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A New Approach to Measuring Poverty in the United States:
The Household’s Ability to Consume

By

David Ashelman

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ABSTRACT OF THESIS

The definition of poverty is a social construct. As such, quantitatively measuring poverty is problematic, and creates ineffective poverty-alleviation policy. This thesis examines the historical measure of poverty in the United States, compares U.S. poverty measurements to Great Britain and Canada, and then proposes a new way to measure poverty. Instead of measuring income as the defining factor of poverty, the new poverty measurement suggested eliminates income factors and focuses on a household’s ability to consume in a non-comparative manner. When quantifying a household’s ability to consume, implications arise in economic policy for anti-poverty programs, defining the middle class, minimum wage, and progressive taxation, which are discussed.
A New Approach to Measuring Poverty in the United States

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Dedication

This work is dedicated to my wife Sarah, my sons Patrick and Liam, and my soon to be born daughter Meira. All of my accomplishments are for them, and in return they have given their unconditional support.

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# Table of Contents

- **Introduction** ........................................................................................................ 1
- **Literature Review** .................................................................................................. 7
  - The Culture of Poverty .............................................................................................. 7
  - The FGT alternative poverty measure ...................................................................... 9
  - Supplemental Poverty Measures ........................................................................... 12
  - British Poverty Measures ....................................................................................... 14
  - Canadian Poverty Measures ................................................................................... 15
- **Theoretical Concepts** ............................................................................................ 16
  - Multigenerational Consequences to households .................................................... 20
  - Representative Agency .......................................................................................... 22
  - Theoretically Defining Poverty ................................................................................ 24
- **Current Data** ........................................................................................................ 26
  - Federal Calculus of Poverty .................................................................................... 26
  - Social Safety Net Programs included and excluded from the federal poverty calculus .................................................................................................................. 32
    - Supplemental Nutrition Assistance Program (SNAP) ............................................ 32
    - Women, Infants & Children (WIC) food supplement program ............................... 36
    - Earned Income Tax Credit .................................................................................... 37
- **Rethinking the calculus** ........................................................................................ 41
  - Current Statistical Methods problems .................................................................... 43
  - Using a Normal Distribution .................................................................................... 44
  - Statistical Methodology .......................................................................................... 45
- **Results** .................................................................................................................. 47
  - Regional Results ....................................................................................................... 47
Results with current U.S., Great Britain, and Canada poverty guidelines .................. 49
U.S. Poverty thresholds under the British and Canadian distribution ...................... 53
Limitations ........................................................................................................... 54
Policy Implications .................................................................................................. 55
The British Commonwealth difference .................................................................. 55
Impacts of changing U.S. poverty guidelines ....................................................... 56
Defining the middle class ...................................................................................... 58
Effects on progressive tax policy ........................................................................... 59
Effects on raising minimum wage ....................................................................... 59
Conclusion ........................................................................................................... 60
Bibliography ........................................................................................................ 63
Appendix 1: U.S. Poverty Guideline History ......................................................... 68
List of Tables

Table 1: Annual Federal Poverty level income limit comparisons of the U.S. Census Bureau and U.S. Department of Health and Human Services, effective 2014.............27

Table 2: Weekly Federal Poverty level income limit comparisons of U.S. Census Bureau and U.S. Department of Health and Human Services, effective 2014.....................28

Table 3: Adjustments for inflation in the federal poverty guidelines and thresholds in relation to Consumer Price Index.................................................................29

Table 4: What federal poverty thresholds would be when adjusted for CPI-U........31

Table 5: SNAP Income Thresholds..................................................................33

Table 6: Maximum SNAP allotment subtracted from 30% of net income..............33

Table 7: SNAP Benefit Changes 2005-2014.......................................................35

Table 8: Example of regional variation in Z-scored income to the national median..48

Table 9: Author’s Calculations of regional data...............................................48

Table 10: U.S. Census ACS median family income per state by family size..........49

Table 11: Comparative differences in U.S. Poverty Thresholds when Z Scored with Great Britain and Canadian formula .................................................................54

