PERSISTENT AND TRANSITORY POVERTY ACROSS LOCATIONS IN THE
UNITED STATES

DISSERTATION

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ABSTRACT

Poverty is often defined as lack of access to necessities such as food, shelter, and medical care. Adverse shocks such as income losses push households below the poverty line for a relatively brief period of time. Those who recover quickly without explicit external assistance are considered as transitorily poor. While households in transitory poverty are able to rebound relatively quickly from adverse shocks, those in persistent poverty remain poor for much more extended periods. Remedial policies for persistent poverty are different from those necessary to fight transitory poverty.

Using a geocoded version of the National Longitudinal Survey of Youth 1979 (NLSY79), my findings suggest that the persistently poor receive less than 65% of their total income as wages, accumulate fewer assets, and rely heavily on government social transfers. Although their incomes fall below the poverty line occasionally, the transitorily poor stay above the poverty line most of the time. I confirm the presence of poverty clusters as well as the presence of spatial interaction across locations. This calls for cooperation among counties or states in the fight against poverty.
I use a generalized mixed linear model that incorporates both fixed and random effects while controlling for individual characteristics and spatial attributes. I find that the persistently poor and the transitorily poor experience very different poverty paths. Years of education, labor market participation, and access to the benefit of economic growth are among the major factors explaining the difference in wellbeing between the two groups of poor households. Spatial attributes such as level of employment and population share of college graduates yield different returns in terms of wellbeing with respect to metro or nonmetro locations.

The effect on wellbeing of both job-training programs and economic growth are consistently greater in metro areas than in nonmetro areas. In contrast to economic growth, the effects of job-training programs and human capital (population share of college graduates) are more pronounced in counties with low education, low employment, persistent poverty, and population loss.

In metro areas, the effect of job-training, economic growth and human capital on household living standards decreases with respect to the population size. In nonmetro areas, the effect of an increase in the share of college graduates increases with the rurality of the location. The more rural the location, the greater is the effect of human capital on living standards.

Overall, my findings support arguments in favor of policies that differentiate persistent poverty from transitory poverty. They also highlight the importance of spatial attributes in the fight against poverty. In the United States, antipoverty strategy revolves around the provision of safety nets to prevent entry
into poverty and foster exit from poverty through job markets. This strategy is not sufficient for persistently poor households who remain in poverty because they are unable to self-finance investments needed to generate high returns from their assets. This category of dynamically poor households would benefit from strategies that enhance their capabilities to accumulate assets and transform them into entitlements through social, economic, cultural and political institutions in place.
Dedicated to my Lord and Savior, Jesus-Christ, and my family
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CHAPTER 1

INTRODUCTION

1.1. Background

In the United States, the declared “War on Poverty” occurred during a long period of postwar economic growth, when both productivity and wages were rising (Danziger and Haveman, 2001). As a result, poverty fell dramatically; the official rate fell from 17.3% in 1965 to 11.1% in 1973. By 2000, 31.1 million Americans, about 11.3% of the total population, lived in poverty despite years of strong economic growth in the 1990s. In 2003, 35.9 million people (12.5%) were below the official poverty line.

Poor households are extremely heterogeneous in terms of the people found therein. In 2003, 24.4% of African-Americans, 22.5% of Latin-American and 8.2% of non-Latin-American whites were in poverty. Half of all poor Americans are either below the age of 18 or over the age of 65 (Blank, 1997). Nonetheless, compared to other age groups, the elderly have experienced the sharpest declines in poverty, from 35.2% living under the poverty line in 1959 to around 10.0% in the 1990s. The trend of child poverty, which is related to the growing number of single-parent families, is very high compared to other age groups.

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1 The poverty line represents the dollar amounts the Census Bureau uses to determine poverty status. If a family’s total income is less than the poverty line, then that family and every individual in it is considered in poverty.
The growth in the number of single-mother families, and their high likelihood of being poor, is a primary reason why child poverty rates in America are at such high levels. In 1970, 48.0% of poor families with children were headed by single mothers. However, by 1993 that number reached 60.0%. Between 1997 and 1999, the number of poor people living in families headed by a single mother declined from 4.3 million to 4.2 million. During that same period, the poverty gap, which is the difference between the family poverty line and their total income, rose from $5.8 billion to $6.3 billion, after accounting for government benefits and taxes. These developments suggest that, on average, poor families with working single mothers became poorer between 1997 and 1999 (Porter and Dupree, 2001).

Compared to poverty rates in most developed countries, both in terms of absolute and relative poverty rankings, U.S. poverty rates are the worst (Smeeding, Rainwater, and Burtless, 2001). Differences between the United States and other nations can be attributed to the high level of child poverty rate in the United States: on average, in most developed countries, the child poverty rate is 8.0% or less. In the United States, it is 14.7%. The high rate of child poverty can be explained in part by the fact that the United States devotes a relatively small share of its national income to social transfers for families with a non-elderly head. This explanation is in line with findings by Smeeding and Phillips (2001) that there is a positive correlation between the percentage of Gross Domestic Product (GDP) spent on social transfers and poverty reduction. The United Kingdom and Germany, for example in the 1990s, eliminated more than
three-quarters of their pre-tax and pre-transfer poverty through their tax and
transfer systems, while devoting an average of 8.0% to 9.0% of their respective
GDPs to social spending. In comparison, the United States spent less than 4.0% of
its GDP on these programs.

In the United States, antipoverty strategies have been dogged by a
persistent dilemma. Should the government provide poor people with enough
income to cover basic needs such as food, shelter and clothing or instead focus on
improving opportunities that help the poor accumulate more assets? By limiting
entitlements and promoting the “work for eligibility” programs by which
individuals can receive aid, U.S. antipoverty strategies reflect the United States’
economic policy orientation, as well as its individualistic social system. This
approach is found in the current social welfare programs that provide social
insurance and limited public assistance. While social insurance improves
opportunities for poor families, public assistance provides support to cover basic
needs. Among U.S. social insurance programs, Social Security and Medicare are
the most prominent in terms of total spending and number of people served, while
the Temporary Aid to Needy Families (TANF) and food stamps are the best
eamples of public assistance programs.

Inherently, poverty is caused by multiple factors; as a result, effective
poverty alleviation strategies are not easy to design. Broadly speaking, poverty is
alleviated through investments in assets that can generate income or increase
one’s accessibility to basic goods and services (e.g., food, shelter and clothing).
Investments of both private and social assets can prevent entry into poverty.
Conversely, a lack of investment or lack of access to the returns derived from investments paves the way to poverty. Then, it follows that to understand poverty one needs a conceptual framework that accounts for both the “time” and “place” of private and social investments.

Timing is a concern in the analysis of poverty because private returns to human capital are determined, in part, by past levels of investment over time. Though a “financial snapshot” at a single point in time can suggest affluence, for example, people can be poor at any time due to constraints that inhibit their ability to utilize the assets with which they are endowed. Static analyses of poverty ignore processes by which households or individuals fall into or escape from poverty (Rank, 2001). If poverty is essentially a short-term phenomenon, then theories concerning the existence of a “culture of poverty” lack credibility. Indeed, these theories rest upon the assumption that certain groups experience poverty that is both severe and long-term; as a result, poverty is likely to be passed from one generation to another (Rodgers and Rodgers, 1991).

Particular poverty trends can be described as being either short-term or long-term poverty paths. Short-term or transitory poverty may occur because of a random event that diminishes a family’s ability to smooth their consumption expenditures (Carter and May, 2001). This is largely a reflection of a non-existent or poorly-functioning financial market. Long-term or persistent poverty, on the other hand, may arise due to a family’s failure to accumulate private and social assets over time, and can be aggravated by poorly-functioning financial, education and healthcare systems. From a policymaking perspective, the distinction between
transitory and persistent poverty is crucial. The transitorily poor may best be served by programs that complement their own resources and help them “bridge” a crisis period, but the persistently poor may require programs that enhance their ability to accumulate private and social assets (Grootaert et al., 1995).

Like time, place also matters when assessing antipoverty policies, because individuals’ geographical proximity to public capital affects both their returns from private capital and their access to services provided by that public capital. In adopting a dynamic approach to poverty, however, most of the recent poverty studies overlook the spatial dimensions of poverty that had previously been considered in some static (i.e., time-insensitive) analyses. Differences in natural amenities, natural resources, economic structure, human capital, policy orientations and geographical topography across individuals’ locations lead to differences in returns to individuals’ characteristics across locations. Thus, two persons with similar individual characteristics may well experience different poverty paths simply on account of living in different areas. As pointed out by Fofack and Bigman (2000), discrepancies in terms of these geographic factors could well be symptomatic of an inefficient physical infrastructure with respect to returns on private endowments. Such discrepancies could also result from spatially-correlated heterogeneity in latent household characteristics such as decision making ability that are not necessarily observable by researchers or policymakers.
1.2. Research Statement

The present research is policy-oriented. Since effective remedial policies for persistent and transitory poverty are likely to be different, the measurement of persistent and transitory poverty should be helpful in designing, targeting and evaluating poverty-reduction programs. This study investigates the possibility of improving the efficiency of antipoverty strategies by way of targeting. Targeting individuals based on the number of years they spend in poverty, with due considerations for such characteristics as age, gender, marital status and race, should enhance the government’s ability to prevent entry into and foster exit from poverty. In addition, understanding the social and economic environments in which poor households reside will also help improve the outcomes of antipoverty strategies.

Profiles of poor individuals based on the length of time spent in poverty are developed for both metro and non-metro areas. By considering a particular set of individuals, this study highlights the characteristics that best describe poor individuals over time and across locations. However, the mere description of “poorness characteristics” is not sufficient for designing antipoverty strategies that minimize such poverty yardsticks as the headcount ratio, poverty gap and poverty gap squared. A dynamic profile of the phenomenon of poverty is complemented by regression analysis.

To evaluate the marginal effects of the exogenous variables that affect individual wellbeing, a general linear mixed model is used. This model combines both fixed and random effects to explain the change in an individual’s wellbeing.
as a function of personal and geographical characteristics. Estimates from the mixed model allow for the identification of potential policy instruments which, at the local and national government levels, can be activated to improve individual wellbeing in a predictable manner.

Simulations allow for the evaluation of policy performance on both measures of wellbeing and measures (i.e., indices) of poverty. More specifically, simulations are performed to evaluate the impact of potential government policy on such poverty measures as headcount ratio, poverty gap and poverty gap squared. Finally, this study also tests for evidence of heterogeneity in terms of policy impact across locations.

1.3. Objectives

This dissertation intends to: (1) propose an econometrically-based simulation framework for predicting the impact of various policies upon poverty – policies that account for the difference between transitory and persistent poverty; (2) develop a framework that incorporates locational factors and is designed to evaluate the potential impact of geographical targeting, as aforementioned; and finally, (3) present a comprehensive, descriptive profile of persistently poor individuals, as well as persistently poor counties.

1.4. Hypotheses

A static (i.e., time-insensitive) analysis focuses on poverty trends across a national population; while this might be useful in some respects, such an analysis does not provide enough insight into the nature of poverty to design effective, long-term antipoverty strategies. As pointed out by Hume (2003), within any
poverty trend there are several different poverty dynamics – an understanding of which is crucial for effective policy action. On the other hand, heterogeneity of geography introduces differences in the returns to individuals in terms of personal characteristics – such as education and training – that need to be accounted for when designing and implementing antipoverty policies.

Considering both the time and space dimensions of poverty, the following hypotheses are formulated: (1) pooling the transitorily and persistently poor in a single regression produces biased estimates; (2) the marginal effects of such individual characteristics as age, race, gender and marital status on wellbeing are expected to be different in metro and non-metro areas; (3) returns to government transfers are higher in non-metro areas than in metro areas; (4) the wellbeing of persistently poor households is expected to be lower than that of the transitorily poor after controlling for individual characteristics and locational attributes; and (5) antipoverty policies yield heterogeneous impacts across locations.

1.5. Methods

The methods used in this research are tailored to the hypotheses described above. These methods range from the use of descriptive statistics to that of linear optimization. Descriptions of the dynamic profile for poor individuals are conducted using sample-weighted means. At the county level, the derivation of poverty clusters requires the use of Geographical Information Systems (GIS) and exploratory spatial measures. These measures – the global Moran’s I and Local Indicators of Spatial Autocorrelation (LISA) – are intended to detect deterministic patterns of spatial dependence in headcount ratios across counties. The mapping
of poverty is then based on a deterministic clustering process, as opposed to the mapping of a mixed process (i.e., random and deterministic), as performed in most studies.

The general mixed linear models used to estimate the impact of individual characteristics and geographical attributes on individual measures of wellbeing accommodate both missing values and heterogeneity issues. Data used in this study are longitudinal, as a cohort of individuals is followed over time for a relatively long period. Because of attrition, refusal, non-response and incorrect responses, these data are marked by a sizeable amount of randomly-generated missing values. Widely used in biometrics, general mixed linear models fit longitudinal data by allowing for different specifications in the structure of the variance-covariance matrix. Variance-components models, as used in poverty dynamics studies, are a special case of the general linear mixed models.

When performing policy simulations, the issue of optimality of government transfers to needy families is often overlooked. To address it, this study uses a linear optimization framework that allows policymakers to minimize selected measures of poverty under budget constraints. The solution to this optimization problem provides conditions used to assess the optimality of current government social transfers. In addition, the poverty elasticity with respect to government transfers is also computed.

1.6. Data

The principal source of my data is a geocoded version of the National Longitudinal Survey of Youth 1979 (NLSY79). The dataset is a nationally
representative sample of 12,686 individuals aged 14-21 years in 1978. This cohort was interviewed annually from 1979 to 1994, and biennially thereafter. Community-level data were obtained from the Bureau of Labor Statistics, the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce, and the Small Area Income and Poverty Estimates (SAIPE) program of the U.S. Census Bureau.

In the NLSY79, income includes earnings, passive income, government transfer payments, food stamps and income from other sources. This definition of income is much broader than the definition in the Current Population Survey (CPS), which is used by the U.S. Census Bureau to calculate the official poverty rate. Finally, this study also adjusts the official poverty threshold by using housing cost indices derived by Citro and Michael (1995).

1.7. Contribution to the literature

Compared to previous studies, the present research presents an in-depth descriptive analysis of dynamically poor individuals that goes beyond differences in the number of years spent in poverty and demographics. The present study includes employment status, income structure, and government welfare transfers. Following recommendations by Citro and Michael (1995), I evaluate the impact on persistent and transitory poverty of ignoring government welfare transfers when computing official measures of poverty. Unlike previous analyses on persistent poverty at county level, I introduce a comparative analysis of persistently poor counties and non persistently poor counties. The major contribution of the present study is the derivation and estimation of a generalized
econometric framework that incorporates both fixed and random effects, accounts
for the number of years spent in poverty and includes spatial attributes among
explanatory variables.

1.8. Overview of this dissertation

In the second chapter, a comprehensive literature review on time-space
analysis of poverty is presented. The third chapter discusses characteristics that
describe the nature of dynamic poverty in the United States at the individual level.
Using urban-rural continuum codes from 2003, individual characteristics are
analyzed by metro versus non-metro areas. The impact on household wellbeing of
not adjusting the poverty line for geographical differences in cost of living and of
leaving out quasi-cash government transfers to low-income families is evaluated.
It also contains an analysis of persistently poor counties.

The fourth chapter deals with the estimation of an econometric model that
links a measure of wellbeing to individual and geographical characteristics. The
analytical framework and estimation methods are fully explored and estimation
results and policy implications are discussed. In the fifth chapter, simple optimal
rules for government welfare transfers are derived, and the poverty elasticity with
respect to government transfers under targeting and non-targeting schemes –
along with policy simulations – are offered. Concluding remarks are presented in
the final and sixth chapter of the dissertation.
CHAPTER 2

LITERATURE REVIEW ON POVERTY ANALYSIS

2.1. Introduction

Poverty is often defined as lack of access to necessities such as food, shelter, and medical care. While relative definitions of poverty allow community flexibility in addressing pressing local concerns, absolute definitions allow tracking progress and comparing one geographical area to another (Bradshaw, 2005). Poverty is also defined as a state into which people fall and from which they can be lifted if their incomes or assets increase (Green and Hulme, 2005). As pointed out by Sen (1999), those in poverty are deprived of rights to health, food and freedom to achieve inherent potential in their capabilities, which is to determine their own future. Poverty is then perceived as the consequence of economic, social and environment policies as well as behavioral strategies of individuals and households. To highlight different facets of poverty, this literature review is conducted using Sen’s entitlement framework.

In Sen’s entitlement framework, households start out with a stock of assets or endowments that they translate into entitlements through an exchange mapping process. The exchange mapping process involves social, political or economic environments affecting positively or negatively the transformation of households
endowments into good or services needed to enjoy a decent human life. Poverty is ultimately the result of insufficient entitlements defined as a broader package of rights including health, education, and freedom.

I review the individualist approach to poverty explaining why households fail to accumulate assets, and the structuralist approach on how the social and political environment may impede households’ efforts to transform assets into entitlements. Common measures of poverty are examined. I also present the importance of local conditions as part of the exchange mapping process in the process of assets accumulation, particularly in explaining household dynamics from one state of poverty to another across locations and over time. I close the review with references on the role of welfare programs as a way of supplementing household assets in the fight against poverty in the United States.

2.2. Poverty theories

Two broad categories of explanation are found in the literature on poverty: the individualist or flawed character approach and the structuralist approach. Both have merit but neither is sufficient alone. Individualist theories argue that individual choices matter above all, while structuralist theories assert that socioeconomic structures constrain people’s choices and may inhibit them from developing and utilizing personal capacities to accumulate assets.

The individualist approach emphasizes the role of individuals’ failures to accumulate assets. Responsibility for poverty is placed on the poor themselves who are thought to lack individual capacities enabling them to generate enough assets or produce enough resources to live above a defined poverty line. The
argument is that the poor lack the correct attitudes, motivation, or morals to overcome individual and social hurdles (Schwartz, 2000). Culture of poverty theory, human capital theory, and status attainment theory are three prominent individualist theories of poverty.

According to culture of poverty theory, poverty tends to be most pervasive in societies where unskilled individuals face persistently high rate of unemployment and under-employment, with low wages and lack of effective social, political, and economic organization (Lewis, 1966). Under these circumstances, it is posited that poor people develop mutually reinforcing attitudes and habits that keep them from moving out of poverty.

For human capital theory, wealth and income are increasing functions of individual stocks of human capital, created through investment in health and education (Schultz, 1961; Becker, 1962). Differences in income are explained primarily by differences in human capital. People who get ahead are those who make significant human capital investments (Schiller, 2001). Becker (1964) argues that individuals acquiring greater human capital will be in greater demand in the marketplace than individuals with less human capital. As a result, they will be able to pursue more lucrative careers, resulting in higher paying and relatively stable jobs. Those lacking human capital are not able to compete as effectively in the labor market and therefore must settle for unstable, low-wage work (Rank, 2001).

Social attainment theory states that poverty is related to a lack of social mobility. Mobility is conceptualized in terms of influences of individuals’
socioeconomic origins on their life chances, especially occupational status. According to Blau and Duncan (1967), the main factor that determines a person’s chances of upward mobility is the level at which he starts. The lower the level, the greater the probability an individual will be upwardly mobile because many more occupational destinations entail upward mobility for persons with low origins than for those with high origins.

