that stem from their need to work forty or more hours per week to provision for the household's needs (Presser and Cox, 1997). One would generally not consider these expenses to be incurred voluntarily. However, it is clear that many child care expenses are discretionary. Often a babysitter is summoned simply to allow a single parent or married couple a reprieve from the drudgery of parenting. In cases such as this, there are no strictly monetary opportunity costs involved if child care is unavailable. This is a very different scenario than one in which a lack of child care represents an opportunity cost in the form of foregone income.

With these caveats in place, child care expenditures were examined for all consumer units with children, as well as single parents. These are the groups that are most likely to have a high percentage of non-discretionary child care expenses (Cattan, 1991, Lino, 1994). Summary statistics of a Tobit analysis on child care expenses are in provided in Tables 4.13 and 4.14 below.

The only demographic characteristic which had a statistically-significant impact on child care expenditures over both time periods was the earning composition of the consumer unit. As expected, single earner consumer units face lower child care expenditures. This is likely the result of greater flexibility in child care arrangements for couples with one member not engaged in paid employment.

Interestingly, no statistically significant relationship was found between total expenditures and child care expenditures for single mothers in a univariate Tobit model. While child care expenditures were a "normal good" over time when the entire sample universe was analyzed, this did not hold for single mothers. This may result from single mothers' consistent use of informal child care arrangements (with friends, boyfriends and extended family), around which no consistent market-based outcome can be predicted (Lino, 1994; Edin and Lein, 1997). Lastly, the sample of single fathers reporting non-zero child care expenses was fewer than ten in both 1984 and 1992, preventing meaningful results from being drawn through statistical analysis.

**Table 4.13. Child Care Expenditures in 1984**

Dependent Variable: Child Care Expenditures	Coefficient	Standard Error	T-Statistic
Independent Variables: Total Expenditures	.0075	.006	1.24
Dichotomous Variable: Single Mom or Dad? 0=No 1=Yes	712.65	99.13	7.19
Dichotomous Variable: Single Earner CU? 0=No 1=Yes	-325.42	65.37	-10.73

$X^2$ : 55.50 with 3 D.F.

A consumer unit's total expenditures did not have a statistically significant impact on child care expenditures. However, whether a CU is comprised of a single mother or father and whether or not a CU only has a single earner are statistically significant factors in determining child care expenditures at the 1% level. The overall measure of goodness of fit,  $X^2$ , is also significant at the 1% level.

**Table 4.14. Child Care Expenditures in 1992**

Dependent Variable: Child Care Expenditures	Coefficient	Standard Error	T-Statistic
Independent Variables: Total Expenditures	.057	.009	6.69
Dichotomous Variable: Single Mom or Dad? 0=No 1=Yes	476.68	254.94	1.87
Dichotomous Variable: Single Earner CU? 0=No 1=Yes	-532.57	165.51	3.22

$X^2$ : 56.34 with 3 D.F.

Surprisingly, whether or not a CU is comprised of a single parent is not a statistically significant factor in determining child care expenditures. However, all other variables were significant at the 1% level. The overall measure of goodness of fit,  $X^2$ , is also significant at the 1% level.

#### **Expenditures on Essential and Luxury Goods**

Expenditures on essential goods are measured by the average expenditures on food, housing, apparel, and health care as a percentage of total expenditures. Although this measure is designed to capture the budget share absorbed by provisioning for essential goods, expenditures

by the second through fifth quintiles will generally contain greater elements of functionings-enhancing consumption (and possibly luxury consumption) than the bottom quintile. It is this "higher consumption" which is one of the necessary ingredients for living "the good life" (Esterovich, 1980; Nussbaum and Sen, 1993). These expenditures may be represented by something as simple as an adequate quality and variety of clothing so as to dress appropriately for meeting friends in a public environment (Johansson, 1991), or as complex as a college education, which may have an unpredictable impact on the future functionings of its recipient. In a modern industrialized nation such as the United States, much in the way of expenditures falls between the polar extremes of essential and functionings-enhancing consumption.

What is the most surprising about expenditures on essential goods between 1984 and 1992 is that the largest percentage point increase in the budget share occurred in the top 5 percent and 1 percent of the expenditures distribution. As seen in Table 4.15 below, the budget share allocated to essential goods changed very little for every category of the expenditures rank except the top five percent and one percent, with the top one percent exhibiting a 2.6 percentage point increase. It may be true that the more affluent consumers are upscaling within the categories of goods labeled essential goods, such as "trophy homes" (Frank, 1999) within the housing category or fashionable apparel with brand-name recognition (Szabo, 1999). The data support these hypothesis, as the mean budget share allocated to housing and apparel increased for both the top 5 and 1 percent of the expenditures distribution. However, topcoding of the housing category at \$200,000 (see below) severely limits the extent to which inferences about luxury expenditure for housing can be drawn. In the next section, an in-depth analysis of luxury expenditures by the affluent provides insight into how they are distributing their economic resources across goods and services.

**Table 4.15. Essential Goods Expenditure Shares by Expenditure Rank**

Year	Bottom Quintile	Second Quintile	Third Quintile	Fourth Quintile	Fifth Quintile	Top 5%	Top 1%
1984	79.6%	70.9%	65.2%	62.0%	53.0%	42.4%	37.3%
1992	78.4%	71.4%	66.8%	63.7%	54.7%	44.4%	39.9%

**Expenditures on Luxury Goods by Affluent Consumers**

Luxury consumption arises from a unique set of motives beyond those necessary for survival. Veblen (1917) posited that many expenditures by those rich in terms of income and wealth are made as a means of demonstrating status. Although the affluent (top 5 percent of the expenditure ranking) and super affluent consumers (top one percent of the expenditure ranking) are not necessarily those who meet Veblenian criteria of being rich in terms of income and wealth, expenditures of this type should nonetheless be measured by a different metric than expenditures which merely exceed some minimum necessary for survival.

Luxury consumption is defined in accord with the criteria of federal luxury taxes created by OBRA, The Omnibus Budget Reconciliation Act (OBRA) of 1990 (United States Statutes at Large, 101st Congress, Second Session, 1990). OBRA imposed a 10 percent excise tax on the portion of the retail price of particular items that exceeded a product-specific dollar threshold. The thresholds were as follows (in 1990 dollars): \$30,000 for automobiles, \$100,000 for boats and yachts, \$250,000 for aircraft and \$10,000 for jewelry and furs. Expenditures for aircraft, however, are not disclosed by the CES, to protect confidentiality. Expenditures in excess of these thresholds made in 1984 were deflated and those made in 1992 were deflated according to the Consumer Price Index. This absolute measure of luxury expenditures, however, rendered only a handful of consumers (in either year) across the entire expenditure distribution who had made a luxury purchase consistent with the definition. Therefore, expenditures on luxuries were redefined as the lower dollar limit of the top one percent of the most expensive expenditures on the goods specified in the OBRA and other goods and services which one might reasonably categorize as "luxury goods". Although it is desirable to include high-priced homes which might realistically be

classified as "trophy homes" the purchase price of real estate is topcoded at \$200,000 in the CES for reasons of confidentiality and is therefore excluded from this category of expenditure. This relative measure rendered a larger sample size, which allowed for the more meaningful statistical inferences that will follow.

Since Edward Wolff's research on the tremendous gains in income and wealth for the richest 5 percent has raised concerns about its social desirability, it is interesting to analyze the luxury expenditures by affluent consumer units. Therefore, a chart detailing relative luxury expenditures amongst the top 5 percent (the top 1 percent did not render a sufficient number of observations for meaningful analysis) of the expenditures distribution is provided in Tables 4.16 and 4.17 below.

**Table 4.16. Relative Luxury Expenditures by Affluent Consumers, 1984**

Item	Lower Dollar Expenditure Limit	Total Number Making Luxury Purchase	Affluent Consumers Making Luxury Purchase	Highest Expenditure on Item
Boats and Yachts	\$12,982	4	1	\$12,982
New Cars	\$14,700	8	4	\$25,000
New Trucks*	\$7,900	4	1	\$21,019
Jewelry	\$2,903	28	11	\$4,664
Catered Affairs	\$4,673	8	2	\$6,235
Maid Services	\$3,060	12	8	\$3,870
Dining Out	\$3,525	68	34	\$5,325
Air Fare	\$2,801	76	32	\$8,996

\*Vans, Minivans and Sport Utility Vehicles are included in the "New Trucks" Category.

**Table 4.17. Relative Luxury Expenditures by Affluent Consumers, 1992**

Item	Lower Dollar Expenditure Limit	Total Number Making Luxury Purchase	Affluent Consumers Making Luxury Purchase	Highest Expenditure on Item
Boats and Yachts	\$58,987	4	2	\$58,987
New Cars	\$18,000	4	0	\$40,277
New Trucks*	\$17,000	4	4	\$26,062
Jewelry	\$4,458	24	14	\$20,555
Catered Affairs	\$1,450	77	33	\$8,950
Maid Services	\$1,892	78	57	\$4,140
Dining Out	\$4,020	80	48	\$11,030
Air Fare	\$2,444	79	48	\$7,529

\*Vans, Minivans and Sport Utility Vehicles are included in the "New Trucks" Category.

Although the conventional wisdom is that the 1980s were a decade of greed and over-the-top extravagance for the wealthy, the consumption patterns of affluent consumers do not bear this out. While those in the top 5 percent of the expenditure ranking do not necessarily correspond with those in the same percentiles of the income and wealth distributions, an analysis of their expenditure patterns provide insights into the extent and extravagance of luxury expenditure between 1984 and 1992. With the exceptions of dining out and jewelry in 1992, even the highest expenditures by these groups are not extravagantly high. In fact relative luxury expenditures are within the reach of non-affluent consumer units, because at least half of the expenditures in 1984 and 1992 were made by those below the top 5 percent of the expenditure ranking in 10 of the 16 cases. For example, more than 55 percent of air fare, catered affairs, maid services and dining out expenditures in 1984 were made by those below the top 5 percent of the expenditures ranking. However, it must be borne in mind that two "big ticket" items, "trophy homes" and aircraft are excluded from the analysis due to topcoding.

## **Preview of Chapter Five**

A more sophisticated analysis is utilized in Chapter Five, in which three complete systems of equations models are estimated. These models are considered "complete" because they account for all possible consumer expenditures (by dividing them into six categories of expenditure in share form) within their systems of equations. The first model is referred to as a Simultaneous-Equations Tobit (SET) and is derived from Amemiya's (1974, 1979, 1985) extension of Tobin's (1958) original single-equation model to a simultaneous-equations framework. The second model follows from Deaton and Muellbauer's (1980a) seminal work on Almost Ideal Demand Systems (AIDS) models, and retains the same name. The model is quite simple, but generates estimates which approximate known household expenditure data very well (Deaton and Meullbauer, 1980; Berck, et al., 1996). Simply put, each budget share is modeled as a function of the natural logarithm of total expenditures. Lastly, the recommendation of Deaton and Muellbauer that variables other than total expenditures need to be systematically modeled to explain demand patterns in a more theoretically coherent and empirically robust way (p. 323) is incorporated into the Enhanced AIDS model, where each budget share is modeled as a function of total expenditure and the following demographic variables: urban or rural status, age of the reference person and consumer units with or without children.

## CHAPTER FIVE

### ESTIMATING COMPLETE SYSTEMS OF CONSUMER EXPENDITURES

#### **Introduction**

Although the descriptive analyses provided in Chapter Four are helpful for analyzing consumer expenditures in isolation, e.g., the burden a consumer faces in provisioning for a necessity of life, it fails to account for the fact that increases in expenditures for one good or service must be counterbalanced by a reduction in expenditures allocated to at least one category of other goods and services. In this chapter, a more sophisticated approach is employed in which the entire system of consumer expenditures is estimated. Since the six categories of expenditure are in share form (with the share "miscellaneous goods and services" representing a residual share of one minus all other shares) the adding-up property insures imposition of the budget constraint (Deaton and Muellbauer, 1980a; Douthitt and Fedyk, 1988).

This chapter provides rationales for using the Simultaneous-Equations Tobit (SET), Almost Ideal Demand System (AIDS) and Enhanced AIDS models to estimate complete systems of consumer expenditures. The chapter concludes with specification of each estimating framework and a discussion of the socioeconomic and demographic groups which will be analyzed in Chapters Six and Seven.

#### **Rationale for Estimating Complete Systems of Consumer Expenditures**

Since consumer expenditures serve as *ex post* measures, i.e., one of economic outcomes (McGregor and Borooah, 1992; Paim, 1995) expenditure shares across all goods and services must sum to one (Douthitt and Fedyk, 1988). Working (1943) added a level of sophistication to this partial equilibrium framework by relating the logarithm of total expenditure to expenditure shares on categories of goods and services. It was not until the research of Stone (1954),

however, that a system of expenditure equations was first employed which established the interdependence of all feasible expenditure shares. Since that time, continual improvements have been made to represent consumer behavior in the most theoretically appealing, systematic and robust way. The culmination of these efforts to improve demand system estimation are embodied in the Almost Ideal Demand System (AIDS) model by Deaton and Muellbauer (1980). This dissertation employs the basic AIDS model, expands it to account for the impact of demographic variables and utilizes a Simultaneous Equations Tobit (SET) model based upon Amemiya's (1974, 1979, 1985) extension of Tobin's (1958) original single equation Tobit model to a simultaneous equations framework.

Representing the relationship between total expenditures and the share spent on a good or service such as food provides insights into consumer behavior not available when absolute values are used. This results from the following: (1) the adding-up property is ensured, which imposes the constraint on the consumer unit that the sum of all expenditure shares must equal one (Deaton and Muellbauer, 1980, p. 316; Douthitt and Fedyk, 1988, p. 224); there is no standardized constraint (such as the adding-up property) that can be imposed on the entire sample when absolute values are employed and (2) expenditure shares communicate, for example, the burden of necessity expenditure or consumers' ability to provision for the finer things in life in a manner absolute values cannot. Take the case of a household whose total expenditures are \$818 per month and who spends \$450 per month on rent and utilities, such that their housing expenditure share is 55 percent. The 55 percent immediately conveys to the reader that this household has a significant housing burden (indeed, Housing and Urban Development designates any amount over 30 percent of gross income spent on housing to represent "the housing burdened"). However, the absolute value of \$450 total housing expense in isolation is not particularly helpful for drawing inferences of economic well-being because it lacks sufficient information: is this a consumer unit with total expenditures of \$4,500 per month and living in a rent-controlled apartment or they the housing burdened consumer unit referred to above? On the

other hand, there are situations in which expenditure share does not create a accurate picture of the standard of living. For example, a student financing expenditures from student loans could exhibit a dramatic increase in a functionings-enhancing category of expenditure in a given period, such as education. However, analyzing only consumer expenditures over two time periods does not capture the intertemporal constraint on this student's capabilities and functionings when these loans must be repaid.

The SET, AIDS and Enhanced AIDS models are designed to provide a robust, comprehensive framework for analyzing how consumers allocate their expenditures across the following broad categories of goods and services: housing, out-of-pocket health care, food, apparel, child care and miscellaneous goods and services. The years 1984 and 1992 were chosen for a cross-sectional study both as a result of the expanded sample universe in 1984 and the fact that they are both periods of early macroeconomic expansion following a recession (refer to Chapter Four for a more complete justification for using a cross-sectional analysis and the two years chosen). While the SET model is represented by a complete system of equations in which the dependent variables (individual expenditure shares) are functions of other expenditure shares as well as a series of demographic characteristics, the AIDS model estimates the impact a change in the natural logarithm of real expenditures has on budget shares on an equation-by-equation basis, which is equivalent to maximum likelihood estimation for the system as a whole when the model has normally distributed error terms and is estimated independently of prices (Deaton and Muellbauer, 1980a, p. 316).

Each of the models employed have unique advantages. The benefits to the SET model are as follows: (1) it allows for the calculation of cross-expenditure effects, i.e., the marginal impact an increase in a budget share's value has on another budget share; (2) it incorporates a broad range of demographic variables and (3) there is no need for demographic specification (segmenting demographic groups prior to estimation). The AIDS models offer the following advantages: (1) it is simple to estimate; (2) it demonstrates which goods and services are luxuries or

necessities across socioeconomic and demographic groups; (3) it has a functional form which is consistent with known household budget data. The Enhanced AIDS model expands the benefits of the AIDS model by eliminating the need for demographic specification and by providing a more comprehensive and theoretically appealing framework of analysis for estimating consumer behavior consistent (Deaton and Muellbauer, 1980a, p. 323).

### **Background on the SET and AIDS Models**

Pioneering work in the estimation of Simultaneous-Equations Tobit models was performed by Takeshi Amemiya (1974, 1979) and remains the most general and straightforward method for extending Tobin's (1958) original work on estimating single equations with limited dependent variables to a simultaneous-equations framework.

The SET model was chosen as a practicable means for testing the simultaneous impact changes in individual expenditure shares, as well as a number of demographic variables, have on all other shares within the system. Imposition of the adding-up property (the fact that all expenditure shares must sum to one) focuses attention to the necessary trade-offs consumers make in their consumption decisions. For example, additional leisure purchases may boost one's share allocated toward "miscellaneous goods and services," and this results in a scaling-back in other shares of consumption. In other cases, such necessitated consumption trade-offs may result from factors over which one has little control, such as an increase in health care costs, which require a greater share of total expenditures to retain the same quantity of health services.

Economic theory and deductive logic, however, are often of little help in inferring, *a priori*, what impact a change in one expenditure share will have on all other shares within the system. As Pollack and Wales (1992, p. 12) stated so well, "The effect on an increase in family size must be viewed in the context of allocating expenditure among all goods...even the direction of the effect of an increase in household size on consumption of the  $i$ th good cannot be inferred from the direction of the effect of such a change on the demand parameter  $b_i$ . Indeed, there is no presumption that an increase in household size will increase rather than decrease  $b_i$ , since

changes in the b's, regardless of their direction, imply a reallocation of expenditure among the goods but leave total expenditure unchanged." In summary, there are many cases in which the direction of interdependence between either expenditure shares or demographic changes are best analyzed *ex post*, rather than tested as *ex ante* hypotheses. The problem is analogous to the one of substitutability and complementarity in consumer theory, whereby the relationship between two goods in the consumption process can only be clearly categorized *ex post* by the elasticity of substitution coefficient. There is no sound basis for stating that tuna and bread are either substitutes, complements or unrelated in consumption without knowing the tastes and preferences of the consumer(s) in question.

### **A SET Model of Consumer Expenditures**

When budget shares serve as both the dependent and independent variables in demand equations, there is "causation" running in both directions, i.e., one or more of the independent variables is itself a function of the dependent variable. Unless these equations are estimated as a system, simultaneous-equations bias will result, and the beta coefficients may no longer be interpreted as an unambiguous measurement of the effect of one variable on another, but rather as the *mix* of effects of the variables on each other (Kelejian and Oates, 1974, p. 227). To disentangle these interdependent effects, a SET model is employed in which Heckman Two-Step Estimators<sup>1</sup> (Heckman, 1974, 1976) of the coefficients are calculated as a necessary precondition to running a standard three-stage least squares (3SLS) model due to the censored nature of the data (the fact that budget shares cannot be negative numbers, but may equal zero for a significant number of consumer units). Three-stage least squares (3SLS) is often referred to as the "systems method" for estimating systems of equations, because the procedure estimates *all* of the identified structural equations as a set, rather than estimating the structural parameters of each equation separately (as is the case for two-stage, least squares models and limited information, maximum likelihood models).

For an excellent description of the applicability of this technique, refer to Kennedy, 1990, pp. 135-137) Heckman's Two-Step Estimators (Heckman, 1976; Maddalla, 1983; Amemiya, 1985) are computed by first employing a Probit maximum-likelihood technique to estimate the probability weights of the parameters. These estimated values are then introduced into the original equations using 3SLS (or OLS in Heckman's original two-equation model of labor supply choice).<sup>2</sup> This two-step technique for estimating simultaneous-equations Tobit models has been referred to as a "Type 3 Tobit Model" in the literature (Amemiya, 1985, Chapter 10). Consistent with Tobin's (1958) seminal research on models with limited dependent variables, coefficients for the entire system of equations, therefore, reflect both the probability structure of the system's variables (via Heckman's Two-Step procedure) and the expected values embodied in standard 3SLS models.<sup>3</sup>

As mentioned previously, Stata Statistical Software, Release 7.1 (StataCorp, 2001) was employed for all statistical and econometric results generated in this research. Stata's programs are sufficiently powerful to calculate the coefficients for 3SLS models rapidly, provided that they are properly specified.

### **Specification of the SET Estimating Model**

The SET model to be estimated is comprised of the following structural equations:

$$(1) \text{ shs} = \alpha + \beta_0 \text{savacctx} - \beta_1 \text{totexpt} - \beta_2 \text{age\_ref} + \beta_3 \text{urbd} + \beta_4 \text{fam} - \beta_5 \text{shc} + \beta_6 \text{sfd}$$

$$(2) \text{ shc} = \alpha + \Gamma_0 \text{totexpt} + \Gamma_1 \text{persit18} - \Gamma_2 \text{age\_ref} + \Gamma_3 \text{fam} - \Gamma_4 \text{shs} + \Gamma_5 \text{scc}$$

$$(3) \text{ sfd} = \alpha - \Omega_0 \text{totexpt} + \Omega_1 \text{fam} + \Omega_2 \text{urbd} + \Omega_3 \text{earn} + \Omega_4 \text{age\_ref} + \Omega_5 \text{shs} - \Omega_6 \text{shc}$$

$$(4) \text{ sap} = \alpha + \Lambda_0 \text{totexpt} + \Lambda_1 \text{earn} + \Lambda_2 \text{fam} + \Lambda_3 \text{persit18} - \Lambda_4 \text{shc} + \Lambda_5 \text{sfd} + \Lambda_6 \text{scc}$$

$$(5) \text{ scc} = \alpha + \Phi_0 \text{totexpt} + \Phi_1 \text{persit18} + \Phi_2 \text{fam} + \Phi_3 \text{earn} - \Phi_4 \text{shc} - \Phi_5 \text{shs}$$

$$(6) \text{ smis} = \alpha + Z_0 \text{age\_ref} - Z_1 \text{fam} + Z_2 \text{earn} + Z_3 \text{urbd} + Z_4 \text{savacctx} - Z_5 \text{shc} - Z_6 \text{shs}$$

Upon first inspection, it may seem unusual that "all other" expenditure shares do not enter the model as independent variables when a specific budget share enters an equation as the dependent variable. However, equations such as this are unestimable either individually or within system of equations for the following reasons: (1) the number of endogenous variables that

appear as regressors in an equation cannot exceed the number of predetermined variables that appear in the model (system) as a whole and are excluded from that equation (Kelejian and Oates, 1974, p. 252; Ramanathan, 1998, p. 626); (2) all of the share variables are endogenous, and one cannot have more endogenous variables than equations in the system (Johnston, 1984, pp. 451-460) and (3) equations in which "all other" shares serve as dependent variables contain no additional information, since the dependent variable is merely a residual of the other variables in the equation in this example. That is, there is perfect multicollinearity among the regressors. Since the regressors are not linearly independent of one another, the parameters of such an equation cannot be estimated (Hansen, 1970, pp. 26-28; Kelejian and Oates, 1974, p. 250; Greene, 2000, p. 218). The preceding restrictions illuminate the fact that systems of equations employing hypothetical estimating techniques are *underidentified*, i.e., they lack sufficient information to estimate the system's parameters.

Table 5.1 on the following page provides definitions for the variables in the system of equations given above.

**Table 5.1. Definitions of Variables in the SET Model**

Variable Abbreviation	Definition
shs	expenditure share for housing.
shc	expenditure share for out-of-pocket health care.
sfd	expenditure share for food (both eaten at home and away.)
sap	expenditure share for apparel.
scc	expenditure share for child care.
smis	expenditure share for miscellaneous goods and services (a residual share equal to one minus all other shares).
OPHC	Out-of-pocket health care expenditures.
savacctx	amount held in savings accounts on the last day of the previous month.
ltotex	natural logarithm of total expenditures.
age_ref	age of the cu's reference person.
urbd	urban status; 0=rural; 1=urban.
fam_type	family type; 0=no children; 1=one or more children.
perslt18	number of persons less than age 18.
eam	single-earner consumer unit; 0=no 1=yes.

### **Rationale for Equation Specification within the Systems of Equations**

Since an identification problem would arise if all expenditure shares (excluding the dependent variable) were employed as independent variables within the system's equations, each equation must be modeled based upon theories of which expenditure shares and demographic variables are most likely related in their respective equations. Such *a priori* postulating has been criticized by Horowitz (1985) and Pollak and Wales (1992), but it is a relatively common practice in empirical studies of consumer behavior (Uusitalo, 1980; Douthitt and Fedyk, 1988; Deaton, 1992). Despite the advantages of analyzing the empirical results of consumer expenditures *ex post*, data

restrictions force one to formulate hypotheses about how the system's variables relate to one another.

In the first equation, the expenditure share allocated to housing is modeled as a function of savings account balances on the last day of the prior month, total expenditures, the age of the consumer unit's reference person, urban or rural residence, the presence of children, the share spent on health care and the share spent on food.

Since households tend to increase their consumption of housing as income increases (though their expenditures on housing tend to grow at a slower rate than income), proxies for income such as accumulated wealth and total expenditures are expected to have a negative impact on the share of total expenditures allocated to housing, i.e., one's housing share<sup>4</sup> tends to decrease as income increases. This is a phenomenon well-documented by Housing and Urban Development (HUD) and other government entities (U.S. Bureau of the Census, American Housing Survey, 1995; U.S. Department of HUD, 1998); furthermore, in modeling the share allocated to housing, Deaton and Muellbauer (1980, p. 319) find that it is a decreasing function of the logarithm of total expenditure.

The expenditure share allocated to housing is expected to decrease as the age of the reference person increases for two reasons: (1) since income (or expenditure) tends to increase with age up to a certain point, according to Modigliani's Life Cycle Hypothesis, it is reasonable to assume that the share allocated to housing would diminish for homeowners with fixed mortgages and (2) the probability of having one's home paid off increases with age, as well. For example, Holden and Smeeding (1990) found that over 75 percent of those aged 65 and older owned their own home in 1986 and approximately 75 percent of these had paid-off their mortgages. Therefore, even when senior citizens face significant decreases in their income when they retire, it is possible that their housing burden will also diminish at this time as their mortgage is retired.

Since urban areas are well-known to have higher housing costs, on average, than rural areas (Working, 1943; Rogers, 1988; Paulin, 2000), the dichotomous variable for urban status is

assumed to have a positive sign. Family size is also expected to be positively related to the share allocated to housing, as it is often the addition of a family member that motivates households to seek larger (and presumably more expensive) housing.

Lastly, the expenditure shares allocated to health care and food are expected to have differential impacts on the housing share. Health care costs increased dramatically over the period 1984 to 1992. In the extreme, high medical bills can cause one to scale back consumption in housing, as they may be forced into a position of borrowing against the equity in their home as a means of reducing or eliminating medical bills. *Ceteris paribus*, those with the largest housing burdens tend to be those with the lowest incomes (or expenditures). It is well known that the poor also spend a high percentage of their budgets on food. With large shares being allocated to these "categorical necessities," there is often little remaining to allocate towards health care, apparel and miscellaneous goods and services (Uusitalo, 1980; Pollak and Wales, 1992).

Equation (2) in the system models the expenditure share allocated for out-of-pocket health (OPHC) care as a function of total expenditures, the number of persons under aged 18 in the consumer unit, the age of the reference person, the size of the family, the share allocated for housing and the share allocated for child care.

Total expenditures are expected to be positively related to the expenditure share allocated toward OPHC, since those with high expenditures are more likely to engage in higher "health maintenance" expenditures as well as those not covered by insurance (such as plastic surgery). When analyzing OPHC during the 1980s, Rubin and Koelln (1996) found this to be the case for all non-senior consumer units. The poor often have low OPHC because of Medicaid, and the elderly (who are often poor) have lower OPHC because of Medicare coverage (Acs and Sabelhaus, 1995). It is expected that the presence of children in a consumer unit places upward pressure on OPHC because the health care needs of children increase the likelihood of medical visits. The age of the reference person is expected to be inversely related to the health care share due to two factors: (1) The existence of Medicare for the elderly; (2) The greater probability that older

consumers have grown children that no longer rely on them for OPHC expenses. Family size is expected to positively impact OPHC for the same reasons that additional children do. Since housing comprises a large portion of a consumer unit's budget, it is predicted that substantial increases in the share allocated towards health care could impose a "downsizing" of consumption choices in housing.

The system's third equation models the share of food expenditure as a function of total expenditure, family size, urban or rural status, number of earners in the household, the age of the consumer unit's reference person and the budget shares allocated towards housing and health care, respectively.