List of Equations

Equation 1: Variance based on specific size and number of observations..............46

Equation 2: Variance by household size and states .............................................46

Equation 3: Z-Score of a single income to an N median....................................47

Equation 4: Z-Score of regional median income to the national median...............47

Equation 5: Z-Score of a single income with a regional median..........................47

Equation 6: Average Z-Score on total household sizes factored ..........................52
List of Figures

Figure 1: SNAP Participation and Benefit Cost 1969-2013 ........................................39
Figure 2: WIC Participation and change: 1974-2013 ............................................40
Figure 3: Normal distribution showing Canada and Great Britain’s average poverty threshold .................................................................51
Introduction

What is poverty and how is it measured in the United States? One would think that this is a relatively easy question to answer, at least quantitatively. When looking at the Organization for Economic Cooperation and Development (OECD), World Bank, or United Nations definitions and statistics, what is discovered however is that the answer is very complicated, especially in the United States. Some countries have no poverty measures at all. Some countries quantify poverty on an abstract level. Some countries have an absolute and quantifiable definition of poverty. The United Nations adds the idea of empowerment in socioeconomic mobility in its definition, which is qualitative. With all of the varying definitions of poverty, this makes poverty a social construct, and any actual definition unquantifiable.

In order to measure the social construct of poverty, the idea of poverty has to be abandoned in the traditional sense. The results of poverty are however, very quantifiable on a myriad of levels. The common theme in the results of poverty, regardless of the sociocultural definition, is that a household's ability to consume good and services needed for its survival and reproduction are greatly inhibited. Therefore, measuring a household's ability to consume in some standardized way may be the only method in which to quantify the social construct of poverty.

In using a standardized method of measuring the ability to consume however, there are those households that do not have the ability to consume when
compared to the norm (or median), and those that have the ability to consume more
than the norm (or median). Hence, a standardized measure becomes less about
measuring poverty, and more about measuring the ability to consume is such a way
that has implications in minimum wage, and progressive tax policy. Measuring a
household’s ability to consume also raises other questions of social construct, such
as, what is the middle class? What is wealth? Instead of asking the question of what
constitutes poverty, political questions arise of what social safety nets should be
provided to aid a household’s ability to consume for those who cannot?

Anti-poverty programs in the United States have been a failure within
multiple global standards. The data shows that there is no mathematical formula for
determining poverty, or who receives services through a social safety net in the
United States. The White House Office of Management and Budget determines what
the poverty guidelines for receiving social safety net services are, and they refuse to
disclose their methodology. What is apparent when examining the data is that who
is poor, and who receives services are largely sociopolitical questions, and not
economic ones.

One can look to Great Britain in an effort to find some type of formulary for
measuring poverty and who receives services. The United Kingdom’s formula is
simple, though problematic. Anyone earning less than 60% of the nation’s median
income for their household size is considered poor, and in need of support services.
The main feature of the British definition is that no adjustments to poverty
thresholds are needed, as they automatically adjust to median incomes as they
fluctuate with peaks and troughs in the macro economy.
Meanwhile in Canada, there is no official measure of poverty, poverty threshold, or poverty guidelines from their central government. Instead, Canada determines if households need services in order to maintain its basic needs on a case-by-case basis, while supporting pro-employment programs. There are tow main features to the Canadian idea of poverty: first is, that poverty thresholds never have to be adjusted, either by inflation or median income, because there is nothing to adjust. Second is that Canada focuses on the consumption needs of a household. With Canada having almost the same GDP per capita as Great Britain and the United States, with a fraction of the population, the result is a lower Gini Coefficient than both nations. This leaves the question: is measuring poverty or having thresholds even important?