Individualist theories are themselves flawed: they focus attention only on individual capacities while neglecting larger economic, social, and political structural influences. In contrast, structuralist approaches to poverty focus on circumstances beyond individual control (Schiller, 2001). Poor people are poor because they lack access to quality education, adequate health coverage, job opportunities, and political power. As Beeghley (1996) pointed out, independently of their individual efforts, the structure of the economy insures that millions of people will be poor no matter how hard they work, no matter what their skills are. Structural factors that cause poverty may be geographically localized because public goods, which affect individual opportunity and productivity, are distributed unevenly across space.

Another theme of the structuralist approach results from the persistence of pockets of poverty and joblessness in some geographic locations. To explain this phenomenon, Kain (1968) introduced the concept of spatial mismatch in analyzing the combined effects of racial segregation in housing markets and the postwar suburbanization of job opportunities on African-American unemployment. Kain’s hypothesis maintains that the suburbanization of jobs and
involuntary housing market segregation have acted together to create a surplus of workers relative to the number of available jobs in submetropolitan areas where blacks are concentrated (Ihlanfeldt and Sjoquist, 1998). In market economies, spatial mismatch often occurs between residential location of poor people and location of jobs for which the poor would qualify. In a broader sense, Preston and McLafferty (1999) define spatial mismatch as geographical barriers to employment for inner city residents that arise from changing social and economic relations and the impacts of those barriers on labor market achievement. Thus, lack of access to job market opportunities due to forces beyond households’ control may explain the persistence of poverty. Due to structural barriers, even when countries perform exceptionally well in terms of poverty alleviation, significant minorities of their people may remain highly deprived (Green and Hulme, 2005).

2.3. Measuring poverty

Poverty can be measured from either relative or absolute perspectives. Absolute measures define a basic needs standard that remains over time and is updated solely for price changes. On the other hand, relative measures define poverty as a condition of comparative disadvantage to be assessed against some shifting or evolving standard of living (Iceland, 2003).

Poverty indexes derived by Foster, Greer and Thorbecke (1984) are commonly used. The best known of these indexes is the headcount ratio which is the percentage of the population living below the poverty line. However, the headcount ratio suffers from being insensitive to income distribution. Indeed, it
cannot capture the effect of programs that reduce poverty without moving the poor above the poverty line. For example, a policy resulting in money transfer from someone just below the poverty line to the poorest person will not affect the headcount index. The index of poverty depth (poverty gap) and the index of poverty severity (squared poverty gap) are distribution-sensitive measures. The index of poverty depth provides information regarding how far families are from the poverty line. It captures the mean aggregate income or consumption shortfall relative to the poverty line across the whole population (Coudouel, Hentschel and Wodon, 2002). The index of poverty severity accounts not only for the distance separating the poor from the poverty line but also for the inequality among the poor. A higher weight is placed on those families further away from the poverty line.

In the US, the official measure of poverty is based on an absolute approach to poverty. An income threshold that represents the cost of acquiring a minimum basket of goods for a family of four was defined in 1963 by Orshansky (1963, 1965). Orshansky used a concept of poverty based on consumption budgets centered on a recommended diet to sustain adequate nutritional level at minimal cost using a sliding scale of income requirements for different family sizes and compositions (Department of Health, Education, and Welfare, 1976). Every year the constant-dollar value of the poverty thresholds is used to measure poverty. However, the official measure of poverty does not capture the change in the cost of basic goods such as food and housing relative to other goods since 1963, nor does it reflect the fact that those costs vary by geographic location.
Based on these criticisms, the National Academy of Sciences (NAS) has recommended several changes (Citro and Michael, 1995): i) poverty thresholds should represent a budget for food, clothing, shelter (including utilities), and a small additional amount to allow for other needs (e.g., household supplies, personal care, non-work-related transportation); ii) a threshold for a two-adult, two-child reference family should be developed using actual consumer expenditure data and should be updated annually to reflect changes in expenditures on food, clothing, and shelter over the previous three years; iii) the reference family threshold should be adjusted to reflect the needs of different family types and to reflect geographic differences in housing costs; iv) family resources should be defined as the sum of money income from all sources together with the value of near-money benefits (e.g., food stamps) that are available to buy goods and services in the budget, minus expenses that cannot be used to buy these goods and services. Such expenses include income and payroll taxes, child care and other work-related expenses, child support payments to another household, and out-of-pocket medical care costs, including health insurance premiums.

The Census Bureau is experimentally developing alternative measures of poverty that incorporate the NSA recommendations. Assessing experimental measures of poverty under the NAS framework, Garner and Short (2005) found that these measures report less severe poverty than the current official measure. However, in terms of inequality both measures yield similar results.
2.4. Dynamic poverty analysis

According to Barrett and Swallow (2006), households remain in persistent poverty because they are unable to self-finance needed investments because of inherent risk to these investments and their lack of access to external finance due to malfunctioning credit and insurance markets.

Most of the time, adverse shocks such as income losses push households below the poverty line for a relatively brief period of time. Those who recover quickly without explicit external assistance are considered as transitorily poor. While households in transitory poverty are able to rebound relatively quickly from adverse shocks, those in persistent poverty remain poor for much more extended periods (Barrett and Swallow, 2006). The distinction between transitory and persistent poverty enables the identification of structural conditions which produce ongoing poverty effects, and encourages researchers to move from poverty as a state to poverty as a dynamic process (Green and Hulme, 2005). The distinction between transitory and persistent poverty emerges also from a critical rethinking of the usefulness of considering the poor as a homogenous category, which they are not.

The persistence of poverty reflects its institutionalization within social and political norms and systems, its legitimation within political discourse and by political elites, and the failure of the poorest groups to gain political representation therein (Hickey and Bracking, 2005). The persistently poor often lack political representation and immediate or natural allies in civil, economic or political sphere. Therefore, successful antipoverty strategies should include
sustained political will to reallocate existing resources and shift power relations among households.

Studies on the longitudinal dynamics of poverty began in the 1970s with availability of longitudinal datasets such as the Panel Study of Income Dynamics (PSID), the National Longitudinal Survey for Youth (NLSY), and the Survey of Income and Program Participation (SIPP). Different approaches have been developed to analyze poverty dynamics. At the individual level, Rodgers and Rodgers (1993) identify four main approaches to differentiate the persistently poor from the transitorily poor. The first is a model-based approach (Duncan and Rodgers, 1991) where individual $i$’s income-to-needs ratio in year $t$ is represented by a fixed-effects model in which the individual-specific intercept is interpreted as the individual permanent income-to-needs ratio while the error term represents the transitory component of the individual income-to-needs ratio. Hence, persistent poverty is measured by the proportion of individuals with permanent income-to-needs ratios less than one. The second approach measures persistent poverty as the proportion of the population with $n$-year aggregate income less than $n$-year aggregate needs. The third approach tabulates the proportion of individuals with income below the poverty line in $x$ out of $n$ time periods, where $0 \leq x \leq n$. The prevalence of persistent versus transitory poverty is then evaluated by comparing the proportion of people who were poor in all or most periods (the persistently poor) with the proportion of people poor in just a few periods (the transitorily poor). The fourth approach consists of hazard rate models (Blane and Ellwood, 1986; Ruggles and Williams, 1989). Here persistent poverty is measured
by the percentage of long spells while transitory poverty is measured by the percentage of short spells.

In general, results suggest that spells of poverty are fairly short, and the transitorily poor represent the majority of the poor population (Blank, 1997; Duncan, 1984). Many of the transitorily poor are in poverty for a short period of time and then rise out of poverty, only to fall into poverty again (Stevens, 1999). Since on average their income is close to the poverty line, a random event such as the loss of a job, the loss of a wage earner or divorce is likely to throw the transitorily poor below the poverty line (Duncan et al., 1995). A much smaller number of households, the persistently poor, experience poverty continuously for years. For this group, the prospects of getting out of poverty for any significant period of time are much dimmer than for the transitorily poor (Devine and Wright, 1993). Using PSID data, Blank (1997) found that during the 1979-1991 period, one third of Americans experienced a spell of poverty. Of those who fell below the poverty line, 50.9% were poor for 3 years or less, 34.5% were in poverty between 4 and 9 years, and 14.6% fell below the poverty line for 10 of the 13 years. Previous studies have also established that many households will reenter poverty after exiting from it. Stevens (1994) found that of all individuals who had managed to escape from poverty, more than half are likely to fall below the poverty line within 5 years.

Current efforts to analyze poverty dynamics often focus on explaining changes in family income or family income-to-needs ratio, implicitly assuming that an increase in family income would automatically move the poor above the
poverty line. As pointed out by Stevens (1999), the crucial question in our understanding of the concentration of poverty and the degree of mobility in the lower portion of the income distribution remains: how long will an individual falling into poverty spend below the poverty line? Most of those who ever become poor will spend only a short time below the poverty line. This implies that most of the people helped by welfare transfers use them only briefly (Bane and Ellwood, 1986). Indeed, most of the welfare resources are absorbed by a much smaller group, the persistently poor who experience very long stays in poverty. The study by Bane and Ellwood (1986) also suggests that while an increase in earnings of all household members was the primary route out of poverty, a decrease in earnings explains the beginning of poverty spells in only a minority of cases.

Allowing for multiple spells in poverty, Stevens (1999) found level of education and race play important roles in predicting stays in poverty. Stevens’s results suggest that the conventional view that most individuals falling into poverty experience for very short stays should be qualified to account for the frequency and the importance of multiple spells of poverty.

Analyzing transition events in the duration of poverty spells, McKernan and Ratcliffe (2000) conclude that poverty entries and exits have changed over the past two decades, with the mid 1990s seeing an increase in both entries into poverty and exits from poverty. Controlling for demographic and economic factors, they found the likelihood of entering or exiting poverty to be highest for persons living in households with employment changes, followed by persons
living in households with a shift in headship. For McKernan and Ratcliff, change in household composition, employment, and disability status are the most important explanatory factors whereas changes in economic conditions such as state unemployment rates and gross domestic product have only a slight influence on poverty transitions.

At the county level, persistently poor counties are those whose poverty rates were 20 percent or higher each decennial census between 1960 and 2000. A study by Miller and Weber (2003) summarizes the main feature of persistently poor counties: i) persistently poor counties are overwhelmingly rural; ii) the number of persistently poor counties increases as county population centers become smaller and as places become more remote from urban centers; iii) across all categories of urban influence, the share of the minority population is higher in persistently poor counties than in all other counties; iv) within persistent poverty counties, minority shares are highest in metro counties and in nonmetro counties with large urban populations that are either adjacent to small metro areas or nonadjacent; v) per capita income is lower and unemployment rates are higher; vi) in persistently poor counties, employment is more concentrated in service, farm/forestry/fishing, construction/maintenance, and production/transportation occupations.

2.5. Spatial analysis of poverty

Areas with persistently high poverty rates may arise from spatial concentrations of individuals with personal attributes which inhibit growth in their living standards (Jalan and Ravaillon, 2002). Fisher (2005) suggests that higher
incidence of poverty found in rural areas compared to urban areas is caused by the concentration of people with specific personal attributes. These attributes are often associated with low income leading to self-selection of poor households into rural places. However, geographic externalities arising from local public goods, or local endowments of private goods, may create differences in living standards between households with similar individual characteristics. Indeed, those living in well-endowed geographical areas can eventually escape poverty while otherwise identical households living in poor areas experience stagnation or decline. Differences in living standards across regions and communities are often too large to be explained by differences in individual or household characteristics alone (Bigman and Fofack, 2000).

Levenier et al. (2000) found that poverty rates in nonmetro counties in the United States were more than one-third higher than in metro poverty rates. Nonmetro areas had poverty rates four percentage points above those of central-city counties and single-county Metropolitan Statistical Areas (MSAs). Using a multilevel framework, Cotter (2002) found the odds of being in poverty 13 percent higher for households living in the South than for households in the rest of the country, and the odds of being poor 17 percent higher in nonmetro areas than metro areas. Using Foster-Greer-Thorbecke poverty indexes, Jolliffe (2003) showed that the incidence of poverty was higher in nonmetro than in metro areas throughout the 1990s, the poverty-gap index was significantly higher in nonmetro areas for six of the 10 years, while the squared poverty-gap index was worse in nonmetro areas only three years.
Although households in nonmetro and metro central city areas experience similar prevalence of high poverty rates, the risk of female-headed families and subfamilies with children living in poverty is higher among nonmetro residents compared to metro residents, and including characteristics of nonmetro residents covers up rather than account for this disadvantage (Snyder and McLaughlin, 2004). Miller and Weber (2003) suggest that poverty rates are lowest in the suburbs (the fringe counties of large metropolitan areas) and highest in remote counties not adjacent to metropolitan rural areas. Furthermore, counties with high poverty rates are geographically concentrated: counties with poverty rates of 20 percent or more are concentrated in the Black Belt and Mississippi Delta in the south, in Appalachia, the lower Rio Grande Valley and counties containing Indian Reservations in the southwest and Great Plains.

Contrary to much past research, Ulimwengu and Kraybill (2004), following guidelines outlined by the National Academy of Sciences, adjust the poverty threshold each year for local cost of living measured by housing costs. They also use a broader definition of income compared to the one used by the Census Bureau when calculating the federal poverty rates. Their definition of family income includes earnings, passive income, government payments, food stamps, and income from other sources. Their results suggest that the real economic wellbeing, as measured by the log of income-to-need ratio, of transitorily poor households living in nonmetro counties is consistently higher than that of their metro counterparts between 1979 and 2000. The same results hold also for the persistently poor. Further, the probability of a household...
remaining in persistent poverty was slightly higher in metro areas (28.4%) than in nonmetro areas (27.4%), except between 1979 and 1983, and 1994 and 2000. From 1979 to 2000, the average conditional probability of being transitorily poor was 24.2% in nonmetro areas and 25.3% in metro areas.

Brown and Lichter (2005) report that single mothers living in nonmetro areas are less likely to benefit economically from full-time employment than metro single mothers. As a result, work-first policies will be less efficient in nonmetro compared to metro areas. Indeed, nonmetro single mothers are often triply disadvantaged. They experience higher poverty rates, higher barriers to welfare receipt, and lower economic returns from other livelihood strategies. Gundersen (2005) found that cyclical macroeconomic forces such as unemployment rate and the per-capita employment growth rate have a much stronger effect on poverty rate in nonmetro areas compared to metro areas, but for the squared poverty gap the effect is similar in both nonmetro and metro areas. Wage growth has a significant impact on poverty rate only in metro areas, while state-level social policies (e.g., the minimum wage and cash assistance benefit levels) have slightly larger effects in nonmetro areas than in metro.

Place-based economic development can reduce poverty in persistently poor counties. It is expected that local job growth will have higher impact in persistently poor counties. As pointed out by Partridge and Rickman (2005), persistently poor counties do not respond more sluggishly to exogenous shocks, nor do they experience more adverse spillover effects from their neighboring counties compared to other counties.
2.6. Welfare and poverty

Antipoverty policy in the United States revolves around the provision of safety nets to bail out socially disadvantaged households in the presence of short term shocks and to help them “get back on their feet again” quickly through job markets (Barrett and Swallow, 2006). Moffit (2002) reveals that much remains to be done to gain full understanding of the different facets of welfare programs. Many issues relating to the optimal levels of welfare program parameters and the social desirability of labor supply effects in different parts of the income distribution remain to be studied.

As pointed out by Fording and Berry (2000), research on welfare impact on poverty rates can be grouped into two categories. In one category are studies contending that welfare decreases poverty by raising the income of the poor above poverty thresholds, and on the other, those claiming that welfare’s impact has been to increase poverty by discouraging work.

Schoeni and Blank (2000) found evidence that welfare policy changes reduced public assistance participation while increasing family earnings; as a result, poverty declined. However, gains from the 1996 reforms were not as broadly distributed across the distribution of less-skilled women as were the effects of waivers. Using a model that allows estimation of both income enhancement and work disincentive effects, Fording and Berry (2000) found that welfare had both of these effects during the 1960-90 period although the net effect varies across states and time. In their study, Moffitt and Rangarajan (1991) provide evidence suggesting that increases in the Aid to Families with Dependent
Children (AFDC) program tax rate, which is the fraction of any earned or unearned income deducted from the AFDC monthly payment, might not be an effective tool for increasing labor supply and work incentives of female heads.

Using a model for family labor supply, Hoynes (1996) found that work disincentive effects for Aid to Families with Dependent Children-Unemployed Parent (AFDC-UP) participants range from 42 to 50 hours per month for husbands and 29 to 33 hours per month for wives. However, despite the large work disincentive, pushed out of the AFDC-UP, most families would fail to increase earnings sufficiently to replace the resulting loss in income.

Reviewing the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA), Danziger (2002) concludes that many recipients reach time limits without finding stable jobs even in the presence of favorable economic conditions. The analysis by Lichter and Jensen (2002) shows that since the introduction of the 1996 reform act, rural poverty rates have declined among female-headed families along with the rates of welfare receipts. Moreover, labor force participation has increased as well as average earnings. Iceland (2003) points out that although the majority of welfare leavers are working, they usually have low-wage jobs so that their earnings remain low. As a result, many remain in poverty shortly after leaving welfare. According to Meyer and Sullivan (2001), tax and welfare changes have sharply increased employment of single mothers and cut welfare rolls. Their study suggests that material conditions of single mothers have improved slightly, even for highly disadvantaged single mothers.
Analyzing the impact of welfare on health, a study by Kaestner and Kaushal (2003) suggests that between 1996 and 1999, decrease in the welfare caseload was associated with significant changes in insurance coverage among low-educated, single mothers: a seven to nine percent decrease in Medicaid coverage, an increase in employer-sponsored, private insurance coverage of six percent, and a two to nine percent increase in the proportion of uninsured. Bitler, Gelbach and Hoynes (2004) found that welfare reform is associated with reductions in health insurance coverage and specific measures of health care utilization.

This literature review reveals that poverty occurs because of failure at both the individual level and the group (county, state, and national) level. This suggests that individualist and structuralist approaches must be combined to gain full understanding of poverty. Over time, the annual cohort of the poor comprises households experiencing short stays in poverty and those with long stays in poverty. Successful antipoverty strategy needs to account for specifics of each of these two aspects of poverty dynamics. By providing limited assistance to needy families, welfare programs are suitable for the transitorily poor but have limited impact on the persistently poor who need strategies that improve their ability to accumulate assets.

Methodologically, the literature is divided into two parallel groups of research. One groups of the papers emphasizes primarily the importance of geographic attributes in explaining poverty, while the other group focuses primarily on poverty dynamics separating the short term poor from the long term
poor. To create a bridge between these two groups, I use a dynamic framework that incorporates geographic attributes. In the next chapter, I introduce a descriptive analysis of dynamically poor households across the urban-rural continuum.
CHAPTER 3

DESCRIPTIVE ANALYSIS OF PERSISTENT POVERTY AT INDIVIDUAL AND COUNTY LEVELS.

3.1. Introduction.

In this chapter I derive and discuss key characteristics of persistent poverty at both the individual and county levels. I first define a dynamically poor individual as someone whose income has been below the poverty line for at least one year. At the individual level, I use the urban-rural continuum to characterize persistent poverty by demographics (age, gender, race, and marital status), employment status, income sources, and welfare transfers.