In equation (3) total expenditures are postulated to have an inverse relationship with the budget share spent on food. This is consistent with the well-established Engel curve relationship. However, the coefficients of family size, number of earners and the age of the reference person all have hypothesized positive signs. Generally, the addition of a family member will increase food expenses on a household. In a study of Canadian households, Douthitt and Fedyk (1988, p. 239) found that the presence of children increased the share of total consumption devoted to food expenditures by approximately three percent, on average. In Uusitalo's article (1980) on household budget allocation in Finland, it was found that households categorized as "Passive Urbanized Consumers" (those with low "variosity" in their consumption bundles and tending to be comprised primarily of blue-collar workers) have the highest *absolute* expenditures on food, beverages and tobacco. Despite the (generally) lower transportation costs involved in getting goods to market in urban areas, it is hypothesized that being of urban status is positively related to the share of one's total expenditures allocated to food for the following reasons: (1) there are greater opportunities for home food production in rural areas; (2) the poor tend to allocate a greater percentage of their total expenditures toward food (3) an estimated 75 percent of the poor in the United States live in metropolitan areas, while 42.4 percent of those poor live in central cities (Alwitt and Donley, 1996, p. 126), and (4) the large percentage of the American poor living

in central cities often enjoys a less competitive environment among retail food outlets and therefore faces higher prices than suburban consumers (Bremner, 1990).

The number of earners in a consumer unit is believed to be positively related to the expenditure share allocated to food, as a greater premium is placed on one's time when both a husband and wife work than just one member (Becker, 1965; Jacobs, et al., 1989). Therefore, consumer units comprised of more than one earner are both likely to dine out more frequently and purchase food with a great deal of value added.

Although a positive relationship between the age of the reference person and the share allocated to food is hypothesized, there are likely counterbalancing effects on this variable as one grows older. On the one hand, as a consumer unit's children grow older, their food requirements increase (often dramatically). However, for those with no children at home and advancing in age (65 or older), it is expected that food expenditures (at least in absolute terms) will decrease. This is embodied in the lower official U.S. Census Bureau income (and expenditure) poverty thresholds for those aged 65 and over. Although the elderly are expected to have lower incomes than their younger counterparts (which could *increase* the share spent on food), this is largely an empirical issue rather than one social researchers should be confident about predicting *a priori*.

Those with high housing shares tend to fall into two categories: the poor and those with high housing needs (e.g., large families). Working (1943, p. 53) addressed the connection between family size and adequacy of living space as follows: "Although larger families use the facilities of the home more efficiently than two-person families, they have also more inclination to expand the satisfactions that the home affords." Both of these groups, of course, also tend to have above-average food expenses as a share of total expenditures, as the poor must allocate a larger share of total expenditures for sustenance, and those with large families are faced with the extra food requirements of a growing family. Therefore, a positive relationship between the expenditure shares spent on food and housing is postulated.

With out-of-pocket health care expenditures (OPHC) often imposing a binding constraint for those with high expenditures in this category (particularly the elderly), it is expected that increases in the OPHC budget share will necessitate a scaling-back in the percentage of a consumer unit's budget allocated to food and other expenses. In equation (4) the apparel expenditure shares are inherently difficult to model, as such divergent factors as one's occupation, leisure choices, regional standards of dress and the "relative stylishness" of one's friends all contribute significantly to apparel choice. Nonetheless, it is still possible to formulate hypotheses of which socioeconomic and demographic factors are most likely to impact apparel choice.

Because high-quality clothing is often regarded as a requirement for participation in white-collar society (Suranyi-Unger, 1977) and embodies elements of "cultural relativism" (Smith, 1976) and luxury, one would expect such expenditures to be luxuries in the traditional economic sense, i.e., a one percent increase in income would result in a greater than one percent increase in clothing expenditure. Deaton and Muellbauer (1980a, p. 319) confirmed that the apparel share's beta coefficient (the change in an individual budget share resulting from a change in the logarithm of total expenditures) was positive using British time-series data over the period 1954-1974.

Having more than one earner in a consumer unit places upward-pressure on apparel requirements because of the requirement to "dress-up" in many occupations (which would cause a consumer unit to allocate a greater portion of their total expenditures to clothing, *ceteris paribus*). This theory has led financial aid offices at American colleges and universities to factor-in what is known informally as a "panty-hose allowance" (to account for working mothers) in the field. This allowance is subtracted from the parents' expected financial contribution toward their child's education. Significant support for expecting higher expenditures on apparel when both husband and wife work outside the home was provided by Jacobs, et al., (1989) in a study comparing expenditures on services and nondurables between husband and wife households in which just the husband worked *vis-a-vis* households in which both worked. The authors found that

households with working wives spent an average of four percent more on apparel than households where wives were not employed.

One would expect the existence of children (under the age of 18) in the consumer unit, *per se*, to increase clothing requirements and therefore the expenditure share allocated to clothing. However, the impact of these phenomena are not clear *a priori*. For example, a study of Canadian households found that the addition of young children to a household causes substitutions out of adult clothing in order to meet the increasing demand for children's clothing (Douthitt and Fedyk, 1988, p. 242). The latter phenomenon implies that the addition of children may have counterbalancing effects (and therefore no predictable impact) on the share allocated toward clothing.

When analyzing the impact of other expenditure shares on out-of-pocket health care, it seems intuitive that a consumer unit would reduce apparel expenditures to meet health care cost because they have much greater flexibility in clothing choice (the use of hand-me-downs, purchase of less expensive clothing, et cetera) than they do for health care. With the exception of procedures such as cosmetic surgery, health care costs tend to be incurred because they *must* be incurred, i.e., they are usually *defensive* expenditures designed to prevent a reduction in one's economic well-being rather than enhance it. Therefore, consumer units tend to find a means to pay these expenses even if it means drastic sacrifices in their consumption of other goods.

In equation (5) child care expenditures are postulated to be positively associated with total expenditures for several reasons: (1) couples with a stay-at-home parent who enters the work force will simultaneously incur greater income and expenditures due to the additional earner and child care costs; (2) child care costs are often incurred voluntarily for the simple purpose of "getting a break from the children" and (3) there is quite a range of quality in child care services; whereas the poor may use low-cost babysitters from the neighborhood, the more affluent are likely to hire a nanny or a more experienced domestic care-giver. Ultimately, whether consumer units treat child care expenditures as a luxury or necessity depends upon a combination of their

demographic profile (single parents, dual income-earners with children) and how they feel about their children, i.e., do parents “expenditure minimize” on their children to enjoy a larger share of their total expenditures for themselves?

It is expected that the number of persons under the age of 18 and the total number of family members in the consumer unit would put upward-pressure on child care expenditures, but this concept is far more interesting as an empirical issue because one can think of many scenarios in which this would not be the case (e.g., the use of “older children” to supervise infants when the parents are not at home, or informal arrangements with neighbors or family members for occasional free child care).

Given the flexibility many consumer units are believed to face in their child care expenses, it is reasonable to expect that an increase in the expenditure share going to health care (such as that resulting from an unexpected illness) or housing (resulting from a rent increase, for example) would cause a scaling-back in the share allocated to child care.

The miscellaneous expenditures modeled in equation (6) is a catch-all spending category. It includes all expenditures excluded from the expenditure groups listed above. Many of the goods within this category are associated with “the finer things in life,” such as travel, education expenditures, books, entertainment and country club fees. Since these goods are generally luxury goods in the technical sense and income/expenditures (up to a point) increase with age, the age of the reference person and expenditure of this type are expected to be positively related. It is expected that the addition of family members to a consumer unit will strain their resources and require a scaling-back of superior goods to meet the increased demand on their resources imposed by the presence of children. Douthitt and Fedyk’s (1988) empirical findings that this is the case have added weight to economists’ intuition on this subject.

Due to increased income and expenditures and the scarcity of time generally associated with dual-earner consumer units above their single-earner cohorts, it is expected that they will allocate a larger share of their budget to miscellaneous expenses. Part of this phenomenon is attributed to

the greater luxury expenditure higher income consumer units are expected to engage in and part of it is embodied in the consumption requirements a more hectic lifestyle can impose (Becker, 1965): such as the need for two cars rather than one, use of maid services and expensive activities for the children to undertake during summer vacation.

One generally associates urban areas with having far more "things to do." These entertainment opportunities are likely to be both more abundant and expensive in urban vis-a-vis rural areas, and are therefore expected to larger shares of urbanites budgets than their rural counterparts. Since consumer units often save for vacation, it is expected that their savings account balances and the budget share going to miscellaneous expenses to be positively related.

Lastly, health care and housing expenditure shares are expected to be negatively related with the share allocated to miscellaneous goods and services because "frivolous" expenditures within the miscellaneous group will be reduced if greater health care or housing burdens are imposed on a consumer unit.

#### **An AIDS Model of Consumer Expenditures**

Relative to the SET model of consumer behavior, the AIDS model is quite simple. In this model, individual expenditure shares are modeled as a function of the natural logarithm of total expenditure. The adding-up property (the fact that the budget shares must sum to one) ensures imposition of an expenditure constraint on the system's equations. Furthermore, the sign of the equations' beta coefficients (the marginal impact of a change in the logarithm of total expenditures on a particular expenditure share) provide a straightforward definition of the luxury or necessity characteristics of various expenditures. A negative sign implies the budget share allocated to a group of goods decreases as total expenditure increases (necessities) and a positive sign implies the converse (luxuries). Leser (1963, p. 5) provides a straightforward method of calculating the elasticities of demand with regard to total expenditure as:  $e_j = 1 + b_j/w_j$ , where  $b_j$  represents the beta coefficient of the natural logarithm of total expenditures for the  $i$ th demographic or socioeconomic subgroup for the  $j$ th expenditure category,  $e_j$  represents its total expenditure

elasticity expenditure category and  $w_i$  represents the budget share at this level, which is also the arithmetic mean of budget shares for consumer units in this group.

### **Specification of the AIDS Estimating Model**

The AIDS model of Deaton and Muellbauer (1980a) has roots in the logarithmic estimation of Engel curves first performed by Working (1943, p. 45). Since price data are not known within the CES, the model reduces to its price-independent form. The advantage of this specification is its simplistic elegance, as the same budget shares estimated within the SET framework are modeled as a function of the natural logarithm of total expenditure, and estimation can be done equation-by-equation by Tobit, since the explanatory variables are the same in each equation.

Given normally-distributed errors, this equation-by-equation method is equivalent to maximum likelihood estimation for the system as a whole (Deaton and Muellbauer, 1980a, p. 316; Deaton, et al., 1989, p. 129). The system to be estimated is as follows (refer to Table 5.1 for definitions of the variables):

$$(1) \text{ shs} = \alpha + \Psi \log(\text{totexpt})$$

$$(2) \text{ shc} = \alpha + X \log(\text{totext})$$

$$(3) \text{ sfd} = \alpha + Y \log(\text{totexpt})$$

$$(4) \text{ sap} = \alpha + \Theta \log(\text{totexpt})$$

$$(5) \text{ scc} = \alpha + A \log(\text{totexpt})$$

$$(6) \text{ smis} = \alpha + O \log(\text{totexpt})$$

### **The Enhanced AIDS Estimating Model**

As mentioned earlier, Deaton and Muellbauer (1980a) suggested extending the basic AIDS model via the incorporation of demographic characteristics. Therefore, this dissertation incorporates their suggestion by developing a more sophisticated version of the AIDS model. Since budget share allocation is expected to differ by age of the reference person, urban or rural status and family (consumer unit) composition (refer to section, "Rationale for Equation Specification in the System of Equations") these demographic translating variables are included.

One advantage to the Enhanced AIDS model is that each equation can be estimated individually, as is the case for the AIDS model. This results from the price-independent nature of the data and the fact that the right-hand side demographic translating variables are exogenous.

The Enhanced AIDS model is specified below (refer to Table 5.1 for definitions of the variables):

$$(1) \text{ shs} = \alpha - \Psi_1 \log(\text{totexpt}) - \Psi_2 \text{age\_ref} + \Psi_3 \text{urbd} + \Psi_4 \text{fam}$$

$$(2) \text{ shc} = \alpha - X_1 \log(\text{totext}) - X_2 \text{age\_ref} - X_3 \text{urbd} + X_4 \text{fam}$$

$$(3) \text{ sfd} = \alpha - Y_1 \log(\text{totexpt}) + Y_2 \text{age\_ref} + Y_3 \text{urbd} + Y_4 \text{fam}$$

$$(4) \text{ sap} = \alpha + \Theta_1 \log(\text{totexpt}) + \Theta_2 \text{age\_ref} - \Theta_3 \text{urbd} + \Theta_4 \text{fam}$$

$$(5) \text{ scc} = \alpha + A_1 \log(\text{totexpt}) - A_2 \text{age\_ref} + A_3 \text{urbd} + A_4 \text{fam}$$

$$(6) \text{ smis} = \alpha + O_1 \log(\text{totexpt}) + O_2 \text{age\_ref} + O_3 \text{urbd} - O_4 \text{fam}$$

### **Empirical Results for the Sample Universe and Demographic/Socioeconomic Subgroups**

The econometric results for the SET, AIDS and Enhanced AIDS models are presented in Chapter Six. Within the SET and Enhanced AIDS frameworks, the demographic translating variables allow inferences to be made about the behavior of consumer units with different demographic profiles. Therefore, expenditure rank is the only *ex ante* restriction required through demographic specification. Conversely, for the basic AIDS model, the lack of demographic translating variables requires that the sample universe be restricted *ex ante* through demographic specification (Pollak and Wales, 1992, pp. 11-14), whereby consumer expenditures are estimated for the following demographic/socioeconomic subgroups in the economy: (1) each total expenditure quintile and the top 5 percent and 1 percent of the expenditure ranking; (2) all non-senior (aged 64 and under) consumer units; (3) those aged 65-74; (4) those aged 75 and older; (5) urban vis-a-vis rural consumer units; (6) single-parent consumer units; (7) all consumer units with children; (8) consumer units without children.

In Chapter Six, the SET, AIDS and Enhanced AIDS models will be evaluated by expenditure ranking over time via  $X^2$ -statistics, z-statistics, t-statistics and log-likelihood ratio tests (Cramer, 1986, p. 39; Jacobs, et al., 1989, p. 23). In Chapter Seven, demographic groups estimated by the

AIDS model are evaluated both intra-year and inter-year by their t-statistics and log-likelihood ratio tests.<sup>6</sup> Lastly, difference-of-means tests will be employed to ascertain if statistically-significant differences exist between demographic groups in a given year or across expenditure quintiles over time.

## ENDNOTES TO CHAPTER FIVE

<sup>1</sup>The Heckman Two-Step procedure, as pertains to a Simultaneous-Equations Tobit model, is estimated in the following manner:

$$Y_1: \text{Share} = \beta_0 + \beta_1 \text{ltotex} + \beta_2 \text{translating}^* + \mu_1$$

$$Y_2: \text{Share} = \gamma_0 + \gamma_1 \text{mwp} + \mu_2$$

if  $Y_2 > 0$ , then share exists; otherwise,  $Y_1 = Y_2 = 0$ .

If no share exists, then:  $\mu_2 - \mu_1/\gamma_1 < \gamma_0 - \beta_0 - \beta_1 \text{ltotex} - \beta_2 \text{translating}/\gamma_1$   
or  $\mu_2 - \mu_1 < \gamma_0 - \beta_0 - \beta_1 \text{ltotex} - \beta_2 \text{translating}$  because  $\gamma_1 > 0$ .

If  $\text{var}(\mu_2 - \mu_1) = \sigma^2$  then  $\text{prob}(\text{mwp} \leq 0) = \Phi(\gamma_0 - \beta_0 - \beta_1 \text{ltotex} - \beta_2 \text{translating}/\sigma)$ .

This is estimated by Probit:  $\Phi(\Delta)/1 - \Phi(\Delta)$  or  $\lambda$  (inverse of Mill's ratio) in Heckman (1979, p. 156).

$$E(\text{Share} | \text{MWP} > 0) = \text{Share} = \beta_0 + \beta_1 \text{ltotex} + \beta_2 \text{translating} + \sigma_{12}/(\sigma_{22})^{1/2}\lambda$$

or  $\text{Share} - \sigma_{12}/(\sigma_{22})^{1/2}\lambda = \beta_0 + \beta_1 \text{ltotex} + \beta_2 \text{translating}$ .

where  $\text{Share} - \sigma_{12}/(\sigma_{22})^{1/2}\lambda$  is the Probit-adjusted share ready to be estimated by 3SLS.

\*Demographic translating variables, such as urban/rural, children/no children and age of reference person.

<sup>2</sup>Heckman, 1974, 1976. Also, refer to Maddala, 1983, Chapter 8 for an excellent illumination of how Heckman's two-stage method is employed within the context of OLS.

<sup>3</sup>To avoid confusion, the term "SET model" will be employed to summarize the rather complex confluence of Heckman Two-Step and Three-Stage Least Squares (3SLS) estimating techniques employed for the model estimated as a system of equations.

<sup>4</sup>A household's "housing share" is broadly defined as the percentage of their gross income spent on rent or a mortgage (principal, interest, taxes and insurance), utilities and what the Consumer Expenditure Survey defines as "household operations," e.g., pest control, repair of household appliances, lawn and garden care, et cetera.

<sup>5</sup>The test statistic is  $X^2 = 2(\text{Log Likelihood U} - \text{Log Likelihood R})$ , where U represents the unrestricted model and R represents the restricted model. The log likelihood of the unrestricted model is obtained when the function is maximized with respect to all explanatory models (for example, the unrestricted model for estimating the difference between urban and rural residents would include both groups), while the restricted model is obtained when the function is maximized with respect to a subgroup of the unrestricted model (urban residents).

## CHAPTER SIX

### **INTERPRETATION OF THE RESULTS BY EXPENDITURE RANKING FROM THE SYSTEMS OF EQUATIONS MODELS**

The explanatory capabilities of the SET, AIDS and Enhanced AIDS models are analyzed in this chapter. As will be explained in more detail, the AIDS and Enhanced AIDS models performed better than the SET model in terms of representing consumer behavior, demonstrating consistency with the hypotheses explained in Chapter Five and exhibiting statistical robustness for both 1984 and 1992. Therefore, the analysis in this chapter will focus primarily upon the AIDS and Enhanced AIDS models.

#### **The SET, AIDS and Enhanced AIDS Models for the Entire Sample, 1984**

For the entire sample of consumer units, the  $X^2$ -statistics on all equations except that for apparel indicate overall goodness-of-fit among the SET model's regressions (Table A6.15, Appendix to Chapter Six). However, when analyzed on a variable-by-variable basis, the results do not exhibit comparable explanatory power. For example, in equation (1) neither a percentage change in total expenditures (*ltotex*) nor changes to savings account balances (*savacctx*) were statistically significant (Table A6.15). This fails to substantiate the hypothesis that a consumer unit's housing burden tends to decrease as total expenditures or wealth increase. However, the model is more successful in providing theoretically consistent estimates of variables influencing the expenditure shares allocated to health care, child care and miscellaneous expenditures. With the exceptions of the expenditure share allocated to child care in equation (2) and that of housing in equation (5), all of the statistically significant variables have signs consistent with those hypothesized earlier.

The AIDS model demonstrates explanatory capability, with all of the expenditure shares exhibiting the predicted relationship with a total expenditures in a statistically significant manner. Consistent with Deaton and Muellbauer's work (1980a, p. 319), food and housing are categorized as necessities. Out-of-pocket health care (which Deaton and Muellbauer did not model individually) is also grouped as a necessity (Table A.6.16). However, whether or not OPHC is classified as a necessity is sensitive to the age of the consumer unit's reference person, as the groups aged 65 to 74 and 75 and older treated OPHC as a necessity and when all consumer units under aged 65 were taken together, OPHC was treated as a luxury. In a cross-sectional study comparing expenditures on necessities over the period 1980-81 to 1989-90, Rubin and Koelln (1996) also find health care to be treated as a necessity for all consumer units with a reference person over aged 65 but as a luxury for those classified as non-elderly (age of reference person under 65). Consistent with the expenditure share specification of Deaton and Muellbauer (which differs from this research, as their remaining expenditure shares were grouped as "fuel," "drink and tobacco," "transportation and communication," "other goods" and "other services"), the remaining expenditure shares of apparel, child care and miscellaneous goods and services are categorized as luxuries.

The Enhanced AIDS model retains the necessity and luxury distinctions of the AIDS model, but the health care share is no longer dependent upon a percentage change in total expenditures in a statistically significant manner (Table A6.17). Nonetheless, the demographic translating variables of age of the consumer unit's reference person (*age\_ref*), urban status (*urbd*) and the consumer unit type (*fam\_type*) generally add explanatory power to the model. Cases where the predicted relationship between the expenditure shares and the demographic translating variables does not hold are as follows: (1) in the equation for housing, consumer unit type is not positively correlated with the housing share; (2) in the equation for health care, consumer unit type is not positively correlated with the health care share; (3) in the equation for food, urban status is not negatively related to the share allocated to food; (4) in the equation for apparel, consumer unit

type is not positively related to the apparel share; (5) in the equation for child care, urban status is not positively related to the child care share; (6) despite the very strong relationship between a percentage change in total expenditures and the share allocated to miscellaneous goods and services, only fam\_type in the demographic translating variables has the hypothesized sign.

#### **The SET, AIDS and Enhanced AIDS Models for the Entire Sample, 1992**

The SET model exhibits very poor explanatory power in 1992, as only the health care and child care equations demonstrate an acceptable goodness-of-fit (Table A6.32). The only statistically significant variables in the model are those with the most theoretically sound foundation upon which to stand: age of the reference person in the health care equation and the number of persons under the age of eighteen in the child care equation. The AIDS model demonstrates overall explanatory power once again in 1992, with all of the budget shares exhibiting the predicted relationship with the natural logarithm of total expenditures in a statistically significant manner. The Enhanced AIDS model improves significantly in 1992, with all of the equations passing the goodness-of-fit test, and only urban status in the food, apparel and child care equations and age of the reference person in the housing equation not statistically significant. Interestingly, OPHC is treated as a necessity by all consumer units with a reference person under aged 65 in 1992, which represents a reversal from the luxury status of OPHC for this group in 1984. Furthermore, the expenditure share allocated to health care did not exhibit a statistically significant relationship with a percentage change in total expenditures for those consumer units with a reference person aged 75 and older in 1992. This is likely the result of the rapid increase in government's share of total medical spending which occurred between 1990 and 1992 (Acs and Sabelhaus, 1995). Across both time periods and all expenditure quintiles, the AIDS model offers improved explanatory power over the SET model. The Enhanced AIDS model tends to mirror the AIDS model in predictive capability but enriches the model through the inclusion of a number of demographic translating variables.

### **Significant Failures and Successes of the Set, AIDS and Enhanced AIDS Models, 1984**

As mentioned previously, the SET model does not demonstrate good explanatory capability across expenditure quintiles or demographic groups. The model had a degree of success when estimating across the entire sample in 1984 but proved to be less useful in 1992. The overall weakness of the model appear to result from the reduction in degrees of freedom the complete systems approach imposes as well as the restrictions imposed on the independent variables in models of this type (refer to Chapter Five).

### **Aggregative Tests of the SET, AIDS and Enhanced AIDS Models, 1984**

In the following section, an overall picture of each model's explanatory power is provided for 1984. The models' explanatory power is estimated by the percentage of statistically significant explanatory variables in each expenditure share equation. The tables provided below offer a comparative analysis of the explanatory variables' statistical significance within the SET, AIDS and Enhanced AIDS models in 1984.

As will be demonstrated, the SET model performs poorly relative to the AIDS and Enhanced AIDS models (even when the analysis was restricted to the entire sample for the SET Model). As seen in Table 6.1 below, no more than 50 percent of the explanatory variables in any of the expenditure share equations were statistically significant. Explanatory power ranges from 50 percent in the health care and child care equations to zero in the housing and apparel equations. Although the fit of individual variables is relatively poor for the SET model across the entire sample, it is even worse when consumer units are segmented by their expenditure rank; therefore, the reporting by quintile and the top 5 and 1 percent of the expenditure ranking for the SET model is relegated to the appendix at the end of the dissertation.

**Table 6.1. SET Model: Statistically Significant Variables in 1984  
(Entire Sample Only)**

Expenditure Share	Total Variables	Number (Percentage) of Statistically Significant Variables
shs	7	0 (0%)
shc	6	3 (50%)
sfd	7	1 (14%)
sap	7	0 (0%)
scc	6	3 (50%)
smis	7	3 (43%)

It is clear from Table 6.2 below that the AIDS model outperforms the SET, with only one case (that of child care) existing where the explanatory power of a percentage change in total expenditures is statistically significant in less than 50 percent of cases. What is particularly impressive about the explanatory power of the AIDS model is that the data reflect an aggregation across the entire sample, and all quintiles and the top 5 and 1 percent of the expenditure rank. Therefore, the eight variables reported for each expenditure share reflect the combination of the entire sample, all five expenditure quintiles and the top 5 and 1 percent of the expenditure rankings. This inclusion of groups segmented by expenditure ranking would be expected to lessen overall the explanatory power because of the much smaller sample size for these subgroups. Nonetheless, the explanatory power of the AIDS model for individual expenditure rankings greatly exceeds that of the SET model for the entire sample.

**Table 6.2. AIDS Model: Statistically Significant Variables in 1984  
(Entire Sample, Quintiles and Top 5 and 1 Percent of Expenditure Rank Combined)**

Expenditure Share	Total Variables	Number (Percentage) of Statistically Significant Variables
shs	8	4 (50%)
shc	8	4 (50%)
sfd	8	7 (88%)
sap	8	5 (63%)
scc	8	3 (38%)
smis	8	7 (88%)

The Enhanced AIDS model performs well when aggregated across the entire sample and expenditure rank subgroups. In 71 percent of cases (17 of 24), the explanatory variables (ltotex, urbd, age, fam) exert a statistically significant influence of greater than 50 percent on the expenditure shares. As with the AIDS model, the numbers shown above reflect an aggregation across the entire sample, all quintiles and the top 5 and 1 percent of the expenditure rank. In terms of overall explanatory power of the demographic translating variables, the age of the reference person was the only one that exerted a statistically significant influence on all expenditure shares in at least 50 percent of cases. The composition of the consumer unit offers the weakest explanatory power of all the demographic translating variables, with statistical significance of 50 percent or greater holding for only 3 of the 6 expenditure shares. This is consistent with previous findings of relatively poor correlation between household composition and consumer expenditure behavior (Working, 1945; Uusitalo, 1980).

**Table. 6.3. Enhanced AIDS Model: Statistically Significant Variables in 1984  
(Entire Sample, Quintiles and Top 5 and 1 Percent of Expenditure Rank Combined)**

Expenditure Share	Total Variables				Number (Percentage) of Statistically Significant Variables			
	ltotex	urbd	age	fam	ltotex	urbd	age	fam
shs	8	8	8	8	8 (100%)	8 (100%)	5 (63%)	2 (25%)
shc	8	8	8	8	2 (25%)	6 (75%)	7 (88%)	0 (0%)
sfd	8	8	8	8	7 (88%)	4 (50%)	5 (63%)	7 (88%)
sap	8	8	8	8	7 (88%)	4 (50%)	7 (88%)	1 (13%)
scc	8	8	8	8	3 (38%)	1 (13%)	7 (88%)	7 (88%)
smis	8	8	8	8	7 (88%)	6 (75%)	6 (75%)	7 (88%)

**Significant Failures and Successes of the SET, AIDS and Enhanced AIDS Models, 1992**

Although there are many similarities in the aggregative results between 1984 and 1992 when all the models are analyzed collectively, the SET model does not perform nearly as well in 1992 as in 1984 (Table 6.4). Whereas there are only two expenditure share equations with no statistically significant variables in the 1984 model, four of the expenditure share equations have no statistically significant variables in 1992. Furthermore, the remaining equations (the health care and child care expenditure shares) have only one statistically significant variable in each case. This contrasts starkly with the SET model in 1984, in which three of the equations have three statistically significant explanatory variables.

**Table 6.4. SET Model, Statistically Significant Variables in 1992  
(Entire Sample Only)**

Expenditure Share	Total Variables	Number (Percentage) of Statistically Significant Variables
shs	7	0 (0%)
shc	6	1 (14%)
sfd	7	0 (0%)
sap	7	0 (0%)
scc	6	1 (14%)
smis	7	0 (0%)

The AIDS model's results (Table 6.5) are reasonably consistent between 1984 and 1992, as the food and miscellaneous expenditure shares had the greatest number of statistically significant variables. However, both apparel and child care each have fewer than 50 percent statistically significant variables in 1992, whereas child care is the only expenditure share with fewer than 50 percent statistically significant variables in 1984.