The lack of any coherent measure of poverty in the United States has led to various official measures of poverty with completely arbitrary income thresholds that provide little poverty alleviation policy. There are two main government entities measuring poverty based on income: the U.S. Census Bureau, which uses its measures for statistical purposes only, and the U.S. Department of Health and Human Services (HHS), which uses its measures for the purpose of determining eligibility for federal social safety net programs. The two measures do not match in any meaningful way. Further, other federal agencies that were charged with using the Health and Human Service (HHS) thresholds in determining services to people have disregarded the HHS measure for their own. This has politicized poverty, instead of alleviating it through any methodological manner.
While the United States uses an income approach to measuring poverty, not accounting for expenses or fixed costs that households face, other advanced nations, such as the United Kingdom and Canada use the cost approach. Both countries use several fixed-cost variables that are taken as a given for any household to survive. For example, in Canada and Great Britain, housing, food, clothing, and health care is seen as a human right, making those services available for all who need it. If a person or household faces healthcare costs, such as out of pocket expenses for medication, and cannot afford those costs, then the government provides for those costs. If the housing market has raised rent prices to a level that a household cannot afford, then housing subsidies are granted automatically. The individual or household does not need to prove their income, but rather needs to prove that they cannot afford the cost of a given right within the market.

For non-given services, those that are not a human right in the public policy of other countries, the cost versus benefits are weighed in providing services. For example, if a household is working poor, and cannot afford transportation to work, a subsidy may be granted if the household can show that it truly cannot afford the cost in relation to their other expenses. This approach is taken on the cost-benefit analysis of whether or not it is cheaper to pay for a transportation subsidy so that the person(s) can continue to work, versus the cost of having them on social assistance. This is a much different approach to poverty than the United States’ income threshold based approach.

While the British Commonwealth countries have specific Constitutional rights that include the right to food, shelter, and medical care, which address issues of socioeconomic mobility, the United States has the right to life, liberty, and the pursuit of happiness. There are no rights to a quality of life, no rights to the liberty to participate in
markets, and no rights to actually improve happiness through socioeconomic mobility in the United States.

In the United States, cost such as transportation, housing, utilities, personal care items, health insurance premiums/co-pays, or other expenses that are a part of daily life are not factored into any government calculus. These lack of factors alone, force people in poverty to choose between paying one basic need while forgoing another basic need in order for a household to survive. This perpetuates poverty. Additionally, both poverty thresholds and poverty guidelines are not adjusted for geographical differences, with the exception of Alaska and Hawaii. The average of nationwide inflation is used in the calculus, and then matched against an income threshold. While the price of food may be high in Chicago, and may be lower in Pittsburg, no federal adjustments are made.

The public policy of an income-based approach to poverty, established in the 1960s, has proven to be ineffective.

This leads to confusion in the general populous of the United States as to what poverty really is, and how to measure it on the ground. This is especially problematic for those social workers that have little experience in dealing with poverty programs, or the challenges that people in poverty face because of the lack government programs’ ability to factor other expenses into their calculus.

Poverty is a social problem that has been an issue for a very long time. No nation has ever eliminated poverty. However, some nations have reduced the instances of poverty significantly through public policy and transfers based on costs to a household. In essence, the cost of a household is the consumption of a household. Those countries that have had the greatest success in alleviating poverty are ones that have used a cost based
approach to households in determining who receives government transfers, and how much they receive. Costs to households speak to the household’s ability to consume.

Under the backdrop of household costs or consumption, this thesis proposes that households are the basic economic and social unit, and that the purpose of the household is to consume goods and services for its own survival. Under this theory, measuring poverty becomes less about income or politics within a social construct, and more about calculating household costs to survive in a consumption environment. By standardizing a measure of a household’s ability to consume, money is removed from any measure of wealth or poverty.

There is interdependency between business enterprises as profit-making entities, and households which are consumption entities. In this thesis, how the United States calculates poverty thresholds to determine who is “poor” will be examined. It will be shown that poverty thresholds based on income measurements for who receive government services is methodologically problematic.

Using a household consumption based approach, a new way of measuring poverty will be proposed, which compares a household’s ability to consume to a median household of similar composition. This measurement is not only applicable to poverty, but can be used as a measure for any household that deviates in its consumption ability from the median. This proposed measure not only has implications in calculating a household’s ability to consume in a poverty environment, but also has implications in defining the middle class, minimum wage and progressive tax policies. This new way of thinking about poverty, a household’s ability to consume, and a way to quantify it, also
raises further questions that challenge us as a society to define issues of class, status, and power.