I also discuss both the impact of not adjusting the poverty line for geographical differences in cost of living and leaving out quasi-cash government transfers to low income families. Using spatial statistics that capture poverty clustering at the local level, I identify clusters of high poverty rates as well as those of low poverty rates. I also compare the main features of counties experiencing high poverty rates and those with low poverty rates in every decennial census between 1970 and 2000. I close the chapter with an attempt to match the spatial distribution of persistently poor individuals to that of persistently poor counties.
3.2. Data

The principal source of my data is a geocoded version of the National Longitudinal Survey of Youth 1979 (NLSY79). This is a nationally representative sample of 12,686 individuals aged 14-21 years in 1978. This cohort was interviewed annually from 1979 to 1994, and biennially thereafter. At the county level, data were collected from the Bureau of Labor Statistics, the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce, and the Small Area Income and Poverty Estimates (SAIPE) program of the U.S. Census Bureau.

In the NLSY79 survey, income includes earnings, passive income, government transfer payments, food stamps and income from other sources. This definition of income is much broader than the definition in the Current Population Survey (CPS), which is used by the U.S. Census Bureau to calculate the official poverty rate. Finally, this study also adjusts the official poverty threshold by using housing cost indices derived by Citro and Michael (1995).

Over the 1979-2000 period, the degree of volatility of family per capita income as reported by the level of the coefficient of variation (ratio of the standard deviation to the mean) in table 1 varies between one and 2.7%, except in 1989 (9.4%) and 1992 (10.1%). This income volatility is relatively low. Moreover, it does not exhibit a systematic monotonic trend over time.

The measure of skewness suggests that income does not follow a normal distribution (a normal distribution has a skewness of 0). In fact, the distribution is skewed to the right, the average income is systematically higher than the median income over the 1979-2000 period. In addition, the kurtosis which is a measure of
heaviness of the tails of a distribution, is higher than three over the period under review. This suggests that the distribution of family per capita income has a strong peak and heavier tails distribution.

Figure 1 displays a significant relationship between family per capita income and the number of years spent in poverty. The downward slope suggests that the longer a family stays in poverty, the lower its income. Inversely, families with low per capita income are more likely to spend much longer time in poverty.

Using the result in figure 1, I define two categories of the dynamically poor households are identified, the persistently poor and the transitorily poor. Persistent poverty applies to individuals poor for 10 years or more, while transitory poverty applies to individuals poor for 1 to 9 years.

3.3. Profile of dynamically poor individuals

3.3.1. Demographics

3.3.1.1. Gender

In terms of time spent in poverty, no significant difference is found between dynamically poor males and dynamically poor females except in completely rural counties where the persistently poor males experience four more years in poverty on average than their females counterparts. Among the transitorily poor, a one year difference between males and females is observed in counties with urban population of 2,500 to 19,999 and in completely rural counties adjacent to a metro area (table 2).

Overall, females account for 55% of the persistently poor and 50% of the transitorily poor. Among individuals with no poverty experience, 43% are
females. Across the urban-rural continuum, 74% of persistently poor males and 76% of persistently poor females live in metro counties compared to 78% of transitorily poor males and 79% of transitorily poor females (table 3). Nonmetro counties with an urban population of 2,500 to 19,999 are home to 12% of the males and 13% of the females who are persistently poor and to 11% of the males and 10% of the females who are transitorily poor.

3.3.1.2. Race

Racial discrimination has been well documented in several studies on poverty in the United States (see Iceland, 2003). Using the official U.S. poverty measure, a poverty measure recommended by the National Research Council (NRC), and a relative poverty measure, Iceland found that poverty rates among Blacks and Hispanics were between two and three times the non-Hispanic white poverty rates in 2000.

In the present study, among families experiencing persistent poverty in the United States, 42% are Caucasians, 34% are Blacks and only 9% are Hispanics. As expected, Caucasians families are the majority among the transitorily poor (69%), while Blacks represent 10% of the transitorily poor and Hispanics account for 5%, over the 1979-2000 period. The results indicate also that among Blacks who have been in poverty for at least a year, 43% are in persistent poverty.

The detailed distribution in figure 2 shows that 7.0% of dynamically poor Blacks are transitorily poor and live in nonmetro counties, 50% are transitorily poor and live in metro counties, 9.0% are persistently poor and live in nonmetro counties, and 34% are persistently poor and live in metro counties. The share of the transitorily poor families among Caucasians families (88%) is higher than that
of Black families (57%). Of transitorily poor Caucasians families, 19% live in nonmetro counties compared to 69% in metro counties. Persistent poverty is only 12% among dynamically poor Caucasians families (figure 3). As for dynamically poor Hispanics, 7% are transitorily poor and live in nonmetro counties, 64% are transitorily poor and live in metro counties, 25% are persistently poor and live in metro counties, while 4% are persistently poor and live in nonmetro counties (figure 4).

3.3.1.3. Marital status

Using a static approach, Iceland (2003) came to the conclusion that among families with children, those with married couples were less likely to be poor (7%) than those that were single-parent male-headed (18%) or female-headed (35%). People living alone or with housemates had a poverty rate of 19%.

Using a dynamic approach, I found that families with married couples spend significantly less time in poverty compared to families with other marital status. Overall, 23% of poor individuals who have never been married are persistently poor while 10% of married persons and 21% of divorced individuals are persistently poor. Marriage union tends to lower the probability that the family will be driven below the poverty line by a random event. Among the persistently poor, 60% have never been married. Moreover, of all individuals who have not been in poverty, 69% are married, while 7% are divorced and 24% have never been in a marriage relationship.

Across the urban-rural continuum, the percentage of poor married couples living in metro counties is lower than that of never married and divorced individuals (Table 4). Indeed, among poor married couples 69% of the
persistently poor live in metro compared to 78% for never married and 71% for divorced individuals. Similarly, 75% of married transitorily poor couples reside in metro countries compared to 82% for the never married and 78% for the divorced individuals.

3.3.2. Employment status

Ulimwengu and Kraybill (2004) found that for dynamically poor individuals, being employed guarantees higher level of living standards compared to not being employed. In the present study, except in nonmetro counties with an urban population of 20,000 or more and not adjacent to a metro area, I found that the unemployment rate is more pronounced among the persistently poor than among the transitorily poor. Among the persistently poor, the unemployment rate ranges from one percent in completely rural counties not adjacent to a metro area to 31% in metro counties of one million population or more. Among transitorily poor households, those living in metro counties of one million population or more experience the highest unemployment rate (19%).

During the 1979-2000 period, 34% of the persistently poor were employed (table 5) in wholesale and retail trade, 21% in professional and related services, and 17% in manufacturing. Likewise, 27% of the transitorily poor were employed in wholesale and retail trade, 28% in professional and related services, and 20% in manufacturing. Wholesale and retail trade attracted more persistently poor households than transitorily poor households, whereas, the reverse holds for manufacturing. While the agriculture sector employs a higher percent of transitorily households, the reverse is true in public administration.
The majority of jobs are in wholesale and retail trade, professional and related services, and manufacturing. Across the urban-rural continuum, the composition of jobs (table 6) held by the persistently poor in metro counties is as follows: wholesale and retail trade (75%), professional and related services (79%), and manufacturing (73%). Within nonmetro areas, counties with an urban population of 2,500 to 19,999 host 14% of wholesale and trade jobs held by the persistently poor (8%) and the transitorily poor (6%), 12% of professional and related services jobs held by the persistently poor (6%) and the transitorily poor (6%), and 16% of manufacturing jobs held by the persistently poor (8%) and the transitorily poor (9%).

3.3.3. Income

It is well understood that poverty goes beyond money metric measures. However, since income is easy to collect and represents a valid proxy for returns to individual capabilities, it is accepted as an indicator of individual poverty status. Thus, a poverty profile is incomplete without a closer examination of the structure of income sources available to the poor. Since wages (monetary remuneration, including bonuses, commissions, pay-in-kind, incentive payments, and tips) are important components of family income as far as poverty is concerned, one can use the ratio of wages over total income as an indicator of vulnerability to events likely to drive a family below the poverty line.

The link between the wages-to-total income ratio and financial vulnerability is not always straightforward. A high percentage of wages in total income might be a source of liability to random shocks when the principal job is
not secure or a family's own internal situation is prone to instability. Such instability may occur when wages are from a part-time or seasonal job or when a wage earner is likely to leave the household through divorce or death. Except for systemic shocks, families with a diversified income structure are less vulnerable to random shocks such as divorce, the birth of a child, sickness, or the collapse of financial markets.

In the present study, on average more than 50% of the total income of dynamically poor households is made up of wages. However, there is a significant difference between the persistently and the transitorily poor with regards to the share of wages in their total income. Wages represent 62% of the total income of the persistently poor compared to 83% for the transitorily poor (table 7). In a static analysis, Schiller (2001) reports that earnings account for 98% of the income sources of nonpoor two-parent families compared to 76% for poor families. This implies that the importance of wages in total family income tends to decrease with the length of time spent in poverty. Across the urban-rural continuum, there is no significant variation among the transitorily poor except for those living in nonmetro counties with an urban population of 20,000 or more not adjacent to a metro area, where the wages-to-total income ratio is six percent below the average. Among the persistently poor, however, the wages-to-total income ratio varies significantly. The highest ratio (74%) is found in completely rural counties not adjacent to a metro area.

The composition of non-wage income reveals that almost 50% of non-wage income of the persistently poor is made up of accumulation of Supplemental
Security Income (SSI), Aid to Families with Dependent Children (AFDC), and food stamps. The three programs represent 12%, 16%, and 21%, respectively, of non-wage income (table 8) of the persistently poor. This is an indication that ignoring government transfers, quasi-cash income or other benefits and services for people with low income not only overestimates persistent poverty but also overlooks the importance of government social transfers. As expected SSI, AFDC, and food stamp transfers make no significant contribution to the overall income of the transitorily poor. Combined, they account for only 6% of the non-wage income of the transitorily poor. Returns to assets (net farm and business income, interest, dividends and rent) account for 53% of non-wage income of the transitorily poor but only 15% of that of the persistently poor. This confirms that poverty is related to not only lack of income or consumption but also to lack of assets as well (Fisher and Weber, 2004). From these statistics, the persistently poor can be characterized as those whose wages account for less than 65% of total income, fail to accumulate assets over time, and rely more on government social transfers compared to the transitorily poor. The significant difference in assets as a share of total income between the two groups of the poor provides a strong argument in favor of programs such as Individual Development Accounts (IDAs), which promote asset accumulation among the poor.

3.3.4. Income gaps and government transfers

The main objective of government transfer programs is to guarantee a minimum level of living standards for low income or socially vulnerable families. To my knowledge, no other study has ever assessed the performance of these
transfers with respect to transitory and persistent poverty. In this section, I discuss income gaps from poverty thresholds across the urban-rural continuum. I define the income gap as the difference between family income and the poverty line or the amount in absolute terms to be transferred to a poor family in order to raise its income to at least the poverty line.

Using a broader definition of income, even without adjusting the official poverty threshold for geographical differences in cost of living, I found that only the persistently poor fall below the poverty threshold on average (table 9). This provides an argument in favor of Jalan and Ravaillion’s (2000) approach to dynamic analysis of poverty. In their approach, persistent poverty applies to households with average income below the average poverty threshold and transitory poverty to those with average income on average above the poverty threshold but occasionally above it over the study period.

In metro areas, the most affected are those living in counties of 250,000 to 1 million population and counties with fewer than 250,000 population. In nonmetro areas, the persistently poor living in counties with an urban population of 2,500 to 19,999 not adjacent to a metro area and in completely rural areas adjacent to a metro area are the most affected. These results also confirm that the transitorily poor, though they occasionally enter poverty, stay above the poverty line most of the time. For this reason, the transitorily poor would benefit from policies that allow them to smooth their consumption through financial markets. As for the persistently poor, their incomes fall below the poverty line for most of their life-cycle. Therefore, they require policy actions that not only increase their
entitlements as the current welfare transfers do, but also improve their capabilities and supply adequate opportunities in terms of jobs, education, and healthcare.

The official poverty thresholds do not account for geographical differences in the cost of living. To evaluate the impact of such omission, income gaps from official poverty thresholds were computed and compared to those from adjusted poverty thresholds (table 9). It turns out that ignoring geographical differences in the cost of living increases the income gap for the persistently poor. In metro counties, the income gap is lower when applying geographically adjusted poverty thresholds for both the persistently poor and the transitorily poor. In nonmetro counties, among the persistently poor, the income gap increases with the adjusted poverty thresholds except for those living in counties with an urban population of 20,000 or more and not adjacent to a metro area and for those living in completely rural counties not adjacent to a metro area. As for those in transitory poverty, the income gap is also systematically overestimated when ignoring geographical differences in the cost of living. Although it is unclear why the difference in the cost of living across geographical locations matters more to the persistently poor than to the transitorily poor, this result implies that the official poverty measure reports fewer persistently poor households than it should.

The official poverty measure leaves out government transfers such as food stamps and AFDC. Using the official poverty thresholds but subtracting the value of food stamps and AFDC transfers from total family income, the results show that both the persistently poor and the transitorily poor are significantly affected. However, the impact is higher among the persistently poor than the transitorily
poor (table 9). When government transfers are not accounted for in poverty thresholds, persistently poor households living in nonmetro counties lose the advantage they appear to have over their metro counterparts when applying the geographically adjusted threshold. Moreover, the persistently poor fall below the poverty line across the entire urban-rural continuum, except for those living in nonmetro counties with an urban population of 20,000 or more, adjacent to a metro area. When government transfers are not taken into account, the gap between income and the poverty threshold is greater for the persistently poor living in metro counties than for those living in nonmetro counties, while the gap is greater for the transitorily poor living in nonmetro counties than for those living in metro counties. By leaving out the value of food stamps and AFDC transferred to low income families, the Census Bureau overestimates the number of families experiencing both persistent and transitory poverty.

3.2.5. Poverty gap and squared poverty gap

I use the poverty indexes derived by Foster, Greer and Thorbecke (1984), expressed as follows

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left( \frac{g_i}{z} \right)^\alpha$$

(1)

where $z$ is the poverty line, $q$ is the number of poor, $g_i$ is the gap between a suitable measure of wellbeing and the poverty line. If $y_i$ represents the income of household $i$, then $g_i = z - y_i$ if $y_i < z$, $g_i = 0$ if $y_i \geq z$, and $\alpha$ is the poverty aversion parameter ($\alpha \geq 0$). For $\alpha = 0, 1$ and 2, $P_\alpha$ is, respectively, the headcount index, poverty gap, and squared poverty gap. To account for the distribution of US
population using the NLSY79 sampling weights, both the index of poverty depth and the index of poverty severity are computed as weighted means.

Overall, except for 1998, poverty depth as measured by the poverty gap is more pronounced in nonmetro counties than in metro counties. The difference in the poverty gap favors metro counties. It ranges from 24.4% in 1990 to 58.8% in 1994 (table 10). Over the 1990-2000 period, the squared poverty gap index was higher in nonmetro than in metro counties by 4.0% in 1990, 8.3% in 1991, 12.8% in 1992, 23.5% in 1996 and 22.3% in 1998 (table 11). Performing the same analysis using the official measure of poverty, Jolliffe (2003) found that in the 1990s, the difference between the severity of metro and nonmetro poverty was not statistically significant.

Counties of one million population or more have the highest level of both indexes among metro counties. Within nonmetro counties, the completely rural counties adjacent to a metro area report the highest values for both the poverty depth and the poverty severity indexes. Moreover, across the urban-rural continuum, counties with an urban population of 20,000 or more, adjacent to a metro area have the lowest values of both poverty depth and poverty severity.

3.4. Profile of persistently poor counties.

3.4.1. Poverty clusters.

Several studies have documented the presence of geographic pockets of poverty in the United States. Persistently poor counties are heavily concentrated in the South (83%), with disproportionate representation in Appalachia, the Ozark-Ouachita area, and the Mississippi Delta. The remaining concentration of
poverty is scattered in counties of the Southwest and Northern Plains (Cook and
Karen, 1994). Beale (1993) identifies four persistently poor regions: (1) counties
of high Black poverty in the heart of the old agricultural South, (2) counties of
high Hispanic poverty in the Rio Grande Valley and the High Plains of the
Central Southwest, (3) counties of high Native American poverty in the
Southwest, the Northern Great Plains, and Alaska, and (4) counties of high White
poverty in the Appalachian Highlands and the Ozark-Ouachita Plateau. Miller
and Weber (2003) point out that counties with poverty rates of 20 percent or more
are concentrated in the Black Belt and Mississippi Delta in the South, in
Appalachia, the lower Rio Grande Valley, and counties containing Indian
Reservations in the southwest and Great Plains. Rupasingha and Goetz (2003),
Swaminathan and Findeis (2004), and Crandall and Webber (2004) are among the
first to produce empirical evidence on spatial dependence in the formation of
poverty clusters in the U.S.

In this study, both global and the local measures of spatial autocorrelation
are used to detect the presence of systematic patterns in the clustering of poverty.
The global Moran’s $I$ spatial autocorrelation statistic is given by

$$I = \frac{(N/S_0) \sum_{i} \sum_{j} w_{ij} (p_i - \bar{p})(p_j - \bar{p})}{\sum (p_i - \bar{p})^2}$$

(2)

where $S_0 = \sum \sum w_{ij}$, $p_i$ is the poverty rate of location $i$, $\bar{p}$ is the average of
poverty rates, and $w_{ij}$ is the element of the weight matrix describing the spatial
relationship between counties $i$ and $j$ ($w_{ij} = 1$ if county $i$ is neighbor to county $j$
and 0 otherwise).
As pointed out by Anselin (1995), the assumption of stationarity or structural stability over space, implicit in the global Moran’s $I$, may be unrealistic when the study involves a large number of spatial observations (over 3,000 counties for this study). To detect spatial instabilities, Anselin introduced a class of local indicators of spatial association (LISA) which allow the decomposition of global Moran’s $I$ into the contribution of each observation. Local indicators of spatial association are useful for assessing spatial stationarity, identifying the scale over which spatial dependence occurs, and identifying pockets of distinctive values (Boots, 2002).

The local indicator of spatial autocorrelation (LISA) is expressed as follows:

$$I_i = \frac{(p_i - \bar{p})}{\sum_i (p_i - \bar{p})^2} \sum_j w_{ij} (p_j - \bar{p})$$  \hspace{1cm} (3)

As shown in table 12, the global Moran’s $I$ statistics are all statistically significant at 5% or less, providing evidence that clustering of poverty in the US is a systematic process. The existence of significant spatial dependence suggests that the poverty status of country $i$ depends on the poverty status of its neighbors. The results also confirm Tobler’s “first law of geography”: everything is related to everything else, but closer things more so. In other words, the impact on a county’s poverty rate is higher the closer are the neighbors. Unlike the global Moran’s $I$, the local indicator of spatial autocorrelation (maps 1-4) explicitly identify two types of poverty clusters of interest: counties with high poverty rates surrounded by counties with high poverty rates (red counties on the maps) are located mainly in the South, and counties with low poverty rates surrounded by
counties with low poverty rates (blue counties) in majority are located in the Midwest.