**Table 6.5. AIDS Model: Statistically Significant Variables in 1992  
(Entire Sample, Quintiles and Top 5 and 1 Percent of Expenditure Rank Combined)**

Expenditure Share	Total Variables	Number (Percentage) of Statistically Significant Variables
shs	8	3 (50%)
shc	8	3 (50%)
sfd	8	6 (75%)
sap	8	2 (25%)
scc	8	2 (25%)
smis	8	6 (75%)

In the Enhanced AIDS model, age of the reference person proved again in 1992 to be the variable with the greatest degree of statistical significance. Urban or rural status replaced consumer unit composition in 1992 as the variable with the weakest explanatory power. Although the expenditures literature indicated the tenuous relationship between consumer unit composition and consumer expenditure patterns, the literature on the impact urban or rural residence has on

consumer expenditures was published prior to 1992 (Rogers, 1988). Therefore, there is no basis for evaluating if the weakness of the urban or rural status variable in 1992 is based upon some convergence of expenditure patterns between the two groups or is merely a statistical aberration.

In 83 percent of cases (20 of 24), the explanatory variables (ltotex, urbd, age, fam) exert a statistically significant influence of 50 percent or greater on the expenditure shares. By this criterion, the Enhanced AIDS model performed better in 1992, as a statistically significant fit of 50 percent or better held in 75 (18 of 24) percent of cases in 1984.

**Table 6.6. Enhanced AIDS Model: Statistically Significant Variables in 1992 (Entire Sample, Quintiles and Top 5 and 1 Percent of Expenditure Rank Combined)**

Expenditure Share	Total Variables				Number (Percentage) of Statistically Significant Variables			
	ltotex	urbd	age	fam	ltotex	urbd	age	fam
shs	8	8	8	8	8 (100%)	5 (63%)	5 (63%)	6 (75%)
shc	8	8	8	8	3 (38%)	6 (75%)	7 (88%)	5 (63%)
sfd	8	8	8	8	8 (100%)	2 (25%)	4 (50%)	7 (88%)
sap	8	8	8	8	6 (75%)	0 (0%)	5 (63%)	4 (50%)
scc*	7	7	7	7	4 (50%)	0 (0%)	7 (88%)	7 (88%)
smis	8	8	8	8	8 (100%)	8 (100%)	5 (63%)	4 (50%)

\*The equation for child care failed to converge for the bottom quintile of the expenditures distribution due to an insufficient number of nonzero observations.

#### **Analysis of the AIDS and Enhanced AIDS Model Results, 1984 and 1992**

The AIDS model was successful at identifying statistically significant relationships in 83 percent of cases in 1984 (Table 6.2) and 75 percent of cases in 1992 (Table 6.5). As expected, the model is less successful when the sample size is reduced to estimate expenditure patterns for particular quintiles and even less successful when reduced even further, such as for the top 1 percent of the expenditures distribution. Nonetheless, the model is consistent with previous research on consumer expenditures patterns, with housing and food categorized as necessities

across all expenditure rankings and demographic groups. Apparel, child care (with very rare exceptions) and miscellaneous goods and services were categorized as luxuries (Deaton and Muellbauer, 1980a; Douthitt and Fedyk, 1988; Pollak and Wales, 1992). Consistent with the work of Rubin and Koelln (1996), health care is sensitive to a consumer unit's demographic or socioeconomic profile. For example, out-of-pocket health care (OPHC) is a luxury for non-senior consumer units but a necessity for senior consumer units in 1984, results that are consistent with the cross-sectional study covering the period 1980-81 and 1989-90 by Rubin and Koelln (1996).

As Deaton and Muellbauer anticipated in their seminal article on Almost Ideal Demand Systems (AIDS) models (1980a, p. 323), the addition of demographic translating variables improves the AIDS model's explanatory power. The Enhanced AIDS model, which includes the variables of urban or rural status, consumer units with or without children and age of the consumer unit's reference person, had a particularly beneficial impact in cases where the sample size was small (the top 5 and 1 percent of the expenditures distribution). Although the addition of demographic translating variables tends to improve the basic AIDS model, some of the variables have limited success in explaining expenditure share allocation. For example, consumer unit type (children or no children) is a particularly poor predictor of the share allocated to housing. As another example, urban status is a poor predictor of the share allocated to food, apparel and child care in both 1984 and 1992. In a study of consumer expenditure patterns between urban and rural consumers, (Rogers, 1988) found that the most significant differences in expenditure share allocation between these groups 1985 existed for health care, housing and transportation, with differences in percentage points of 1.7 for health care, 4.3 for housing and 5.2 for transportation. However, the differences between these groups for food and apparel were only 0.4 and 1.0 percentage points, respectively. It appears these differences were not significantly large for urban status to generate results which differ in statistically-significant fashion from the control group.

## **The Enhanced AIDS Model: Inter-Year Comparisons Over the Expenditure Ranking, 1984 and 1992**

Housing is a necessity in both 1984 and 1992 for all expenditure rankings. Although the age of the reference person is negatively correlated with the share allocated to housing in 1984 for the entire sample of consumer units, no statistically significant relationship is found between the variables in 1992. Despite the hypothesis that a consumer unit's housing burden should decrease with age, the age of the reference person proved to be a poor predictor of the housing share by expenditure ranking in either 1984 or 1992 (Tables A6.1-A6.34). Urban status, however, is positively correlated with the share allocated to housing for all expenditure rankings in both 1984 and 1992. Although not a consistent predictor, the existence of children generally reduces the share allocated to housing, which is contrary to the earlier hypothesis that increased household size tends to impose upward-pressure on housing needs as well as earlier empirical findings (Douthitt and Fedyk, 1988) but consistent with the findings of Uusitalo (1980) that household composition is a relatively poor predictor in explaining consumption pattern differences.

Health care is a luxury for the poorest quintiles in 1984 and 1992 and for the entire sample in 1992. The share allocated to health care is poorly correlated with expenditure ranking, however, as health care does not necessarily move from luxury to necessity as a consumer unit's expenditure ranking increases. The age of the reference person is positively correlated with the share allocated to health care (Tables A6.1-A6.34), which is opposite of the relationship that was postulated. Urban status places downward-pressure on the health care expenditure share, as Rogers (1988) and Acs and Sabelhaus (1995) have indicated. The explanation Rogers posits is that rural residents pay a much greater share of their insurance premiums than do urban dwellers. Interestingly, having children tends to decrease the health care budget share for seven of eight expenditure groups in 1984 and three of eight expenditure groups in 1992. This is inconsistent with the hypothesis because the existence of children is expected to increase health care expenditure share (Deaton, et al., 1989). However, these data were collected prior to the

**"Personal Responsibility and Work Opportunity Reconciliation Act of 1996" (H.R. 3734, Public Law 104-193), when Medicaid ceased to be treated as an entitlement for those receiving Aid to Families with Dependent Children. Under the former regime, a consumer unit whose total expenditures rose as a result of receiving the bundle of income and in-kind income would have the opportunity to scale-back on health care expenditures for their children as a result of Medicaid coverage.**

**The food expenditure share tended to match the hypotheses extremely well as food is a necessity across all expenditure groups. This confirms the familiar Engel's Curve relationship of a falling expenditure share for food as income increases. Age is positively related to the share allocated to food for the entire sample in 1984 and 1992, but is not statistically significant with the food share for expenditure groupings in either year (Tables A6.1-A6.34). Although it was hypothesized that the inner-city poor pay significantly higher food prices than those in the suburbs or rural areas, the data were only modeled for urban or rural distinctions. This lack of detailed information on urban versus rural consumer units may contribute to the poor statistical correlation found. Furthermore, the interaction effect of residing in the inner-city and socioeconomic status were not modeled here. It may be that dividing groups by urban or rural status is too simplistic for drawing meaningful conclusions about the expenditure share allocated to food.**

**The expenditure share allocated to apparel proved to be quite predictable based upon percentage changes in total expenditures and the demographic translating variables when grouped by expenditure ranking. For all groups but the third and fourth expenditure quintiles in 1992, it is classified as a luxury in 1984 and 1992. Additional years of age for the reference person reduced the apparel expenditure share. Furthermore, urban status is positively correlated with the share allocated to clothing. This outcome was supported by previous studies that distinguished between urban and rural status (Rogers, 1988) or living in metropolitan instead of non- metropolitan areas (Banta, 1989).**

Child care is a luxury for the entire sample in 1984 and 1992 but it does not exhibit a predictable relationship with percentage changes in total expenditures based upon expenditure ranking. The age of the reference person, however, is inversely related to the share allocated to child care for the entire sample and all expenditure groupings (statistically significant in 14 of 16 cases, Tables A6.3 and A6.6). This confirms the hypothesis of Jacobs, et al., (1989) that consumer units with substantial child care needs, such as dual-income couples with children, tend to be younger than consumer units where the wife does not work outside the home and therefore has greater child care needs. The prediction that the share allocated to child care would be lower in urban areas did not hold across the expenditure ranking over time.

The miscellaneous category demonstrated, as predicted, a strong positive correlation with a percentage change to total expenditures and the demographic translating variables across both time periods and the expenditure ranking. Unexpectedly, the age of the reference person and urban status are inversely correlated with the miscellaneous expenditure share. It was postulated that as people get older they would travel more and spend more on goods such as recreational vehicles, books and magazines. This hypothesis was not confirmed. Although comparisons of miscellaneous goods and services expenditures between non-elderly and elderly groups over a comparable time period do not exist, studies by Hitchler (1993) and Paulin (2000) compared expenditures patterns of the elderly by two groups: those aged 65 to 74 and those aged 75 and older, and their results are consistent with those found here. In Hitchler's cross-sectional study between 1980 and 1990, it was found that consumer units with a reference person 75 years of age and older spent less on miscellaneous goods and services in both 1980 and 1990 and that this difference was statistically significant in 1990. Using time-series data over the period 1984 to 1997, Paulin estimated that expenditures on a subcategory of miscellaneous goods and services, "recreation and related items" was lower for the 75 and older group than the 65 to 74 group by \$163 in 1984 and \$55 in 1997. Furthermore, it was hypothesized that urban areas have a greater range of cultural and recreational opportunities and that these would absorb a greater portion of

urban residents' total expenditures. The exact opposite held true. Urban residency decreases the share allocated to miscellaneous for every expenditure rank and the entire sample in both time periods (Tables A6.1-A6.34). Using a less comprehensive measure of miscellaneous goods and services than in this study, Rogers (1988) found that urban areas spent a statistically significant greater amount on such items than rural consumer units in 1985. This disparity in results is likely due to the much more comprehensive measure of this category of expenditure employed for this study. For example, transportation expenses are included in the miscellaneous category for this study but not in Rogers' study. Since rural consumer units had an expenditure share 5.2 percentage points higher than urban consumer units for transportation in 1985, it is likely that this component is creating the large divergence in findings between the two studies. The hypothesis that consumer units with children would scale back on miscellaneous expenditures to provide for increased needs in other areas, such as food and child care, (based upon the findings of Douthitt and Fedyk, 1988, p. 244) held for every expenditure ranking and the sample universe across both time periods.

#### **The Bottom Quintile of the Expenditure Ranking**

As expected by the well-established Engel curve for food, the bottom quintile of the expenditure distribution has the largest mean share expenditure for food across all expenditure quintiles and demographic groups (Table A6.37). Furthermore, mean expenditures for health care exceeded those of all other expenditure quintiles and all demographic groups except for rural consumer units, aged 65 to 74 and 75 and older. It is interesting to note that the natural logarithm of total expenditures does not have a statistically significant impact on the share allocated to child care for the bottom quintile within the Enhanced AIDS model in 1984 (Table A6.2). This could be the result of the inherent difficulties in modeling child care expenditures for consumer units with low total expenditures on this service (Cattan, 1991; Lino, 1994, Lein and Edin, 1997), due to their extensive use of informal child care arrangements.

Despite the Enhanced AIDS model's overall explanatory power for the bottom quintile in 1984, the following demographic translating variables are not statistically significant: in equation (2), consumer units type; in equation (3) age and urban status; in equation (4) consumer unit type; in equation (5), only age was statistically significant. In the case of health care, where the presence of children was not statistically correlated with the health care, the expenditure share can be explained by the extension of Medicaid benefits to children for parents receiving public assistance. Age proves to be a consistently poor predictor across the expenditure ranking and demographic groups of the expenditure share allocated to food. Uusitalo (1980) found that household composition was generally a poor predictor of budget share allocation, and that proved to be the case for the health care, apparel and child care categories. Lastly, Rogers (1988) established that the greatest differences in budget share allocation between urban and rural consumer units was for transportation and housing. This may explain the lack of explanatory power the urban status variable had in the food and child care equations for the bottom quintile.

#### **The Middle Quintile**

The AIDS model did not explain expenditure patterns of the middle quintile of the expenditures distribution well, as only health care, food and miscellaneous goods and services are statistically significant. The Enhanced AIDS model does not improve the correlation between expenditure share allocation and a percentage change in total expenditures much, as housing, food, apparel and miscellaneous goods and services were statistically significant. The explanatory power of the AIDS model worsens in 1992 for this group, as only health care and miscellaneous goods and services are statistically significant (Table A6.22). In the Enhanced AIDS model, housing, food, child care and miscellaneous goods and services have a statistically significant relationship with a percentage change in total expenditures. Interestingly, the only case in which all of the demographic translating variables are statistically significant is for equation (2) in 1992 (Table A6.23). The middle quintile experienced statistically significant increases in the expenditure share

allocated to housing and health care and decreases in the share allocated to child care and miscellaneous goods and services.

The most surprising results that emerge for the middle quintile in 1984 (Table A6.5) are that a percentage change in total expenditures is not statistically significant for the health care share, nor is consumer unit type a significant determinant of the housing expenditure share (at the 5 percent level; however, both were significant at the 10 percent level). Otherwise, the results are not particularly surprising, as the following variables are not statistically significant: in equation (2) urban status and consumer unit type; in equation (3) urban status; in equation (4) urban status and consumer unit type; (5) in the child care equation, *Itotex* and urban status and in equation (6) urban status. Although Rogers (1988) found that those in rural areas spent larger shares on the miscellaneous category, his definition of this group of expenditure was far narrower than that employed here.

The model's explanatory power is diminished slightly in 1992, as the equation for apparel no longer passes the goodness-of-fit test. However, the explanatory power of the miscellaneous category improves, as all variables are statistically significant. The same situation holds for health care in 1992, but age becomes the only demographic translating variable that is not statistically significant in the housing equation. The following are not statistically significant for equations 3 and 5: in equation (3) age and urban status; in equation four all variables; in equation (5) *Itotex* and urban status.

### **The Top 5 and 1 Percent**

As mentioned previously, one would expect the top 5 and 1 percent of the expenditures distribution to be difficult to model due to the smaller sample size for these groups (the top 5 percent of the expenditures distribution had 343 consumer units in 1984 and 375 in 1992; the top 1 percent of the expenditures distribution had 68 consumer units in 1984 and 75 in 1992). The problem is particularly severe for the top 1 percent of the expenditures distribution within the AIDS model, as there are no statistically significant variables in either 1984 or 1992. The results

are far better for the top 5 percent of the expenditures distribution and when the Enhanced AIDS model was employed. For example, all but health care and child care are statistically significant for the top 5 percent in the AIDS model, with the same scenario holding for the correlation with a percentage change in total expenditures in the Enhanced AIDS model. The Enhanced AIDS model shows all but the health care share to be significantly correlated with a percentage change in total expenditures. For the top 5 percent in 1984, all of the demographic translating variables were statistically significant in equations (3) and (6), but this only held for equation (6) for the top 1 percent.

Although the AIDS model only exhibits statistical significance for the food, child care and apparel shares for the top 5 percent of the expenditure ranking, all of the shares are significantly correlated with a percentage change in total expenditures in the Enhanced AIDS model for this group. The same problem arose in 1992 as in 1984 with the AIDS model for the top 1 percent, as none of the variables were statistically significant. However, these variables are significantly correlated with a percentage change in total expenditures in the Enhanced AIDS model of this group in 1992. For the top 5 and 1 percent in 1992, all of the demographic translating variables are statistically significant in equation (1). The only statistically significant difference of means for these groups are an increase in the child care budget share for the top 5 percent and a decrease in the miscellaneous budget share for this group.

The explanatory power of the Enhanced AIDS model in 1992 (Tables A6.29 and A6.41) is comparable to 1984, with the goodness of fit tests holding for all equations. All of the variables in the housing equation were statistically significant and only consumer unit type failed to be statistically significant in the health care equation. The following variables are not statistically significant in equations 3-6: in equation (3) age and urban status; in equation (4) urban status; in equation (5) urban status; in equation (6) age and consumer unit type.

The small sample size for the top 1 percent of the expenditure rank does not hinder the overall explanatory power of the Enhanced AIDS in 1984, as each equation passes the goodness-of-fit

test (Table A1.14). However, percentage changes in total expenditures did not have a statistically significant impact on the health care expenditure share. The following demographic translating variables are not statistically significant: in equation (1) age and consumer unit type; in equation (2) consumer unit type; in equation (3) age; in equation (4) urban status and consumer unit type and in equation (5) urban status.

The explanatory power of the Enhanced AIDS model improves significantly in 1992, as all budget shares are correlated with a percentage change in total expenditures in a statistically significant manner. All of the demographic translating variables are statistically significant in the housing share equation; however, the following were not significant in equations 2-6: in equation (2) consumer unit type; in equation (3) age and urban status; in equation (4) urban status; in equation (5) urban status and in equation (5) age and consumer unit type.

#### **Inter-Year Difference of Means Tests for Expenditure Shares**

In the case of housing, the mean expenditure share increases significantly between 1984 and 1992 for the third through fifth expenditure quintiles and the entire sample of consumer units, but it did not exhibit statistically significant changes for any other expenditure group.

Health care demonstrates the exact same pattern as housing in terms of increasing across the same expenditure groups and the entire sample over this period. Since health care expenditures are considered defensive in nature, this trend is quite disturbing, as it implies greater allocation to functionings-maintaining rather than functionings-enhancing goods and services.

As expected, the mean share allocated to food diminishes in every case, but this reduction is only statistically significant for the fourth and fifth quintiles of the expenditure distribution and the sample universe. Since total expenditures had risen between 1984 and 1992, the Engel relationship where the share allocated to food falls as a household's expenditures (income) increase holds here.

The expenditure share allocated to apparel increases significantly for the top 5 and 1 percent of the expenditure rank over this period. These results are consistent with those of Julia Szabo,

who discusses “dressing rich” in the book, *Icons of Fashion: The 20<sup>th</sup> Century* (1999, p. 124): “The ‘go-getter’ decade made millionaires of those who dressed for success. Fashion was no longer the enemy; it was an ally, but it came at a price. Flashy clothes and accessories rigged with instantly recognized logos...had the power to convey life altering status.”

Child care expenditures exhibit an intriguing pattern between 1984 and 1992, as the expenditure share allocated to them decreased significantly for the third and fourth quintiles and the entire sample, but increase significantly for the top 5 percent of the expenditure ranking. This phenomenon is consistent with “positive assortive mating” (Furchtgott-Roth, 1995) as high-powered professional couples’ demanding schedules increased their need for child care (Jacobs, et al., 1989).

The most surprising result in the inter-year comparisons across means occurs within the miscellaneous category, as the expenditure share allocated to these goods and services decreases significantly in every case but the top 1 percent of the expenditure ranking. This trend is troubling, as expenditures in this category, such as vacations, recreational vehicles, books, club membership fees and gifts are associated with “the good life” in the Aristotelian sense (Sen, 1987, Nussbaum and Sen, 1993).

The housing and health care shares increase represent most of where this share reduction is being absorbed. The data are not sufficiently detailed, however, to determine if the increased housing burden represents the same hedonic bundle of attributes in housing at a higher price relative to total expenditure or if the share increase embodies some voluntary upscaling in housing choice, with a greater hedonic bundle of attributes. Furthermore, with home purchase prices topcoded at \$200,000 in the 1984 and 1992 Consumer Expenditure Survey data sets, it is impossible to determine if homes purchased might reasonably be classified as “trophy homes” (Frank, 1999), which go far beyond fulfilling the necessity role of shelter. Likewise, although health care is generally regarded as a “defensive” expenditure, increased usage of procedures

over this time period which are clearly functionings-enhancing, such as cosmetic plastic surgery (Frank, 1999), would contribute to greater shares allocated to health care.

### **Summary of the Most Interesting Results from the Enhanced AIDS Model**

The empirical results reported in this chapter tend to match both intuition and the findings of previous researchers in the field of consumer expenditure patterns. Nonetheless, the specific characteristics of this study often led to unique and compelling findings. In what follows, the most interesting findings for each category of expenditure and group within the expenditure ranking are provided.

As expected from previous findings of consumer expenditure patterns (Working, 1945; Deaton and Muellbauer, 1980a; Pollak and Wales, 1992), housing is a necessity for all expenditure groups. The most interesting result on housing expenditure share allocation arise within the difference of means tests between 1984 and 1992, with a statistically significant increase in mean share allocation only for those consumer units within the middle (the second through fourth quintiles) of the expenditure distribution. It does not appear that those in the bottom of the expenditures distribution became more "housing burdened" over this time, nor do these findings support the notion of significant upscaling in housing choice by the affluent or super affluent.

The health care expenditure share is the only one that was sensitive both to demographic specification (analyzed in Chapter Seven) and expenditure ranking. That is, the luxury or necessity status health care depends both upon a consumer unit's demographic characteristics (age, presence of children, urban or rural status) and their socioeconomic position. Health care is a luxury for the bottom two quintiles of the expenditure distribution, but a necessity for all other expenditure groups in 1984. Health care no longer has a statistically significant relationship with the lowest expenditure quintile in 1992, but retains its luxury status for the second quintile and necessity status for all other groups. Interestingly, health care demonstrates the same pattern as housing in the difference of means tests, as there are statistically significant increases in this share restricted to the second through fourth quintiles of the expenditure distribution. Given the

generally defensive nature of health care expenditures (Cobb, 1995; Halstead, 1996), such expenditures reflect a troubling trend of functionings-maintaining rather than functionings-enhancing expenditures.

As is the case with housing, food is a necessity across all expenditure and demographic groups. Stated differently, Engel's relationship of a falling expenditure share allocated to food as economic resources increase holds in all cases. The mean share allocated to food is relatively stable over the 1984 to 1992 period, as it was reduced in a statistically significant manner only for the fourth and fifth quintiles of the expenditure distribution.

Apparel is a luxury across the entire expenditure rank and all demographic groups. However, the marginal impact of a percentage change in total expenditures differs dramatically across the expenditure ranking, ranging from 0.4 percent for the top 5 percent of the expenditure ranking to 1.8 percent for the middle quintile. The mean expenditure share exhibits a statistically significant increase only for the top 5 and 1 percent of the expenditure distribution, which Szabo (1999) associates with the career benefits associated with "dressing rich" for high-powered professionals.

Child care expenditures are not statistically significant in many cases, but are classified as a luxury for all expenditure groups except the fourth quintile in 1984 and third quintile in 1992. Such expenditures are highly sensitive to changes in total expenditures (note its high expenditure elasticity, Table A6.35) and difficult to predict based upon socioeconomic or demographic status. For example, there is no statistically significant relationship between a percentage change in total expenditures and changes in the child care expenditure share for the bottom two quintiles of the expenditure distribution within the Enhanced AIDS model in either 1984 or 1992. Nor is there a statistically significant relationship between a percentage change in total expenditures and the child care expenditure share in 1992 for single parents. Researchers have found that modeling child care expenditures for single parents and the poor are inherently difficult due to their extensive use of informal child care arrangements (Cattan, 1991; Lino, 1994; Edin, 1997).

Consistent with the sensitivity to changes in total expenditures mentioned above, the marginal impact of a percentage change in total expenditures on the child care expenditure share was very volatile in 1984 and 1992, ranging from 4.0 percent for the fifth quintile in 1992 to 8.3 percent for the top 1 percent of the expenditures distribution in 1992.

The expenditure share, "miscellaneous goods and services," includes all categories of expenditure not captured within the other five expenditure categories. Since many expenditures within the miscellaneous category represent the "finer things in life," such as college education, vacations and country club fees, this share was expected to be a luxury with high expenditure elasticity. This hypothesis held, as the miscellaneous share was a luxury across the expenditure ranking and demonstrates an expenditure elasticity second only to child care, when estimated over the entire sample (Table A6.35). The marginal impact of a percentage change in total expenditures on the miscellaneous expenditure share (i.e., the "strength" of its luxury nature) tends to increase at higher levels of the expenditure ranking, from 6.5 percent for the third quintile to 16 percent for the top 5 percent of the expenditure ranking in 1984. In 1992, the smallest marginal impact is within the second quintile at 7.5 percent and the largest is within the fourth quintile at 12.6 percent.

The most dramatic changes within mean expenditure share allocation occur within the miscellaneous expenditure share, with every group except the top 1 percent of the expenditure ranking incurring a decrease in the share allocated to this category of expenditure between 1984 and 1992. Since expenditures in this category tend to be functioning-enhancing in nature, this calls into question consumer unit's ability to provision for those goods and services which enrich the quality of life (Sen, 1987, 1992, 1999)

In the following chapter, the analysis will shift to demographic specification, as groups will be analyzed by age, urban or rural residence and consumer unit type. Since demographic specification requires segmenting groups by demographic characteristics prior to estimation, the

**AIDS model is the only appropriate model to employ out of the three utilized in this dissertation because it does not contain demographic translating variables.**

**APPENDIX TO CHAPTER SIX**  
**(Grouped by Expenditure Rank)**  
**Table A6.1**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Lowest Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	4.59	Itotex	-.023,-2.144	0.032	Necessity
		_cons	.569,7.680	0.000	
shc	6.30	Itotex	.022,2.499	0.013	Luxury
		_cons	-.092,-1.489	0.137	
sfd	44.87*	Itotex	-.052,-6.769	0.000	Necessity
		_cons	.622,11.664	0.000	
sap	27.61*	Itotex	.022,5.180	0.000	Luxury
		_cons	-.139,-4.607	0.000	
scc	11.91	Itotex	.400,2.904	0.004	Luxury
		_cons	-4.047,-3.858	0.000	
smis	59.57*	Itotex	.082,7.777	0.000	Luxury
		_cons	-.333,-4.550	0.000	

\*Statistically significant at the 5% level.

**Table A6.2, pp. 115-116**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Lowest Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	68.76*	ltotex	-.008,-0.85	0.394	N/A
		age_ref	.001,3.06	0.002	
		urbd	.077,6.39	0.000	
		fam	-.037,-2.43	0.015	
		_cons	.351,5.10	0.000	
shc	467.67*	ltotex	.023,3.28	0.001	Luxury
		age_ref	.004,17.73	0.000	
		urbd	-.041,-4.67	0.000	
		fam	-.018,-1.47	0.142	
		_cons	-.332,-6.15	0.000	
sfd	230.20*	ltotex	-.075,-11.9	0.000	Necessity
		age_ref	.000,0.21	0.833	
		urbd	-.010,-1.24	0.216	
		fam	.102,9.72	0.000	
		_cons	.787,16.62	0.000	
sap	54.10*	ltotex	.010,2.81	0.005	Luxury
		age_ref	-.001,-4.60	0.000	
		urbd	.010,2.12	0.034	
		fam	.004,0.70	0.484	
		_cons	-.028,-1.02	0.306	
scc	53.72*	ltotex	.112,1.15	0.252	N/A
		age_ref	-.013,-3.44	0.001	
		urbd	-.164,-1.41	0.159	
		fam	.239,2.11	0.035	
		_cons	-1.118,-1.50	0.135	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P>t;	Expenditure Category: Luxury or Necessity
smis	277.61*	ltotex	.074,8.71	0.000	Luxury
		age_ref	-.004,-14.02	0.000	
		urbd	-.030,-2.71	0.007	
		fam	-.058,-4.03	0.000	
		_cons	-.016,-0.25	0.806	

\*Statistically significant at the 5% level.

**Table A6.3**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Second Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	2.44	ltotex	-.043,-1.564	0.118	N/A
		_cons	.713,3.347	0.001	
shc	0.90	ltotex	.018,0.949	0.343	N/A
		_cons	-.083,-0.558	0.577	
sfd	22.87*	ltotex	-.085,-4.802	0.000	Necessity
		_cons	.874,6.392	0.000	
sap	7.56*	ltotex	.024,2.750	0.006	Luxury
		_cons	-.153,-2.230	0.026	
scc	5.84*	ltotex	.326,2.349	0.019	Luxury
		_cons	-3.126,-2.863	0.004	
smis	17.38*	ltotex	.119,4.184	0.000	Luxury
		_cons	-.595,-2.701	0.007	

\*Statistically significant at the 5% level.