Literature Review

Poverty is reinforcing, multigenerational, and can happen to individuals or entire nations. While much of the current public policy debate seems to center on individual ability to escape poverty, there is a growing amount of evidence that the primary means of escaping poverty traps is with copious amounts of capital investment on both a micro and macro level. Since the policy debate dichotomizes capital investment and social safety nets in the alleviation of poverty, those in poverty have reduced life chances and little social mobility as their access to important societal resources such as food, clothing, and adequate shelter is reduced.

The Culture of Poverty

Poverty is social, economic, financial, a matter of public policy, labor policy, educational policy, and a myriad of other facets. Poverty is part of a culture, and currently, the only way it is measured is with income. The income measurement is typically called the “poverty guideline,” or the amount of income people and families make in relationship to a measure in which the receiving of social safety net services is

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determined. However, when determining whether people are poor, the United States, as a matter of culture, asks whether or not income meets a certain level, as opposed to asking if income falls below certain levels. In this sense, a poverty guideline could be considered a “wealth” threshold; does a person or family have enough wealth to not be poor? In this sense, from the distinction of poverty measures versus wealth measures in comparison with both numbers and other people, plus the myriad of other social aspects that makes people “poor,” any idea of a “poverty measure” becomes a social construct.

The consequences of poverty beyond the numerical measures are also vivid. People often feel stigmatized by poverty, have cognitive deficiencies because of malnutrition, face gender related double standards both social and physical, and face class discrimination. Under these social conditions, the federal poverty thresholds, which are based on food nutrition alone, are only a relative measure of poverty, have no real basis in maintaining nutritional standards, and thus cannot be used alone in defining poverty.

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The social construct of poverty presents fundamental poverty measurement problems. There is a wide array of disagreement on how to measure real poverty against the federal poverty threshold measures. One argument is to consider poverty outside of an inequality measure, and focus more on a priority view; giving priority to anti poverty programs only as it relates to other levels of poverty. So contentious is the measure of the federal poverty threshold, that a number of social safety net programs now use a percentage above the federal poverty threshold. Programs like the Affordable Care Act, Low Income Home Energy Assistance, Student Loans, National School Lunch Program, Earned Income Tax Credits, and other federal programs use measures that are specifically targeted above the poverty threshold. The array of disagreement on the validity of the federal poverty threshold has resulted in an equally large array of disagreement on new, supplemental poverty measures.

**The FGT alternative poverty measure**

The earlier supplemental poverty measures comes from development economics in the Foster-Greer-Thorbecke index that attempts to combine a poverty threshold with an inequality index based on a weighed average of various categories of poverty subgroups,

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18 S. Sparks, "New Census Measure Shifts the Face of Poverty; Census Bureau's New Poverty Threshold Shows Safety Net's Impact," *Education Week*, November 16 2011.
in an attempt to count poor people in a methodological way. Most post-1984 discussions about supplemental poverty measurements are based on this model. The formula is:

$$FGT_\alpha = \frac{1}{N} \sum_{i=1}^{H} \left( \frac{z - y_i}{z} \right)^\alpha$$

Where:

- $z =$ the poverty threshold
- $N =$ total population
- $H =$ the total number of people with income $\leq z$
- $y_i =$ the income of each individual
- $\alpha =$ “poverty aversion” multiplier

When $\alpha = 0$ the formula reduces to a fraction (ratio) of the population that lives below the poverty line. When $\alpha = 2$, the formula can be rewritten as:

$$FGT_2 = H\mu^2 + (1 - \mu^2)C_v^2$$

Where $C_v^2$ is the coefficient of variation among the incomes of those at or below the poverty line, which sets the equation as both a poverty index, and an inequality index.