3.4.2. Spatial distribution of persistent poor counties
Defining persistent poverty counties as those that have had poverty rates of 20% or higher in every decennial census between 1970 and 2000, I found results (table 13) similar to those of Miller and Weber (2003): 88% of persistently poor counties are in nonmetro. While 17% of nonmetro counties are in the persistent poverty category, only four percent of metro counties are in this category. A further disaggregation shows that counties with an urban population of 2,500 to 19,999 (48%) and completely rural counties (32%) contain 80% of the persistently poor counties.

In addition to persistently poor counties, I define "persistently less poor" counties as those whose poverty rates have been consistently at the national average poverty rates (11%) or lower in every decennial census between 1970 and 2000. Unlike persistently poor counties, 70% of the counties in this new group are metro. Among the persistently poor counties, 83% are found in the South whereas the Midwest (54%) and the Northeast (22%) regions account for 76% of persistently less poor counties.

3.4.3. Wages and employment
Wages and salary disbursements as reported by the Bureau of Economic Account (BEA) consist of the monetary remuneration of employees, including corporate officers’ salaries and bonuses, commissions, pay-in-kind, incentive payments, and tips. In addition to being an indicator of the return to individual
capabilities such as education, wages represent the outcome of local job market processes.

Persistently poor counties offer lower wages than persistently less poor counties. Over the 1969-2000 period, wages paid in persistently poor counties are significantly different from those paid in persistently less poor counties (table 14). The highest differences are found in completely rural counties adjacent (171%) and not adjacent (48%) to a metro area. In dollar terms, the annual wage difference ranges from $2,861 in counties with an urban population of 20,000 or more adjacent to a metro area to $19,717 in completely rural counties adjacent to a metro area. Regardless of the geographical region, persistently poor counties pay lower wages than persistently less poor counties. The average annual difference in wages between the two groups ranges from $4,416 in the Midwest to $6,123 in the South.

In terms of employment, government, manufacturing, and services sectors account for 60% within persistently poor counties compared to 66% for persistently less poor counties. Compared to persistently poor counties, the shares of manufacturing and service sectors in the total employment are higher within persistently less poor counties.

3.4.4. Earnings and government transfers to individuals

I examine nonfarm earnings, the sum of wages and salary disbursements, supplements to wages and salaries, and proprietors’ income for all industries. The results show little difference in the structure of earnings between the two groups of counties. Government, manufacturing, and services are the main sources of
income. The three combined make up 61% of the total earnings of persistently poor counties and 64% of persistently less poor counties. Persistently poor counties rely more on government (25%) for income than do persistently less poor (18%). In addition, the percentage of income from manufacturing sector as a share of total income is higher within persistently less poor counties than within persistently poor counties (figure 5).

Medical, and retirement and disability payments are the major transfers received from the government by individuals in persistently poor counties (65%) and persistently less poor counties (74%). The payments for retirement and disability account for 50% of the total transfers within persistently less poor counties compared to 39% within persistently poor counties. The share of income maintenance payments within persistently poor counties is three times that of persistently less poor counties.

3.4.5. Poor households or poor counties?

It is often suggested that the spatial concentration of persistently low living standards arises from the spatial concentration of individuals with personal attributes that inhibit improvement in their living standards (Jalan and Ravallion, 2002). Then, location itself has no causal role and identical individuals will follow the same poverty path regardless of where they live. In the United States, Glaeser et al (2000) argue that urban social problems such as crime, divorce, and female-headed households are not caused by urban poverty. These problems derive from the concentration of poor people in cities rather than anything intrinsic to cities themselves.
In this study, from figures 6 and 7, there is no evidence that persistently poor families are concentrated in persistently poor counties: only 9% of persistently poor families live in persistently poor counties. As for transitorily poor families, only 4% are found in persistently poor counties. The majority of dynamically poor families, 75% of persistently poor and 69% of transitorily poor, live in counties whose poverty rates have not been 20% or higher in every decennial census from 1970 to 2000 nor have they been consistently at 11% or less. The share of transitorily poor families (27%) living in persistently less poor counties is higher than that of transitorily poor families (4%) living in persistently poor counties. This suggests that households are not necessarily poor because they live in poor counties. Neither are counties poor necessarily because of concentration of poor households. In other words, forces driving “family poverty” are not necessarily the same as those behind “place poverty”. It follows that successful antipoverty strategy should target both individual characteristics of the poor such as gender, marital status and race, and geographical attributes.

This chapter analyzes features that characterize both dynamically poor individuals and dynamically poor counties. I establish the difference beyond the length of time persistently poor individuals and transitorily poor individuals spend in poverty. The persistently poor receive less than 65% of their total income as wages, accumulate fewer assets, and rely heavily on government social transfers. Although their incomes fall below the poverty line occasionally, the transitorily poor manage to stay above the poverty line most of the time.
My analysis confirms the presence of systematic poverty clustering. This suggests that to be successful in the fight against poverty, counties should cooperate with their neighbors to find solutions to the common problems that create poverty. This study also suggests that the poverty depth and the poverty severity indexes are not significantly different between metro and nonmetro counties. The claim that poor households make poor counties or vice-versa could not be confirmed. These results support arguments in favor of policies that account for length of time spent in poverty. They also highlight the importance of spatial attributes in the fight against poverty.

These results are simply descriptive. They do not explicitly control for individual characteristics or locational attributes. They are derived under the implicit assumption that the returns to individual characteristics are the same for everyone, everywhere. To complete this descriptive analysis, the next chapter introduces a framework aimed at explaining dynamic poverty by explicitly controlling for heterogeneity among households while incorporating locational attributes.
CHAPTER 4

A GENERALIZED LINEAR MIXED-EFFECTS APPROACH TO POVERTY MODELING

4.1. Introduction

In the literature, two main dynamic approaches are used to model poverty: fixed-effects or variance components models and hazard rates models. The two approaches complement each other. In the first, individual $i$’s income-to-needs ratio in year $t$ is represented by a fixed-effects model in which the individual-specific intercept is interpreted as the individual permanent income-to-needs ratio while the error term represents its transitory component. The second approach models entry into poverty and exit from poverty using a survival function. While variance components models help identify variables that explain changes in the wellbeing of poor and nonpoor households, hazard rates models determine variables that cause households to transit move one poverty status to another.

In this study, I use the generalized mixed-effect approach which includes the variance components model as a special case. The independence and identical assumption about the error term, inherent to the variance components model, is relaxed to allow for more flexibility. Second, the mixed linear approach allows the estimation of both fixed-effects and random-effects models. Finally, unlike previous studies, in addition to individual characteristics I include spatial attributes as explanatory variables. By allowing differences in both individual-
specific observed heterogeneity (the intercept) and exogenous shocks (the explanatory variables) between the persistently poor and the transitorily poor, I extend the study by Ulimwengu and Kraybill (2004), who examined only differences in individual-specific observed heterogeneity.

4.3. Analytical framework

I introduce a framework that is a mathematical expression of Sen’s entitlement framework. I use an intertemporal model in which the $i$th household starts out with a vector of assets $A_{it}$ at time $t$. Assets include individual characteristics such as age, gender, education, and work experience. Each period household $i$ chooses a level of consumption ($C_{it}$) and investment ($I_{it}$) in assets to maximize its discounted stream of expected wellbeing. Formally,

$$\max E \sum_{t=0}^{\infty} \beta^t U(C_{it}),$$

where $U(\cdot)$ represents a utility function and $\beta$ the discount rate.

Using Bellman’s equation, the dynamic optimization problem takes the following form:

$$V(A_{it}) = \max_{\{C_{it}, I_{it}\}} \left[ U(C_{it}) + \beta E[V(A_{i+1})] \right]$$

subject to

$$C_{it} = f(A_{it}, \Theta_{it}) - I_{it},$$
$$A_{it+1} = (1 - \delta)A_{it} + I_{it},$$
$$A_{it+1} \geq 0,$$
$$0 < \beta \leq 1, 0 < \delta < 1$$

or equivalently

$$V_t(A_{it}) = \max_{\{A_{it+1}\}} \left[ U[(1 - \delta)A_{it} + f(A_{it}, \Theta_{it}) - A_{it+1}] + \beta E[V_{t+1}(A_{it+1})] \right]$$

$$(5')$$
where \( f(\cdot) \) is a generalized earning or livelihood function corresponding to Sen’s exchange mapping process, \( \delta \) is the asset’s depreciation rate, \( \beta \) the discount rate, and \( \Theta \) is a vector of stochastic shocks affecting the earning function.

The Euler equation is given by

\[
U_t'(C_t) = \beta E[(1 - \delta) + f'(A_{t+1}, \Theta_{t+1})]U_{t+1}'(C_{t+1})
\]  

Equation (7) states that at the optimum the marginal utility of consumption at time \( t \) must be equal to the discounted expected marginal utility at time \( t+1 \) multiplied by the marginal productivity of assets plus the marginal rate of asset utilization.

Let \( U_t = \log C_t \) for \( \beta = 1 \). The Euler equation becomes

\[
\frac{1}{C_t} = E[(1 - \delta) + f'(A_{t+1}, \Theta_{t+1})] \frac{1}{C_{t+1}} \]

It follows that

\[
C_{t+1} = b_0 + b_1 C_t + \mu_{t+1}
\]

or

\[
C_t = b_0 + b_1 C_{t-1} + \mu_t
\]

where \( b_0 \) is a positive constant, \( b_1 = [(1 - \delta) + f'(A_t)] \) represents the sum of the marginal rate of asset utilization \((1 - \delta)\) and asset marginal productivity \((f'(A_t))\), and \( \mu_t \) is normally distributed with mean 0 and variance \( \sigma^2 \). Under Sen’s entitlement approach, the error term \( \mu_t \) represents an entitlement failure if negative or an entitlement windfall if positive.

The expected value of optimal consumption in (10) is then given by

\[
\overline{C}_t = b_0 + b_1 \overline{C}_{t-1}
\]
Equation (11) is a first-order difference equation with constant coefficient and its solution is given by

\[
\bar{C}_u = \left[ C_0 - \frac{b_0}{\delta - f'(A_u)} \right] [(1 - \delta) + f''(A_u)] + \frac{b_0}{\delta - f'(A_u)}
\]  

(12)

where \( C_0 \) is the initial level of consumption. The qualitative dynamics of the average optimal consumption (\( \bar{C}_u \)) path depends on the value of \([(1 - \delta) + f''(A_u)]\):

- If \(|(1 - \delta) + f''(A_u)| < 1\): this guarantees that wherever a household starts, its \( \bar{C}_u \) will converge to \( C^* = b_0 / (\delta - f'(A_u)) \), the long run level of consumption which corresponds to the steady state. This includes the case where the marginal productivity of the asset (\( f''(A_u) \)) is less than the depreciation rate (\( \delta \)) of the asset;

- If \(|(1 - \delta) + f''(A_u)| > 1\): \( \bar{C}_u \) diverges from the stable equilibrium, especially when the marginal productivity of the asset is higher than the depreciation rate of the asset. This is the case where a household ends up trapped in poverty with a low probability of escape.

The complete dynamics of \( \bar{C}_u \) depend on both \( b_i \) and \( \mu_i \) in the following equation:

\[
\bar{C}_u = \left[ C_0 - \frac{b_0}{\delta - f'(A_u)} \right] [(1 - \delta) + f''(A_u)] + \frac{b_0}{\delta - f'(A_u)} + \mu_i
\]  

(13)

As pointed out by Carter and May (2001), under the diminishing marginal utility assumption, each individual facing the intertemporal choice represented in (4) would prefer a smooth consumption stream as opposed to a consumption
stream that fluctuates over time. This requires each individual to borrow against his/her higher expected earnings. If the poor can borrow, current consumption will depend solely on the individual’s long term or permanent income \( C^* \), which is a function of the marginal productivity of assets \( f'(A_i) \) and the asset depreciation rate \( \delta \). Another strategy would be for the poor to accumulate enough fungible assets to be used in the face of random shocks as self-insurance to smooth consumption.

Understanding dynamic poverty requires a static poverty line \( C \), an asset \( A \) poverty line, and a dynamic \( V \) poverty line. The static poverty line defines the poor in period \( t \) as those for whom \( C_{it} \leq C \). The asset poverty line is defined as the combination of assets that yield the level of expected wellbeing exactly equal to the static poverty line: \( A = \{ A \mid \hat{C}(A) = C \} \). The dynamic poverty line represents the discounted present value of a sequence of static poverty lines, \( V = \left( \sum_{t=0}^{\infty} \beta^t C \right) \). Thus, household \( i \) is dynamically poor if \( V(A_{it}) < V \), where \( A_{i0} \) represents its initial asset endowment.

Diagram 1 below presents three main groups of dynamically poor individuals. The first group is made up of individuals who are poor under the static poverty line but not under the asset poverty line (point B). To move above the static poverty line, the poor will have to accumulate more assets or experience random positive shocks. Individuals in the second group are in transition (point C) between poverty states; they are the transitorily poor. These individuals are not poor under the money metric measure but poor under the asset measure. The
transitorily poor are still at risk of falling back into static poverty in the event of a negative random shock. The third and final group is made up of the persistently poor (point D). They are poor under both the static and asset poverty lines. Even under the asset poverty line, the persistently poor may fall below the “Micawber threshold,” where their way out of poverty is more than improbable.

Diagram 1: Poverty dynamics.

To allow interpersonal comparisons of utility at the optimal consumption \( (C^*_u) \), following Blackborby and Donaldson (1987), I assume the existence of poverty consumption bundles \( \{C(\omega)\mid \omega \in A\} \) such that \( U(C(\omega), \omega) = u^r \), where \( \omega \)

---

\(^2\) Carter and May (2001) use the term “Micawber threshold” (named after the character, Wilkins Micawber, an apostle of Victorian savings virtue, in Charles Dickens’s book *David Copperfield*) to evoke the idea that there may be a level of poverty from which individuals cannot be pulled out even by a forward-looking willingness to sacrifice and save.
represents household characteristics, and $u^r$ refers to the poverty level of utility. Define $Z(u^r, p, \omega)$ as the minimum income necessary for household $i$ to achieve utility level $u^r$ at current prices ($p$). The welfare ratio for household $i$ ($w_i$) is then the ratio of its income ($y_i$) to the poverty line at current prices:

$$w_i = \frac{y_i}{Z(u^r, p, \omega)}$$

(14)

As shown by Blackborby and Donaldson (1987), equation (14) is equivalent to a poverty-based standard-of-living index.

In the wellbeing model described below, the dependent variable refers to the log of the welfare ratio. Explanatory variables ($X$) include demographic characteristics of individuals such as gender, race or ethnicity, age, and marital status, education level, employment status of individuals, household welfare participation, and household size. Geographical variables include place of residence, local employment (number of people employed by sector of activity), college graduate as a share of adult population, and local welfare benefits.

4.4. Generalized linear mixed-effects model

4.4.1. Derivation

The NLSY79 data are highly unbalanced panel data because of missing values. The missing values occur in three ways (Bureau of Labor Statistics, 2001): i) some respondents do not participate at all, causing all information in that particular survey to be missing; ii) some respondents do not provide a valid answer to a question; and iii) the interviewer incorrectly follows the survey instrument’s flow.
Multivariate models with general unrestricted covariance structure are often inappropriate to apply to highly unbalanced data (Laird and Ware, 1982). A way to circumvent this problem is to use a two-stage analysis (Verbeke and Molenberghs, 2000). In the first stage, one summarizes the vector of repeated measurements for each individual by a vector of a relatively small number of estimated individual-specific regression coefficients. In the second stage, multivariate regression techniques are used to link these estimates to exogenous covariates.

Let \( w_i \) be the \( n_i \)-dimensional vector of repeated measurements of wellbeing for the \( i \)th individual satisfying the following linear relationship:
\[
    w_i = F_i\beta_i + \varepsilon_i, \tag{15}
\]
where \( F_i \) is a \( (n_i \times q) \) matrix of exogenous variables, explaining how wellbeing evolves over time for the \( i \)th individual, \( \beta_i \) is a \( q \)-dimensional vector of unknown individual-specific regression coefficients, and \( \varepsilon_i \) is a vector of residual components, independently and normally distributed with mean zero and variance \( \sigma^2 I_{n_i} \) (where \( I_{n_i} \) is a \( n_i \)-dimensional identity matrix).

In the second stage, the following model
\[
    \beta_i = K_i\beta + b_i, \tag{16}
\]
is used to capture the observed heterogeneity between individuals with respect to their individual-specific regression coefficients \( \beta_i \). The variable \( K_i \) is a \( (q \times p) \) matrix of exogenous covariates, \( \beta \) is a \( p \)-dimensional vector of unknown
regression parameters, and \( b_i \) is assumed to follow a \( q \)-dimensional normal distribution with mean zero and general covariance matrix \( D \).

Equations (15) and (16) are combined to yield the generalized mixed-effect model,

\[
w_i = X_i \beta + F_i b_i + \varepsilon_i ,
\]

where \( X_i = F_i K_i \) is a \((n_i \times p)\) matrix of exogenous covariates. Equation (17) is called linear mixed-effect model because it comprises the fixed-effect \( \beta \) and the random, individual-specific effect \( b_i \). As pointed out by Laird and Ware (1982), a linear mixed-effect model is any model which satisfies

\[
\begin{aligned}
&\begin{cases}
w_i = X_i \beta + F_i b_i + \varepsilon_i \\
b_i \sim N(0, D),
\end{cases} \\
&\begin{cases}
\varepsilon_i \sim N(0, \Sigma_i),
\end{cases}
\end{aligned}
\]

\( b_1, \ldots, b_N, \varepsilon_1, \ldots, \varepsilon_N \) are independent.

4.4.2. Estimation and inference

From equation (18), it follows that

\[
w_i \sim N(X_i \beta, F_i D F_i' + \Sigma_i). \tag{19}
\]

Let \( \alpha \) denote the vector of all variance and covariance parameters (also called variance components) in \( V_i = F_i D F_i' + \Sigma_i \), let \( \theta = (\beta', \alpha')' \) be an \( s \)-dimensional vector of all parameters in equation (19), and let \( \Theta = \Theta_{\beta} \times \Theta_{\alpha} \) denote the parameter space for \( \theta \), with \( \Theta_{\beta} \) and \( \Theta_{\alpha} \) being the parameter spaces for the fixed effects and for the variance components, respectively. Given the above specification, estimators are obtained from maximizing the following marginal likelihood function
\[ L_{ML}(\theta) = \prod_{i=1}^{N} \left\{ (2\pi)^{-n/2} |V_i(\alpha)|^{-1/2} \times \exp \left( -\frac{1}{2} (w_i - X_i, \beta)' V_i^{-1}(\alpha) (w_i - X_i, \beta) \right) \right\}, \quad (20) \]

Conditional on \( \alpha \), the maximum likelihood estimator (MLE) of \( \beta \) is given by

\[
\hat{\beta}(\alpha) = \left( \sum X_i'W_iX_i \right)^{-1} \sum X_i'W_i w_i, \quad (21)
\]

where \( W_i \) is equal to \( V_i^{-1} \). The estimator \( \hat{\beta}(\alpha) \) follows a multivariate distribution with mean vector \( \beta \) and variance-covariance matrix,

\[
\text{var}(\hat{\beta}) = \left( \sum_{i=1}^{N} X_i'W_iX_i \right)^{-1}. \quad (22)
\]

The maximum likelihood or restricted maximum likelihood method is used to estimate \( \alpha \). For any known matrix \( L \), hypothesis testing on \( \hat{\beta} \) is formulated as follows (Verbeke and Molenberghs, 2000):

\[
\begin{cases}
H_0 : L\beta = 0 \\
H_A : L\beta \neq 0,
\end{cases} \quad (23)
\]

The test statistic is given by

\[
\left( \hat{\beta} - \beta \right)' L \left[ L \left( \sum_{i=1}^{N} X_i'V_i^{-1}(\alpha)X_i \right)^{-1} L' \right]^{-1} L \left( \hat{\beta} - \beta \right), \quad (24)
\]

which follows a chi-squared distribution asymptotically with rank \((L)\) degrees of freedom.