**Table A6.4, pp. 117-118**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Second Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	71.22*	ltotex	-.045,-4.31	0.000	Necessity
		age_ref	-.000,-1.92	0.055	
		urbd	.079,6.52	0.000	
		fam	-.019,-1.95	0.051	
		_cons	.673,8.02	0.000	
shc	329.35*	ltotex	.014,1.96	0.050	Luxury
		age_ref	.003,17.33	0.000	
		urbd	-.015,-1.89	0.058	
		fam	-.000,-0.03	0.979	
		_cons	-.178,-3.08	0.002	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	74.04*	ltotex	-.018,-2.72	0.007	Necessity
		age_ref	.001,4.59	0.000	
		urbd	-.004,-0.49	0.622	
		fam	.049,8.01	0.000	
		_cons	.303,5.63	0.000	
sap	54.60*	ltotex	.013,3.62	0.000	Luxury
		age_ref	-.000,-6.12	0.000	
		urbd	.005,1.34	0.180	
		fam	-.007,-2.39	0.017	
		_cons	-.040,-1.42	0.155	
scc	204.42*	ltotex	-.046,-0.99	0.321	N/A
		age_ref	-.010,-6.39	0.000	
		urbd	-.156,-3.54	0.000	
		fam	.310,6.80	0.000	
		_cons	.293,0.79	0.427	
smis	130.56*	ltotex	.066,6.26	0.000	Luxury
		age_ref	-.002,-9.03	0.000	
		urbd	-.044,-3.63	0.000	
		fam	-.036,-3.66	0.000	
		_cons	-.011,-0.13	0.898	

\*Statistically significant at the 5% level.

**Table A6.5**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Third Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	0.75	Itotex	-.030,-0.867	0.386	N/A
		_cons	.592,2.086	0.037	
shc	11.42	Itotex	-.078,-3.388	0.001	Necessity
		_cons	.695,3.690	0.000	
sfd	5.26*	Itotex	-.046,-2.296	0.022	Necessity
		_cons	.571,3.510	0.000	
sap	1.52	Itotex	.013,1.234	0.217	N/A
		_cons	-.066,-0.760	0.447	
scc	2.65	Itotex	.162,1.617	0.106	N/A
		_cons	-1.638,-1.983	0.048	
smis	12.71	Itotex	.137,3.573	0.000	Luxury
		_cons	-.742,-2.369	0.018	

\*Statistically significant at the 5% level.

**Table A6.6, pp. 120-121**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Third Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	47.63*	ltotex	-.054,-5.39	0.000	Necessity
		age_ref	-.001,-3.06	0.002	
		urbd	.037,2.81	0.005	
		fam	-.017,-1.94	0.052	
		_cons	.800,9.56	0.000	
shc	169.12*	ltotex	.011,1.84	0.065	N/A
		age_ref	.002,12.86	0.000	
		urbd	-.007,-0.86	0.392	
		fam	.005,0.97	0.332	
		_cons	-.125,-2.50	0.013	
sfd	151.77*	ltotex	-.012,-2.20	0.028	Necessity
		age_ref	.001,8.04	0.000	
		urbd	-.004,-0.56	0.577	
		fam	.055,11.58	0.000	
		_cons	.219,4.68	0.000	
sap	45.55*	ltotex	.018,5.37	0.000	Luxury
		age_ref	-.000,-3.58	0.000	
		urbd	.006,1.46	0.146	
		fam	-.001,-0.35	0.726	
		_cons	-.095,-3.47	0.001	
scc	303.05*	ltotex	.042,1.11	0.265	N/A
		age_ref	-.013,-8.34	0.000	
		urbd	-.008,-0.19	0.852	
		fam	.330,8.84	0.000	
		_cons	-.356,-1.12	0.262	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
smis	85.58*	ltotex	.065,6.01	0.000	Luxury
		age_ref	-.002,-5.36	0.000	
		urbd	-.021,-1.47	0.141	
		fam	-.059,-6.37	0.000	
		_cons	-.035,-0.38	0.703	

\*Statistically significant at the 5% level.

**Table A6.7**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Fourth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	1.54	Itotex	-.040,-1.242	0.214	N/A
		_cons	.680,2.466	0.014	
shc	0.60	Itotex	-.012,-0.776	0.438	N/A
		_cons	.153,1.132	0.258	
sfd	5.07	Itotex	-.040,-2.253	0.024	Necessity
		_cons	.520,3.442	0.001	
sap	0.14	Itotex	-.004,-0.371	0.711	N/A
		_cons	.084,0.935	0.350	
scc	2.92	Itotex	.116,1.704	0.089	N/A
		_cons	-1.193,-2.025	0.043	
smis	5.26	Itotex	.087,2.295	0.022	Luxury
		_cons	-.334,-1.026	0.305	

\*Statistically significant at the 5% level.

**Table A6.8, pp. 123-124**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Fourth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	92.12*	ltotex	-.051,-5.33	0.000	Necessity
		age_ref	-.002,-7.58	0.000	
		urbd	.034,2.52	0.012	
		fam	-.004,-0.49	0.625	
		_cons	.848,10.15	0.000	
shc	63.31*	ltotex	-.002,-0.46	0.646	N/A
		age_ref	.001,6.33	0.000	
		urbd	-.026,-4.72	0.000	
		fam	-.001,-0.22	0.828	
		_cons	.051,1.44	0.151	
sfd	93.68*	ltotex	-.013,-2.48	0.013	Necessity
		age_ref	.001,6.72	0.000	
		urbd	.018,2.46	0.014	
		fam	.037,8.22	0.000	
		_cons	.198,4.49	0.000	
sap	29.05*	ltotex	.012,4.00	0.000	Luxury
		age_ref	-.000,-2.16	0.031	
		urbd	.012,2.66	0.008	
		fam	.002,0.65	0.514	
		_cons	-.060,-2.21	0.027	
scc	385.39*	ltotex	-.065,-3.14	0.002	Necessity
		age_ref	-.014,-10.97	0.000	
		urbd	.068,2.27	0.023	
		fam	.258,9.29	0.000	
		_cons	.641,3.54	0.000	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P>t;	Expenditure Category: Luxury or Necessity
smis	112.40*	ltotex	.083,7.44	0.000	Luxury
		age_ref	.001,4.13	0.000	
		urbd	-.032,-2.04	0.042	
		fam	-.054,-5.41	0.000	
		_cons	-.295,-3.04	0.002	

\*Statistically significant at the 5% level.

**Table A6.9**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Fifth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	52.25*	Itotex	-.093,-7.297	0.000	Necessity
		_cons	1.159,9.810	0.000	
shc	18.07*	Itotex	-.019,-4.264	0.000	Necessity
		_cons	.216,5.160	0.000	
sfd	165.43*	Itotex	-.072,-13.259	0.000	Necessity
		_cons	.806,16.038	0.000	
sap	16.18*	Itotex	-.015,-4.035	0.000	Necessity
		_cons	.188,5.522	0.000	
scc	1.31	Itotex	-.016,-1.141	0.254	N/A
		_cons	.030,0.228	0.820	
smis	152.93*	Itotex	.192,12.722	0.000	Luxury
		_cons	-1.261,-9.043	0.000	

\*Statistically significant at the 5% level.

**Table A6.10, pp. 126-127**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Fifth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	193.72*	ltotex	-.074,-14.19	0.000	Necessity
		age_ref	-.001,-2.64	0.008	
		urbd	.048,3.29	0.001	
		fam	.005,0.63	0.531	
		_cons	.973,19.45	0.000	
shc	155.79*	ltotex	-.007,-3.06	0.002	Necessity
		age_ref	.001,10.58	0.000	
		urbd	-.021,-3.31	0.001	
		fam	.006,1.59	0.112	
		_cons	.053,2.33	0.020	
sfd	568.42*	ltotex	-.063,-24.29	0.000	Necessity
		age_ref	.001,5.38	0.000	
		urbd	.023,3.21	0.001	
		fam	.034,7.96	0.000	
		_cons	.637,25.78	0.000	
sap	55.02*	ltotex	.004,2.71	0.007	Luxury
		age_ref	-.000,-4.44	0.000	
		urbd	.011,2.59	0.010	
		fam	.004,1.34	0.179	
		_cons	.016,1.04	0.299	
scc	430.18*	ltotex	.004,0.51	0.613	N/A
		age_ref	-.009,-12.16	0.000	
		urbd	.029,1.25	0.213	
		fam	.158,9.74	0.000	
		_cons	.047,0.57	0.572	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
smis	603.40*	ltotex	.158,25.98	0.000	Luxury
		age_ref	-.001,-1.62	0.105	
		urbd	-.050,-3.03	0.002	
		fam	-.056,-5.79	0.000	
		_cons	-.837,-14.33	0.000	

\*Statistically significant at the 5% level.

**Table A6.11**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Top 5 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P>t;	Expenditure Category: Luxury or Necessity
shs	2.16	Itotex	-.070,-1.980	0.049	Necessity
		_cons	.929,2.695	0.007	
shc	.388	Itotex	-.019,-1.899	0.058	N/A
		_cons	.217,2.185	0.030	
sfd	4.06	Itotex	-.055,-4.387	0.000	Necessity
		_cons	.633,5.240	0.000	
sap	6.5*	Itotex	-.018,-2.112	0.035	Necessity
		_cons	.215,2.631	0.009	
scc	4.3	Itotex	.025,1.340	0.181	N/A
		_cons	-.308,-1.685	0.093	
smis	95.15*	Itotex	.137,3.207	0.001	Luxury
		_cons	-.718,-1.730	0.085	

\*Statistically significant at the 5% level.

**Table A6.12, pp. 128-129**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Top 5 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P>t;	Expenditure Category: Luxury or Necessity
shs	130.12*	Itotex	-.073,-11.46	0.000	Necessity
		age_ref	.000,0.43	0.665	
		urbd	.065,3.05	0.002	
		fam	.016,1.10	0.271	
		_cons	.890,14.34	0.000	
shc	112.25*	Itotex	-.004,-1.22	0.224	N/A
		age_ref	.002,8.78	0.000	
		urbd	-.037,-3.49	0.001	
		fam	.006,0.86	0.388	
		_cons	.005,0.17	0.868	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	346.00*	ltotex	-.068,-19.98	0.000	Necessity
		age_ref	.001,2.83	0.005	
		urbd	.037,3.26	0.001	
		fam	.041,5.37	0.000	
		_cons	.678,20.38	0.000	
sap	22.55*	ltotex	.004,2.31	0.021	Luxury
		age_ref	-.000,-2.11	0.035	
		urbd	.008,1.20	0.229	
		fam	.003,0.82	0.414	
		_cons	.009,0.48	0.630	
scc	173.69*	ltotex	.021,1.90	0.058	N/A
		age_ref	-.009,-7.60	0.000	
		urbd	.017,0.44	0.659	
		fam	.106,4.75	0.000	
		_cons	-.062,-0.61	0.544	
smis	443.26*	ltotex	.160,22.54	0.000	Luxury
		age_ref	-.002,-3.86	0.000	
		urbd	-.059,-2.53	0.011	
		fam	-.072,-4.72	0.000	
		_cons	-.777,-11.06	0.000	

\*Statistically significant at the 5% level.

**Table A6.13**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Top 1 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	3.27	Itotex	-.202,-1.830	0.072	N/A
		_cons	2.283,2.035	0.046	
shc	0.00	Itotex	-.001,-0.063	0.950	N/A
		_cons	.032,0.169	0.866	
sfd	2.16	Itotex	-.050,-1.481	0.143	N/A
		_cons	.588,1.724	0.089	
sap	0.89	Itotex	-.019,-0.946	0.348	N/A
		_cons	.226,1.132	0.261	
scc	0.22	Itotex	.026,0.464	0.645	N/A
		_cons	-.318,-0.557	0.579	
smis	3.62	Itotex	.250,1.930	0.058	N/A
		_cons	-1.878,-1.429	0.158	

\*Statistically significant at the 5% level.

**Table A6.14, pp. 131-132**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Top 1 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	60.62*	ltotex	-.063,-7.82	0.000	Necessity
		age_ref	-.000,-0.22	0.827	
		urbd	.065,2.77	0.006	
		fam	.015,0.86	0.392	
		_cons	.838,11.16	0.000	
shc	92.25*	ltotex	.003,0.68	0.495	N/A
		age_ref	.003,8.15	0.000	
		urbd	-.052,-3.85	0.000	
		fam	.007,0.68	0.496	
		_cons	-.070,-1.57	0.116	
sfd	173.19*	ltotex	-.065,-13.84	0.000	Necessity
		age_ref	.001,1.85	0.065	
		urbd	.039,2.80	0.005	
		fam	.051,4.82	0.000	
		_cons	.664,15.10	0.000	
sap	40.46*	ltotex	.008,3.48	0.001	Luxury
		age_ref	-.001,-3.73	0.000	
		urbd	.004,0.52	0.605	
		fam	-.001,-0.14	0.891	
		_cons	-.002,-0.08	0.939	
scc	121.88*	ltotex	.042,2.88	0.004	Luxury
		age_ref	-.008,-5.51	0.000	
		urbd	-.002,-0.04	0.967	
		fam	.108,3.69	0.000	
		_cons	-.235,-1.80	0.073	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
smis	263.47*	ltotex	.143,17.04	0.000	Luxury
		age_ref	-.002,-3.46	0.001	
		urbd	-.049,-2.06	0.040	
		fam	-.088,-4.82	0.000	
		_cons	-.661,-8.32	0.000	

\*Statistically significant at the 5% level.

**Table A6.15, pp. 133-134**  
**The SET Model of Consumer Expenditures, 1984**  
**Entire Sample of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	115.482*	ltotex	-.042,-1.736	0.083
		age_ref	.001,0.419	0.675
		urbd	.025,0.983	0.325
		fam	-.031,-0.973	0.330
		savacctx	-3.09* <sup>07</sup> ,-0.839	0.401
		shc	-1.026,-0.955	0.339
		sfd	.503,0.831	0.406
		_cons	.630,2.334	0.020
		shc	84.478*	ltotex
age_ref	.001,1.058			0.290
fam	.007,0.451			0.652
perslt18	.014,2.382			0.017
shs	-.648,-2.592			0.010
scc	-.965,-1.916			0.055
_cons	.704,2.845			0.004
sfd	36.444*			ltotex
		age_ref	-.003,-1.301	0.193
		urbd	.027,0.505	0.614
		fam	.053,2.489	0.013
		earn	.010,0.455	0.649
		shs	.769,0.601	0.548
		shc	2.713,1.676	0.094
		_cons	-.281,-0.246	0.806

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	.118	ltotex	.215,0.058	0.954
		fam	-.175,-0.057	0.954
		earn	.012,0.078	0.938
		perslt18	-.068,-0.054	0.957
		shc	-1.895,-0.062	0.951
		sfd	4.190,0.057	0.955
		scc	2.145,0.056	0.955
		_cons	-2.278,-0.056	0.955
scc	54.046*	ltotex	-.039,-2.055	0.040
		fam	.012,1.093	0.274
		earn	.004,0.855	0.393
		perslt18	.011,2.679	0.007
		shc	-.580,-2.658	0.008
		shs	-.442,-1.522	0.128
		_cons	.511,1.904	0.057
		smis	163.366*	age_ref
fam	-.064,-2.975			0.003
urbd	-.062,-0.858			0.391
earn	-.029,-0.931			0.352
savacctx	4.39 <sup>e-07</sup> ,0.556			0.578
shc	-4.766,-2.187			0.029
shs	-1.419,-4.352			0.000
_cons	1.012,8.993			0.000

\*Statistically significant at the 5% level.

**Table A6.16**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Entire Sample of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	421.74*	Itotex	-.049,-20.859	0.000	Necessity
		_cons	.750,39.361	0.000	
shc	106.72*	Itotex	-.015,-10.444	0.000	Necessity
		_cons	.176,14.978	0.000	
sfd	1291.28*	Itotex	-.053,-37.740	0.000	Necessity
		_cons	.628,55.019	0.000	
sap	277.77*	Itotex	.013,16.619	0.000	Luxury
		_cons	-.063,-10.107	0.000	
scc	142.28*	Itotex	.080,10.894	0.000	Luxury
		_cons	-.979,-14.882	0.000	
smis	1857.61*	Itotex	.118,46.194	0.000	Luxury
		_cons	-.591,-28.145	0.000	

\*Statistically significant at the 5% level.

**Table A6.17, pp. 135-136**  
**The Enhanced AIDS Model of Consumer Expenditures, 1984**  
**Entire Sample of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	533.82*	Itotex	-.052,-20.95	0.000	Necessity
		age_ref	-.000,-3.22	0.001	
		urbd	.058,9.85	0.000	
		fam	-.010,-2.36	0.018	
		_cons	.754,33.96	0.000	
shc	1273.5*	Itotex	.000,0.20	0.841	N/A
		age_ref	.002,32.14	0.000	
		urbd	-.023,-6.80	0.000	
		fam	.000,0.14	0.892	
		_cons	-.042,-3.26	0.001	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	1640.5*	ltotex	-.057,-39.01	0.000	Necessity
		age_ref	.001,9.81	0.000	
		urbd	-.000,-0.02	0.981	
		fam	.047,18.56	0.000	
		_cons	.610,46.69	0.000	
sap	420.64*	ltotex	.010,11.99	0.000	Luxury
		age_ref	-.000,-10.14	0.000	
		urbd	.009,4.55	0.000	
		fam	.001,0.39	0.697	
		_cons	-.027,-3.79	0.000	
scc	1509.9*	ltotex	.026,3.53	0.000	Luxury
		age_ref	-.011,-18.95	0.000	
		urbd	-.017,-1.04	0.300	
		fam	.248,17.68	0.000	
		_cons	-.188,-2.98	0.003	
smis	2089.8*	ltotex	.119,43.67	0.000	Luxury
		age_ref	-.002,-13.00	0.000	
		urbd	-.032,-5.03	0.000	
		fam	-.051,-11.00	0.000	
		_cons	-.463,-19.03	0.000	

\*Statistically significant at the 5% level.

**Table A6.18**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Lowest Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	11.49	Itotex	-.035,-3.396	0.001	Necessity
		_cons	.660,8.677	0.000	
shc	0.57	Itotex	.007,0.752	0.452	N/A
		_cons	.013,0.185	0.853	
sfd	38.03*	Itotex	-.047,-6.209	0.000	Necessity
		_cons	.606,10.724	0.000	
sap	49.84*	Itotex	.033,6.932	0.000	Luxury
		_cons	-.224,-6.407	0.000	
scc	0.53	Itotex	.096,0.706	0.481	N/A
		_cons	-2.075,-1.948	0.052	
smis	41.70*	Itotex	.066,6.495	0.000	Luxury
		_cons	-.270,-3.592	0.000	

\*Statistically significant at the 5% level.

**Table A6.19, pp. 137-138**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Lowest Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	49.20*	Itotex	-.044,-4.45	0.000	Necessity
		age_ref	-.000,-0.60	0.546	
		urbd	.079,5.42	0.000	
		fam	.017,1.23	0.217	
		_cons	.683,8.76	0.000	
shc	575.38*	Itotex	.015,1.92	0.056	N/A
		age_ref	.004,19.87	0.000	
		urbd	-.035,-3.03	0.002	
		fam	-.038,-3.18	0.002	
		_cons	-.276,-4.36	0.000	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	94.76*	ltotex	-.050,-6.75	0.000	Necessity
		age_ref	.000,1.28	0.200	
		urbd	-.015,-1.39	0.165	
		fam	.072,7.22	0.000	
		_cons	.614,10.59	0.000	
sap	85.22*	ltotex	.021,5.25	0.000	Luxury
		age_ref	-.000,-3.97	0.000	
		urbd	.006,1.09	0.277	
		fam	.014,2.73	0.006	
		_cons	-.119,-3.81	0.000	
scc**					
smis	224.89*	ltotex	.077,8.38	0.000	Luxury
		age_ref	-.003,-11.79	0.000	
		urbd	-.038,-2.87	0.004	
		fam	-.097,-7.72	0.000	
		_cons	-.159,-2.18	0.030	

\*Statistically significant at the 5% level.

\*\*Convergence not achieved due to insufficient number of nonzero observations.

**Table A6.20**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Second Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	0.01	ltotex	-.004,-0.120	0.904	N/A
		_cons	.407,1.701	0.089	
shc	0.06	ltotex	.006,0.245	0.806	N/A
		_cons	.015,0.080	0.936	
sfd	11.71	ltotex	-.065,-3.428	0.001	Necessity
		_cons	.741,4.831	0.000	
sap	0.16	ltotex	.004,0.401	0.688	N/A
		_cons	.003,0.038	0.969	
scc	0.87	ltotex	.173,0.924	0.355	N/A
		_cons	-2.175,-1.419	0.156	
smis	5.67	ltotex	.073,2.385	0.017	Luxury
		_cons	-.308,-1.241	0.215	

\*Statistically significant at the 5% level.

**Table A6.21, pp. 139-140**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Second Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	65.65*	ltotex	-.058,-4.38	0.000	Necessity
		age_ref	.001,4.59	0.000	
		urbd	.069,4.40	0.000	
		fam	-.009,-0.84	0.403	
		_cons	.732,6.68	0.000	
shc	276.94*	ltotex	.021,2.49	0.013	Luxury
		age_ref	.003,16.18	0.000	
		urbd	-.044,-4.65	0.000	
		fam	.016,2.42	0.016	
		_cons	-.235,-3.36	0.001	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	65.32*	ltotex	-.022,-2.69	0.007	Necessity
		age_ref	.000,2.53	0.011	
		urbd	.021,2.07	0.039	
		fam	.052,7.72	0.000	
		_cons	.321,4.62	0.000	
sap	33.19*	ltotex	.004,0.82	0.411	N/A
		age_ref	-.000,-4.97	0.000	
		urbd	.003,0.56	0.578	
		fam	.005,1.26	0.208	
		_cons	.029,0.73	0.466	
scc	71.15*	ltotex	-.037,-0.58	0.560	N/A
		age_ref	-.007,-3.76	0.000	
		urbd	.130,1.56	0.120	
		fam	.275,4.86	0.000	
		_cons	-.207,-0.39	0.695	
smis	153.72*	ltotex	.076,5.42	0.000	Luxury
		age_ref	-.003,-10.86	0.000	
		urbd	-.065,-3.94	0.000	
		fam	-.067,-6.02	0.000	
		_cons	-.069,-0.59	0.554	

\*Statistically significant at the 5% level.

**Table A6.22**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Third Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	0.78	Itotex	-.031,-0.885	0.376	N/A
		_cons	.620,2.089	0.037	
shc	9.79	Itotex	-.073,-3.136	0.002	Necessity
		_cons	.692,3.464	0.001	
sfd	0.36	Itotex	-.012,-0.603	0.547	N/A
		_cons	.298,1.686	0.092	
sap	1.99	Itotex	.017,1.412	0.158	N/A
		_cons	-.098,-0.975	0.330	
scc	0.21	Itotex	.054,0.453	0.651	N/A
		_cons	-.867,-0.843	0.399	
smis	7.37	Itotex	.097,2.718	0.007	Luxury
		_cons	-.502,-1.652	0.099	

\*Statistically significant at the 5% level.

**Table A6.23, pp. 141-142**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Third Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	61.88*	Itotex	-.046,-3.75	0.000	Necessity
		age_ref	.001,1.81	0.071	
		urbd	.084,5.77	0.000	
		fam	-.024,-2.69	0.007	
		_cons	.650,6.13	0.000	
shc	104.63*	Itotex	-.008,-1.11	0.267	N/A
		age_ref	.002,9.55	0.000	
		urbd	-.025,-3.04	0.002	
		fam	.011,2.18	0.029	
		_cons	.058,0.97	0.333	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	72.90*	ltotex	-.029,-4.05	0.000	Necessity
		age_ref	.000,0.75	0.454	
		urbd	-.006,-0.73	0.467	
		fam	.041,7.58	0.000	
		_cons	.410,6.47	0.000	
sap	6.89	ltotex	-.005,-1.19	0.236	N/A
		age_ref	-.000,-1.07	0.286	
		urbd	.010,1.83	0.067	
		fam	.002,0.73	0.463	
		_cons	.085,2.21	0.027	
scc	114.06*	ltotex	-.036,-0.91	0.365	Necessity
		age_ref	-.008,-5.52	0.000	
		urbd	.031,0.67	0.502	
		fam	.254,6.39	0.000	
		_cons	.106,0.30	0.762	
smis	96.43*	ltotex	.099,7.54	0.000	Luxury
		age_ref	-.002,-4.67	0.000	
		urbd	-.066,-4.20	0.000	
		fam	-.040,-4.15	0.000	
		_cons	-.343,-2.97	0.003	

\*Statistically significant at the 5% level.

**Table A6.24**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Fourth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	0.44	Itotex	.021,0.665	0.506	N/A
		_cons	.166,0.592	0.554	
shc	1.42	Itotex	-.019,-1.190	0.234	N/A
		_cons	.231,1.587	0.113	
sfd	11.59	Itotex	-.055,-3.411	0.001	Necessity
		_cons	.664,4.598	0.000	
sap	1.06	Itotex	.017,1.028	0.304	N/A
		_cons	-.048,-0.512	0.609	
scc	3.37	Itotex	.116,1.833	0.067	N/A
		_cons	-1.255,-2.220	0.027	
smis	0.38	Itotex	.021,0.619	0.536	N/A
		_cons	.171,0.577	0.564	

\*Statistically significant at the 5% level.

**Table A6.25, pp. 143-144**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Fourth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	76.53*	Itotex	-.083,-7.01	0.000	Necessity
		age_ref	-.001,-2.52	0.012	
		urbd	.060,3.47	0.001	
		fam	-.027,-2.52	0.012	
		_cons	1.096,10.19	0.000	
shc	82.63*	Itotex	.002,0.44	0.660	N/A
		age_ref	.002,8.99	0.000	
		urbd	.004,0.48	0.629	
		fam	.018,3.79	0.000	
		_cons	-.052,-1.09	0.276	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	42.20*	ltotex	-.026,-4.55	0.000	Necessity
		age_ref	.000,1.99	0.047	
		urbd	-.002,-0.22	0.825	
		fam	.025,4.85	0.000	
		_cons	.362,7.01	0.000	
sap	11.68	ltotex	-.009,-2.41	0.016	Necessity
		age_ref	-.000,-1.79	0.074	
		urbd	.006,0.99	0.325	
		fam	-.004,-1.01	0.310	
		_cons	.135,3.91	0.000	
scc	87.44*	ltotex	-.040,-1.79	0.074	N/A
		age_ref	-.005,-5.27	0.000	
		urbd	.023,0.65	0.518	
		fam	.143,5.37	0.000	
		_cons	256,1.25	0.213	
smis	99.03*	ltotex	.126,9.39	0.000	Luxury
		age_ref	-.000,-0.18	0.861	
		urbd	-.076,-3.90	0.000	
		fam	-.022,-1.82	0.070	
		_cons	-.662,-5.44	0.000	

\*Statistically significant at the 5% level.

**Table A6.26**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Fifth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	68.58*	Itotex	-.101,-8.376	0.000	Necessity
		_cons	1.289,11.141	0.000	
shc	12.13	Itotex	-.019,-3.492	0.000	Necessity
		_cons	.231,4.371	0.000	
sfd	145.13*	Itotex	-.063,-12.343	0.000	Necessity
		_cons	.729,15.005	0.000	
sap	0.15	Itotex	-.001,-0.383	0.702	N/A
		_cons	.060,1.752	0.080	
scc	2.56	Itotex	.027,1.609	0.108	N/A
		_cons	-.422,-2.618	0.009	
smis	135.71*	Itotex	.178,11.928	0.000	Luxury
		_cons	-1.257,-8.811	0.000	

\*Statistically significant at the 5% level.

**Table A6.27, pp. 145-146**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Fifth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	170.81*	Itotex	-.055,-10.45	0.000	Necessity
		age_ref	-.002,-5.59	0.000	
		urbd	.071,4.75	0.000	
		fam	-.032,-3.25	0.001	
		_cons	.901,18.33	0.000	
shc	166.80*	Itotex	-.001,-0.20	0.841	N/A
		age_ref	.002,12.10	0.000	
		urbd	-.018,-2.67	0.008	
		fam	.000,0.05	0.964	
		_cons	-.010,-0.42	0.673	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	561.25*	ltotex	-.066,-24.22	0.000	Necessity
		age_ref	.000,2.17	0.030	
		urbd	-.008,-1.06	0.287	
		fam	.031,6.22	0.000	
		_cons	.743,28.98	0.000	
sap	82.69*	ltotex	.006,3.40	0.001	Luxury
		age_ref	-.001,-6.05	0.000	
		urbd	-.002,-0.38	0.702	
		fam	.007,2.01	0.045	
		_cons	.018,1.06	0.288	
scc	224.25*	ltotex	.040,3.42	0.001	Luxury
		age_ref	-.007,-8.86	0.000	
		urbd	.024,0.82	0.413	
		fam	.157,6.48	0.000	
		_cons	-.404,-3.78	0.000	
smis	423.64*	ltotex	.124,20.81	0.000	Luxury
		age_ref	.001,3.12	0.002	
		urbd	-.046,-2.77	0.006	
		fam	-.013,-1.23	0.220	
		_cons	-.775,-13.88	0.000	

\*Statistically significant at the 5% level.