Thus $\mu$ is rewritten as the average of the sum those at or below poverty level incomes:

$$\mu = \frac{1}{H} \sum_{i=1}^{H} \left( \frac{z - y_i}{z} \right)$$

One of many problems with this formula were pointed out by the authors themselves twenty-five years later when they stated that the formula was based in part on subjective axioms. When $\alpha = 2$ for example, it is meant to categorize poverty levels

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within subgroups of populations (race, gender, class, etc). Using an econometric for
nominal variables is problematic.

Another problem with this model is that it relies on an absolute poverty level,
regardless of household size or circumstances. One of the axioms is that individuals are
representative agents of the household and therefore the well-being of the household is
assumed through the well-being of the individual. This axiom, of course, does not present
itself in the real world. Not all members of a household are happy just because one
individual in it is happy. This is especially true in households that have one disabled
individual, while the rest are not.

The problem of nominal variables is addressed by changing them to categorical,
or ordinal variables.21,22 By renaming nominal variables to ordinal variables in order to
accurately compare poverty groups to population subgroups, suggests that different races,
classes, genders, or religious groups are rank-ordered, with one subgroup being above or
below another subgroup. For example, using the FGT model, it was found that Hindus
are much less poor than Muslims in India, where Muslims have little political power.23
This shows that if alpha in the FGT model is simply a “poverty aversion multiplier,” then
alpha simply becomes “political will.”24

Another critique of the model is that $z_1$ and $y_1$ are not mutually exclusive, allowing for random measurement errors based on sample size. Also, the FGT model cannot differentiate time; those who are chronically below poverty lines, and those who are below poverty lines for short periods of time, such as in the case of short-run unemployment. Additionally, the time issue does not aggregate short-run poverty spells into chronic poverty.

Lastly, a problem with the FGT model is that it creates an index of poverty, and not an actual measurement of poverty. The index thresholds themselves become a social construct just as actual poverty thresholds in currency terms becomes a social construct. In order to make the FGT model work as an index, the World Bank must arbitrarily choose $1.25 per day as the world poverty threshold, which is largely a social construct. The FGT model effectively becomes an index of a social construct.

**Supplemental Poverty Measures**

In 1995, the National Academy of Science adopted a new approach to measuring poverty from the National Research Council. This approach involved more subjective and realistic financial considerations that were adjusted for several factors, such as after-tax income, tax transfers, median cost of food, clothing, shelter, and utilities adjusted for

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geography, amongst others. The measure basically subtracts basic living expenses beyond the federal poverty measure of just food from total after-tax income. There are however, several calculations missing, such as transportation, childcare expenses, and out-of-pocket medical expenses. One these were factored into the NAS formula, the poverty rate in the United States climbed 4%. The choice of poverty calculation methods has also shown to have a distinct difference in the effects of pre and post tax poverty levels.

The supplemental poverty measures adapted by the U.S. Census Bureau based on the NAS report are just that - a supplement and not a replacement of the federal poverty threshold of three times the cost of food. The supplemental formula is based on the cost of food, shelter, clothing and utilities with a multiplier of 1.2 to account for unknowns. The multiplier methodology is not disclosed. In-kind benefits such as food bank visits, housing subsidies, as well as aid from charities, and relatives, will be included as income. Adjustments to this measure will be made over an undisclosed time period to reflect ± 0.5 standard deviations of a standardization of median expenditures (Z-Score) across a 5-year data time frame. This means that the definition of “poverty level” will be in the 33rd percentile below the median expenditures for the basket items in the formula. This formula poses significant challenges.

Other than the U.S. Census Bureau’s supplemental poverty measure, the only other alternative to measuring poverty on a purely income level is the multidimensional approach, which used whole, or in part, the earlier FGT model which has proven problematic statistically. Other social factors of poverty such as culture, race, class,

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gender, geography, or environmental conditions, while identified, have not been factored into any proposed alternative measure or policy proposal. This leaves the problem of the very definition of poverty, which the discipline of economics alone is not equipped to deal with.

The United States is the only advanced nation in the G-7 to have a supplemental food program (SNAP), yet has the highest poverty level among the G-7 countries. Other nations have poverty formulas that are more holistic in its approach to the costs that households incur in relation to median household income. Additionally, other advanced economies means test the household’s expenses rather than the household’s income when determining service eligibility.