4.5. Estimation results

Over the 1979-2000 period, the measure of wellbeing (the log of the income-to-need ratio) of the persistently poor was consistently below that of the
transitorily poor (table 15). The difference in wellbeing between the persistently poor and the transitorily poor increased sharply during the 1994-2000 period. Even after controlling for individual characteristics and spatial attributes, the persistently poor and the transitorily poor experienced very different poverty paths and therefore deserve separate attention from policymakers. Level of education, labor market participation, and access to the benefits of economic growth are among the major factors explaining the difference in wellbeing between the two groups of poor households.

Instead of being randomly drawn, a sample can be based in part on values taken by a dependent variable, creating a sample selection bias. As a result, parameter estimates may be inconsistent. In the present study, sample selection bias may occur because each sample is directly or indirectly based on the values of family income. Indeed, from the overall sample, three sub-samples were selected: poor households, transitorily poor households, and persistently poor households. To correct for possible selection bias, I use the Heckman (1979) two-step estimator. The inverse of Mill’s ratio reported in table 16 is not significant, suggesting the absence of sample selection bias.

To test the difference between regression estimates (slopes and intercept) for the persistently poor and the transitorily poor, I use the likelihood ratio version of the Chow test for structural change (Green, 2003). The restricted model is based on the pooled data set of the combined persistently and transitorily poor households (Table 16). The log-likelihood for the pooled model is -89,065. The log-likelihoods for the transitorily poor and the persistently poor regressions are -
58,879 and -27,970, respectively. The log-likelihood for the unrestricted model with separate coefficient vectors is the sum of the log-likelihood for the transitorily poor regression and that of the persistently poor regression, -86,849. The chi-squared statistic for testing the restrictions of the pooled model is 4432. The p-value of the chi-squared distribution with 46 degrees of freedom is 0.000. This suggests that the coefficients for the transitorily poor are significantly different from the coefficients for the persistently poor. In other words, the two groups of dynamically poor households follow significantly different paths in terms of wellbeing. Below, I discuss in detail the observed differences between the persistently and the transitorily poor as reported in table 16.

4.5.1. Demographics

The effect of aging is qualitatively the same for the persistently and transitorily poor. An additional year tends to decrease living standards by 0.5% for the transitorily poor and 1.7% for the persistently poor. Gender discrimination is not observed among the transitorily poor as both males and females in this group share similar poverty experience. Among the persistently poor, females enjoy a 13.9% higher level of living standards than their male counterparts.

Race is a major factor among dynamically poor individuals, especially among the transitorily poor. Transitorily poor Blacks experience 15.3% lower living standards than White non-Hispanics while Hispanics transitorily poor experience 12.3% lower living standards than White non-Hispanics. Among the persistently poor, no evidence of racial discrimination was found.
Education is important for both the transitorily and the persistently poor. The transitorily poor with a college degree have a living standard 23.8% higher than that of the transitorily poor with a high-school diploma. Likewise, the persistently poor with a college degree enjoy a 38.8% higher living standard than those with a high-school diploma.

Marital status plays a significant role for both the persistently and the transitorily poor. Among the transitorily poor, the living standard of married individuals is higher than that of the never married by 80.6%, higher than that of the separated individuals by 75.7%, and higher than that of divorced individuals by 66.9%. Married persistently poor individuals experience 59.1% higher living standard than the never married, 58.5% higher than the separated, and 53.2% higher than the divorced.

4.5.2. Labor market participation

In a market economy and individualistic society, labor market participation is the most reliable way of preventing entry into poverty or fostering exit from poverty. As expected, my results confirm the importance of being employed for both the persistently poor and the transitorily poor. The employed transitorily poor experience a 19.7% higher level of living standard than the unemployed. Similarly, the employed persistently poor enjoy a 33.7% higher living standard than the unemployed persistently poor. It is worth noting that the impact of employment on the living standard is greater for the persistently poor than for the transitorily poor.
Compared to those in public administration, the transitorily poor employed in manufacturing are better off by 5.4% while the transitorily poor working in wholesale are worse off by 8.3%. Among the persistently poor, those employed in wholesale hold a 10.3% advantage over the persistently poor working in public administration. This suggests that the power of a given sector to lift households out of poverty is not the same for all the poor. In current welfare programs, the poor are treated as a homogenous group with respect to time spent in poverty and all economic sectors are implicitly given the same weight.

4.5.3. Government non-cash transfers
Job training programs are found to boost living standards by 5.5% for the transitorily poor and 39.3% for the persistently poor compared to non-participants. Those receiving a housing subsidy tend to be worse off than those who do not. However, one would expect that after receiving the subsidy, the condition of the recipients would be at least as well off as that of non-recipients. This deserves further investigation.

4.5.4. Locational attributes
Locational attributes may induce differences in poverty paths among persons with otherwise similar individual characteristics. With respect to the region of residence, the transitorily poor living in the South are as well off as those living in the Northeast while lagging behind those in the Northcentral region by 3.3% and those in the West by 7.4%. Among the persistently poor, only the northeasterners are significantly better off than those living in the South.
Living standards of the transitorily poor living in nonmetro countries are higher than those of the transitorily poor living in metro counties by 18.7%. However, the persistently poor living in nonmetro countries are worse off by 43.1% than their counterparts living in metro areas. This suggests that, once individual and spatial attributes are accounted for, the difference in the living standards between metro and nonmetro residents depends on the length of time spent in poverty. Therefore, it might be inappropriate to draw an overall conclusion involving all individuals given that their poverty experiences differ over time.

I use the percentage of persons 25 years old or more with a college degree as a proxy for the stock of human capital at the county level. The result suggests that a marginal increase in the stock of human capital has a positive impact on the living standards of the poor only in nonmetro countries: 13.0% for the transitorily and 12.5% for the persistently poor. As for metro counties, no significant effect is observed among the persistently poor. The transitorily poor suffer a small (1.9%) but significant decrease in their living standards as a result of a marginal increase in the local stock of human capital.

To complete the results on local stock of human capital, I examine the local level of employment by sectors of activity. The results suggest that aggregating the impact of employment as is often done hides policy-relevant differences across locations, sectors, and the dynamically poor. An additional thousand workers in agriculture in metro counties does not have a significant effect on living standards of the transitorily poor but induces a 0.3% increase in
the living standards of persistently poor individuals. The same exogenous change in nonmetro counties induces a 0.15% decrease in the living standards of the transitorily poor while leaving unchanged that of the persistently poor.

An increase in the employment level of the manufacturing sector is poverty-reducing for the persistently poor regardless of where they live. Among the transitorily poor, only those living in metro counties tend to benefit from an increase in the level of employment in manufacturing. A similar increase in the employment level of the wholesale and retail sector does not improve the wellbeing of the persistently poor, especially those living in nonmetro counties. Among the transitorily poor, only nonmetro residents experience an increase in their living standards as a thousand more workers are added to the wholesale and retail sector. Increasing the level of government employment at local level leads to a decrease in wellbeing of the transitorily poor living in metro as well as that of the persistently poor living in nonmetro.

This study confirms that a favorable macroeconomic environment is good for the poor. An additional one percent growth of the national economy leads to a 1.3% increase in the living standards of the transitorily poor living in metro counties and a 0.7% increase in the living standards of the transitorily poor living in nonmetro counties. Similarly, the persistently poor living in metro counties enjoy a 0.23% increase in their living standards compared to 0.25% for those living in nonmetro counties.

The transitorily poor tend to gain more from economic expansion than the persistently poor. This suggests that the later need an additional safety net along
with gain from economic growth. Across locations, while no significant
difference was found among the persistently poor, the impact of economic growth
on the living standards of the transitorily poor living in metro is almost twice that
on the living standards of the transitorily poor living in nonmetro areas.

In the preceding chapter, I highlighted differences among dynamically
poor individuals across locations. In this chapter, the effort consisted of
explaining the source of these differences. Using a dynamic framework, this study
suggests that similar policy tools may yield different results on the living
standards of the poor depending on the length of time spent in poverty. In
addition, spatial attributes such as employment level yield different returns in
terms of wellbeing with respect to metro or nonmetro locations and poverty
status. Based on these results, it is fair to say that ignoring these differences may
well derail even well designed antipoverty strategies and undermine the
credibility of policymakers. The next chapter discusses policy issues related to
poverty and presents simulation results using the model estimated in this chapter.
5.1. Introduction

Depending on the leading view on wellbeing within a society, antipoverty programs can be universal (open to all) or restricted. Prior to the 1996 welfare reform, the antipoverty programs in the United States evolved around three main components: Aid to Family with Dependent Children (AFDC), Medicaid, and food stamp programs. Under the welfare system, eligibility is based on individual characteristics. To be granted welfare benefits, needy individuals have to provide the proof of being in distress of some sort. Eligibility to the three most important components of the welfare system explicitly exemplifies such restrictions.

For the most part, the AFDC program was oriented to female-headed families with income and assets below certain specified levels set in each of the 51 states and jurisdictions in the United States. As pointed out by Moffit (1992), almost half of husband-wife families who met the income and asset conditions for AFDC and had children under 18 were also eligible for the AFDC-UP program (UP stands for unemployed parent). The primary wage earner had to be unemployed and have a history of labor force attachment and earnings similar to
that required for unemployment insurance. Eligibility for the Medicaid program is restricted for non-disabled and non-elderly individuals and is linked to the participation to the AFDC program. Regarded as the most universal of all welfare programs, the food stamp program provides food coupons to socially disadvantaged families regardless of their marital status.

As summarized by Schoeni and Blank (2000), the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) passed in 1996 (i) ends the dependence of needy parents upon government benefits by promoting job preparation, work, and marriage; (ii) aids needy families so that children may be cared for in their homes or those of relatives; (iii) prevents and reduces out-of-wedlock pregnancies and establishes goals for preventing and reducing their incidence; and (iv) encourages formation and maintenance of two-parent families.

The main change introduced under the new legislation was the termination of the AFDC program and its replacement by the Temporary Assistance to Needy Families (TANF) block grant. TANF provides assistance and work opportunities to needy families by granting states flexibility to develop and implement their own welfare programs.

In this chapter, I first derive a simple optimal rule for government transfers to needy families and assess the optimality of current welfare transfers. The second section presents a poverty elasticity with respect to government transfers as a tool to evaluate geographic targeting and non-geographic targeting schemes. In the last two sections, estimates from the preceding chapter are used to perform simulations of poverty indexes and the income-to-need ratio.
5.2. Optimal rule for welfare transfers

In the United States, welfare transfers are not aimed directly at reducing particular measures of poverty. In this section, following Dasgupta and Kanbur (2003) and Elbers et al. (2004), I discuss a framework that allows the derivation of optimal transfer rules through the minimization of a specific measure of poverty. The question under consideration is: how can the government allocate a limited welfare transfer budget for the biggest impact on poverty?

Consider a country of \( n \) individuals represented by a set \( S \), which can be partitioned into two non-empty subsets, \( a \) and \( b \). Let the country consist of two regions, indexed by \( A \) and \( B \). The set \( a \) then is the population of region \( A \), and the set \( b \) is the population of region \( B \). The sets \( a \), \( b \), and \( S \) contain, respectively, \( n_A \), \( n_B \) and \( n \) individuals. All individuals residing in the same region are treated alike, but populations of different regions can be treated differently. Resources transferable to each region are denoted by \( c \), individual \( i \)'s income by \( I_i \), and the poverty line by \( z \). The policy question is: if the transfers were to be given to only one region, which region should it be?

The overall poverty index can be written as:

\[
P_\alpha = \frac{1}{n} \left[ \sum_{i \in \Pi_A} \left( 1 - \frac{I_i}{z} \right)^\alpha + \sum_{i \in \Pi_B} \left( 1 - \frac{I_i}{z} \right)^\alpha \right]
\]

(25)

where \( \Pi_A \) and \( \Pi_B \) are the sets of poor individuals in the two regions.

Equation (26) represents the poverty index (\( P_0 \) is the headcount ratio, \( P_1 \) is the poverty gap index, and \( P_2 \) is the squared poverty gap index) when the transfer
is made to individuals living in region A, while equation (27) represents the poverty index when the transfer is made to individuals in region B:

\[
P_{a} = \frac{1}{n} \left[ \sum_{i \in \Pi_{A}} \left( 1 - \frac{I_{i} + \frac{c}{n_{A}}}{z} \right)^{\alpha} \right] + \sum_{i \in \Pi_{B}} \left( 1 - \frac{I_{i}}{z} \right)^{\alpha}
\]

(26)

\[
P_{a} = \frac{1}{n} \left[ \sum_{i \in \Pi_{A}} \left( 1 - \frac{I_{i}}{z} \right)^{\alpha} \right] + \sum_{i \in \Pi_{B}} \left( 1 - \frac{I_{i} + \frac{c}{n_{B}}}{z} \right)^{\alpha}
\]

(27)

The impact on the poverty index of a marginal transfer to either region is given by the derivatives of (26) and (27), evaluated at \( c = 0 \):

\[
\frac{dP_{a}}{dc} \bigg|_{c=0} = -\frac{\alpha}{nz} \left\{ \frac{1}{n_{A}} \sum_{i \in \Pi_{A}} \left( 1 - \frac{I_{i}}{z} \right)^{\alpha-1} \right\} = -\frac{\alpha}{nz} P_{(a-1),A}
\]

(28a)

\[
\frac{dP_{a}}{dc} \bigg|_{c=0} = -\frac{\alpha}{nz} \left\{ \frac{1}{n_{B}} \sum_{i \in \Pi_{B}} \left( 1 - \frac{I_{i}}{z} \right)^{\alpha-1} \right\} = -\frac{\alpha}{nz} P_{(a-1),B}
\]

(28b)

This implies that at the margin, \( P_{a-1} \) should be equalized across regions.

It follows that if the objective is to minimize \( P_{a} \), then the region with the highest \( P_{a-1} \), not the one with the highest value of \( P_{a} \), should be targeted at the margin. In other words, if the objective is \( P_{a} \), the targeting indicator should be \( P_{a-1} \). This rule has been used to analyze the effects of food subsidies (Besley and Kanbur, 1988), land holding based targeting (Ravallion and Chao, 1989) and geographic targeting (Ravallion, 1993). If \( \alpha=1 \), the group with the highest headcount ratio should be targeted first; for \( \alpha=2 \), the group with the higher value of the income gap should be targeted, and so on.
To use this rule, I create maps (maps 5 and 6, and maps 7 and 8) using the local indicators of spatial correlation defined in the third chapter. I compare clusters of government transfers with clusters of poverty rates \((P_0)\) assuming that the government goal is to reduce the poverty gap \((P_1)\). If government transfers are made optimally, I expect transfer clusters and poverty clusters to match each other. Scatter plots (figures 8-13) are also used as a measure of correlation between government transfers and poverty rates across locations.

Neither the cluster maps nor the scatter plots suggest that the expected optimality in actual government transfers occurs as described above, assuming the government objective is to minimize the poverty gap index. The cluster maps indicate that actual government transfers are not made according to the poverty rates. The scatter plots show a downward slope in the correlation between government transfers and poverty rates, suggesting that places with high poverty rates receive a small amount of government transfers. Such a mismatch between government transfers and poverty rates may occur either because of mis-targeting or because of lack of targeting (Elbers et al., 2004). The first refers to the case where the government has a geographic targeting scheme but it is not efficiently administered. The second refers to a case where there is no geographic targeting scheme at all. In both cases, if the objective is to minimize a given measure of poverty, taxpayers’ money is not well spent as far as poverty alleviation is concerned.
5.3. Poverty elasticity

Another tool used to evaluate antipoverty programs is the percentage change in the measure of poverty induced by a percentage change in the amount of transfers shifted to poor households. To derive the elasticity of poverty with respect to government transfers, I borrow the methodology introduced by Besley and Kanbur (1988) where FGT\( \alpha \) indexes are given by

\[
P_\alpha = \int_0^z \left( \frac{z - y_T}{z} \right)^\alpha f(y)dy
\]

(29)

where \( z \) is the poverty line, \( y_T = y + T \) is the total household income after a positive transfer (T) and \( f(y) \) is the density function of income. The marginal effect of a change in transfer \( T \) on the poverty index \( P_\alpha \) is as follows:

\[
\frac{\partial P_\alpha}{\partial T} = \int_0^z \left( \frac{\alpha}{z} \right) \left( \frac{z - y_T}{z} \right)^{\alpha-1} \left( -\frac{\partial y_T}{\partial T} \right) f(y)dy
\]

(30)

Since \( \frac{\partial y_T}{\partial T} = 1 \), it follows that the elasticity of poverty with respect to government transfers is

\[
\varepsilon_\alpha = -\frac{T}{P_\alpha} \frac{\partial P_\alpha}{\partial T} = \alpha \left( \frac{T}{z} \right) \left( \frac{P_{\alpha-1}}{P_\alpha} \right)
\]

(31)

When \( \alpha = 1 \), equation (31) collapses to:

\[
\varepsilon_1 = \frac{T}{z} \frac{P_0}{P_1} = \frac{T}{z - y_T^e}
\]

(32)

where \( y_T^e \) is the average income of the poor.

As pointed out by Besley and Kanbur (1988), the poverty elasticity in equation (32) depends on how much the government transfer fills the poverty gap.
of the average poor person. The ideal situation or perfect targeting would be where the elasticity is close to one, meaning that the government transfer is sufficient to offset the poverty gap.

I assume that the government is pursuing the minimization of the poverty gap index. Using the NLSY79 data, two versions of equation (32) are computed. The first version reproduces the current transfer scheme which does not account for the geographical distribution of headcount ratios. The second incorporates the optimal rule discussed earlier by redistributing the same amount of transfers to households based on the level of headcount ratios in their county of residence. Results are reported in table 16.

Over the 1979-2000 period, the value of the poverty elasticity has been systematically less than 0.5. This indicates that government transfers are not sufficient to eliminate the income gap of the average poor person. The poverty elasticity of government transfers exhibits an increasing trend from 1979 (0.01) to 1994 (0.41) before starting to fall sharply to 0.22 in 2000. When transfers are made based on the geographical distribution of the headcount ratios, the poverty elasticity of government transfers is rather modest. It averages 0.13 a year compared to 0.22 when the geographical distribution of poverty is not taken into account. However, in 2000 the scheme that accounts for the geographical distribution of the headcount ratios yields a higher elasticity than the scheme that ignores the geographical distribution of the headcount ratios (table 17).