**Table A6.28**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Top 5 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	2.97	ltotex	-.053,-1.727	0.085	N/A
		_cons	.796,2.562	0.011	
shc	1.29	ltotex	-.014,-1.136	0.257	N/A
		_cons	.179,1.414	0.158	
sfd	22.56*	ltotex	-.055,-4.822	0.000	Necessity
		_cons	.656,5.674	0.000	
sap	0.07	ltotex	.003,0.270	0.787	N/A
		_cons	.014,0.119	0.906	
scc	4.57	ltotex	.116,2.135	0.033	Luxury
		_cons	-1.385,-2.504	0.013	
smis	4.44	ltotex	.094,2.113	0.035	Luxury
		_cons	-.405,-0.900	0.369	

\*Statistically significant at the 5% level.

**Table A6.29, pp. 147-148**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Top 5 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	61.55*	ltotex	-.052,-6.03	0.000	Necessity
		age_ref	-.002,-3.54	0.000	
		urbd	.071,3.54	0.000	
		fam	-.032,-2.15	0.032	
		_cons	.873,11.31	0.000	
shc	100.70*	ltotex	.013,2.74	0.006	Luxury
		age_ref	.002,8.96	0.000	
		urbd	-.025,-2.30	0.022	
		fam	-.011,-1.28	0.201	
		_cons	-.137,-3.11	0.002	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
sfd	148.16*	ltotex	-.063,-12.27	0.000	Necessity
		age_ref	.000,1.19	0.236	
		urbd	.003,0.23	0.822	
		fam	.044,5.03	0.000	
		_cons	.711,15.56	0.000	
sap	83.42*	ltotex	.018,5.36	0.000	Luxury
		age_ref	-.001,-3.63	0.000	
		urbd	.008,1.01	0.311	
		fam	.012,2.10	0.036	
		_cons	-.093,-3.12	0.002	
scc	93.97*	ltotex	.059,2.25	0.025	Luxury
		age_ref	-.011,-5.27	0.000	
		urbd	-.022,-0.45	0.656	
		fam	.145,3.27	0.001	
		_cons	-.441,-1.94	0.053	
smis	132.11*	ltotex	.104,11.66	0.000	Luxury
		age_ref	.001,1.66	0.097	
		urbd	-.056,-2.75	0.006	
		fam	-.018,-1.20	0.231	
		_cons	-.602,-7.52	0.000	

\*Statistically significant at the 5% level.

**Table A6.30**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Top 1 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of ltotex and t-statistics	P>t:	Expenditure Category: Luxury or Necessity
shs	0.03	ltotex	-.014,-0.179	0.859	N/A
		_cons	.394,0.461	0.646	
shc	0.78	ltotex	-.019,-0.884	0.379	N/A
		_cons	.226,1.005	0.318	
sfd	0.41	ltotex	.012,0.639	0.524	N/A
		_cons	-.060,-0.298	0.767	
sap	0.28	ltotex	-.025,-0.525	0.601	N/A
		_cons	.313,0.632	0.529	
scc	2.93	ltotex	.250,1.682	0.097	N/A
		_cons	-2.810,-1.778	0.080	
smis	0.04	ltotex	-.025,-0.190	0.850	N/A
		_cons	.848,0.617	0.539	

\*Statistically significant at the 5% level.

**Table A6.31, pp. 149-150**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Top 1 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t:	Expenditure Category: Luxury or Necessity
shs	73.24*	ltotex	-.048,-6.63	0.000	Necessity
		age_ref	-.002,-3.65	0.000	
		urbd	.071,3.58	0.000	
		fam	-.033,-2.28	0.023	
		_cons	.843,12.81	0.000	
shc	103.42*	ltotex	.008,2.06	0.040	Luxury
		age_ref	.002,9.10	0.000	
		urbd	-.025,-2.35	0.019	
		fam	-.010,-1.27	0.205	
		_cons	-.094,-2.48	0.013	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P>  t	Expenditure Category: Luxury or Necessity
sfd	225.22*	ltotex	-.066,-15.54	0.000	Necessity
		age_ref	.000,0.95	0.342	
		urbd	.001,0.13	0.900	
		fam	.042,4.99	0.000	
		_cons	.744,19.38	0.000	
sap	80.60*	ltotex	.013,4.55	0.000	Luxury
		age_ref	-.001,-3.89	0.000	
		urbd	.008,1.06	0.289	
		fam	.013,2.43	0.015	
		_cons	-.050,-2.00	0.046	
scc	102.81*	ltotex	.084,3.68	0.000	Luxury
		age_ref	-.011 -5.40	0.000	
		urbd	-.014,-0.26	0.797	
		fam	.154,3.28	0.001	
		_cons	-.708,-3.58	0.000	
smis	175.93*	ltotex	.105,13.47	0.000	Luxury
		age_ref	.001,1.95	0.052	
		urbd	-.056,-2.71	0.007	
		fam	-.018,-1.21	0.227	
		_cons	-.612,-8.70	0.000	

\*Statistically significant at the 5% level.

**Table A6.32, pp. 151-152**  
**The SET Model of Consumer Expenditures, 1992**  
**Entire Sample of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	3.859	ltotex	-.028,-0.155	0.877
		age_ref	-.042,-0.466	0.642
		urbd	.506,0.554	0.579
		fam	.090,0.283	0.777
		savacctx	2.31 <sup>e-07</sup> ,0.045	0.964
		shc	21.340,0.465	0.642
		sfd	-1.056,-0.211	0.833
		_cons	1.006,0.357	0.721
		shc	79.027*	ltotex
age_ref	.001,2.713			0.007
fam	-.002,-0.205			0.838
persit18	.012,1.481			0.139
shs	-.104,-0.973			0.330
scc	-1.651,-1.635			0.102
_cons	.117,1.220			0.222
sfd	.830	ltotex	.178,0.131	0.896
		age_ref	.013,0.079	0.937
		urbd	-.735,-0.134	0.893
		fam	.117,0.246	0.805
		earn	.586,0.154	0.878
		shs	8.276,0.156	0.876
		shc	-2.701,-0.044	0.965
		_cons	-4.537,-0.139	0.889

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	6.110	ltotex	-.022,-1.019	0.308
		fam	.020,0.517	0.605
		earn	.031,0.766	0.443
		persit18	.033,1.225	0.221
		shc	-.839,-1.157	0.247
		sfd	-.239,-0.619	0.536
		scc	-3.827,-0.993	0.321
		_cons	.324,1.402	0.161
scc	40.474*	ltotex	-.000,-0.106	0.915
		fam	.002,0.265	0.791
		earn	.010,0.911	0.362
		persit18	.007,2.997	0.003
		shc	-.163,-1.493	0.136
		shs	.044,0.416	0.678
		_cons	-.001,-0.017	0.986
		smis	5.130	age_ref
fam	-.129,-0.300			0.764
urbd	-.695,-0.190			0.849
earn	-.063,-0.132			0.895
savacctx	4.51 <sup>e-07</sup> ,0.024			0.981
shc	-31.600,-0.221			0.825
shs	.083,0.008			0.993
_cons	.050,0.010			0.992

\*Statistically significant at the 5% level.

**Table A6.33**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Entire Sample of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	270.20*	Itotex	-.038,-16.587	0.000	Necessity
		_cons	.690,34.780	0.000	
shc	71.80*	Itotex	-.013,-8.541	0.000	Necessity
		_cons	.174,13.129	0.000	
sfd	1537.21*	Itotex	-.057,-41.307	0.000	Necessity
		_cons	.675,57.557	0.000	
sap	220.65*	Itotex	.012,14.812	0.000	Luxury
		_cons	-.063,-9.053	0.000	
scc	193.51*	Itotex	.100,12.311	0.000	Luxury
		_cons	-1.219,-15.876	0.000	
smis	1502.70*	Itotex	.103,40.821	0.000	Luxury
		_cons	-.550,-25.540	0.000	

\*Statistically significant at the 5% level.

**Table A6.34, pp. 153-154**  
**The Enhanced AIDS Model of Consumer Expenditures, 1992**  
**Entire Sample of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	420.51*	Itotex	-.044,-15.53	0.000	Necessity
		age_ref	-.000,-1.48	0.139	
		urbd	.076,10.91	0.000	
		fam	-.015,-3.10	0.002	
		_cons	.695,27.23	0.000	
shc	1270.8*	Itotex	.004,2.42	0.016	Luxury
		age_ref	.003,34.34	0.000	
		urbd	-.024,-6.27	0.000	
		fam	.006,2.39	0.017	
		_cons	-.088,-5.96	0.000	

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients and t-statistics	P>t:	Expenditure Category: Luxury or Necessity
sfd	1271.9*	ltotex	-.061,-36.19	0.000	Necessity
		age_ref	.000,4.64	0.000	
		urbd	-.002,-0.56	0.576	
		fam	.039,13.98	0.000	
		_cons	.674,44.45	0.000	
sap	297.25*	ltotex	.008,7.67	0.000	Luxury
		age_ref	-.000,-10.10	0.000	
		urbd	.004,1.56	0.118	
		fam	.005,2.78	0.005	
		_cons	-.007,-0.75	0.453	
scc	733.08*	ltotex	.052,6.37	0.000	Luxury
		age_ref	-.007,-12.11	0.000	
		urbd	.038,1.91	0.056	
		fam	.197,12.79	0.000	
		_cons	-.636,-8.57	0.000	
smis	1356.3*	ltotex	.105,33.83	0.000	Luxury
		age_ref	-.002,-11.06	0.000	
		urbd	-.060,-7.97	0.000	
		fam	-.042,-8.32	0.000	
		_cons	-.421,-15.06	0.000	

\*Statistically significant at the 5% level.

**Table A6.35**  
**Inter-Year Expenditure Elasticities**  
**Entire Sample of Expenditures**

Budget Share	Coefficient of Itotex (from AIDS model)		Mean Budget Share		Expenditure Elasticity	
	1984	1992	1984	1992	1984	1992
Housing	-.049	-.038	.354	.362	.862	.895
Health Care	-.015	-.013	.064	.072	.765	.819
Food	-.053	-.057	.199	.193	.734	.705
Apparel	.013	.012	.043	.044	1.30	1.27
Child Care*	.08	.10	.109	.099	1.73	2.01
Miscellaneous Goods and Services	.118	.10	.376	.327	1.31	1.31

\*Mean share restricted to those with positive child care expenditures in 1984 and 1992.

**Table A6.36, pp. 156-157**  
**Enhanced AIDS Model - Demographic Translating**  
**Inter-Year Comparisons by Expenditure Rank**

Dep. Var.	Expend. Quints	LLR X <sup>2*</sup>	Coefficients of Independent Variables							
			ltotex		Age_Ref		Urban		Fam_Type	
			1984	1992	1984	1992	1984	1992	1984	1992
shs	Lowest	137.51	-.008	-.044	.001	2 <sup>-04</sup>	.077	.079	-.037	.017
	Second	142.43	-.045	-.058	2 <sup>-04</sup>	.001	.079	.069	-.019	-.009
	Third	95.25	-.054	-.046	-.001	.001	.037	.084	-.017	-.024
	Fourth	184.24	-.051	-.083	-.002	-.001	.034	.060	-.004	-.027
	Fifth	193.63	-.074	-.055	-.001	-.002	.048	.071	.005	-.032
	Top 5%	35.71	-.073	-.052	2 <sup>-04</sup>	-.002	.065	.071	.016	-.032
	Top 1%	28.09	-.063	-.048	1 <sup>-04</sup>	-.002	.065	.071	.015	-.033
	Entire	867.22	-.052	-.044	4 <sup>-04</sup>	2 <sup>-04</sup>	.058	.076	-.010	-.015
shc	Lowest	935.33	.023	.015	.004	.004	-.041	-.035	-.018	-.038
	Second	658.10	.014	.021	.003	.003	-.015	-.044	6 <sup>-4</sup>	.016
	Third	338.25	.011	-.008	.002	.002	-.007	-.025	.005	.011
	Fourth	126.62	-.002	.002	.001	.002	-.026	.004	-.001	.018
	Fifth	74.42	-.007	-.001	.001	.002	-.021	-.018	.006	2 <sup>-04</sup>
	Top 5%	23.88	-.004	.013	.002	.002	-.037	-.025	.006	-.011
	Top 1%	12.72	.003	.008	.003	.002	-.052	-.025	.007	-.010
	Entire	3,153	3 <sup>-4</sup>	.004	.002	.003	-.023	-.024	3 <sup>-04</sup>	.006
sfd	Lowest	460.39	-.075	-.050	4 <sup>-05</sup>	2 <sup>-04</sup>	-.010	-.015	.102	.072
	Second	148.08	-.018	-.022	.001	4 <sup>-04</sup>	-.004	.021	.049	.052
	Third	303.54	-.012	-.029	.001	1 <sup>-04</sup>	-.004	-.006	.055	.041
	Fourth	187.35	-.013	-.026	.001	4 <sup>-04</sup>	.018	-.002	.037	.025
	Fifth	411.99	-.063	-.066	.001	3 <sup>-04</sup>	.023	-.008	.034	.031
	Top 5%	112.98	-.068	-.063	.001	3 <sup>-04</sup>	.037	.003	.041	.044
	Top 1%	27.82	-.065	-.066	.001	2 <sup>-04</sup>	.039	.001	.051	.042
	Entire	3,269	-.057	-.061	.001	4 <sup>-04</sup>	8 <sup>-05</sup>	-.002	.047	.039

sap	Lowest	108.2	.010	.021	-.001	3 <sup>-04</sup>	.010	.006	.004	.014
	Second	109.19	.013	.004	5 <sup>-04</sup>	5 <sup>-04</sup>	.005	.003	-.007	.005
	Third	91.1	.018	-.005	3 <sup>-04</sup>	1 <sup>-04</sup>	.006	.010	-.001	.002
	Fourth	58.1	.012	-.009	2 <sup>-04</sup>	2 <sup>-04</sup>	.012	.006	.002	-.004
	Fifth	46.94	.004	.006	4 <sup>-04</sup>	-.001	.011	-.002	.004	.007
	Top 5%	72.04	.004	.018	3 <sup>-04</sup>	-.001	.008	.008	.003	.012
	Top 1%	13.74	.008	.013	-.001	-.001	.004	.008	-.001	.013
	Entire	819.95	.010	.008	4 <sup>-04</sup>	-.000	.009	.004	.001	.005
scc	Lowest	107.45	.112	N/A	-.013	N/A	-.164	N/A	.239	N/A
	Second	408.83	-.050	-.037	-.010	-.007	-.160	.130	.310	.275
	Third	606.10	.042	-.036	-.013	-.008	-.008	.031	.330	.254
	Fourth	770.79	-.065	-.040	-.014	-.005	.068	.023	.258	.143
	Fifth	694.70	.004	.040	-.009	-.007	.029	.024	.158	.157
	Top 5%	**	.021	.059	-.009	-.011	.017	-.022	.106	.145
	Top 1%	**	.042	.084	-.008	-.011	-.002	-.014	.108	.154
	Entire	2,442	.026	.052	-.011	-.007	-.017	.038	.248	.197
smis	Lowest	555.22	.074	.077	-.004	-.003	-.030	-.038	-.058	-.097
	Second	261.13	.066	.076	-.002	-.003	-.044	-.065	-.040	-.067
	Third	171.16	.065	.099	-.002	-.002	-.021	-.066	-.059	-.040
	Fourth	224.8	.083	.126	.001	-.000	-.032	-.076	-.054	-.022
	Fifth	406.82	.158	.124	-.001	.001	-.050	-.046	-.060	-.013
	Top 5%	77.84	.160	.104	-.002	.001	-.059	-.056	-.072	-.602
	Top 1%	33.7	.143	.105	-.002	.001	-.049	-.056	-.088	-.018
	Entire	3,210	.119	.105	-.002	-.002	-.032	-.060	-.051	-.042

\*\*Convergence not achieved due to insufficient non-zero observations for child care expenditures.

**Table A6.37, pp. 158-159**  
**Inter-Year Difference of Means Tests by Expenditure Quintile**

Dependent Variable	Expenditure Quintile	Mean		Difference of Means t-statistic	Reject Null Hypothesis? (At 5% Level)
		1984	1992		
shs	Lowest	.411	.402	1.54	No
	Second	.380	.378	0.34	No
	Third	.346	.357	-2.01	Yes
	Fourth	.337	.353	-2.89	Yes
	Fifth	.298	.320	-3.54	Yes
	Top 5%	.247	.259	-0.93	No
	Top 1%	.230	.238	-0.28	No
	Entire Sample	.354	.362	-2.95	Yes
shc	Lowest	.089	.094	-1.19	No
	Second	.072	.078	-1.72	No
	Third	.066	.074	-2.51	Yes
	Fourth	.052	.062	-3.90	Yes
	Fifth	.041	.050	-3.68	Yes
	Top 5%	.031	.040	-1.78	No
	Top 1%	.022	.040	-1.22	No
	Entire Sample	.064	.072	-5.44	Yes
sfd	Lowest	.263	.256	1.47	No
	Second	.217	.215	0.53	No
	Third	.197	.191	1.88	No
	Fourth	.180	.172	2.73	Yes
	Fifth	.140	.130	3.67	Yes
	Top 5%	.103	.098	1.05	No
	Top 1%	.083	.068	1.91	No
	Entire Sample	.199	.193	3.48	Yes

sap	Lowest	.033	.032	0.54	No
	Second	.040	.043	-1.70	No
	Third	.043	.046	-1.84	No
	Fourth	.051	.050	0.57	No
	Fifth	.051	.047	2.28	Yes
	Top 5%	.043	.047	-0.10	No
	Top 1%	.038	.053	-1.33	No
	Entire Sample	.043	.044	0	No
scc	Lowest	.010	.005	1.10	No
	Second	.011	.008	1.26	No
	Third	.017	.011	2.45	Yes
	Fourth	.021	.012	3.79	Yes
	Fifth	.010	.011	-0.57	No
	Top 5%	.006	.015	-2.35	Yes
	Top 1%	.008	.021	-1.36	No
	Entire Sample	.014	.009	4.81	Yes
smis	Lowest	.238	.220	2.95	Yes
	Second	.328	.286	7.07	Yes
	Third	.378	.325	9.30	Yes
	Fourth	.414	.355	9.86	Yes
	Fifth	.512	.444	8.88	Yes
	Top 5%	.613	.545	3.99	Yes
	Top 1%	.658	.580	1.99	No
	Entire Sample	.376	.327	15.59	Yes

## **CHAPTER SEVEN**

### **INTERPRETATION OF THE RESULTS BY DEMOGRAPHIC PROFILE FROM THE SYSTEMS OF EQUATIONS MODELS**

This chapter analyzes consumer expenditure patterns by focusing on the role of demographic variables. Groups are analyzed by age, urban or rural residence and consumer unit composition. Demographic specification requires segmenting groups by demographic characteristics prior to estimation; therefore, the AIDS model, which contains no demographic translating variables, is the appropriate model to employ for estimation of this type (Pollak and Wales, 1992). The analysis begins with intra-year comparisons across the demographic groups, provides a detailed analysis of the consumer expenditure patterns for each demographic group and concludes with inter-year comparisons of the results between like groups.

#### **Intra-Year Comparisons Across Demographic Groups within the AIDS Model**

In intra-year comparisons during 1984 between demographic groups (grouped by age of reference person, urban or rural status and consumer unit composition), the AIDS model demonstrates consistency with traditional predictions of necessity and luxury expenditure. Housing and food proved to be necessities for all demographic groups, while apparel, child care and miscellaneous expenditures are luxury items across all demographic groups. Health care is the only variable sensitive to demographic specification in this case, as it is categorized as a necessity for those of either urban or rural residence, senior citizens and consumer units with children. It is a luxury for those categorized as consumer units without children and single parents and all non-seniors (Tables A7.1-A7.16, Appendix to Chapter Seven). Rubin and Koelln (1996) found a similar pattern in the categorization of health care, as those consumer units with a

reference person over the age of 65 treated it as a necessity and all non-seniors taken as a group treated it as a luxury in a cross-sectional study over the period 1980-81 to 1989-90.

In the case of child care, the expenditure share for single parents and rural residents shows the largest percentage increase as total expenditures increase. Single parents' expenditure share on child care increases more than two times as much as the share for all consumer units with children in 1984 (Tables A7.8 and A7.9). For single parents, the strong luxury nature of child care is likely due to the following factors. First, there appears to be some bottom income/expenditures threshold for child care expenditures, below which the single parent incurs no child care expenses. For example, in a cross-sectional study covering 1989 to 1991, Lino (1994, p. 34) found that only 16 percent of never-married mothers incurred child care expenses, while 31 percent of married couples incurred such expenses. Lino indicates that this is likely the result of lower labor force participation rates for poor single mothers. However, once this threshold is exceeded, poor mothers purchasing child care tend to face high expenses relative to their income or expenditures. When grouping all mothers into poor and non-poor categories, Cattan (1991, p. 7) found that poor mothers purchasing child care spent an average of 26.3 percent of gross weekly income on child care, while non-poor mothers spent an average of 8.2 percent of weekly income on child care. Second, child care likely retains its strong luxury nature due to the strong correlation between income and total expenditures, as increments to these categories are generally associated with greater work effort, which would require more time away from home and therefore greater need for child care (Cattan, 1991). It may seem unusual to refer to child care as a "luxury" good for single parents, who find child care expenditures a necessary consequence of engaging in market employment. However, luxuries are defined here as goods and services for which their expenditure share is positively correlated with a percentage change in total expenditures.

In 1992, the intra-year results again exhibited excellent consistency, as housing and food are once again necessities for all demographic groups and apparel, child care and miscellaneous

expenditures are categorized as luxuries for all (Tables A7.1-A7.16). Health care is a necessity in 1992 for the same groups as in 1984 and also for all non-seniors. Interestingly, child care expenditures increase the most dramatically for rural residents and those aged 65-74 in 1992. Lino (1994) found that family members played a very significant role in providing child care for single parents in 1988. It is possible that increased child care cost for those aged 65-74 reflect occasional child care expenses incurred by parents who had children at an advanced age or grandparents with a substantial role in raising their grandchildren.

#### **Aggregative Tests of the AIDS Models by Demographic Group**

The following tables provide insight into the relationship between a percentage change in total expenditures and expenditure shares when the analysis is restricted to demographic specification. The AIDS model performs well across all demographic groups. Thus, while the model may lack the theoretical appeal or sophistication of the SET and Enhanced AIDS models, its empirical appeal is undeniable here, as it has been in several previous studies (Stone, 1954; Deaton and Muellbauer, 1980a; Pollak and Wales, 1992; Berck, et al., 1996).

**Table 7.1. AIDS Model: Statistically Significant Variables, 1984**

Demographic Group	Total Variables	Number (Percent) of Statistically Significant Variables
Urban	6	6 (100%)
Rural	6	6 (100%)
CU with Children	6	6 (100%)
CU without Children	6	5 (83%)
Single Parents	6	4 (67%)
Non-Senior	6	6 (100%)
Aged 65-74	6	6 (100%)
Aged 75 and Older	6	5 (83%)

As indicated in Table 7.1, the explanatory variable (a percentage change in total expenditures) was statistically significant across all expenditure shares for five of the eight demographic groups in 1984. Explanatory power was the worst for single parents, with no statistically significant

relationship holding between changes in total expenditures for their housing and apparel expenditure shares and, of course, for consumer units without children. Lastly, the housing expenditure share did not have a statistically significant relationship with a percentage change in total expenditures for those aged 75 and older (Table A7.9). As mentioned previously, this is likely due to the high rate of homeownership amongst seniors and the high probability that they have already paid-off their home (Holden and Smeeding, 1990).

In 1992, the AIDS model results were similar to 1984, with statistical significance of a percentage change in total expenditures holding across all expenditure shares for five of the eight demographic groups (Table A7.2). A percentage change in total expenditures for all consumer units with children no longer has a predictable impact on the apparel share in 1992. For single parents, the child care expenditure share is the only share without a statistically significant relationship with a percentage change in total expenditures in 1992. Lastly, the health care expenditure share no longer has a statistically significant relationship with changes in total expenditures in 1992. This appears to be due to substantial increases in Medicaid funding over the period 1990 to 1992 (Acs and Sabelhaus, 1995) weakening the link between marginal changes in total expenditures and the health care expenditure share for the elderly.

**Table 7.2. AIDS Model: Statistically Significant Variables, 1992**

Demographic Group	Total Variables	Number (Percent) of Statistically Significant Variables
Urban	6	6 (100%)
Rural	6	6 (100%)
CU with Children	6	5 (83%)
CU without Children	6	6 (100%)
Single Parents	6	5 (83%)
Non-Senior	6	6 (100%)
Aged 65-74	6	6 (100%)
Aged 75 and Older	6	5 (83%)

## **Expenditures by Consumer Unit Type: All Consumer Units with Children, Single Parents and those without Children**

### **Consumer Units with Children**

In the model for all consumer units with children, health care is categorized as a necessity and all of the explanatory variables are statistically significant in both 1984 and 1992. This demographic group exhibits statistically significant increases in the mean share allocated to housing and health care and decreases to food, child care and miscellaneous goods and services over the period 1984 to 1992. In a log-likelihood ratio test comparing the AIDS model equations for all consumer units with and without children, the differences between the two groups are statistically significant in both 1984 and 1992 (Tables A7.17 and A7.18).

### **Single Parents**

The expenditure patterns of single parents differ significantly from all consumer units with children in 1984 in several ways: (1) a percentage change in total expenditures does not have a statistically significant impact on the budget shares for housing and apparel; (2) health care is a luxury; (3) the marginal impact of a percentage change to total expenditures on the share allocated to child care for this group is more than twice as high for single parents than for all consumer units taken as a whole, 0.127 versus 0.057 (Tables A7.7 and A7.8).

In 1992, all coefficients of a percentage change in total expenditures except that for child care are statistically significant. Although the marginal impact on the child care budget share of a percentage change in total expenditures was very substantial in 1984 for single parents, the inherent difficulties in modeling child care expenditures for this group are sufficient to prevent meaningful conclusions to be drawn about these expenses in 1992. Single parents only experienced statistically significant changes in the budget shares allocated to child care and miscellaneous goods and services over the period 1984 to 1992, with both shares decreasing (Table A7.19). In a log-likelihood ratio test comparing the AIDS model equations for all consumer

units with children and single parents, the differences between the two groups are statistically significant in both 1984 and 1992.

### **Urban versus Rural Consumer Units**

Based upon previous research of spending patterns between those in metropolitan and nonmetropolitan areas (Banta, 1989), and urban versus rural areas (Rogers, 1988) during the 1980s, the expenditure patterns between urban and rural consumer units are expected to differ across several categories of goods and services and over time. The coefficients of a percentage change in total expenditures for all expenditure shares are statistically significant for both urban and rural consumer units in 1984 and 1992 (Tables A7.4-A7.5 and A7.12-A7.13), with equations one through three representing necessities and four through six representing luxuries; however, the similarities between the two groups end there. As found by Rogers (1988) in a study comparing urban and rural consumer units in 1985, urban residents allocated higher expenditure shares for housing and miscellaneous goods and services, while rural residents allocated larger shares to health care in both 1984 and 1992. Although the expenditure share allocated to miscellaneous goods and services is larger for urban residents in 1984, it became smaller by 1992. Rogers (1988) found the miscellaneous goods and services expenditure share to be larger for urban residents in 1985, which matches these results well.

Urban consumer units have statistically significant increases in the budget shares allocated to housing and health care, and decreases to the food, child care and miscellaneous goods and services shares between 1984 and 1992. The expenditure patterns of rural consumer units are much more stable over this period, as the food and child care budget shares are the only shares to change (decrease) significantly. In a log-likelihood ratio test comparing the AIDS model equations for urban and rural consumer units, the differences between the two groups are statistically significant in both 1984 and 1992.

### **Non-Senior, Aged 65 to 74 and 75 and Older Consumer Units**

The greatest difference between non-senior consumer units and those aged 65 to 74 occurs in 1984, as health care is a luxury by the former and a necessity by the latter group. This distinction is eliminated by 1992, however, as both groups treat health care as a necessity. All of the coefficients are statistically significant for both groups over time, with the exception of child care for those aged 65 to 74 in 1984. In 1992, however, child care is a luxury good in which increments to total expenditure have a strong marginal impact on its share (Table A7.10).

Based upon Rubin and Koelln's (1996) findings of far greater composite budget shares allocated to necessity expenditures (food, housing and health care) by elderly vis-a-vis non-elderly (under 65) consumer units between 1980-81 and 1989-90, those aged 65 to 74 were expected to have greater shares allocated to necessity expenditure over the period 1984 to 1992. Rubin and Koelln found that among consumer units not receiving financial assistance (Aid to Families with Dependent Children or Supplemental Security Income), the elderly allocated 13.3 percentage points more than the non-elderly to necessities in 1980-81 and this differential declined to 9.9 percentage points in 1989-90. In this research, which includes both recipients and non-recipients of financial assistance and segments seniors into those aged 65 to 74 and 75 and older, those aged 65 to 74 were found to allocate 9.4 percentage points more toward necessities than non-seniors in 1984 and 9.6 percentage points more in 1992 (Table A7.19).

The non-senior group's expenditure shares proved to be quite volatile over the period 1984 to 1992, as their mean budget shares decreased for food, child care and miscellaneous goods and services and increased for housing and health care in a statistically significant manner. Expenditure share allocation is more stable for those aged 65 to 74, as health care and child care increase, while miscellaneous goods and services decrease by a statistically significant amount. In a log-likelihood ratio test comparing the AIDS model equations for non-senior consumer units with those aged 65 to 74, the differences between the two groups are statistically significant in both 1984 and 1992 (Tables A7.17-A7.18), with the coefficient 1.7 percentage points higher for

the senior group than non-senior group in 1984. The size difference of the housing share coefficient reverses in 1992, as the coefficient for the non-senior group is greater by 2.2 percentage points. The implication of this finding is that the expenditure share allocated to housing fell more dramatically with increments to total expenditures for those aged 65 to 74 than non-seniors in 1984, but that trend reversed by 1992.

#### **Comparing those Aged 65 to 74 with those Aged 75 and Older**

The most interesting difference in 1984 between those aged 65 to 74 and those 75 and older is that percentage change in total expenditures does not have a statistically significant impact on the housing budget share for the latter group. This may reflect consumer unit having their home paid off. Holden and Smeeding (1990) found that over 75 percent of those over the age of 65 own their own home and approximately 75 percent of those had no mortgage owing in 1986. In 1992, it was only the impact of a percentage change in total expenditures on the health care budget share that is not statistically significant for those aged 75 and older (Table A7.11). In a study spanning 1980 to 1992, Acs and Sabelhaus (1995) found that a combination of reduced employer-sponsored insurance coverage and the recession of 1990-91 imposed pressure on the federal government to increase Medicare and Medicaid spending over the period 1980-92, with the most rapid increase coming between 1990-92. For example, the federal government's share of aggregate medical expenditures increased from 33.9 percent in 1990 to 39.0 percent in 1992. It appears that government's increased contributions toward medical expenses over the latter period of analysis weakened the relationship between total expenditures and out-of-pocket health care expenditures for the most needy (those aged 75 and older).

In a study by Hitschler (1993), which segmented the elderly into those aged 65 to 74 and 75 and older, it was found that those aged 75 and older spend a greater percentage on necessities than their younger elderly counterparts (those aged 65 to 74) but that the gap between the two groups declined between 1980 and 1990. Table A7.19 shows that those aged 65 to 74 reduced their budget share allocated to necessities by 2.6 percentage points while those aged 75 and

older reduced their share by 4.5 percentage points between 1984 and 1992. The difference in total necessity budget allocation between these groups is reduced from 8.6 percentage points in 1980 to 6.7 percentage points in 1990. This is considerably lower than the difference in necessity budget allocation between the non-elderly and elderly Rubin and Koelln found for the period 1980-81 to 1989-90.

Neither age group amongst seniors experienced a statistically significant change in the share allocated to housing over the period 1984 to 1992. However, the expenditure share allocated to health care and child care increased while the share allocated to miscellaneous goods and services decreased for those aged 65 to 74. The budget shares of the group aged 75 and older are more stable over time, as the food share was the only one to change (decrease) in a statistically significant manner over this period. Interestingly, all rural consumer units and those aged 75 and older are the only demographic groups not to experience a statistically significant reduction in the share allocated to miscellaneous goods and services between 1984 and 1992. In a log-likelihood ratio test comparing the AIDS model equations for consumer units aged 65 to 74 with those aged 75 and older, the differences between the two groups are statistically significant in both 1984 and 1992.

#### **Inter-Year Difference of Means Tests**

In the case of housing, the groups for which the mean expenditure share increased significantly between 1984 and 1992 were urban residents, all consumer units with children and all non-seniors. The health care expenditure share increased in a statistically significant manner for all but rural consumer units, single parents and those aged 75 and older. For the last two groups, stability of the expenditure share is likely the result of the dramatic increase in the federal government's provision of Medicaid and Medicare (Acs and Sabelhaus, 1992). Since health care expenditures are considered defensive in nature, this finding of increased expenditure shares allocated to health care for five of the eight demographic groups represents a troubling increase in allocation toward a functionings-maintaining rather than functionings-enhancing good.

The expenditure share allocated to food diminished in every case except for those aged 65 to 74, but the only statistically significant changes were reductions for urban and rural consumer units, all consumer units with children, all non-seniors and those aged 75 and older. The largest reduction occurred for the last group, which Rubin and Koelln (1996) found to be the most important factor in determining why expenditures for necessities declined for the elderly (those aged 65 and older) during the 1980s. The expenditure shares allocated to apparel were even more stable by demographic group than expenditure rank, as none of the demographic groups experienced a statistically significant change between 1984 and 1992. Child care expenditures, however, exhibited volatility over this time, as the expenditure shares allocated to them decreased significantly for urban and rural consumer units, all consumer units with children, single parents and all non-seniors.

The expenditure shares allocated to the miscellaneous goods and services category decreased by a statistically significant amount for all but rural consumer units and those aged 75 and older. This reduction occurred by expenditure ranking as well, with significant decreases for all but the top 1 percent. With increases in the expenditures share allocated to housing and health care being commonplace (Table A7.19), miscellaneous goods and services appear to represent where most of this reduction is being absorbed.

### **Summary of the Most Interesting Results**

The empirical results reported by demographic group tend to match well with intuition and previous research in the consumer expenditures literature. The designations of necessity and luxury expenditure are consistent with earlier research (Deaton and Muellbauer, 1980a), with housing and food categorized as necessities and apparel, child care and miscellaneous goods and services categorized as luxuries. Consistent with the work of Rubin and Koelln (1996), the categorization of health care is sensitive to demographic specification, as it is a luxury for consumer units without children, single parents and all non-seniors in 1984 (Tables A7.1-A7.9). While Rubin and Koelln only segmented their sample into those aged 65 and older and those

under the age of 65 (with health care a luxury for non-seniors and necessity for seniors), this dissertation segments the entire sample into eight demographic subgroups with three treating health care as a luxury and the remaining groups treating it as a necessity. In 1992, the only groups for whom health care is a luxury are single parents and all consumer units with children (Tables A7.9-A7.16).

From an aggregate standpoint, the AIDS model performs very well in both 1984 and 1992, as at least four of the six expenditure shares are statistically correlated with a percentage change in total expenditures over both periods. For ten of the sixteen cases (eight demographic groups over two periods), all of the expenditure shares are statistically significant. The worst statistical significance exists for single parents in 1984, as the results are surely impacted by their relatively small sample size.

#### **Other Results by Category of Expenditure**

As expected, housing is categorized as a necessity across all demographic groups. However, no statistically significant relationship exists between the housing expenditure share and a percentage change in total expenditures for consumer units over 75 and for single parents in 1992. For the former group, the high probability that they have already paid off their home is probably weakening the link between total expenditures and the housing expenditure share. For the latter group, the lack of statistical significance may result from reliance on subsidized housing and reliance on informal housing arrangements (Edin and Lein, 1997).

Food was a necessity for all demographic groups and exhibits the strongest marginal response to a percentage increase in total expenditures (i.e., "drops" the most dramatically) for single parents with a coefficient of -0.109 in 1984 and the least dramatically for those aged 65 to 74 with a coefficient of -0.046. The implication here is that single parents make a large substitution out of food, and those aged 65 to 74 make a small substitution out of food, with increments to total expenditures. The mean expenditure share allocated to food fell for five of the eight demographic groups between 1984 and 1992 (Table A7.19).

Apparel is the most stable expenditure share of all, with none of the expenditure shares encountering a statistically significant change in its expenditure share allocation between 1984 and 1992. Not surprisingly, single parents spent the highest average percentage of total expenditures on apparel in both 1984 and 1992 (Table A7.19).

Child care expenditure shares are very volatile among demographic groups. The most interesting result is for single parents, as child care is a luxury in 1984 with a marginal impact resulting from a percentage change in total expenditures twice as high as for any other group (Tables A7.1-A7.8) but is not statistically significant in 1992.

Several interesting results emerge within the "miscellaneous goods and services" category. First, the largest marginal impact on this expenditure share allocation over both time periods is for rural consumer units in 1984 at 0.136 (Table A7.5) , while the smallest is for those aged 65 to 74 at 0.092 in 1992 (Table A7.10). Second, the highest mean expenditure share occurred for all non-seniors in 1984 and rural consumer units in 1992. Lastly, every demographic group except rural consumer units and those aged 75 and older incurred a statistically significant reduction in their mean expenditure share in this category between 1984 and 1992. This result is similar to the results by expenditure ranking, in which six of the seven groups incurred such a reduction. Thus, a potential reduction in functionings-enhancing expenditures occurred for these expenditure and demographic groups.

**APPENDIX TO CHAPTER SEVEN  
(Grouped by Demographic Profile)**

**Table A7.1**

**The AIDS Model of Consumer Expenditures, 1984  
All Non-Senior Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	261.66*	Itotex	-.044,-16.383	0.000	Necessity
		_cons	.713,31.546	0.000	
shc	45.41*	Itotex	.009,6.695	0.000	Luxury
		_cons	-.038,-3.479	0.001	
sfd	976.28*	Itotex	-.055,-32.816	0.000	Necessity
		_cons	.647,46.440	0.000	
sap	108.57*	Itotex	.009,10.400	0.000	Luxury
		_cons	-.033,4.382	0.000	
scc	36.26*	Itotex	.044,5.820	0.000	Luxury
		_cons	.627,-9.502	0.000	
smis	848.72*	Itotex	.096,30.343	0.000	Luxury
		_cons	-.391,-14.752	0.000	

\*Statistically significant at the 5% level.

**Table A7.2**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Consumer Units Aged 65-74**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	79.00*	Itotex	-.061,-9.058	0.000	Necessity
		_cons	.834,15.864	0.000	
shc	11.63	Itotex	-.015,-3.426	0.001	Necessity
		_cons	.231,6.600	0.000	
sfd	125.46*	Itotex	-.046,-11.552	0.000	Necessity
		_cons	.574,18.559	0.000	
sap	23.16*	Itotex	.010,4.789	0.000	Luxury
		_cons	-.051,3.050	0.000	
scc	7.61	Itotex	.008,1.596	0.111	N/A
		_cons	-.102,-1.799	0.072	
smis	352.70*	Itotex	.125,20.462	0.000	Luxury
		_cons	-.664,-13.906	0.000	

\*Statistically significant at the 5% level.

**Table A7.3**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Consumer Units Aged 75 and Older**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of ltotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	1.57	ltotex	-.013,-1.252	0.211	N/A
		_cons	.523,7.017	0.000	
shc	11.70	ltotex	-.024,-3.442	0.001	Necessity
		_cons	.325,6.250	0.000	
sfd	100.25*	ltotex	-.057,-10.412	0.000	Necessity
		_cons	.655,16.060	0.000	
sap	30.30*	ltotex	.018,5.446	0.000	Luxury
		_cons	-.116,4.807	0.000	
scc	0.00	ltotex	-.001,-0.046	0.963	N/A
		_cons	-.322,-1.131	0.259	
smis	122.59*	ltotex	.097,11.619	0.000	Luxury
		_cons	-.530,-8.553	0.000	

\*Statistically significant at the 5% level.

**Table A7.4**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Urban Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	449.59*	Itotex	-.054,-21.608	0.000	Necessity
		_cons	.800,39.046	0.000	
shc	66.65*	Itotex	-.012,-8.238	0.000	Necessity
		_cons	.151,12.359	0.000	
sfd	1072.21*	Itotex	-.051,-34.300	0.000	Necessity
		_cons	.614,50.191	0.000	
sap	203.21*	Itotex	.012,14.228	0.000	Luxury
		_cons	-.054,-8.009	0.000	
scc	132.34*	Itotex	.080,10.488	0.000	Luxury
		_cons	-.970,-14.134	0.000	
smis	1622.84*	Itotex	.118,43.178	0.000	Luxury
		_cons	-.589,-26.219	0.000	

\*Statistically significant at the 5% level.

**Table A7.5**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Rural Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	34.30*	Itotex	-.040,-5.916	0.000	Necessity
		_cons	.630,11.924	0.000	
shc	19.90*	Itotex	-.023,-4.518	0.000	Necessity
		_cons	.257,6.447	0.000	
sfd	184.69*	Itotex	-.062,-14.391	0.000	Necessity
		_cons	.703,20.786	0.000	
sap	51.00*	Itotex	.015,7.049	0.000	Luxury
		_cons	-.088,-5.279	0.000	
scc	14.57*	Itotex	.095,3.493	0.001	Luxury
		_cons	-1.166,-4.954	0.000	
smis	249.10*	Itotex	.136,16.988	0.000	Luxury
		_cons	-.704,-11.175	0.000	

\*Statistically significant at the 5% level.

**Table A7.6**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Consumer Units without Children**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	253.83*	Itotex	-.052,-16.201	0.000	Necessity
		_cons	.779,30.566	0.000	
shc	83.57*	Itotex	-.021,-9.252	0.000	Necessity
		_cons	.229,12.928	0.000	
sfd	773.47*	Itotex	-.055,-29.309	0.000	Necessity
		_cons	.633,42.239	0.000	
sap	172.24*	Itotex	.014,13.058	0.000	Luxury
		_cons	-.077,-8.939	0.000	
scc	0.61	Itotex	.006,0.779	0.436	N/A
		_cons	-.221,-3.085	0.002	
smis	1368.83*	Itotex	.134,40.513	0.000	Luxury
		_cons	-.699,-26.633	0.000	

\*Statistically significant at the 5% level.

**Table A7.7**  
**The AIDS Model of Consumer Expenditures, 1984**  
**Single Parents Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	1.60	Itotex	-.013,-1.266	0.206	N/A
		_cons	.508,6.173	0.000	
shc	51.64*	Itotex	.045,6.768	0.000	Luxury
		_cons	-.350,-6.498	0.000	
sfd	177.08*	Itotex	-.109,-15.111	0.000	Necessity
		_cons	1.109,19.419	0.000	
sap	0.76	Itotex	.003,0.870	0.385	N/A
		_cons	.031,1.041	0.299	
scc	11.94	Itotex	.127,3.194	0.002	Luxury
		_cons	-1.286,-3.863	0.000	
smis	52.46*	Itotex	.096,7.531	0.000	Luxury
		_cons	-.473,-4.660	0.000	

\*Statistically significant at the 5% level.

**Table A7.8**  
**The AIDS Model of Consumer Expenditures, 1984**  
**All Consumer Units with Children**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	103.88*	Itotex	-.039,-10.280	0.000	Necessity
		_cons	.669,20.620	0.000	
shc	18.47*	Itotex	.007,4.287	0.000	Luxury
		_cons	-.023,-1.554	0.120	
sfd	798.43*	Itotex	-.068,-30.278	0.000	Necessity
		_cons	.777,40.852	0.000	
sap	45.59*	Itotex	.008,6.746	0.000	Luxury
		_cons	-.022,-2.155	0.031	
scc	14.6*	Itotex	.057,3.441	0.001	Luxury
		_cons	-.982,-6.004	0.000	
smis	506.92*	Itotex	.108,23.461	0.000	Luxury
		_cons	-.519,-13.290	0.000	

\*Statistically significant at the 5% level.

**Table A7.9**  
**The AIDS Model of Consumer Expenditures, 1992**  
**All Non-Senior Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	56.95*	Itotex	-.044,-7.610	0.000	Necessity
		_cons	.734,15.694	0.000	
shc	17.55*	Itotex	-.016,-4.203	0.000	Necessity
		_cons	.278,8.759	0.000	
sfd	242.21*	Itotex	-.054,-16.132	0.000	Necessity
		_cons	.651,24.025	0.000	
sap	77.81*	Itotex	.015,8.752	0.000	Luxury
		_cons	-.101,-7.062	0.000	
scc	28.26*	Itotex	.083,3.384	0.001	Luxury
		_cons	-.998,-3.831	0.000	
smis	364.49*	Itotex	.107,20.164	0.000	Luxury
		_cons	-.636,-14.780	0.000	

\*Statistically significant at the 5% level.

**Table A7.10**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Aged 65-74 Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	11.55*	Itotex	-.022,-3.408	0.001	Necessity
		_cons	.524,9.952	0.000	
shc	16.74*	Itotex	-.019,-4.110	0.000	Necessity
		_cons	.291,7.506	0.000	
sfd	178.20*	Itotex	-.058,-13.903	0.000	Necessity
		_cons	.693,20.288	0.000	
sap	29.21*	Itotex	.013,5.385	0.000	Luxury
		_cons	-.075,-3.837	0.000	
scc	19.37*	Itotex	.124,2.234	0.026	Luxury
		_cons	-1.394,-2.380	0.017	
smis	197.09*	Itotex	.092,14.701	0.000	Luxury
		_cons	-.495,-9.539	0.000	

\*Statistically significant at the 5% level.

**Table A7.11**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Aged 75 and Older Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	21.50*	Itotex	-.043,-4.668	0.000	Necessity
		_cons	.762,10.325	0.000	
shc	3.34	Itotex	-.011,-1.832	0.067	N/A
		_cons	.247,5.134	0.000	
sfd	117.62*	Itotex	-.055,-11.255	0.000	Necessity
		_cons	.650,16.589	0.000	
sap	44.73*	Itotex	.015,6.590	0.000	Luxury
		_cons	-.101,-5.582	0.000	
scc	14.65*	Itotex	.073,2.600	0.010	Luxury
		_cons	-.892,-3.014	0.003	
smis	154.00*	Itotex	.104,13.049	0.000	Luxury
		_cons	.647,-10.095	0.000	

\*Statistically significant at the 5% level.

**Table A7.12**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Urban Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	275.95*	Itotex	-.041,-16.784	0.000	Necessity
		_cons	.717,34.356	0.000	
shc	50.82*	Itotex	-.012,-7.178	0.000	Necessity
		_cons	.157,11.356	0.000	
sfd	1357.27*	Itotex	-.056,-38.784	0.000	Necessity
		_cons	.668,54.069	0.000	
sap	180.24*	Itotex	.012,13.402	0.000	Luxury
		_cons	-.058,-7.824	0.000	
scc	162.61*	Itotex	.096,11.399	0.000	Luxury
		_cons	-1.185,-14.858	0.000	
smis	1366.61*	Itotex	.103,38.976	0.000	Luxury
		_cons	-.557,-24.570	0.000	

\*Statistically significant at the 5% level.

**Table A7.13**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Rural Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	31.84*	Itotex	-.041,-5.699	0.000	Necessity
		_cons	.655,10.806	0.000	
shc	10.86	Itotex	-.018,-3.327	0.001	Necessity
		_cons	.234,5.284	0.000	
sfd	160.37*	Itotex	-.062,-13.342	0.000	Necessity
		_cons	.722,18.715	0.000	
sap	31.36*	Itotex	.015,5.521	0.000	Luxury
		_cons	-.091,-4.096	0.000	
scc	27.72*	Itotex	.127,4.232	0.000	Luxury
		_cons	-1.459,-5.107	0.000	
smis	181.36*	Itotex	.117,14.252	0.000	Luxury
		_cons	-.627,-9.157	0.000	

\*Statistically significant at the 5% level.

**Table A7.14**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Consumer Units without Children**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	140.10*	Itotex	-.038,-11.930	0.000	Necessity
		_cons	.683,25.733	0.000	
shc	68.24*	Itotex	-.020,-8.332	0.000	Necessity
		_cons	.238,12.086	0.000	
sfd	894.43*	Itotex	-.060,-31.467	0.000	Necessity
		_cons	.694,43.503	0.000	
sap	211.65*	Itotex	.016,14.496	0.000	Luxury
		_cons	-.102,-10.837	0.000	
scc	15.67*	Itotex	.034,3.886	0.000	Luxury
		_cons	-.516,-6.372	0.000	
smis	997.32*	Itotex	.111,33.423	0.000	Luxury
		_cons	-.612,-21.990	0.000	

\*Statistically significant at the 5% level.

**Table A7.15**  
**The AIDS Model of Consumer Expenditures, 1992**  
**Single Parents Consumer Units**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	35.83*	Itotex	-.059,-6.103	0.000	Necessity
		_cons	.898,11.415	0.000	
shc	89.86*	Itotex	.055,8.786	0.000	Luxury
		_cons	-.445,-8.511	0.000	
sfd	150.90*	Itotex	-.095,-13.362	0.000	Necessity
		_cons	1.020,17.502	0.000	
sap	6.05	Itotex	.011,2.455	0.014	Luxury
		_cons	-.033,-0.906	0.365	
scc	2.09	Itotex	.046,1.411	0.159	N/A
		_cons	-.700,-2.505	0.013	
smis	151.03*	Itotex	.127,13.382	0.000	Luxury
		_cons	-.804,-10.275	0.000	

\*Statistically significant at the 5% level.

**Table A7.16**  
**The AIDS Model of Consumer Expenditures, 1992**  
**All Consumer Units with Children**

Dependent Variable	X <sup>2</sup>	Independent Variable	Coefficients of Itotex and t-statistics	P> t	Expenditure Category: Luxury or Necessity
shs	119.55*	Itotex	-.042,-11.042	0.000	Necessity
		_cons	.722,21.581	0.000	
shc	38.04*	Itotex	.011,6.121	0.000	Luxury
		_cons	-.055,-3.404	0.001	
sfd	808.13*	Itotex	-.065,-30.437	0.000	Necessity
		_cons	.761,40.485	0.000	
sap	0.56	Itotex	.001,0.746	0.456	N/A
		_cons	.040,3.459	0.001	
scc	19.64*	Itotex	.063,3.923	0.000	Luxury
		_cons	-1.009,-6.084	0.000	
smis	510.62*	Itotex	.103,23.611	0.000	Luxury
		_cons	-.564,-14.659	0.000	

\*Statistically significant at the 5% level.

**Table A7.17, pp. 188-190**  
**AIDS Model - Demographic Specification**  
**Intra-Year Comparisons by Demographic Characteristics, 1984**

Dependent Variable	Demographic Group	Coefficient of $\ln \text{totex}$	LLR $\chi^2$ *
shs	Urban	-.054	
	Rural	-.040	544.2
	CU without Children	-.052	
	CU with Children	-.039	2834.34
	Single Parents	-.013	1268.81
	Non-Senior	-.044	
	Aged 65-74	-.061	4791.06
	Aged 75 and older	-.013	215.40
	shc	Urban	-.012
Rural		-.023	581.1
CU without Children		-.021	
CU with Children		.007	2649.46
Single Parents		.045	5471.92
Non-Senior		.009	
Aged 65-74		-.015	7183.64
Aged 75 and older		-.024	580.38

Dependent Variable	Demographic Group	Coefficient of Itotex	LLR X <sup>2*</sup>
sap	Urban	.012	
	Rural	.015	1890.62
	CU without Children	.003	
	CU with Children	.014	8565.1
	Single Parents	.008	4103.17
	Non-Senior	.009	
	Aged 65-74	.010	14256.32
	Aged 75 and older	.018	837.24
	sfd	Urban	-.051
Rural		-.062	1370.52
CU without Children		-.055	
CU with Children		-.068	3303.85
Single Parents		-.109	2571.06
Non-Senior		-.055	
Aged 65-74		-.046	9800.78
Aged 75 and older		-.057	1007.84
scc		Urban	.080
	Rural	.095	441.88
	CU without Children	.006	
	CU with Children	.057	1305.10
	Single Parents	.127	1538.88
	Non-Senior	.044	
	Aged 65-74	.008	3023.94
	Aged 75 and older	-.001	47.26

Dependent Variable	Demographic Group	Coefficient of Itotex	LLR X <sup>2*</sup>
smis	Urban	.118	
	Rural	.136	328.04
	CU without Children	.134	
	CU with Children	.108	1268.49
	Single Parents	.096	1417.22
	Non-Senior	.096	
	Aged 65-74	.125	3002.58
	Aged 75 and older	.097	328.24

\*Statistically significant at the 5 percent level.

**Table A7.18, pp. 190-192**  
**AIDS Model - Demographic Specification**  
**Intra-Year Comparisons by Demographic Characteristics, 1992**

Dependent Variable	Demographic Group	Coefficient of Itotex	LLR X <sup>2*</sup>
shs	Urban	-.041	
	Rural	-.041	524.88
	CU without Children	-.038	
	CU with Children	-.042	3650.98
	Single Parents	-.059	2376.76
	Non-Senior	-.044	
	Aged 65-74	-.022	2720.92
	Aged 75 and older	-.043	805.66
	shc	Urban	-.012
Rural		-.018	769.50
CU without Children		-.020	
CU with Children		.011	3206.82
Single Parents		.055	5004.80
Non-Senior		-.016	
Aged 65-74		-.019	7043.1
Aged 75 and older		-.011	1431.24

Dependent Variable	Demographic Group	Coefficient of Itotex	LLR X <sup>2*</sup>
sap	Urban	.012	
	Rural	.015	1601.14
	CU without Children	.016	
	CU with Children	.001	9803.18
	Single Parents	.011	7429.48
	Non-Senior	.015	
	Aged 65-74	.013	14668.48
	Aged 75 and older	.015	2097.40
	sfd	Urban	-.056
Rural		-.062	677.18
CU without Children		-.060	
CU with Children		-.065	8033.3
Single Parents		-.095	5609.36
Non-Senior		-.054	
Aged 65-74		-.058	11305.4
Aged 75 and older		-.055	1788.8
scc		Urban	.096
	Rural	.127	230.68
	CU without Children	.034	
	CU with Children	.063	1107.06
	Single Parents	.046	1440.56
	Non-Senior	.083	
	Aged 65-74	.124	2657.62
	Aged 75 and older	.073	44

Dependent Variable	Demographic Group	Coefficient of ltotex	LLR X <sup>2*</sup>
smis	Urban	.103	
	Rural	.117	362.28
	CU without Children	.111	
	CU with Children	.103	2928.82
	Single Parents	.127	1400.66
	Non-Senior	.107	
	Aged 65-74	.092	3736.14
	Aged 75 and older	.104	832.14

\*Statistically significant at the 5 percent level.

**Table A7.19, pp. 193-194**  
**Inter-Year Difference of Means**  
**Tests by Demographic Group**

Dep. Variable	Demographic Group	Mean		Difference of Means t-statistics	Reject Null Hypothesis? (at 5% level)
		1984	1992		
		.359	.368	-3.12	Yes
shs	Urban	.320	.311	1.04	No
	Rural	.337	.354	-4.29	Yes
	CU with Children	.368	.368	0.27	No
	CU without Children	.405	.420	-1.35	No
	Single Parents	.344	.357	-4.46	Yes
	Non-Senior	.357	.345	1.64	No
	Aged 65-74	.430	.419	0.65	No
	Aged 75 and Older	.061	.069	-5.32	Yes
shc	Urban	.089	.096	-1.3	No
	Rural	.046	.051	-3.24	Yes
	CU with Children	.078	.085	-3.13	Yes
	CU without Children	.036	.033	0.80	No
	Single Parents	.045	.049	-3.36	Yes
	Non-Senior	.112	.134	-4.58	Yes
	Aged 65-74	.151	.161	-1.46	No
	Aged 75 and Older	.197	.191	5.02	Yes
sfd	Urban	.219	.210	2.32	Yes
	Rural	.203	.191	4.72	Yes
	CU with Children	.196	.194	0.83	No
	CU without Children	.251	.244	0.74	No
	Single Parents	.192	.186	3.15	Yes
	Non-Senior	.217	.220	-0.62	No
	Aged 65-74	.232	.211	3.56	Yes
	Aged 75 and Older				

sap	Urban	.045	.044	1.18	No
	Rural	.035	.038	-1.42	No
	CU with Children	.048	.050	1.67	No
	CU without Children	.040	.039	0.96	No
	Single Parents	.060	.061	-0.24	No
	Non-Senior	.047	.047	0	No
	Aged 65-74	.036	.036	0	No
	Aged 75 and Older	.028	.026	0.99	No
scc	Urban	.013	.010	3.01	Yes
	Rural	.017	.006	3.45	Yes
	CU with Children	.029	.021	3.41	Yes
	CU without Children	.002	.001	1.72	No
	Single Parents	.056	.019	8.50	Yes
	Non-Senior	.018	.012	4.52	Yes
	Aged 65-74	2 <sup>5</sup>	3 <sup>4</sup>	-2.22	Yes
	Aged 75 and Older	3 <sup>4</sup>	7 <sup>4</sup>	-1.17	No
smis	Urban	.378	.325	16.03	Yes
	Rural	.362	.347	1.49	No
	CU with Children	.396	.343	11.21	Yes
	CU without Children	.360	.316	10.43	Yes
	Single Parents	.294	.241	4.22	Yes
	Non-Senior	.410	.355	16.20	Yes
	Aged 65-74	.317	.266	6.75	Yes
	Aged 75 and Older	.190	.193	-0.33	No

## CHAPTER EIGHT

### SUMMARY AND CONCLUSION

During the 1980s, two phenomena regarding the standard of living in the United States received a great deal of attention in the economics literature: (1) a skewing of the distribution of income and wealth in favor of the rich and (2) a middle class that was shrinking as a percentage of the population. Amartya Sen's theory of capabilities and functionings provides a broader measure of the standard of living. As mentioned in Chapter Two, income and wealth data contain information about capabilities, because they measure the resources available to an individual or household. Therefore, they represent one's potential well-being. Functionings, however, represent one's capabilities that are actualized. For example, a person may have great wealth, but finds her functionings restricted because of tremendous out-of-pocket health care expenses.