Unlike transfer schemes that ignore the geographical distribution of the poverty rates, schemes that account for geographical difference in poverty rates
yield a poverty elasticity that is systematically higher in nonmetro than in metro areas. This is an important result. It suggests that transfers schemes that take into account the geographical distribution of poverty rates have greater impact in nonmetro areas where most of the persistently poor counties are located.

5.4. Simulations.

Policymakers often assume that policies that increase average income at the individual level should also decrease poverty. Consequently, poverty rates are expected to decline with an increase participation of the poor into the job market. The focus is on the state or local employment level by economic sectors, national economic growth, and the share of college graduates used as a proxy for human capital. When I allow an increase in the number of workers in a given sector, the level of total employment is not kept constant. As a result, I compute and discuss only direct (partial) effects as opposed to total effects which is the sum of direct and indirect (induced) effects.

The estimated results for the year 2000 represent the baseline for all simulations. Results (table 18) are presented for metro and nonmetro areas, and a combination of both. Except for the change in the real GDP for which I assume a two percent economic growth rate, all other simulations use a 10% increase from the baseline. An increase of 10% in the employment level of agriculture does not affect the headcount ratio. Individual incomes change but not enough to move those experiencing these changes above the poverty line. However, the change in employment in agriculture induces a change in income distribution that the headcount ratio cannot capture. The poverty gap and the squared poverty gap
indexes are reduced in metro counties but increased in nonmetro counties. Similar results are obtained for manufacturing and wholesale and retail sectors.

A 10% change in the employment level of the government sector (public administration) decreases the poverty gap index while increasing the headcount ratio in metro counties. In nonmetro counties, although the headcount ratio is unchanged, the poverty gap index increases by 1.6% and the squared poverty gap index increases by 2.0%.

A change in the share of college graduates tends to favor nonmetro residents more than metro residents. In nonmetro counties, a 10% increase in the share of college graduates decreases the headcount ratio by 1.0%, the poverty gap index by 2.5%, and the squared poverty gap index by 2.4%.

Of all potential policy instruments, economic growth is unequivocally the most poverty-reducing tool in both metro and nonmetro areas. A two percent rate of economic growth at the national level leads to a decrease in all three measures of poverty. Not only do individuals move above poverty line but income distribution tends to become less unequal. It can be inferred that economic growth increases opportunities available to the poor and increases funds available for government transfers to socially disadvantaged families.

From this exercise, it should be clear that an increase in individual income does not necessarily translate to a decrease in overall poverty measures such as the headcount ratio, poverty gap and squared poverty gap indexes. Moreover, a given policy tool may have conflicting impacts on different poverty measures and
these impacts are not always uniformly distributed across locations. In contrast, economic growth at the national level is a sure pathway out of poverty.

5.5. Place and policy

In this section I present empirical evidence on the link between poverty, place, and policy based on theoretical insights provided by Blank (2002). She indicates how geographical attributes might affect the nature of poverty within a locality and their implications for antipoverty strategies. I divide the sample into metro and nonmetro areas. Metro and nonmetro areas are further broken down according to urban-rural continuum, economic and policy type codes as defined by the U.S. Department of Agriculture (USDA):

i) Economic type-codes are defined as follows:

- Farming-dependent counties: either 15 percent or more of average annual labor and proprietors' earnings derived from farming during 1998-2000 or 15 percent or more of employed residents worked in farm occupations in 2000;
- Mining-dependent counties: 15 percent or more of average annual labor and proprietors' earnings derived from mining during 1998-2000;
- Manufacturing-dependent counties: 25 percent or more of average annual labor and proprietors' earnings derived from manufacturing during 1998-2000;
- Federal/state government-dependent counties: 15 percent or more of average annual labor and proprietors' earnings derived from federal and state government during 1998-2000;
• Services-dependent counties: 45 percent or more of average annual labor and proprietors' earnings derived from services during 1998-2000.

• Nonspecialized counties: did not meet the dependence threshold for any one of the above industries.

ii) Policy type codes are defined as follows:

• Low-education counties: 25 percent or more of residents 25-64 years old had neither a high school diploma nor GED in 2000;

• Low-employment counties: less than 65 percent of residents 21-64 years old were employed in 2000;

• Persistently poor counties: 20 percent or more of residents were poor as measured by each of the last 4 censuses, 1970, 1980, 1990, and 2000;

• Population loss counties: the number of residents declined both between the 1980 and 1990 censuses and between the 1990 and 2000 censuses.

*Job-training programs*

Across the urban-rural continuum, except in nonmetro counties with an urban population of 20,000 or more and adjacent to a metro area, individuals who received job training tend to enjoy better living standards than those who did not (table 19). Unlike in metro areas, in nonmetro areas the response to job training programs varies widely across counties. No significant difference is found between those who receive the training and those who do not within nonmetro counties with an urban population of 20,000 or more adjacent to a metro area. Individuals living in completely rural areas not adjacent to a metro area experience the highest effect from job-training.
Using the economic dependence indicator, no significant difference is observed between the wellbeing of households participating in job-training programs and non-participants in counties described as farming-dependent metro counties, mining-dependent metro and nonmetro counties, and non-specialized-dependent nonmetro counties (figure 14). The greatest differences between job-training participants and non-participants are observed in service-dependent counties and federal/state government-dependent counties.

Households participating in job-training programs and living in high employment counties are relatively better off than those in low employment counties (figure 15). This result holds for both metro and nonmetro areas.

Considering county education status, job-training participants are still better off than non-participants (figure 16). The difference in wellbeing between job-training participants and non-participants is more pronounced among households in low education counties compared to those in high education counties. Overall, the response to job-training programs is higher in low education counties than in high education.

The impact of job-training programs is greater among participants in persistently poor counties than in non-persistently poor counties (figure 17). In persistently poor counties, the difference in living standards between programs participants and non-participants is more pronounced in nonmetro areas than in metro areas.

The difference in living standards as a result of job-training programs is greater within counties that have lost population than within counties that have
not lost population. In counties that have not lost population, the difference is more pronounced among metro residents than among nonmetro (figure 18). However, in counties that have lost population, the difference in living standards due to job-training is almost the same between metro and nonmetro residents.

*Human capital*

I examine the impact of an increase in the proportion of college graduates on living standards. In metro counties, the results show that the impact is negative but significant, except in areas with a population of 250,000 to 1 million where no significant effect is observed (table 19). This is an unexpected result that requires further investigation. An increase in the share of college graduates has a positive and significant impact on living standards of nonmetro residents, except in areas with an urban population of 20,000 or more. In nonmetro areas, the impact of an increase in the proportion of college graduates increases with the “rurality” of the location: the more rural the location, the higher is the effect of an increase in the share of college graduates.

In metro areas, except for mining-dependent counties, the marginal effect of an increase in the share of college graduates is either negative or non-significant (figure 19). In nonmetro areas, except in service-dependent counties, a marginal increase in the share of college graduates improves household wellbeing. In both metro and nonmetro areas, the greatest impact is observed in mining-dependent counties.

In nonmetro areas, an increase in the share of college graduates improves household wellbeing more in low employment counties than in high employment
counties (figure 20). In metro areas, an increase in the share of college graduates decreases households wellbeing in high employment counties while increasing wellbeing of those living in low employment counties.

The results for county education status are similar to those for employment status. In nonmetro areas, the effect is greater in low education counties than in high education counties (figure 21). In metro areas, an increase in the share of college graduates leads to a decrease in household wellbeing in high education counties while increasing wellbeing of those in low education counties.

Nonmetro households living in persistently poor counties see their living standards improve more than that of those in non-persistently poor counties as a result of an increase in the share of college graduates (figure 22). In metro areas, the impact of an increase in the share of college graduates is significantly negative in both persistently and non-persistently poor counties.

With an increase in the share of college graduates, households living in nonmetro counties with population loss experience a greater increase in their wellbeing than those in counties that did not lose population (figure 23). In metro areas, household wellbeing is negatively affected in counties with no population loss but positively affected in counties with population loss.

*Economic growth*

Over the urban-rural continuum, in both metro and nonmetro areas, the impact of economic growth on living standards is consistently positive and significant. In metro areas, the effect of economic growth decreases with
population size (table 19). Metro residents capture a greater economic growth effect than nonmetro residents.

Except for mining-dependent counties in nonmetro areas, the impact of a two percent economic growth on the living standard is significantly positive everywhere (figure 24). The highest effect is found in service-dependent counties for both metro and nonmetro areas.

The effect of economic growth on the wellbeing of households is greater in high employment counties than in low employment counties for both metro and nonmetro areas (figure 25). In nonmetro areas, economic growth has no significant effect on the wellbeing of households living in low employment countries.

As expected, the effect of economic growth on the wellbeing of households is greater in high education counties than in low education counties for both metro and nonmetro areas (figure 26). The effect is greater in metro areas than in nonmetro.

Households in non-persistently poor counties experience higher levels of living standard than those in persistently poor counties as a result of an increase in economic growth (figure 27). The same pattern holds for both metro and nonmetro areas. However, in nonmetro areas, the two percent economic growth has no significant effect on the wellbeing of households living in persistently poor counties.

A growing economy has a greater impact on living standards of households in counties with no population loss compared to those in counties with
population loss. In nonmetro areas, the impact is not significant in counties with population loss (figure 28).

Across these simulations, several policy relevant patterns emerge. Overall, the effect of both job-training programs and economic growth are consistently greater in metro areas than in nonmetro areas. Job-training programs and education have more effect in counties with low education, low employment, persistent poverty, and population loss. In contrast, the greatest impact of economic growth is observed in more endowed counties.

In metro areas, the effect of job-training, economic growth and education on households living standards decrease with respect to population size. In nonmetro areas, policy effects vary significantly across locations. The effect of an increase in the share of college graduates increases with the rurality of the location. The more rural the location, the greater is the effect of education on living standards.

This chapter demonstrates how the design and implementation of antipoverty strategies is complex. Government transfers based on population size are not necessarily optimal. When there are differences in poverty rates across locations, the simulations performed here indicate that the poverty rate can be reduced the most by targeting the poor in the poorest locations. These simulations also underscore the importance of having a well defined antipoverty objective in order to choose the most effective antipoverty tools.
CHAPTER 6

GENERAL CONCLUSION

The literature review is chapter two revealed that poverty occurs because of failure at both the individual and the community levels. Over time, each annual cohort of the poor comprises households experiencing short stays in poverty and those experiencing long stays in poverty. As a result, a successful antipoverty strategy should account for the needs of each of these two groups of individuals. While the transitorily poor would benefit from a strategy that helps smooth their consumption over time, the persistently poor would be better served with programs that improve their ability to accumulate assets.

In this dissertation, I first identify the main features that characterize both dynamically poor individuals and dynamically poor counties. At the individual level, my findings suggest that females account for 55% of the persistently poor and 50% of the transitorily poor. Across the urban-rural continuum, 74% of persistently poor males and 76% of persistently poor females live in metro counties compared to 78% of transitorily poor males and 79% of transitorily poor females.
At the county level, I find that 88% of persistently poor counties are nonmetro. While 17% of nonmetro counties have persistent poverty, only 4% of metro counties have persistent poverty. A further disaggregation shows that nonmetro counties with an urban population of 2,500 to 19,9999 and completely rural counties comprise 80% of the persistently poor counties.

My analysis of the difference between persistently poor and transitorily poor individuals goes beyond the length of time they spend in poverty. Compared to the transitorily poor individuals, the persistently poor receive less than 65% of their total income as wages, accumulate fewer assets, and rely more heavily on government social transfers than the non-persistently poor. Although their incomes fall below the poverty line occasionally, the transitorily poor stay above the poverty line most of the time.

The official poverty thresholds in the United States do not account for geographical differences in the cost of living. My results suggest that ignoring geographical differences in the cost of living inflates the income gap for both the persistently poor and the transitorily poor. In other words, non-adjusted poverty thresholds are higher than geographically adjusted poverty thresholds. This implies that the official poverty measure reports fewer dynamically poor households than it should.

The official poverty measure also leaves out government transfers such as food stamps and TANF. When the value of food stamps and TANF transfers are subtracted from total family income, the results suggest that the distribution of dynamic poverty is affected. I find that by leaving out the value of food stamps
and TANF transferred to low income families, the Census Bureau overestimates the number of families experiencing both persistent and transitory poverty. The change is more pronounced for persistent poverty than for transitory poverty.

Alongside persistently poor counties, I define "persistently less poor" counties as those whose poverty rates have been consistently at the national average poverty rates (11%) or lower in every decennial census between 1970 and 2000. Unlike persistently poor counties, 70% of persistently less poor counties are found in metro areas. Among the persistently poor counties, 83% are found in the South whereas the Midwest (54%) and the Northeast (22%) regions account for 76% of persistently less poor counties.

My analysis confirms the presence of systematic poverty clustering. This calls for regional cooperation in the fight against poverty. In other words, to be successful in the fight against poverty, counties should cooperate with their neighbors to find solutions to the common problems that create poverty. The claim that poor households make poor counties or vice-versa could not be confirmed: only nine percent of persistently poor families live in persistently poor counties. As for transitorily poor families, only four percent are found in persistently poor counties. The majority of dynamically poor families, 75% of persistently poor and 69% of the transitorily poor, live in counties whose poverty rates have not been 20% or higher in every decennial census from 1970 to 2000.

I use a generalized linear mixed-effects model to explain the difference in living standards between persistently poor individuals and transitorily poor individuals. The results suggest that policy instruments such as job-training
programs may yield different impacts on the living standards of the poor. Spatial attributes such as the local labor force induce different qualitative and quantitative returns. Based on these results, I infer that accounting for individual and locational heterogeneity has the potential to improve the efficiency of antipoverty strategies.

This research underscores the complexity of the design and implementation of antipoverty strategies. Government transfers based on the distribution of the population may not necessarily yield optimal outcomes. The optimal rule I discuss suggests that when poverty rates are different across locations, the poor in the poorest locations should be served in priority.

Several policy simulations are performed. Findings suggest that the effect of job-training programs and economic growth on households living standards is consistently greater in metro areas than in nonmetro areas. In contrast to economic growth, the greatest impact of job-training programs and education is observed in counties with low education, low employment, persistent poverty, and population loss.

These results support arguments in favor of policies that account for length of time spent in poverty. They also highlight the importance of spatial attributes in the fight against poverty. In the United States, antipoverty strategy revolves around the provision of safety nets to prevent entry into poverty and foster exit from poverty through job markets. This strategy is not sufficient for persistently poor households who remain in poverty because they are unable to self-finance investments needed to generate high returns from their assets. This
category of dynamically poor households would benefit from strategies that enhance their capabilities to accumulate assets and transform them into entitlements through social, economic, cultural and political institutions in place.

The major contributions of this dissertation consist of: i) an in-depth descriptive analysis of dynamically poor individuals that goes beyond differences in the number of years spent in poverty and demographics. The present study examines also differences in employment status, income structure, and government welfare transfers; ii) an evaluation of the impact on persistent and transitory poverty of ignoring government welfare transfers when computing official measures of poverty; iii) a comparative analysis of persistently poor counties and non persistently poor counties; and iv) a derivation and estimation of a generalized econometric framework that incorporates both fixed and random effects, accounts for number of years spent in poverty and includes spatial attributes among explanatory variables.

Despite the efforts invested, the present research does not cover all the aspects of poverty dynamics. Although locational attributes are included in the model, my analysis focuses primarily on individual behavior which overlooks the ongoing decision process to fight poverty at local, county or state level. For policy purposes, a framework that incorporates spatial interactions between locations is needed to analyze policy coordination in the fight against poverty. Moreover, poverty dynamics is characterized by substantial time persistence. Poverty persistence may be the result of structural state dependence such that the current poverty status affects an individual’s propensity to stay in poverty in the future.
The current research fails to explain how individuals move from one poverty status to another. Hazard models are useful for analyzing poverty transitions.

For future research, I would suggest that key variables such as local labor market be modeled explicitly. Given the role of local labor markets in the fight against poverty, both supply and demand variables should explicitly enter the model. Moreover, policy simulations involving government social programs should incorporate household decision making processes leading to participation or lack of participation in these programs. I would also encourage similar studies at regional, state or county level as opposed to national level. Indeed, the assumption of geographic homogeneity embedded in aggregate national studies often hides geographical characteristics crucial for optimal targeting.
APPENDIX A: TABLES
### Descriptive statistics

<table>
<thead>
<tr>
<th>Period</th>
<th>Mean</th>
<th>Median</th>
<th>Standard deviation</th>
<th>Coefficient of variation (%)</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
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</tr>
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<td>2.2</td>
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<td>39.3</td>
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<td>$67.3</td>
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<td>3.3</td>
<td>32.5</td>
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<td>1.3</td>
<td>2.2</td>
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<td>$5,000.0</td>
<td>$101.3</td>
<td>1.4</td>
<td>4.1</td>
<td>52.3</td>
</tr>
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<td>$6,151.7</td>
<td>$109.4</td>
<td>1.3</td>
<td>2.9</td>
<td>23.0</td>
</tr>
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<td>$11,237.6</td>
<td>$8,800.0</td>
<td>$128.4</td>
<td>1.1</td>
<td>2.6</td>
<td>17.6</td>
</tr>
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<td>1988</td>
<td>$12,161.9</td>
<td>$9,325.0</td>
<td>$143.6</td>
<td>1.2</td>
<td>2.9</td>
<td>22.7</td>
</tr>
<tr>
<td>1989</td>
<td>$19,689.4</td>
<td>$10,003.3</td>
<td>$1,851.9</td>
<td>9.4</td>
<td>41.9</td>
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<td>1990</td>
<td>$14,385.6</td>
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<td>$188.4</td>
<td>1.3</td>
<td>4.0</td>
<td>35.5</td>
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<td>1991</td>
<td>$15,126.1</td>
<td>$11,087.7</td>
<td>$211.0</td>
<td>1.4</td>
<td>5.2</td>
<td>60.4</td>
</tr>
<tr>
<td>1992</td>
<td>$28,593.9</td>
<td>$11,333.3</td>
<td>$2,893.4</td>
<td>10.1</td>
<td>17.6</td>
<td>337.0</td>
</tr>
<tr>
<td>1993</td>
<td>$16,376.7</td>
<td>$11,375.0</td>
<td>$302.8</td>
<td>1.8</td>
<td>8.4</td>
<td>124.0</td>
</tr>
<tr>
<td>1994</td>
<td>$16,941.9</td>
<td>$12,115.0</td>
<td>$250.7</td>
<td>1.5</td>
<td>4.7</td>
<td>47.7</td>
</tr>
<tr>
<td>1996</td>
<td>$19,255.5</td>
<td>$13,001.5</td>
<td>$335.8</td>
<td>1.7</td>
<td>7.3</td>
<td>111.2</td>
</tr>
<tr>
<td>1998</td>
<td>$19,635.7</td>
<td>$13,925.0</td>
<td>$304.1</td>
<td>1.5</td>
<td>4.3</td>
<td>36.4</td>
</tr>
<tr>
<td>2000</td>
<td>$22,613.3</td>
<td>$14,500.0</td>
<td>$273.9</td>
<td>1.2</td>
<td>4.8</td>
<td>44.0</td>
</tr>
</tbody>
</table>

Table 1: Distribution of family per capita income.