In the Senian framework, income and wealth measures are too narrow to fully capture the type of life one is able to lead. That is, while income and wealth measures convey information about the resources an individual or household has at their disposal, they are not adequate measures of the standard of living from the perspective of Senian functionings because they represent an *indirect* measure of well-being based on the opportunities embodied in financial resources rather than the *direct* measure of consumer expenditures which communicate one's ability to convert opportunities into achievements (functionings).

A broad analysis of the distribution of expenditure gains by socioeconomic and demographic characteristics and changes in the size composition of the middle class by expenditure measures provided a meaningful research agenda. A consumer expenditure approach was employed since expenditures provide information about economic *outcomes*, akin to Sen's concept of functionings.

The consumer expenditure data revealed that real expenditure gains over the period 1984 to 1992 were shared far more widely across expenditure and demographic groups than income or wealth. When measured by consumer expenditures, the middle class was found to increase as a percentage of the total population. Furthermore, the middle class enjoyed real expenditure growth comparable for the population as a whole by two of the three measures of middle class status. Lastly, an analysis of expenditures on out-of-pocket health care, child care and essential goods and services provides insight into provisioning for critical expenditures.

Complications arise, however, from using consumer expenditure measures to assess the standard of living when the analysis is broadened to account for: (1) changes in debt and wealth accumulation; (2) inter-temporal economic well-being and (3) human capital investment. In analyzing the impact of changes in wealth and debt accumulation on intertemporal well-being, annual consumer expenditures do not provide information as to how those expenditures are financed. Therefore, households demonstrating high consumer expenditure growth in a particular year or large real expenditure gains over a short time horizon may be accumulating debt or drawing down financial assets to finance these expenditures (refer to Chapter One).

This chapter is divided into four broad segments: (1) a summary of Chapters One Through Four; (2) a summary of Chapters Five Through Seven; (3) significant contributions to the literature and (4) implications for future research.

#### **Summary of Chapters One Through Four**

An analysis of changes in the distribution of income and wealth in the United States during the 1980s provided one of the "baseline" measurements for how the standard of living changed over this period. Wolff (1994, 1995a, 1995b, 1998) and Weicher (1995) both found evidence of a greater skewing of the income and wealth distributions in favor of the rich and at the expense of the poor and middle class. Findings of a shrinking middle class by income measures during this

time also provided a basis for comparisons with changes in middle class status by consumer expenditure measures.

### **Real Expenditure Growth by Expenditure Quintile**

Real expenditure growth exhibited an interesting pattern across expenditure groups over the period 1984 to 1992 which contrast starkly with the findings of Wolff (1995b) and Auerbach and Slemrod (1997). The greatest gain in real expenditures for any quintile was 12.7 percent for the bottom quintile, while the smallest gain was 0.5% for the top five percent. Consumer expenditures tell a very different story about changes in the standard of living, as gains were more evenly shared by this measure and the smallest gains accrued to two of the top groups in the expenditure ranking, the top quintile and top 5 percent.

### **Real Expenditure Growth by Demographic Group**

Although expenditure quintiles have been used infrequently as a means for gauging changing economic fortunes (Smeeding, 1993, 1994), there are a few studies that provide insight into how expenditure quintiles have fared in terms of real expenditure gains. Such measures, however, ignore changes in economic well being by type of household, e.g., single mother households and husband and wife households with children under age six. When all nine "consumer unit types" were analyzed in Chapter Four, it was found that single parents were the worst-off in terms of real expenditure gains because they experienced reductions in both their expenditure ranking and real expenditures. While all husband and wife couples enjoyed increases in their expenditure ranking and real expenditures, singles and cohabitants encountered by far the greatest real expenditure gains by household composition at 34.3 percent and 37.7 percent, respectively. However, the largest real expenditure gains for any of the eleven consumer unit types was the 55.7 percent increment enjoyed by consumer units with a reference person aged 75 and older. While many of the demographic groups enjoyed large expenditure gains by consumer expenditure measures, the CES data do not include information about how expenditures are financed. Therefore, it is possible that some demographic groups financed their expenditures by dissaving or borrowing.

### **The Size Composition of the Middle Class**

A deluge of research pointing to a shrinking middle class based on income and wealth measures in the United States came forth during the mid-1980s. Evidence that the middle class had indeed diminished as a percentage of the entire population was quite robust. However, none of these studies analyzed changes within the middle class according to consumer expenditures. Three different measures of the middle class were employed to determine if evidence from consumer expenditures supported that of income. It was found that the middle class increased between 1984 and 1992 by all three middle class measures when consumer expenditure data were used. The middle class not only increased, but enjoyed real expenditure gains comparable to the population as a whole during this time.

### **Single-Equation Estimates of Health and Child Care Expenses**

A number of expenditure categories were estimated for consumer units. Two significant issues of concern were child care and health care expenses. While both child care and health care expenditures exhibited significant increases between 1984 and 1992, it is interesting to note that the consumer units most affected by these increased costs were those we would least expect. Using a limited, single-equation Tobit model, for example, there was no statistically significant relationship between increased total expenditures and increased child care for single mothers, but this relationship was quite significant for husband and wife couples with children under six years of age. Furthermore, while increases in age had a statistically significant relationship with increased out-of-pocket health care for the population as a whole, this was not the case for those aged sixty-five and older. In summary, the two groups that public policymakers have afforded the most concern over these expenses (Smeeding and Straub, 1987; Acs and Sabelhaus, 1995) did not appear to be exceedingly burdened by them in a statistically-consistent manner. These findings are consistent with a study by Acs and Sabelhaus (1995, p. 37), who analyzed out-of-pocket health care expenditures in the United States, 1980 to 1992. The authors found that escalating health care costs had a modest impact on household budgets across all age and

demographic groups over this time due to government and business bearing the bulk of this increase. Nonetheless, the significant increases in expenditures encountered by the population as a whole for health care and child care do represent cause for concern, as these expenditures tend to have large "defensive" components. That is, they are designed to maintain functionings rather than enhance them.

For the entire sample, two single-equation Tobit regressions were run for OPHC -- a basic model, which excluded health insurance as a dependent variable and an expanded model in which health insurance was included as a dichotomous variable. In the basic model, both an additional year of age for the reference person and whether or not a consumer unit was urban or rural had a substantial impact on OPHC. When the Tobit analysis was expanded to include health insurance, the curious result occurred that those with insurance had higher OPHC, on average, than those without by \$250.16 in 1984 and \$479.12 in 1992. An explanation for this is that those with health insurance tend to utilize physicians' services more frequently than those incurring the full cost of a visit to their physician. Since most medical insurance programs require some co-pay from the insured, a high frequency of physician visits for themselves or their children could drive the OPHC of the insured above what it is for the uninsured, who would be far more likely to reserve their physician visits for "emergencies" (Rubin and Koellin, 1993). In the case of child care, a multivariate Tobit regression was run for both 1984 and 1992 to determine the impact single of parenthood, the size of the consumer unit, the consumer unit's total expenditures and single earners had on child care expenditures. In 1984, neither a consumer unit's total expenditures nor their size had a statistically significant impact on child care expenditures. However, a consumer unit comprised of a single parent had a significant positive relation to child care expenditures; while being a single earner consumer unit had an inverse impact on child care expenses. In the latter case, it appears there are predictable cost savings to having a spouse or other member of the consumer unit available for child care services, particularly for working mothers (Littman, 1989).

## **Expenditures on Essential Goods**

The fact that the share of income allocated to essential goods (housing, food, apparel and health care) decreases as income increases has been well-established in the economics literature. To test if the same relationship held for those whose total expenditures increased, essential goods expenditure was estimated for all expenditure quintiles and the top 5 and 1 percent of the expenditures distribution. The share allocated to essentials, as expected, decreased for higher expenditure quintiles in both years. However, the top 5 percent and 1 percent of consumer units showed significant increases. This may be the result of expenditures on luxury components within categories classified broadly as essentials. These results are supported by the rather modest expenditures on luxury goods by these groups, as will be discussed later. There were significant increases in the percentage allocated to essentials by the second, third, fourth and fifth quintiles and top five percent of the expenditure distribution. This has implications for the standard of living, as a larger share of total expenditures allocated to "necessities" has been associated with lower levels of economic well-being (Rubin and Koelln, 1996).

### **Summary of Chapters Five Through Seven**

Building upon the descriptive and Single-Equation Tobit estimates provided in Chapter Four, a more sophisticated approach was employed in Chapter Five, as the complete system of consumer expenditures was estimated. Three different estimating techniques were used within the framework of a complete system of consumer expenditures: the Simultaneous-Equations Tobit (SET), Almost Ideal Demand System (AIDS) and Enhanced AIDS models.

While the SET model is represented by a complete system of equations in which the dependent variables (individual expenditure shares) are functions of other expenditure shares as well as a series of demographic characteristics, the AIDS model estimates the impact a percentage change in total expenditures has on budget shares on an equation-by-equation basis, which is equivalent to maximum likelihood estimation for the system as a whole when the model

has normally distributed error terms and is estimated independently of prices (Deaton and Muellbauer, 1980a, p. 316). The Enhanced AIDS model builds upon the basic AIDS model through the inclusion of demographic translating variables.

Each of the models employed have unique advantages. The benefits to the SET model are as follows: (1) it allows for the calculation of cross-expenditure effects, i.e., the marginal impact an increase in a budget share's value has on another budget share; (2) it incorporates a broad range of demographic variables and (3) there is no need for demographic specification (segmenting demographic groups prior to estimation). The AIDS models offer the following advantages, it: (1) is simple to estimate; (2) demonstrates which goods and services are luxuries or necessities across socioeconomic and demographic groups and (3) has a functional form which is consistent with known household budget data. The Enhanced AIDS model expands the benefits of the AIDS model by eliminating the need for demographic specification (segmenting the sample by demographic group prior to estimation) and by providing a more comprehensive and theoretically appealing framework of analysis for estimating consumer behavior (Deaton and Muellbauer, 1980a, p. 323).

In this dissertation, the Simultaneous-Equations Tobit model developed by Amemiya (1974, 1979) is extended to a complete system of consumer expenditures. The AIDS model of Deaton and Muellbauer (1980a) is employed on a different data set and with different expenditure share classifications and an Enhanced AIDS model is developed as a more theoretically-appealing extension of the basic AIDS model.

#### **Summary of Chapter Six: Consumer Expenditure Patterns by Expenditure Ranking**

Consumer units were grouped by expenditure ranking in Chapter Six. An advantage to grouping by expenditure ranking is that it allows for the Enhanced AIDS model to be employed, which is not possible when demographic specification (segmenting by demographic group) is used. Consistent with earlier reporting, the expenditure patterns of the bottom and middle

expenditure quintiles as well as the top 5 and 1 percent of the expenditures distribution will be emphasized.

### **The Bottom Quintile of the Expenditure Ranking**

Interestingly, neither the expenditure share allocated to housing or child care were statistically correlated with a percentage change in total expenditures for the bottom quintile of the expenditures distribution. In the case of housing, this lack of a statistically significant relationship between the two variables appears to result from subsidized housing, which would weaken the link between total expenditures and the housing expenditure share. Although the Consumer Expenditure Survey captures the value of housing vouchers, rents paid for government-owned "public housing", would be biased-downward since they are held substantially below market-clearing. As mentioned previously, child care expenditures are very difficult to model for consumer units with low incomes or total expenditures, because of their heavy reliance on informal child care arrangements (Cattan, 1991; Lino, 1994; Lein and Edin, 1997).

In 1992, the health care expenditure was no longer statistically correlated with a percentage change in total expenditures. Furthermore, the child care equation was not estimable due to a relatively large number of zero observations. The overall explanatory power of the Enhanced AIDS model in 1992 (Table A6.26) is comparable to 1984 for the bottom quintile, but some interesting differences arose, as only the following demographic translating variables were not statistically significant: In equation (1), age and consumer unit type; in equation (3), age and urban status and in equation (4), urban status.

### **The Middle Quintile of the Expenditure Ranking**

The most surprising results that emerged for the middle quintile in 1984 was that the coefficient of a percentage change in total expenditures (*ltotex*) was not statistically significant for the health care share, nor was consumer unit type a significant determinant of the housing expenditure share (at the 5 percent level; however, both were significant at the 10 percent level).

The model's explanatory power diminished slightly in 1992, as the equation of apparel no longer passed the goodness-of-fit test. However, the explanatory power of the miscellaneous category improved, as all variables are statistically significant. The same situation holds for health care in 1992, but age becomes the only demographic translating variable that is not statistically significant in the housing equation.

#### **The Top 5 and 1 Percent of the Expenditure Ranking**

For the top 5 percent of the expenditure ranking, a percentage change in total expenditures did not exert a statistically significant impact on the health care and child care expenditure shares. However, the model did reasonably well overall, particularly considering the small sample size, as all equations passed the goodness-of-fit test. The explanatory power of the Enhanced AIDS model was particularly impressive in 1992 with the goodness-of-fit test holding for all equations. All of the variables in the housing equation were statistically significant and only consumer unit type failed to be statistically significant in the health care equation.

The small sample size for the top 1 percent of the expenditure rank did not hinder the overall explanatory power of the Enhanced AIDS in 1984, as each equation passed the goodness-of-fit test (Table A6.20). However, a percentage change in total expenditures did not have a statistically significant impact on the health care expenditure share. The explanatory power of the Enhanced AIDS model improved significantly in 1992, as all budget shares were correlated with a percentage change in total expenditures in a statistically significant manner.

#### **Inter-Year Results by Expenditure Ranking, from the Enhanced AIDS Model**

Although the Enhanced AIDS model proved to be a very robust predictor of expenditure share allocation in both 1984 and 1992, the instances in which it provided results inconsistent with hypothesized relationships are as follows: (1) despite the earlier postulate that a consumer unit's housing burden should decrease with age, the age of the reference person proved to be a poor predictor of the housing share by expenditure ranking in either 1984 or 1992; (2) although not a consistent predictor across all expenditure rankings, the existence of children generally reduced

the share allocated to housing, which is contrary to the earlier hypothesis that increased household size tend to put upward-pressure on housing needs. However, Douthitt and Fedyk's study (1988), which employed cross-sectional data of Canadian households' life-cycle spending behavior, found that the share allocated to housing is greater for households with children headed by an adult male aged thirty-nine or younger; this trend reverses for households with an adult male aged forty or older (p. 243).

Surprisingly, having children decreased the health care budget share for seven of eight expenditure groups in 1984 and three of eight expenditure groups in 1992. This finding is inconsistent with economic theory, as the existence of children was expected to increase the need for health care, causing an increase in its budget share and necessitating a scaling-back in others (Douthitt and Fedyk, 1988; Deaton, et al., 1989).

The miscellaneous category demonstrated strong positive correlation with a percentage change in total expenditures and the demographic translating variables across both time periods and the expenditure ranking, as predicted. However, the age of the reference person and urban status were inversely correlated with the miscellaneous budget share. The earlier hypothesis was that as a consumer unit ages, they will allocate smaller shares to housing and child care and channel extra spending into the miscellaneous category. This hypothesis was not supported by the empirical tests. Furthermore, it was hypothesized that urban areas have a greater range of cultural and recreational opportunities and that these would absorb a greater portion of urban residents' budgets. However, the converse held, as urban residency placed downward-pressure on the share allocated to the miscellaneous category for every expenditure rank and the entire sample universe in both time periods.

#### **Intra-Year Difference of Budget Share Means by Expenditure Ranking**

Health care demonstrated an intriguing pattern between 1984 and 1992, increasing in mean value by a statistically significant amount for the third through fifth expenditure quintiles and the entire sample. Since health care expenditures are considered defensive in nature, this trend is

quite disturbing, as it implies a greater allocation to functionings-maintaining rather than functionings-enhancing goods and services.

The most surprising result in the inter-year comparisons across means occurred within the miscellaneous category, as the share allocated to these goods and services decreased significantly in every case but the top 1 percent of the expenditure ranking. Since expenditures in this category are generally associated with "the good life," as mentioned earlier, reductions in this share imply a scaling-back for some of these finer things in life to meet increased expenditure shares for adequate housing and health care, whose share increased across the expenditure ranking.

### **Summary of Chapter Seven: Consumer Expenditure Patterns by Demographic Group**

In Chapter Seven, consumer units were segmented by demographic specification, i.e., age, urban or rural status and with or without children. While most expenditure patterns matched previous studies (e.g., Deaton and Muellbauer, 1980a, 1980b) -- housing and food were necessities across all expenditure groups and apparel, child care and miscellaneous goods and services were luxuries -- particularly interesting differences arose for expenditures on health care and child care by demographic specification.

In the case of out-of-pocket health care, it was a luxury for consumer units under the age of 65 in 1984 and a necessity in 1992. This shift in the categorization in health care differs from the findings of Rubin and Koelln (1996), who found health care to be a luxury for this group in a cross-sectional study covering 1980-81 to 1989-90. However, health care was found to be a necessity for those aged 65-74 and 75 and older in 1984, and this is consistent with Rubin and Koelln's study. While health care remained a necessity by those aged 65-74 in 1992, there was no longer a statistically significant relationship between health care expenditures and a percentage increase in total expenditures for the group aged 75 and older in 1992.. This result for those aged 75 and older, therefore, is consistent with the findings of Acs and Sabelhaus (1995), who found that Medicare increased dramatically over the period.

Child care expenditures are characterized by a large number of zero observations and high expenditure-elasticity (Table A6.35). Since those single mothers who have nonzero child care expenditures have been found to spend a large share of income on child care (Cattan, 1991), an interesting application within the systems of equations approach is to analyze the marginal impact increments to total expenditures have on child care expenditure share allocation. Child care expenditures by single parents followed the pattern implied by Cattan for 1984, as a percentage change in total expenditures exerted a marginal impact on its expenditure share which was more than twice as large as that for all consumer units with children taken together. However, no statistically significant relationship existed in 1992.

#### **Intra-Year Results from the AIDS Model, 1984**

The hypothesized relationships held in all instances. One of the most interesting results showed that the child care expenditure share for single parents increased more than two times that of all consumer units with children with a percentage increase in total expenditures. The tendency for this budget share to increase rapidly as total expenditures increase underscores the strong correlation between income and total expenditures, as increments to these categories are generally associated with greater work effort, which would require more time away from home (Littman, 1989).

The categories of necessity and luxury expenditure were consistent across all demographic groups with the exception of health care. Whether health care was categorized as a necessity or luxury expenditure was sensitive to demographic specification. For consumer units with children, single parents and all non-senior consumer units, health care was a luxury, and for all other groups it was a necessity. The health care expenditure share declined the most significantly with a percentage increase in total expenditures for those aged seventy-five and older, and increased the most significantly for single parents.

### **Intra-Year Results from the AIDS Model, 1992**

The AIDS model exhibited solid explanatory power once again in 1992. Health care was the only expenditure category sensitive to demographic specification, categorized as a necessity for all the same groups as in 1984, as well as non-seniors. Unlike the 1984 case, however, the share allocated to child care did not increase dramatically for all single parents, but increased the most dramatically with a percentage increase in total expenditures for rural residents and those aged 65-74.

### **Significant Contributions to the Literature**

This dissertation has contributed to the literature in several ways. First, consumer expenditure measures of the standard of living were combined with income and wealth data to create a more complete picture of living standards. Second, Senian functionings were captured within the context of consumer expenditures. Third, the question of a shrinking middle class was evaluated by three different consumer expenditures, rather than conventional income measures. Contrary to the substantial body of literature supporting the declining middle class thesis by income measures, the middle class was found to expand by all three consumer expenditure measures employed for the period 1984 to 1992. Fourth, consumer units were grouped both by their expenditure ranking and demographic characteristics, rather than one or the other (Rogers, 1988; Jacobs, et al., 1989; Slesnick, 1993, 1994; Johnson and Shipp, 1996). Fifth, Amemiya's Simultaneous-Equations Tobit (1974, 1979, 1985) model was expanded to a complete system of consumer expenditures for the first time. Despite the limited success of the Simultaneous-Equations Tobit model, its execution on a complete expenditure system provides a framework for future researchers to experiment with the model under different specifications. Lastly, the Almost Ideal Demand System (AIDS) of Deaton and Muellbauer (1980a) was estimated than expanded to account for demographic characteristics. This model, referred to as the Enhanced AIDS model, increases the model's explanatory power over the AIDS model considerably.

## **Conclusions about the Standard of Living by Consumer Expenditure Measures**

Several interesting implications for the standard of living emerge from the results found in this dissertation. First, real expenditure gains were far more evenly-distributed than income and wealth gains over the period 1984 to 1992. Second, by consumer expenditure measures, those consumer units categorized as middle class actually increased as a percentage of all consumer units. This is in stark contrast to middle class estimates by income measures, which a consensus of economists found to decrease as a percentage of all households during the 1980s. Third, an analysis of the microdata presents a different picture of the standard of living than merely looking at real expenditure gains. For example, the age group 75 and older had the greatest growth in real expenditures between 1984 and 1992 (Table 4.1) but have the highest expenditure share of "defensive" expenditures (for out-of-pocket health care) and allocate a larger share of total expenditures to necessities than any other expenditure or demographic group (Tables A6.37 and A7.19). Rubin and Koelln (1996) have used the share of total expenditures allocated to "necessities" as a proxy for the standard of living, with higher shares representing lower living standards; so the real expenditure gains by those 75 and older do not appear to be quite as beneficial in this context. Lastly, the manner by which current consumer expenditures are financed has implications for intertemporal well-being. For example, borrowing or drawing down financial assets to finance current expenditures mitigates one's standard of living in the future, whereas expenditures financed out of current income do not.

## **Development of Estimating Models of Complete Expenditure Systems**

Three estimating models for complete systems of expenditures were developed in this dissertation. First, Amemiya's Simultaneous-Equations Tobit (1974, 1979, 1985) model provided a theoretically-appealing framework for estimating a simultaneous system of expenditure equations. The Almost Ideal Demand System (AIDS) model of Deaton and Muellbauer (1980a) did not have the theoretical appeal of the more comprehensive Simultaneous-Equations Tobit model, but had the benefits of a proven success record (Stone, 1954; Deaton and Muellbauer,

1980a; Berck, et al., 1996) and ease of estimation. Lastly, the AIDS model was expanded to account for the impact demographic characteristics have on consumer expenditure patterns.

### **The Impact of Demographic Characteristics on Consumer Expenditure Patterns**

In Chapter Six, the basic AIDS model was enhanced to account for the demographic characteristics of urban or rural status, age and consumer unit composition. This allowance for demographic characteristics, without segmenting groups prior to estimation is referred to as demographic translating (Pollak and Wales, 1992). In 1984, age provided the greatest explanatory power of the demographic variables, as it was statistically significant in at least 50 percent of the time for all expenditure shares (Table 6.3). In 1992, age and consumer unit composition shared very comparable explanatory power, but the explanatory power of urban or rural status weakened considerably between 1984 and 1992 (Table 6.6).

In Chapter Seven, the process of demographic specification was employed, whereby groups are segmented by demographic characteristics prior to estimation. The AIDS model is the only one applicable when demographic specification is employed, because the equations do not include any demographic translating variables. The impact a percentage change in total expenditures had on expenditure share allocation was estimated for eight demographic groups (Table 7.1). In aggregative tests of overall explanatory power, the model performed comparably to the Enhanced AIDS model, as statistical significance holds for the expenditure shares in at least 50 percent of cases in both 1984 and 1992 (Tables 7.1 and 7.2).

An interesting result emerged for single parents in 1984, as the marginal impact of a percentage increase in total expenditures was twice as high as for all consumer units with children taken together (Tables A7.7 and A7.8). The only expenditure share sensitive to demographic specification (whether it is a luxury or necessity) is out-of-pocket health care. In 1984 it is a luxury for all consumer units with children, single parents and all non-seniors, but a

luxury for the other five demographic groups. However, it only retains its luxury status for all consumer units with children and single parents in 1992.

### **Implications for Future Research**

Employing consumer expenditure measures to assess the standard of living highlights the need for a completely integrated survey which collects reliable data on income, wealth, consumer expenditures and the service flows from consumer durables. While consumer expenditure data hold many advantages over income data when analyzing the standard of living over some short period of time, such as a year, they do not present a complete picture of intertemporal living standards. For example, high consumer expenditures may be sustained by dissaving or borrowing, which mitigate future functionings. Conversely, low consumer expenditures in a given year may reflect high savings rates, which provide for a higher living standard in the future.

The Enhanced AIDS model developed in this dissertation provides a very sound framework in which to evaluate the full spectrum of consumer expenditures. Since one of the more pressing concerns to be derived from the analytical results was that of health care burdens, more research in this area would be tremendously helpful in assessing the kinds of lives individuals are able to lead. As Americans are living longer, on average, more research in the area of panel surveys of seniors would be helpful to assess how aging beyond 65 impacts health care expenditures for the same group of individuals.

Although child care expenses faced by single parents were difficult to model in this study, they have proven to be a barrier to employment for single mothers (Littman, 1989) and to absorb large expenditure shares for single mothers who work outside the home (Cattan, 1991). Furthermore, recent legislation such as the "Personal Responsibility and Work Opportunity Reconciliation Act of 1996" (H.R. 3734, Public Law 104-193) is likely to place many single parents in the precarious position of paying market rates for child care to work in a low-paying job with insufficient financial reward to justify such an expense. Further research in the area of child care burdens for single parents could provide valuable information for targeting child care subsidy programs.

A rewarding application of the Enhanced AIDS model is the modeling of "interaction effects," e.g., the impact on consumer expenditure behavior of the interaction between demographic, socioeconomic and life-cycle characteristics. An example of interaction effect analysis within a different econometric framework is the multinomial logit budget allocation model of Douthitt and Fedyk (1988). The authors analyzed the impact of total expenditures on expenditure share allocation over different stages of the life cycle. One of their most interesting findings was that couples with children tend to allocate a larger expenditure share to housing than their childless counterparts early in the life-cycle, however, this trend reverses at the age of forty and beyond for the male. The Enhanced AIDS model provides a theoretically sound and computable framework for researchers wishes to pursue interaction effects.

An additional interesting future research application of the standard of living would be to compare expenditure patterns by demographic group vis-a-vis some "control group". For example, middle-aged consumer units, aged 40-54, tend to have the highest incomes and lowest poverty rates in North America (Smeeding and Sullivan, 1998, p. 255) and have expenditure patterns most closely representing the average over the life-cycle (Bradford, 1995). It would be interesting to evaluate their standard of living over time and relative to other demographic groups. This group could be used as a "baseline" for performing ratio analysis over time with other groups, and the results from this type of analysis could provide insight into how, for example, seniors' living standards have fared relative to the middle-aged control group over time.