*For univariate data $y_1, y_2, \ldots, y_N$, the skewness $= \frac{\sum_{i=1}^{N} (y_i - \bar{y})^3}{(N-1)S^3}$, and the kurtosis $= \frac{\sum_{i=1}^{N} (y_i - \bar{y})^4}{(N-1)S^4} - 3$; where $\bar{y}$ is the mean, $S$ the standard deviation, and $N$ the number of observations.*
<table>
<thead>
<tr>
<th>Location</th>
<th>Persistently poor</th>
<th>Transitorily poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>13 Males, 13 Females</td>
<td>4 Males, 4 Females</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>13 Males, 13 Females</td>
<td>4 Males, 4 Females</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>13 Males, 13 Females</td>
<td>4 Males, 4 Females</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>13 Males, 13 Females</td>
<td>4 Males, 4 Females</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>14 Males, 14 Females</td>
<td>5 Males, 5 Females</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>14 Males, 13 Females</td>
<td>5 Males, 4 Females</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>14 Males, 13 Females</td>
<td>5 Males, 5 Females</td>
</tr>
<tr>
<td>Completely rural adjacent to a metro area</td>
<td>15 Males, 15 Females</td>
<td>5 Males, 4 Females</td>
</tr>
<tr>
<td>Completely rural not adjacent to a metro area</td>
<td>15 Males, 11 Females</td>
<td>4 Males, 4 Females</td>
</tr>
</tbody>
</table>

Table 2: Average years spent in poverty by location.
<table>
<thead>
<tr>
<th>Location</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Persistently</td>
<td>Transitorily</td>
</tr>
<tr>
<td>Metro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>74.2</td>
<td>77.5</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>47.0</td>
<td>48.9</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>16.5</td>
<td>18.0</td>
</tr>
<tr>
<td>Nonmetro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>25.8</td>
<td>22.5</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>6.9</td>
<td>6.0</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>2.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>7.1</td>
<td>6.7</td>
</tr>
<tr>
<td>Completely rural adjacent to a metro area</td>
<td>5.3</td>
<td>4.5</td>
</tr>
<tr>
<td>Completely rural not adjacent to a metro area</td>
<td>2.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3: Dynamically poor individuals by gender and location (%).
### Table 4: Dynamically poor individuals by marital status and location (%).

<table>
<thead>
<tr>
<th></th>
<th>Never married</th>
<th>Married</th>
<th>Divorced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Persistently</td>
<td>Transitorily</td>
<td>Persistently</td>
</tr>
<tr>
<td><strong>Metro</strong></td>
<td>78.4</td>
<td>81.7</td>
<td>68.8</td>
</tr>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>51.5</td>
<td>52.7</td>
<td>38.7</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>16.8</td>
<td>18.3</td>
<td>17.2</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>10.1</td>
<td>10.6</td>
<td>12.9</td>
</tr>
<tr>
<td><strong>Nonmetro</strong></td>
<td>21.6</td>
<td>18.3</td>
<td>31.2</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>5.4</td>
<td>5.3</td>
<td>4.3</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>2.2</td>
<td>2.1</td>
<td>2.9</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>6.1</td>
<td>5.1</td>
<td>9.7</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>4.0</td>
<td>3.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Completely rural, adjacent to a metro area</td>
<td>2.9</td>
<td>1.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Completely rural, not adjacent to a metro area</td>
<td>0.9</td>
<td>1.1</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Sector</td>
<td>Persistently</td>
<td>Transitorily</td>
<td>Never poor</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------------</td>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>Mining</td>
<td>0.1</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Construction</td>
<td>1.1</td>
<td>1.1</td>
<td>2.3</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>17.3</td>
<td>19.7</td>
<td>33.6</td>
</tr>
<tr>
<td>Professional and related services</td>
<td>20.6</td>
<td>28.3</td>
<td>3.1</td>
</tr>
<tr>
<td>Agriculture, forestry and fisheries</td>
<td>3.1</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Wholesale and retail trade</td>
<td>34.3</td>
<td>27.3</td>
<td>30.0</td>
</tr>
<tr>
<td>Public administration</td>
<td>3.2</td>
<td>4.2</td>
<td>6.1</td>
</tr>
<tr>
<td>Transportation, communication, public utilities</td>
<td>4.1</td>
<td>6.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Finance, insurance and real estate</td>
<td>2.4</td>
<td>0.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Business and repair services</td>
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<td>7.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Personal services</td>
<td>5.3</td>
<td>3.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Entertainment and recreation services</td>
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<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5: Dynamically poor individuals by sector of employment (%).
<table>
<thead>
<tr>
<th>Sector Employment and Location</th>
<th>Wholesale and Retail Trade</th>
<th>Professional and Related Services</th>
<th>Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Persistently</td>
<td>Transitorily</td>
<td>Persistently</td>
</tr>
<tr>
<td>Metro</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>74.9</td>
<td>79.7</td>
<td>78.6</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>44.1</td>
<td>48.6</td>
<td>48.7</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>18.6</td>
<td>19.0</td>
<td>20.3</td>
</tr>
<tr>
<td>Nonmetro</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>25.1</td>
<td>20.3</td>
<td>21.4</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>5.8</td>
<td>6.0</td>
<td>4.6</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>2.7</td>
<td>2.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>7.8</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>Completely rural, adjacent to a metro area</td>
<td>5.0</td>
<td>3.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Completely rural, not adjacent to a metro area</td>
<td>2.1</td>
<td>0.9</td>
<td>2.6</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 6: Dynamically poor individuals by sector employment and location (%).
### Table 7: Wage-income ratio by location (%).

<table>
<thead>
<tr>
<th>Location</th>
<th>Persistently</th>
<th>Transitorily</th>
<th>Never Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td>60.4</td>
<td>84.1</td>
<td>59.7</td>
</tr>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>59.7</td>
<td>84.9</td>
<td>57.7</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>57.7</td>
<td>84.1</td>
<td>63.7</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>63.7</td>
<td>83.4</td>
<td>60.4</td>
</tr>
<tr>
<td>Nonmetro</td>
<td>62.5</td>
<td>82.3</td>
<td>64.5</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>63.2</td>
<td>83.9</td>
<td>64.5</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>64.5</td>
<td>77.4</td>
<td>64.2</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>64.2</td>
<td>80.0</td>
<td>52.2</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>52.2</td>
<td>81.3</td>
<td>57.5</td>
</tr>
<tr>
<td>Completely rural, adjacent to a metro area</td>
<td>57.5</td>
<td>82.4</td>
<td>73.7</td>
</tr>
<tr>
<td>Completely rural, not adjacent to a metro area</td>
<td>73.7</td>
<td>83.2</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>61.9</strong></td>
<td><strong>82.9</strong></td>
<td><strong>60.4</strong></td>
</tr>
</tbody>
</table>

### Table 8: Composition of non-wage income (%).

<table>
<thead>
<tr>
<th>Income Source</th>
<th>Persistently</th>
<th>Transitorily</th>
<th>Never Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational benefit, scholarship</td>
<td>4.7</td>
<td>7.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Supplement Security Income (SSI)</td>
<td>11.5</td>
<td>1.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Disability, Veteran benefits</td>
<td>5.0</td>
<td>3.8</td>
<td>4.1</td>
</tr>
<tr>
<td>Aid to Families with Dependent Children (AFDC)</td>
<td>15.8</td>
<td>1.7</td>
<td>0.2</td>
</tr>
<tr>
<td>Child support, Alimony</td>
<td>6.0</td>
<td>4.5</td>
<td>2.9</td>
</tr>
<tr>
<td>Unemployment compensation</td>
<td>6.8</td>
<td>9.0</td>
<td>11.3</td>
</tr>
<tr>
<td>Military income</td>
<td>3.4</td>
<td>8.5</td>
<td>9.7</td>
</tr>
<tr>
<td>Food stamps</td>
<td>21.1</td>
<td>2.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Net Farm and Business income</td>
<td>3.2</td>
<td>8.6</td>
<td>10.9</td>
</tr>
<tr>
<td>Interest, Dividends, Rent</td>
<td>12.0</td>
<td>43.9</td>
<td>54.1</td>
</tr>
<tr>
<td>Other</td>
<td>10.6</td>
<td>8.0</td>
<td>3.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
<td><strong>100.0</strong></td>
</tr>
<tr>
<td></td>
<td>Total income with geographical adjusted poverty thresholds</td>
<td>Total income with official thresholds</td>
<td>Total income minus food stamp and AFDC with official thresholds</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-----------------------------------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Persistently Transitorily</td>
<td>Persistently Transitorily</td>
<td>Persistently Transitorily</td>
</tr>
<tr>
<td><strong>Metro</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>$ (101) $ 22,821</td>
<td>$ 260 $ 23,187</td>
<td>$ (643) $ 22,554</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>$ (52) $ 27,579</td>
<td>$ 502 $ 27,795</td>
<td>$ (129) $ 27,612</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>$ 77 $ 23,804</td>
<td>$ 549 $ 24,108</td>
<td>$ (803) $ 22,947</td>
</tr>
<tr>
<td><strong>Nonmetro</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>$ 52 $ 19,058</td>
<td>$ (501) $ 19,706</td>
<td>$ (2,880) $ 15,757</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>$ 373 $ 19,058</td>
<td>$ 1,186 $ 19,556</td>
<td>$ 560 $ 18,887</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>$ 476 $ 16,690</td>
<td>$ 218 $ 17,397</td>
<td>$ (2,470) $ 15,741</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>$ 2,933 $ 19,931</td>
<td>$ 3,603 $ 20,757</td>
<td>$ (2,217) $ 16,049</td>
</tr>
<tr>
<td>Completely rural, adjacent to a metro area</td>
<td>$ (1,817) $ 21,557</td>
<td>$ (781) $ 21,962</td>
<td>$ (3,992) $ 16,396</td>
</tr>
<tr>
<td>Completely rural, not adjacent to a metro area</td>
<td>$ (3,702) $ 16,338</td>
<td>$ (2,643) $ 16,904</td>
<td>$ (5,474) $ 11,554</td>
</tr>
<tr>
<td>Metro-Nonmetro difference (%)</td>
<td><strong>24.4</strong></td>
<td><strong>37.2</strong></td>
<td><strong>9.0</strong></td>
</tr>
</tbody>
</table>

Note: Figure in parentheses are negative.

Table 9: Income gaps by locations ($).

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metro</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>0.078</td>
<td>0.078</td>
<td>0.088</td>
<td>0.085</td>
<td>0.080</td>
<td>0.100</td>
<td>0.126</td>
<td>0.097</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>0.098</td>
<td>0.094</td>
<td>0.100</td>
<td>0.107</td>
<td>0.090</td>
<td>0.086</td>
<td>0.111</td>
<td>0.101</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>0.081</td>
<td>0.082</td>
<td>0.095</td>
<td>0.119</td>
<td>0.105</td>
<td>0.086</td>
<td>0.111</td>
<td>0.099</td>
</tr>
<tr>
<td><strong>Nonmetro</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>0.077</td>
<td>0.082</td>
<td>0.069</td>
<td>0.091</td>
<td>0.069</td>
<td>0.069</td>
<td>0.091</td>
<td>0.124</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>0.121</td>
<td>0.118</td>
<td>0.157</td>
<td>0.184</td>
<td>0.135</td>
<td>0.134</td>
<td>0.118</td>
<td>0.129</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>0.111</td>
<td>0.102</td>
<td>0.106</td>
<td>0.114</td>
<td>0.131</td>
<td>0.106</td>
<td>0.120</td>
<td>0.166</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>0.101</td>
<td>0.129</td>
<td>0.124</td>
<td>0.145</td>
<td>0.148</td>
<td>0.128</td>
<td>0.110</td>
<td>0.196</td>
</tr>
<tr>
<td>Completely rural, adjacent to a metro area</td>
<td>0.141</td>
<td>0.153</td>
<td>0.156</td>
<td>0.210</td>
<td>0.220</td>
<td>0.162</td>
<td>0.214</td>
<td>0.128</td>
</tr>
<tr>
<td>Completely rural, not adjacent to a metro area</td>
<td>0.118</td>
<td>0.106</td>
<td>0.168</td>
<td>0.140</td>
<td>0.150</td>
<td>0.157</td>
<td>0.121</td>
<td>0.133</td>
</tr>
<tr>
<td><strong>Metro-Nonmetro difference (%)</strong></td>
<td><strong>24.4</strong></td>
<td><strong>37.2</strong></td>
<td><strong>19.3</strong></td>
<td><strong>52.9</strong></td>
<td><strong>58.8</strong></td>
<td><strong>9.0</strong></td>
<td><strong>-2.4</strong></td>
<td><strong>54.6</strong></td>
</tr>
</tbody>
</table>

Table 10: Poverty gap index.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metro</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>0.075</td>
<td>0.072</td>
<td>0.078</td>
<td>0.094</td>
<td>0.081</td>
<td>0.081</td>
<td>0.103</td>
<td>0.109</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>0.073</td>
<td>0.074</td>
<td>0.080</td>
<td>0.098</td>
<td>0.086</td>
<td>0.090</td>
<td>0.115</td>
<td>0.114</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>0.054</td>
<td>0.058</td>
<td>0.068</td>
<td>0.093</td>
<td>0.082</td>
<td>0.067</td>
<td>0.091</td>
<td>0.079</td>
</tr>
<tr>
<td><strong>Nonmetro</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>0.078</td>
<td>0.078</td>
<td>0.088</td>
<td>0.085</td>
<td>0.080</td>
<td>0.100</td>
<td>0.126</td>
<td>0.097</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>0.053</td>
<td>0.059</td>
<td>0.050</td>
<td>0.065</td>
<td>0.049</td>
<td>0.052</td>
<td>0.073</td>
<td>0.101</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>0.092</td>
<td>0.091</td>
<td>0.121</td>
<td>0.144</td>
<td>0.103</td>
<td>0.110</td>
<td>0.097</td>
<td>0.103</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>0.081</td>
<td>0.069</td>
<td>0.075</td>
<td>0.080</td>
<td>0.097</td>
<td>0.083</td>
<td>0.098</td>
<td>0.147</td>
</tr>
<tr>
<td>Completely rural, adjacent to a metro area</td>
<td>0.072</td>
<td>0.091</td>
<td>0.087</td>
<td>0.109</td>
<td>0.106</td>
<td>0.098</td>
<td>0.079</td>
<td>0.164</td>
</tr>
<tr>
<td>Completely rural, not adjacent to a metro area</td>
<td>0.099</td>
<td>0.110</td>
<td>0.107</td>
<td>0.161</td>
<td>0.161</td>
<td>0.118</td>
<td>0.169</td>
<td>0.092</td>
</tr>
<tr>
<td><strong>Metro-Nonmetro difference (%)</strong></td>
<td>4.0</td>
<td>8.3</td>
<td>12.8</td>
<td>-9.6</td>
<td>-1.2</td>
<td>23.5</td>
<td>22.3</td>
<td>-11.0</td>
</tr>
</tbody>
</table>

Table 11: Squared poverty gap.
### Table 12: Global Moran’s I by k-nearest neighbors.

<table>
<thead>
<tr>
<th>Years</th>
<th>k=5</th>
<th>k=10</th>
<th>k=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>0.6285</td>
<td>0.5891</td>
<td>0.5598</td>
</tr>
<tr>
<td></td>
<td>(0.0108)</td>
<td>(0.0076)</td>
<td>(0.0062)</td>
</tr>
<tr>
<td>1993</td>
<td>0.6458</td>
<td>0.6119</td>
<td>0.5860</td>
</tr>
<tr>
<td></td>
<td>(0.0112)</td>
<td>(0.0077)</td>
<td>(0.0062)</td>
</tr>
<tr>
<td>1995</td>
<td>0.6447</td>
<td>0.6094</td>
<td>0.5832</td>
</tr>
<tr>
<td></td>
<td>0.6226</td>
<td>0.5845</td>
<td>0.5541</td>
</tr>
<tr>
<td>1997</td>
<td>(0.0112)</td>
<td>(0.077)</td>
<td>(0.0063)</td>
</tr>
<tr>
<td>1998</td>
<td>0.6213</td>
<td>0.5838</td>
<td>0.5536</td>
</tr>
<tr>
<td></td>
<td>(0.0111)</td>
<td>(0.0075)</td>
<td>(0.0059)</td>
</tr>
<tr>
<td>1999</td>
<td>0.6607</td>
<td>0.6284</td>
<td>0.5996</td>
</tr>
<tr>
<td></td>
<td>(0.0107)</td>
<td>(0.0076)</td>
<td>(0.0064)</td>
</tr>
<tr>
<td>2000</td>
<td>0.6532</td>
<td>0.6177</td>
<td>0.5896</td>
</tr>
<tr>
<td></td>
<td>0.6565</td>
<td>0.6225</td>
<td>0.5969</td>
</tr>
<tr>
<td>2001</td>
<td>(0.0110)</td>
<td>(0.0079)</td>
<td>(0.0064)</td>
</tr>
<tr>
<td></td>
<td>0.6283</td>
<td>0.5957</td>
<td>0.5710</td>
</tr>
<tr>
<td>2002</td>
<td>(0.0108)</td>
<td>(0.0077)</td>
<td>(0.0061)</td>
</tr>
</tbody>
</table>

Numbers in parentheses are p-values.