Lastly, in the absence of a completely integrated survey such as mentioned above, consumer expenditure measures of economic well-being need to ultimately be integrated into official government statistics. Voluminous research has established the superiority of using consumer expenditure measures to assess well-being (McGregor and Borooah, 1992; Mayer and Jencks, 1993; Rogers and Gray, 1994; Eberstadt, 1996), and policymakers in the United States are beginning to give serious consideration to establishing the official poverty threshold and measures of inequality in consumer expenditure terms. For example, Garner, et al., (1998),

U.S. Bureau of the Census (1999) and Iceland and Short (2000) have worked with the National Academy of Sciences (NAS) Panel on Poverty and Family Assistance to develop improvements to measuring poverty, with the poverty threshold representing an equivalence-adjusted budget for food, clothing shelter (including utilities) and a small additional amount to allow for other common needs (such as household supplies and personal care), using actual CES data. On an international level, the United Nations Human Development Report has integrated Sen's concept of capabilities and functionings into its "Human Development Index" since 1990. Such measures provide much richer insight into functionings than the limited income-based measure in use presently.

**APPENDIX: SET MODEL, 1984 AND 1992**

**Table A1, pp. 214-215**  
**The SET Model of Consumer Expenditures, 1984**  
**Lowest Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	.225	ltotex	-.548,-0.233	0.816
		age_ref	-.020,-0.190	0.849
		urbd	.179,0.183	0.855
		fam	.557,0.211	0.833
		savacctx	-.000,-0.216	0.829
		shc	13.420,0.200	0.841
		sfd	-6.086,-0.239	0.811
		_cons	5.449,0.254	0.799
shc	36.174*	ltotex	-.005,-0.227	0.821
		age_ref	.002,1.771	0.077
		fam	-.079,-2.027	0.043
		persit18	.012,0.540	0.589
		shs	-.942,-1.373	0.170
		scc	.234,0.211	0.833
		_cons	.421,0.889	0.374
sfd	23.431*	ltotex	-.039,-1.592	0.111
		age_ref	.002,0.950	0.342
		urbd	-.061,-2.577	0.010
		fam	.086,1.362	0.173
		earn	-.031,-1.220	0.222
		shs	.419,0.417	0.676
		shc	-.330,-0.312	0.755
		_cons	.286,0.546	0.585

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	15.271*	ltotex	-.005,-0.486	0.627
		fam	.022,1.273	0.203
		earn	-.010,-1.063	0.288
		persit18	.005,0.948	0.343
		shc	-.015,-0.162	0.872
		sfd	-.211,-1.394	0.163
		scc	.030,0.135	0.893
		_cons	.113,1.103	0.270
scc	5.592	ltotex	-.015,-0.497	0.619
		fam	-.040,-0.474	0.636
		earn	.009,0.279	0.780
		persit18	.023,1.129	0.259
		shc	-.452,-1.006	0.314
		shs	-.957,-0.913	0.361
		_cons	.562,0.888	0.374
		smis	12.186	age_ref
fam	-.117,-0.916			0.360
urbd	.133,1.581			0.114
earn	.059,1.032			0.302
savacctx	-2.11 <sup>e</sup> , -0.705			0.481
shc	.620,0.188			0.851
shs	-2.159,-1.134			0.257
_cons	1.264,1.513			0.130

\*Statistically significant at the 5% level.

**Table A2, pp. 216-217**  
**The SET Model of Consumer Expenditures, 1984**  
**Second Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	15.837*	ltotex	.015,0.044	0.965
		age_ref	.002,0.343	0.732
		urbd	.031,0.129	0.898
		fam	.003,0.032	0.975
		savacctx	1.46* <sup>06</sup> ,0.774	0.439
		shc	-1.400,-0.263	0.792
		sfd	-.078,-0.209	0.834
		_cons	.210,0.086	0.931
shc	4.401	ltotex	.534,0.678	0.498
		age_ref	-.001,-0.309	0.757
		fam	.336,0.605	0.545
		persit18	.039,0.549	0.583
		shs	-.334,-0.445	0.657
		scc	-8.585,-0.646	0.518
		_cons	-3.912,-0.663	0.507
sfd	.091	ltotex	-1.904,-0.201	0.840
		age_ref	-.027,-0.185	0.853
		urbd	1.745,0.190	0.849
		fam	.444,0.219	0.827
		earn	.121,0.163	0.870
		shs	-7.168,-0.198	0.843
		shc	23.500,0.191	0.849
		_cons	15.856,0.205	0.838

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	6.843	ltotex	.043,0.211	0.833
		fam	.021,0.232	0.816
		earn	.004,0.428	0.669
		persit18	.019,0.974	0.330
		shc	-.133,-0.215	0.830
		sfd	-.286,-0.443	0.658
		scc	-.772,-0.336	0.737
		_cons	-.233,-0.143	0.886
scc	44.671*	ltotex	.065,1.598	0.110
		fam	.037,2.165	0.030
		earn	.003,0.329	0.742
		persit18	.005,0.631	0.528
		shc	-.173,-0.889	0.374
		shs	-.046,-0.288	0.773
		_cons	-.472,-1.430	0.153
		smis	.208	age_ref
fam	-.096,-0.260			0.795
urbd	-.500,-0.191			0.848
earn	-.021,-0.080			0.936
savacctx	-.000,-0.218			0.827
shc	12.292,0.220			0.826
shs	10.749,0.207			0.836
_cons	-2.703,-0.176			0.861

\*Statistically significant at the 5% level.

**Table A3, pp. 218-219**  
**The SET Model of Consumer Expenditures, 1984**  
**Third Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	19.097*	ltotex	-.101,-0.772	0.440
		age_ref	-.000,-0.181	0.856
		urbd	.079,1.943	0.052
		fam	.008,0.170	0.865
		savacctx	-1.06 <sup>e-06</sup> ,-1.518	0.129
		shc	.762,-0.465	0.642
		sfd	-.101,-0.133	0.894
		_cons	1.198,1.110	0.267
		shc	28.396*	ltotex
age_ref	.001,1.323			0.186
fam	.003,0.199			0.842
perslt18	.006,0.849			0.396
shs	-.203,-1.187			0.235
scc	-.544,-1.684			0.092
_cons	.484,1.096			0.273
sfd	.805	ltotex	.415,0.353	0.724
		age_ref	-.015,-0.354	0.724
		urbd	.130,0.257	0.797
		fam	.062,0.567	0.571
		earn	.149,0.423	0.672
		shs	-.187,-0.054	0.957
		shc	9.242,0.398	0.690
		_cons	-3.297,-0.344	0.731

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	7.697	ltotex	.018,0.554	0.579
		fam	-.019,-1.240	0.215
		earn	.000,0.034	0.973
		perslt18	.004,0.385	0.700
		shc	-.304,-1.132	0.258
		sfd	.035,0.087	0.931
		scc	-.115,-0.284	0.776
		_cons	-.079,-0.271	0.786
scc	12.141	ltotex	-.029,-0.338	0.735
		fam	.008,0.362	0.718
		earn	.013,0.913	0.361
		perslt18	.010,1.072	0.284
		shc	-.909,-1.698	0.089
		shs	-.280,-0.898	0.369
		_cons	.397,0.523	0.601
		smis	.852	age_ref
fam	-.083,-0.514			0.607
urbd	-.484,-0.339			0.735
earn	-.191,-0.390			0.696
savacctx	5.04 <sup>e-06</sup> ,0.418			0.676
shc	-6.610,-0.387			0.699
shs	3.943,0.280			0.780
_cons	-.852,-0.178			0.859

\*Statistically significant at the 5% level.

**Table A4, pp. 220-221**  
**The SET Model of Consumer Expenditures, 1984**  
**Fourth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	1397.498*	ltotex	.096,2.989	0.003
		age_ref	-.013,-1.395	0.163
		urbd	.049,0.837	0.403
		fam	-.030,-0.384	0.701
		savacctx	2.20 <sup>e-08</sup> ,0.071	0.944
		shc	5.931,1.180	0.238
		sfd	-1.467,-1.087	0.277
		_cons	dropped	
shc	42.426*	ltotex	-.025,-1.375	0.169
		age_ref	.002,4.233	0.000
		fam	.006,0.572	0.568
		perslt18	.004,1.334	0.182
		shs	.073,0.644	0.520
		scc	-.003,-0.020	0.984
		_cons	.134,0.805	0.421
		sfd	219.151*	ltotex
sfd	219.151*	age_ref	-.009,-0.941	0.346
		urbd	.033,1.126	0.260
		fam	-.021,-0.343	0.732
		earn	.000,0.068	0.946
		shs	-.689,-0.988	0.323
		shc	4.060,1.036	0.300
		_cons	dropped	

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	3.532	ltotex	-.433,-1.267	0.205
		fam	.145,1.466	0.143
		earn	.091,1.127	0.260
		persit18	.007,0.279	0.781
		shc	-7.132,-1.328	0.184
		sfd	3.713,1.149	0.251
		scc	-5.975,-1.492	0.136
		_cons	3.468,1.288	0.198
		scc	11.567	ltotex
fam	.021,1.015			0.310
earn	.016,0.876			0.381
persit18	.011,1.380			0.168
shc	-.998,-1.525			0.127
shs	-.229,-0.749			0.454
_cons	.796,0.914			0.361
smis	4.410	age_ref	.013,0.870	0.384
		fam	.026,0.254	0.799
		urbd	-.022,-0.446	0.656
		earn	-.016,-0.784	0.433
		savacctx	3.96 <sup>e-07</sup> ,0.380	0.704
		shc	-6.208,-1.065	0.287
		shs	.207,0.132	0.895
		_cons	.098,0.101	0.920

\*Statistically significant at the 5% level.

**Table A5, pp. 222-223**  
**The SET Model of Consumer Expenditures, 1984**  
**Fifth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	10.654	ltotex	-.257,-1.128	0.260
		age_ref	-.000,-0.180	0.857
		urbd	.153,1.371	0.171
		fam	.063,0.578	0.563
		savacctx	1.19 <sup>e-06</sup> ,0.768	0.442
		shc	1.056,0.589	0.556
		sfd	-2.348,-0.620	0.536
		_cons	2.746,1.200	0.230
shc	4.692	ltotex	-.009,-0.205	0.837
		age_ref	.002,1.351	0.177
		fam	-.031,-0.870	0.384
		persit18	.005,0.466	0.641
		shs	-.155,-0.396	0.692
		scc	3.872,0.988	0.323
		_cons	.047,0.094	0.925
sfd	2.848	ltotex	.298,0.487	0.626
		age_ref	.003,0.614	0.539
		urbd	-.253,-0.515	0.606
		fam	-.029,-0.313	0.754
		earn	.106,0.637	0.524
		shs	2.807,0.571	0.568
		shc	1.683,0.793	0.428
		_cons	-3.475,-0.498	0.618

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	4.386	ltotex	-.040,-0.939	0.348
		fam	.044,1.320	0.187
		earn	-.073,-1.336	0.181
		perslt18	.032,1.455	0.146
		shc	-2.654,-1.405	0.160
		sfd	.526,0.705	0.481
		scc	-3.481,-1.810	0.070
		_cons	.479,1.057	0.291
scc	9.674	ltotex	-.012,-0.587	0.557
		fam	.013,1.451	0.147
		earn	-.018,-1.237	0.216
		perslt18	.008,1.614	0.107
		shc	-.533,-1.284	0.199
		shs	.011,0.089	0.929
		_cons	.133,0.571	0.568
		smis	166.319*	age_ref
fam	-.021,-0.978			0.328
urbd	.021,0.622			0.534
earn	-.025,-1.060			0.289
savacctx	-3.84 <sup>e-07</sup> ,-1.293			0.196
shc	-1.917,-3.308			0.001
shs	-1.478,-8.176			0.000
_cons	1.065,16.640			0.000

\*Statistically significant at the 5% level.

**Table A6, pp. 224-225**  
**The SET Model of Consumer Expenditures, 1984**  
**Top 5 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	2.163	ltotex	.027,0.034	0.973
		age_ref	.002,0.307	0.758
		urbd	.022,0.046	0.963
		fam	-.128,-0.126	0.900
		savacctx	-4.81 <sup>e-06</sup> , -0.143	0.886
		shc	-15.821,-0.181	0.857
		sfd	6.040,0.195	0.845
		_cons	-.154,-0.020	0.984
		shc	.388	ltotex
age_ref	.014,0.562			0.574
fam	-.111,-0.575			0.566
persit18	.019,0.514			0.607
shs	-.918,-0.477			0.633
scc	29.270,0.565			0.572
_cons	-1.869,-0.531			0.596
sfd	4.059			ltotex
		age_ref	-.001,-0.440	0.660
		urbd	-.035,-0.339	0.735
		fam	-.028,-0.299	0.765
		earn	.027,0.249	0.803
		shs	.833,0.918	0.359
		shc	3.004,0.833	0.405
		_cons	-.993,-0.578	0.563

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	6.502	ltotex	.107,1.261	0.207
		fam	-.064,-1.167	0.243
		earn	.104,1.397	0.162
		perslt18	-.030,-1.387	0.166
		shc	2.167,1.084	0.278
		sfd	1.187,1.848	0.065
		scc	6.108,1.642	0.101
		_cons	-1.231,-1.294	0.196
scc	4.320	ltotex	-.022,-1.237	0.216
		fam	.011,1.055	0.292
		earn	-.015,-1.073	0.283
		perslt18	.004,0.809	0.418
		shc	-.577,-1.218	0.223
		shs	-.035,-0.368	0.713
		_cons	.236,1.269	0.204
smis	95.147*	age_ref	.001,0.843	0.399
		fam	-.021,-0.664	0.506
		urbd	.008,0.176	0.860
		earn	.001,0.012	0.990
		savacctx	-6.86 <sup>e-07</sup> ,-1.054	0.292
		shc	-3.589,-2.175	0.030
		shs	-1.269,-4.412	0.000
		_cons	1.003,14.435	0.000

\*Statistically significant at the 5% level.

**Note: SET model failed to converge for the top 1 percent of expenditures due to insufficient number of nonzero observations in the child care equation.**

**Table A7, pp. 226-227**  
**The SET Model of Consumer Expenditures, 1992**  
**Lowest Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	4.994	ltotex	-.020,-0.180	0.857
		age_ref	-.009,-0.410	0.682
		urbd	.201,1.314	0.189
		fam	-.010,-0.078	0.938
		savacctx	-1.11 <sup>e-06</sup> ,-0.693	0.489
		shc	3.351,0.421	0.673
		sfd	.839,1.173	0.241
		_cons	.387,0.315	0.753
shc	90.788*	ltotex	.006,0.406	0.685
		age_ref	.002,4.113	0.000
		fam	-.016,-0.746	0.456
		persit18	-.001,-0.154	0.878
		shs	-.118,-0.932	0.351
		scc	-2.472,-0.769	0.442
		_cons	-.034,-0.242	0.809
sfd	2.635	ltotex	.017,0.132	0.895
		age_ref	.013,0.455	0.649
		urbd	-.066,-0.676	0.499
		fam	-.017,-0.103	0.918
		earn	-.137,-0.784	0.433
		shs	-.539,-0.296	0.767
		shc	-5.383,-0.470	0.638
		_cons	.121,0.122	0.903

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	3.062	ltotex	.123,0.830	0.406
		fam	.126,1.263	0.206
		earn	-.082,-0.930	0.352
		persit18	-.052,-0.719	0.472
		shc	1.751,0.939	0.348
		sfd	1.485,0.596	0.551
		scc	43.378,1.043	0.297
		_cons	-1.436,-0.761	0.447
scc	13.558*	ltotex	-.001,-0.509	0.611
		fam	-.003,-1.154	0.248
		earn	.005,1.741	0.082
		persit18	.001,0.530	0.596
		shc	-.308,-1.601	0.109
		shs	.006,0.243	0.808
		_cons	.010,0.516	0.606
		smis	.399	age_ref
fam	.193,0.061			0.951
urbd	-.992,-0.067			0.947
earn	.991,0.078			0.937
savacctx	7.89 <sup>e-06</sup> ,0.065			0.948
shc	14.108,0.084			0.933
shs	10.417,0.066			0.947
_cons	-2.618,-0.056			0.955

\*Statistically significant at the 5% level.

**Table A8, pp. 228-229**  
**The SET Model of Consumer Expenditures, 1992**  
**Second Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	8.436	ltotex	-.225,-1.236	0.216
		age_ref	-.003,-0.791	0.429
		urbd	.119,1.258	0.208
		fam	-.082,-1.591	0.112
		savacctx	-4.53 <sup>*07</sup> ,-0.423	0.672
		shc	1.641,0.748	0.455
		sfd	.825,0.948	0.343
		_cons	2.114,1.363	0.173
shc	17.617*	ltotex	-.144,-1.363	0.173
		age_ref	.001,1.610	0.107
		fam	.022,0.789	0.430
		perslt18	.021,1.664	0.096
		shs	-.125,-0.488	0.625
		scc	-1.519,-3.901	0.000
		_cons	1.300,1.384	0.166
sfd	1.951	ltotex	.243,0.742	0.458
		age_ref	.004,0.748	0.454
		urbd	-.138,-0.713	0.476
		fam	.098,1.148	0.251
		earn	-.033,-0.335	0.738
		shs	.872,0.890	0.374
		shc	-2.722,-0.682	0.495
		_cons	-2.155,-0.725	0.469

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	7.998	ltotex	-.091,-1.074	0.283
		fam	.011,0.570	0.568
		earn	.040,1.609	0.108
		perslt18	.021,1.675	0.094
		shc	-.220,-0.627	0.530
		sfd	-.109,-0.201	0.840
		scc	-1.041,-1.789	0.074
		_cons	.830,1.151	0.250
scc	10.618	ltotex	-.094,-1.008	0.313
		fam	.011,0.443	0.658
		earn	.009,0.588	0.557
		perslt18	.013,1.427	0.154
		shc	-.313,-0.801	0.423
		shs	-.008,-0.029	0.977
		_cons	.824,0.967	0.334
smis	.591	age_ref	-.015,-0.213	0.831
		fam	-.122,-0.333	0.739
		urbd	.154,0.246	0.805
		earn	.364,0.193	0.847
		savacctx	6.24 <sup>e-06</sup> ,0.242	0.809
		shc	11.091,0.204	0.838
		shs	1.633,0.108	0.914
_cons	-.672,-0.090	0.929		

\*Statistically significant at the 5% level.

**Table A9, pp. 230-231**  
**The SET Model of Consumer Expenditures, 1992**  
**Third Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	11.966	ltotex	-.040,-0.735	0.462
		age_ref	.000,0.087	0.931
		urbd	.077,1.397	0.162
		fam	.041,1.125	0.261
		savacctx	6.74 <sup>e-07</sup> ,1.248	0.212
		shc	-2.480,-1.738	0.082
		sfd	.298,0.423	0.672
		_cons	.614,1.074	0.283
shc	16.962*	ltotex	.026,0.977	0.329
		age_ref	.001,1.143	0.253
		fam	-.003,-0.198	0.843
		persit18	.010,1.997	0.046
		shs	-.008,-0.046	0.963
		scc	-1.099,-1.551	0.121
		_cons	-.236,-0.893	0.372
sfd	6.031	ltotex	-.037,-0.653	0.514
		age_ref	-.002,-0.798	0.425
		urbd	.014,0.160	0.873
		fam	.018,0.340	0.734
		earn	.084,0.971	0.331
		shs	-.074,-0.082	0.935
		shc	2.522,0.857	0.391
		_cons	.394,0.519	0.603

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	1.519	ltotex	.041,0.031	0.975
		fam	.030,0.054	0.957
		earn	.322,0.062	0.951
		persit18	.098,0.089	0.929
		shc	.288,0.008	0.994
		sfd	-4.246,-0.058	0.954
		scc	-9.020,-0.106	0.915
		_cons	-.169,-0.011	0.991
		scc	24.124*	ltotex
fam	-.001,-0.124			0.901
earn	.012,0.759			0.448
persit18	.007,2.472			0.013
shc	-.363,-0.886			0.376
shs	-.010,-0.068			0.946
_cons	-.269,-1.672			0.095
smis	9.540	age_ref	.007,1.557	0.119
		fam	-.048,-0.736	0.462
		urbd	-.045,-0.360	0.719
		earn	-.184,-1.287	0.198
		savacctx	-3.39 <sup>*07</sup> ,-0.345	0.730
		shc	-5.623,-1.997	0.046
		shs	-.412,-0.353	0.724
		_cons	.780,2.556	0.011

\*Statistically significant at the 5% level.

**Table A10, pp. 232–233**  
**The SET Model of Consumer Expenditures, 1992**  
**Fourth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	5.862	ltotex	.140,0.154	0.877
		age_ref	.006,0.174	0.862
		urbd	.063,0.233	0.815
		fam	-.031,-0.136	0.892
		savacctx	2.59 <sup>e-06</sup> ,0.439	0.661
		shc	-6.289,-0.261	0.794
		sfd	.322,0.092	0.926
		_cons	-.941,-0.118	0.906
shc	15.427*	ltotex	.026,0.494	0.621
		age_ref	.001,1.667	0.096
		fam	-.001,-0.049	0.961
		persit18	-.001,-0.071	0.944
		shs	-.113,-0.919	0.358
		scc	.040,0.057	0.954
		_cons	-.191,-0.409	0.683
sfd	2.095	ltotex	-1.749,-0.454	0.650
		age_ref	-.049,-0.784	0.433
		urbd	-.072,-0.075	0.940
		fam	.202,0.221	0.825
		earn	1.295,0.225	0.822
		shs	12.623,0.291	0.771
		shc	57.378,0.483	0.629
		_cons	9.170,0.671	0.502

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	3.597	ltotex	.121,1.173	0.241
		fam	.023,0.872	0.383
		earn	-.038,-0.606	0.545
		persit18	.055,0.745	0.456
		shc	.623,0.194	0.846
		sfd	-1.605,-0.585	0.558
		scc	-2.181,-1.344	0.179
		_cons	-.783,-0.759	0.448
scc	12.788	ltotex	.074,1.075	0.282
		fam	.017,0.740	0.459
		earn	-.004,-0.048	0.962
		persit18	.010,1.519	0.129
		shc	-.647,-0.520	0.603
		shs	.021,0.038	0.970
		_cons	-.631,-1.326	0.185
smis	1.052	age_ref	-.009,-0.259	0.795
		fam	-.193,-0.479	0.632
		urbd	.277,0.408	0.683
		earn	-.846,-0.432	0.665
		savacctx	3.56 <sup>e-06</sup> ,0.470	0.638
		shc	-5.546,-0.364	0.716

\*Statistically significant at the 5% level.

**Table A11, pp. 234–235**  
**The SET Model of Consumer Expenditures, 1992**  
**Fifth Quintile of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and Z-statistics	P> z
shs	11.966	ltotex	-.040,-0.735	0.462
		age_ref	.000,0.087	0.931
		urbd	.077,1.397	0.162
		fam	.041,1.125	0.261
		savacctx	6.74 <sup>*07</sup> ,1.248	0.212
		shc	-2.48,-1.738	0.082
		sfd	.298,0.423	0.672
		_cons	.614,1.074	0.283
		shc	16.962*	ltotex
age_ref	.001,1.143			0.253
fam	-.003,-0.198			0.843
persit18	.010,1.997			0.046
shs	-.008,-0.046			0.963
scc	-1.099,-1.551			0.121
_cons	-.236,-0.893			0.372
sfd	6.031	ltotex	-.037,-0.653	0.514
		age_ref	-.002,-0.798	0.425
		urbd	.014,0.160	0.873
		fam	.018,0.340	0.734
		earn	.084,0.971	0.331
		shs	-.074,-0.082	0.935
		shc	2.522,0.857	0.391
		_cons	.394,0.519	0.603

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	1.519	ltotex	.041,0.031	0.975
		fam	.030,0.054	0.957
		earn	.322,0.062	0.951
		perslt18	.098,0.089	0.929
		shc	.288,0.008	0.994
		sfd	-4.246,-0.058	0.954
		scc	-9.020,-0.106	0.915
		_cons	-.169,-0.011	0.991
scc	24.124*	ltotex	.029,2.419	0.016
		fam	-.001,-0.124	0.901
		earn	.012,0.759	0.448
		perslt18	.007,2.472	0.013
		shc	-.363,-0.886	0.376
		shs	-.010,-0.068	0.946
		_cons	-.269,-1.672	0.095
smis	9.540	age_ref	.007,1.557	0.119
		fam	-.048,-0.736	0.462
		urbd	-.045,-0.360	0.719
		earn	-.184,-1.287	0.198
		savacctx	-3.39 <sup>e-07</sup> ,-0.345	0.730
		shc	-5.623,-1.997	0.046
		shs	-.411,-0.353	0.724
_cons	.780,2.556	0.011		

\*Statistically significant at the 5% level.

**Table A12, pp. 236-237**  
**The SET Model of Consumer Expenditures, 1992**  
**Top 5 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	3.657	ltotex	.132,0.558	0.577
		age_ref	-.009,-0.994	0.320
		urbd	.161,0.683	0.494
		fam	.026,0.276	0.782
		savacctx	-4.94 <sup>*07</sup> ,-0.188	0.851
		shc	3.385,0.910	0.363
		sfd	1.633,0.469	0.639
		_cons	-1.111,-0.425	0.671
		shc	4.894	ltotex
age_ref	.003,1.316			0.188
fam	-.024,-0.526			0.599
persit18	-.006,-0.289			0.773
shs	.353,1.160			0.246
scc	.856,0.494			0.621
_cons	.753,0.477			0.634
sfd	.589			ltotex
		age_ref	.015,0.097	0.923
		urbd	-.091,-0.073	0.941
		fam	-.085,-0.087	0.931
		earn	-.157,-0.037	0.970
		shs	1.888,0.094	0.925
		shc	-6.901,-0.082	0.935
		_cons	.714,0.171	0.864

Dependent Variable	$\chi^2$	Independent Variables	Coefficients and z-statistics	P> z
sap	4.778	ltotex	-.528,-0.096	0.923
		fam	.014,0.024	0.981
		earn	.722,0.266	0.790
		persit18	-.023,-0.058	0.954
		shc	5.870,0.146	0.884
		sfd	-1.183,-0.063	0.950
		scc	5.076,0.075	0.940
		_cons	4.486,0.092	0.927
scc	8.038	ltotex	.096,1.970	0.049
		fam	.005,0.107	0.915
		earn	-.090,-0.950	0.342
		persit18	.005,0.312	0.755
		shc	-.911,-1.237	0.216
		shs	.044,0.158	0.874
		_cons	-.854,-1.790	0.073
smis	1.109	age_ref	-.016,-0.283	0.777
		fam	.056,0.129	0.897
		urbd	.094,0.132	0.895
		earn	.270,0.165	0.869
		savacctx	4.40 <sup>e-08</sup> ,0.010	0.992
		shc	7.751,0.251	0.802
		shs	-3.382,-0.422	0.673
		_cons	1.547,0.912	0.362

\*Statistically significant at the 5% level.

**Table A13, pp. 238-239**  
**The SET Model of Consumer Expenditures, 1992**  
**Top 1 Percent of Expenditures**

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
shs	10.917	ltotex	1.099,2.021	0.043
		age_ref	.006,0.731	0.465
		urbd	dropped	
		fam	-.019,-0.084	0.933
		savacctx	-6.08 <sup>e-06</sup> ,-2.690	0.007
		shc	5.027,1.312	0.189
		sfd	dropped	
		_cons	-11.525,-2.066	0.039
shc	17.213*	ltotex	.024,1.163	0.245
		age_ref	-.005,-1.058	0.290
		fam	.159,1.539	0.124
		persit18	-.053,-1.617	0.106
		shs	-.184,-0.796	0.426
		scc	-.203,-0.707	0.480
		_cons	dropped	
sfd	2.755	ltotex	-.019,-0.230	0.818
		age_ref	.002,1.632	0.103
		urbd	dropped	
		fam	.039,1.076	0.282
		earn	dropped	
		shs	-.035,-0.364	0.716
		shc	-.406,-0.535	0.593
		_cons	.157,0.184	0.854

Dependent Variable	X <sup>2</sup>	Independent Variables	Coefficients and z-statistics	P> z
sap	19.422*	ltotex	-.004,-0.259	0.796
		fam	.251,1.642	0.101
		earn	dropped	
		perslt18	-.069,-1.843	0.065
		shc	-2.873,-1.520	0.128
		sfd	1.115,0.456	0.649
		scc	.267,0.676	0.499
		_cons	dropped	
scc	5.691	ltotex	-.016,-0.805	0.421
		fam	-.753,-0.981	0.327
		earn	dropped	
		perslt18	.213,1.130	0.259
		shc	2.926,0.561	0.575
		shs	1.415,1.202	0.229
		_cons	dropped	
smis	74.075*	age_ref	.005,0.381	0.703
		fam	-.024,-0.076	0.939
		urbd	.756,1.235	0.217
		earn	dropped	
		savacctx	-4.27 <sup>e-07</sup> ,-0.227	0.820
		shc	2.070,0.519	0.603
		shs	-1.744,-2.503	0.012
_cons	dropped			

\*Statistically significant at the 5% level.

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