### Table 13: Persistently poor counties by locations (%).

<table>
<thead>
<tr>
<th>Metro areas</th>
<th>Persistently poor</th>
<th>Persistently less poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>12</td>
<td>70</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

**Nonmetro areas**

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>88</td>
<td>30</td>
</tr>
</tbody>
</table>

### Table 14: Average wage paid by locations and poverty status ($).

<table>
<thead>
<tr>
<th>Metro areas</th>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counties in metro areas of 1 million population or more</td>
<td>$13,505</td>
<td>$17,493</td>
<td>29.5</td>
</tr>
<tr>
<td>Counties in metro areas of 250,000 to 1 million population</td>
<td>$13,918</td>
<td>$18,270</td>
<td>31.3</td>
</tr>
<tr>
<td>Counties in metro areas of fewer than 250,000 population</td>
<td>$13,265</td>
<td>$17,295</td>
<td>30.4</td>
</tr>
</tbody>
</table>

**Nonmetro areas**

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12,295</td>
<td>$18,831</td>
<td>53.2</td>
</tr>
</tbody>
</table>

Urban population of 20,000 or more, adjacent to a metro area

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$13,190</td>
<td>$16,051</td>
<td>21.7</td>
</tr>
</tbody>
</table>

Urban population of 20,000 or more, not adjacent to a metro area

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$13,036</td>
<td>$17,344</td>
<td>33.0</td>
</tr>
</tbody>
</table>

Urban population of 2,500 to 19,999, adjacent to a metro area

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12,297</td>
<td>$15,185</td>
<td>23.5</td>
</tr>
</tbody>
</table>

Urban population of 2,500 to 19,999, not adjacent to a metro area

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12,467</td>
<td>$16,549</td>
<td>32.7</td>
</tr>
</tbody>
</table>

Completely rural, adjacent to a metro area

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$11,550</td>
<td>$31,267</td>
<td>170.7</td>
</tr>
</tbody>
</table>

Completely rural not adjacent to a metro area

<table>
<thead>
<tr>
<th>Persistently poor</th>
<th>Persistently less poor</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$11,227</td>
<td>$16,590</td>
<td>47.8</td>
</tr>
</tbody>
</table>
## Decomposition of well-being measure

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>1.17</td>
<td>1.50</td>
<td>1.11</td>
<td>1.74</td>
<td>1.01</td>
<td>1.81</td>
<td>1.19</td>
<td>2.26</td>
</tr>
<tr>
<td>Demographics (age, gender, size, and marital status)</td>
<td>-1.48</td>
<td>-1.58</td>
<td>-1.41</td>
<td>-1.30</td>
<td>-1.43</td>
<td>-1.24</td>
<td>-1.48</td>
<td>-1.27</td>
</tr>
<tr>
<td>Education</td>
<td>0.23</td>
<td>0.25</td>
<td>0.38</td>
<td>0.42</td>
<td>0.39</td>
<td>0.45</td>
<td>0.39</td>
<td>0.45</td>
</tr>
<tr>
<td>Labor market participation (job status and sector of employment)</td>
<td>0.13</td>
<td>0.07</td>
<td>0.08</td>
<td>0.03</td>
<td>0.07</td>
<td>0.02</td>
<td>0.25</td>
<td>0.15</td>
</tr>
<tr>
<td>Government programs (job training and housing subsidy)</td>
<td>0.02</td>
<td>-0.01</td>
<td>0.05</td>
<td>-0.01</td>
<td>0.06</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>Residence (region, metro/nonmetro)</td>
<td>-0.10</td>
<td>0.04</td>
<td>-0.11</td>
<td>0.05</td>
<td>-0.11</td>
<td>0.07</td>
<td>-0.15</td>
<td>0.08</td>
</tr>
<tr>
<td>Local econ environment (county employment)</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.02</td>
<td>-0.04</td>
<td>0.02</td>
</tr>
<tr>
<td>National economic environment (real gross domestic product)</td>
<td>0.54</td>
<td>0.60</td>
<td>0.64</td>
<td>0.73</td>
<td>0.73</td>
<td>0.85</td>
<td>0.90</td>
<td>1.01</td>
</tr>
<tr>
<td><strong>Income-to-needs ratio</strong></td>
<td><strong>1.65</strong></td>
<td><strong>2.45</strong></td>
<td><strong>2.07</strong></td>
<td><strong>5.39</strong></td>
<td><strong>2.02</strong></td>
<td><strong>7.20</strong></td>
<td><strong>2.85</strong></td>
<td><strong>14.91</strong></td>
</tr>
</tbody>
</table>

Table 15: Estimated wellbeing by sources.
<table>
<thead>
<tr>
<th></th>
<th>Transitorily poor</th>
<th></th>
<th>Persistently poor</th>
<th></th>
<th>Pooled</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>Standard error</td>
<td>Coefficients</td>
<td>Standard error</td>
<td>Coefficients</td>
<td>Standard error</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.504</td>
<td>0.367</td>
<td>-0.266</td>
<td>*</td>
<td>0.151</td>
<td>0.7748</td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.005</td>
<td>*</td>
<td>-0.017</td>
<td>***</td>
<td>0.003</td>
<td>0.000</td>
</tr>
<tr>
<td>Size</td>
<td>-0.273</td>
<td>***</td>
<td>-0.123</td>
<td>***</td>
<td>0.012</td>
<td>-0.239</td>
</tr>
<tr>
<td>Size-square</td>
<td>0.013</td>
<td>***</td>
<td>0.003</td>
<td>***</td>
<td>0.001</td>
<td>0.009</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female (default)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>-0.006</td>
<td>0.010</td>
<td>-0.139</td>
<td>***</td>
<td>0.023</td>
<td>-0.015</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White non Hispanics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>-0.153</td>
<td>**</td>
<td>-0.072</td>
<td>0.080</td>
<td>-0.351</td>
<td>*** 0.023</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-0.123</td>
<td>***</td>
<td>-0.005</td>
<td>0.066</td>
<td>-0.279</td>
<td>*** 0.022</td>
</tr>
<tr>
<td>Asian</td>
<td>0.070</td>
<td>0.194</td>
<td>0.312</td>
<td>0.314</td>
<td>-0.001</td>
<td>0.173</td>
</tr>
<tr>
<td>Indian</td>
<td>-0.124</td>
<td>***</td>
<td>0.042</td>
<td>0.045</td>
<td>0.074</td>
<td>-0.177</td>
</tr>
<tr>
<td>Other</td>
<td>-0.009</td>
<td>0.023</td>
<td>-0.070</td>
<td>0.064</td>
<td>-0.010</td>
<td>0.023</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-school (Default)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College/University</td>
<td>0.238</td>
<td>***</td>
<td>0.388</td>
<td>***</td>
<td>0.050</td>
<td>0.417</td>
</tr>
<tr>
<td>Other</td>
<td>0.474</td>
<td>***</td>
<td>0.406</td>
<td>***</td>
<td>0.053</td>
<td>0.431</td>
</tr>
</tbody>
</table>

Table 16: Estimation results.
Table 16: continued.

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Married (default)</th>
<th>Never married</th>
<th>0.806 ***</th>
<th>0.047</th>
<th>-0.591 ***</th>
<th>0.083</th>
<th>-0.992 ***</th>
<th>0.012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Separated</td>
<td>-0.757 ***</td>
<td>0.059</td>
<td>-0.585 ***</td>
<td>0.090</td>
<td>-0.977 ***</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Divorced</td>
<td>-0.669 ***</td>
<td>0.033</td>
<td>-0.532 ***</td>
<td>0.070</td>
<td>-0.789 ***</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>-0.450 ***</td>
<td>0.063</td>
<td>-0.546 ***</td>
<td>0.122</td>
<td>-0.723 ***</td>
<td>0.059</td>
</tr>
</tbody>
</table>

Labor market participation

| Job (yes=1, no=0) | 0.197 *** | 0.038  | 0.337 *** | 0.047  | 0.341 *** | 0.010  |

Sectors of employment

| Public Admistration (Default) | Manufacturing | 0.054 ** | 0.021  | 0.271 *** | 0.040  | 0.111 *** | 0.019  |
|                               | Construction  | -0.011  | 0.104  | 0.272    | 0.213  | 0.063    | 0.104  |
|                               | Wholesale     | -0.083 ***| 0.026  | 0.103 ** | 0.050  | -0.110 ***| 0.023  |
|                               | Other         | -0.011  | 0.013  | 0.036    | 0.024  | -0.054 ***| 0.011  |

Non-cash programs

| Job training (1 if received, 0 if not) | 0.055 * | 0.030  | 0.393 *** | 0.025  | 0.149 *** | 0.018  |
| Subsidy (1 if received, 0 if not)    | -0.295 ***| 0.029  | -0.115 ***| 0.024  | -0.374 ***| 0.018  |

Spatial attributes

<table>
<thead>
<tr>
<th>Place of residence</th>
<th>Region of residence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>South (default)</td>
</tr>
<tr>
<td>Northeaster</td>
<td>0.013</td>
</tr>
<tr>
<td>Northcentral</td>
<td>-0.033</td>
</tr>
<tr>
<td>West</td>
<td>-0.074</td>
</tr>
</tbody>
</table>

(continued)
Table 16: continued.

<table>
<thead>
<tr>
<th>Metro-Nonmetro difference</th>
<th>Metro (default)</th>
<th>Nonmetro</th>
<th>Population of 25 years or more with college degree</th>
<th>Metro</th>
<th>Nonmetro</th>
<th>Employment (1,000)</th>
<th>Agriculture</th>
<th>Metro</th>
<th>Nonmetro</th>
<th>Manufacturing</th>
<th>Metro</th>
<th>Nonmetro</th>
<th>Wholesale and retail</th>
<th>Metro</th>
<th>Nonmetro</th>
<th>Government</th>
<th>Metro</th>
<th>Nonmetro</th>
<th>Service</th>
<th>Metro</th>
<th>Nonmetro</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Metro</td>
<td>0.187</td>
<td>***</td>
<td>0.054</td>
<td>-0.431</td>
<td>***</td>
<td>0.098</td>
<td>0.044</td>
<td>***</td>
<td>0.050</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonmetro</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population of 25 years or more with college degree</td>
<td>Metro</td>
<td>-0.020</td>
<td>***</td>
<td>0.007</td>
<td>-0.021</td>
<td>0.016</td>
<td>-0.010</td>
<td>0.006</td>
<td></td>
<td></td>
<td>Nonmetro</td>
<td>0.130</td>
<td>***</td>
<td>0.013</td>
<td>0.125</td>
<td>**</td>
<td>0.024</td>
<td>0.159</td>
<td>***</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td>Employment (1,000)</td>
<td>Agriculture</td>
<td>Metro</td>
<td>0.002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nonmetro</td>
<td>-0.041</td>
<td>***</td>
<td>0.014</td>
<td>-0.004</td>
<td>0.009</td>
<td>-0.024</td>
<td>***</td>
<td>0.007</td>
<td></td>
<td></td>
<td>Manufacturing</td>
<td>Metro</td>
<td>0.001</td>
<td>***</td>
<td>0.000</td>
<td>**</td>
<td>0.000</td>
<td>0.000</td>
<td>***</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Table 16: continued.

| Index of real Gross Domestic Product (year 2000=100) | Metro | 0.013 | *** | 0.002 | 0.009 | *** | 0.002 | 0.006 | *** | 0.001 |
| Nonmetro | 0.007 | *** | 0.002 | 0.013 | *** | 0.002 | 0.002 | ** | 0.001 |

| Inverse of Mill's ratio<sup>a</sup> | 0.088 | 0.311 | -0.083 | 0.253 |

| Log likelihood | -58,879 | -27,970 | -89,065 |
| Observations | 186,902 | 48,211 | 235,113 |

*., **., *** significant at 0.10, 0.05, and 0.01 levels
<sup>a</sup> Test for sample selection biased due to the exclusion of the transitorily poor in the persistently poor regression or the exclusion of the persistently poor in the transitorily poor regression.
<table>
<thead>
<tr>
<th>Year</th>
<th>Current scheme</th>
<th>Simulated (optimal) scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Metro</td>
<td>Nonmetro</td>
</tr>
<tr>
<td>1979</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>1980</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>1981</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>1982</td>
<td>0.06</td>
<td>0.05</td>
</tr>
<tr>
<td>1983</td>
<td>0.09</td>
<td>0.08</td>
</tr>
<tr>
<td>1984</td>
<td>0.12</td>
<td>0.11</td>
</tr>
<tr>
<td>1985</td>
<td>0.15</td>
<td>0.11</td>
</tr>
<tr>
<td>1986</td>
<td>0.18</td>
<td>0.14</td>
</tr>
<tr>
<td>1987</td>
<td>0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>1988</td>
<td>0.23</td>
<td>0.25</td>
</tr>
<tr>
<td>1989</td>
<td>0.35</td>
<td>0.22</td>
</tr>
<tr>
<td>1990</td>
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<td>0.31</td>
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<td>1991</td>
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<td>1992</td>
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<td>1993</td>
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<td>1994</td>
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<tr>
<td>1996</td>
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<td>0.43</td>
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<tr>
<td>1998</td>
<td>0.28</td>
<td>0.26</td>
</tr>
<tr>
<td>2000</td>
<td>0.27</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Table 17: Poverty elasticity of government transfers.
|                | Baseline |          |          | Manufacturing | Wholesale and retail |          |          |          |          |          |          |          |          |          |          |
|----------------|----------|----------|----------|---------------|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
|                |          | Metro    | Nonmetro | All           | Metro                | Nonmetro | All      | Metro    | Nonmetro | All      | Metro    | Nonmetro | All      | Metro    | Nonmetro | All      |
| P1             | 0.02     | 0.02     | 0.04     |               |                      |          |          |          |          |          |          |          |          |          |          |          |
| P2             | 0.01     | 0.01     | 0.02     |               |                      |          |          |          |          |          |          |          |          |          |          |          |
| P0             | 0.12     | 0.19     | 0.13     |               |                      |          |          |          |          |          |          |          |          |          |          |          |
| P1             | -0.19    | 1.74     | 0.75     | -0.05         | 0.52                 | 0.23     |          |          |          |          |          |          |          |          |          |          |
| P2             | -0.30    | 2.58     | 1.39     | -0.08         | 0.69                 | 0.37     |          |          |          |          |          |          |          |          |          |          |
| P0             | 0.00     | 0.00     | 0.00     | 0.00          | 0.00                 | 0.00     |          |          |          |          |          |          |          |          |          |          |
| P1             | -0.36    | 0.12     | -0.12    | -0.07         | 1.55                 | 0.82     |          |          |          |          |          |          |          |          |          |          |
| P2             | -0.52    | 0.16     | -0.12    | 0.01          | 2.04                 | 1.28     |          |          |          |          |          |          |          |          |          |          |
| P0             | 0.00     | 0.00     | 0.00     | 1.73          | 0.00                 | 1.12     |          |          |          |          |          |          |          |          |          |          |
| P1             | 0.27     | -2.45    | -0.01    | -2.76         | -2.08                | -2.35    |          |          |          |          |          |          |          |          |          |          |
| P2             | 0.53     | -2.40    | -0.01    | -4.04         | -1.67                | -2.64    |          |          |          |          |          |          |          |          |          |          |
| P0             | 2.00     | -1.00    | 0.94     | -2.55         | -4.33                | -3.18    |          |          |          |          |          |          |          |          |          |          |

Table 18: Simulation results (%).
### Table 19: Effect of policy across urban-rural continuum.

<table>
<thead>
<tr>
<th>Urban-rural continuum</th>
<th>Job training</th>
<th>Share of population with college/university degree</th>
<th>Real Gross Domestic Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Marginal effect</td>
<td>Marginal effect</td>
<td>Marginal effect</td>
</tr>
<tr>
<td><strong>Metro areas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas of 1 million population or more</td>
<td>0.2558 ***</td>
<td>-0.0003 ***</td>
<td>1.1160 ***</td>
</tr>
<tr>
<td>Areas of 250,000 to 1 million population</td>
<td>0.2504 ***</td>
<td>0.0001</td>
<td>1.0010 ***</td>
</tr>
<tr>
<td>Areas of fewer than 250,000 population</td>
<td>0.2530 ***</td>
<td>-0.0004 ***</td>
<td>0.9485 ***</td>
</tr>
<tr>
<td><strong>Non-metro areas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban population of 20,000 or more, adjacent to a metro area</td>
<td>0.0144</td>
<td>0.0002</td>
<td>0.8556 ***</td>
</tr>
<tr>
<td>Urban population of 20,000 or more, not adjacent to a metro area</td>
<td>0.2781 ***</td>
<td>0.0001</td>
<td>0.8619 ***</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, adjacent to a metro area</td>
<td>0.1233 **</td>
<td>0.0012 ***</td>
<td>0.7185 ***</td>
</tr>
<tr>
<td>Urban population of 2,500 to 19,999, not adjacent to a metro area</td>
<td>0.3460 ***</td>
<td>0.0013 ***</td>
<td>0.5483 **</td>
</tr>
<tr>
<td>Completely rural, adjacent to a metro area</td>
<td>0.2703 ***</td>
<td>0.0019 ***</td>
<td>0.6232 **</td>
</tr>
<tr>
<td>Completely rural, not adjacent to a metro area</td>
<td>0.4649 **</td>
<td>0.0024 ***</td>
<td>0.5559 **</td>
</tr>
</tbody>
</table>

*, **, *** significant at 0.10, 0.05, and 0.01 levels
APPENDIX B: FIGURES
Figure 1: Average family per capita income and years in poverty.
Figure 2: Dynamic poverty among Blacks by location.

Figure 3: Dynamic poverty among Caucasians by location.
Figure 4: Dynamic poverty among Hispanics by location.

Figure 5: Earnings for persistently poor and persistently less poor counties by sector of activity (%).
Transitorily poor individuals in persistently poor counties
4%

Transitorily poor individuals in persistently less poor counties
27%

Transitorily poor individuals in other counties
69%

Persistently poor individuals in persistently poor counties
9%

Persistently poor individuals in persistently less poor counties
16%

Persistently poor individuals in other counties
75%

Figure 6: Transitorily poor individuals in persistently poor counties.

Figure 7: Persistently poor individuals in persistently poor counties.
Figure 8: Government transfers (TTRANS89) and poverty rates (POV89) in 1989.

Figure 9: Government transfers (TTRANS93) and poverty rates (POV93) in 1993.
Figure 10: Government transfers (TTRANS95) and poverty rates (POV95) in 1995.

Figure 11: Government transfers (TTRANS98) and poverty rates (POV98) in 1998.

Figure 12: Government transfers (TTRANS99) and poverty rates (POV99) in 1999.
Figure 13: Government transfers (TTRANS00) and poverty rates (POV00) in 2000.

Figure 14: Effects of job-training programs on individuals’ wellbeing in metro and non-metro areas classified by economic-dependence indicator.
Figure 15: Effects of job-training programs on individuals’ wellbeing in metro and non-metro areas classified by level of employment.

Figure 16: Effects of job-training programs on individuals’ wellbeing in metro and non-metro areas classified by level of education.

Figure 17: Effects of job-training programs on individuals’ wellbeing in metro and non-metro areas classified by level of persistent poverty.
Figure 18: Effects of job-training programs on individuals’ wellbeing in metro and non-metro areas classified by population loss.

Figure 19: Effects of human capital on individuals’ wellbeing in metro and non-metro areas classified by economic-dependence indicator.
Figure 20: Effects of human capital on individuals’ wellbeing in metro and non-metro areas classified by level of employment.

Figure 21: Effects of human capital on individuals’ wellbeing in metro and non-metro areas classified by level of education.

Figure 22: Effects of human capital on individuals’ wellbeing in metro and non-metro areas classified by level of persistent poverty.
Figure 23: Effects of human capital on individuals’ wellbeing in metro and non-metro areas classified by population loss.

Figure 24: Effects of national economic growth on individuals’ wellbeing in metro and non-metro areas classified by economic-dependence indicator.

Figure 25: Effects of national economic growth on individuals’ wellbeing in metro and non-metro areas classified by level of employment.
Figure 26: Effects of national economic growth on individuals’ wellbeing in metro and non-metro areas classified by level of education.

Figure 27: Effects of national economic growth on individuals’ wellbeing in metro and non-metro areas classified by level of persistent poverty.

Figure 28: Effects of national economic growth on individuals’ wellbeing in metro and non-metro areas classified by population loss.
APPENDIX C: MAPS
Map 1: Poverty clusters (1993).

Legend
- Not Significant
- High-High
- Low-Low
- Low-High
- High-Low


Legend
- Red: High-High
- Blue: Low-Low
- Pink: Low-High
- Fuchsia: High-Low

Map 4: Poverty clusters (2002).
Map 5: Transfer clusters (1989).

Legend

- Not Significant
- High-High
- Low-Low
- Low-High
- High-Low

Map 7: Transfer clusters (1993).

Legend

- Not Significant
- High High
- Low-Low
- Low-Rich
- High-Low

Map 8: Poverty clusters (1993).
BIBLIOGRAPHY


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