**British Poverty Measures**

The United Kingdom has no official poverty guideline for services, but measures poverty in relative terms to households. Instead of a person meeting an income guideline, a household’s income is compared against the median income of households of similar size. Currently in Great Britain, a household is considered poor if its income falls below 60% of the median household income for its size, after taxes (net), after housing costs, and after medical expenses. This measure was a result of the Child Poverty Act passed in 2010 in the United Kingdom, which was designed not just to alleviate child poverty, but also to eradicate it.

The United Kingdom however, does not use its poverty measure to determine services. The formula of 60% of median household income after tax, housing and

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medical expenses is purely a statistical measure in which to determine which services to provide, instead of how much services. The United Kingdom also considers housing and medical care to be human rights, and not something that should only be provided based on income means testing. How much services to provide to those under the 60% poverty line has largely been a political question.

**Canadian Poverty Measures**

Canada has a similar policy to the United Kingdom, with nuances. Canada has no official poverty threshold or measure. Canada’s poverty measures are for statistical purposes only and not for determining services, since Canada has no legislative mandate to maintain any official poverty measure. The statistical measure Canada uses is based on expenditure (consumption) measured both on a pre and post tax basis. If families spend more than 54.7% of their pretax income, or 63.6% of their post tax income on food, shelter, and clothing, then they are counted statistically as poor. The purpose for the pre and post tax measurements is because those Canadians that are receiving services, and the working poor, do not pay taxes in general. While this measure however, does not determine social safety net services for Canadians, it does provide a framework for service agencies to use. Unlike the income approach to measuring poverty, this is the consumption approach.

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38 Cotton & Webber.
This does however lead to confusion in government programs using various measures to determine social needs. Most government programs however, weigh household expenses against income in determining programs against the backdrop that housing, food and clothing are human rights. This is similar to the United Kingdom’s approach. The main difference between Canada and the United Kingdom is that benefits to poor households automatically increase as household expenses increase. For example, a rise in housing costs (including utilities) will trigger a rise in benefits to poor households.\textsuperscript{39} In the United Kingdom, only a shift in median income will trigger adjustments to social safety nets.

Like the United States, Canada also has a program similar to the Earned Income Tax Credit, known as the Child Tax Benefit. However, Canada’s rate per child is $6,000 per year (as of 2014), which is significantly higher than the average $2,400 EITC amount for the Untied States.\textsuperscript{40} The most notable feature of Canada’s Child Tax Benefit is that it is paid out on a monthly basis instead of only being paid out once per year with tax filings.

**Theoretical Concepts**

The main point that all poverty measures, and debate fail to recognize is not that poverty is an income problem, but that poverty is a consumption problem. The result of poverty is not a lack of income, but rather an inability of households to consume, and thus engage in normal economic activity. The lack of income is the cause of the inability

\textsuperscript{39} Social Assistance Advisory Council, *Recommendations for an Ontario Income Security Review* (Ottawa, Canada: Ministry of Community and Social Services, 2010).

to consume. It is the lack of ability of consumption that stagnates socioeconomic mobility, and the lack of the ability to consume that causes the basic consumption needs of households to not be met.

There are two main theoretical concepts to understand when trying to define the purpose of economics and poverty. The first is that the purpose of the economy is for household consumption as the basic economic unit. The second is that poverty needs to be defined within the framework of having the ability to consume at a level that assures its survival and socioeconomic mobility. Both are achieved through agents of the household who represent only their own household interests. The household is not just the basic economic unit, but also the basic social familial unit.

It has long been established that the household is the basic economic unit. While the primary purpose of capitalism, or the firm, is to create profit for its own existence, the purpose of the household is the consumption of goods and services for its own existence. This is revealed in the fact that consumption accounts for 71% of the total economy of the United States. Whether a firm consumes an intermediate good in the production of a final good, or a real estate firm sells houses, at the end of the process, the household consumes goods and services for its own survival.

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The purpose of the existence of an economy is open for interpretation. Strangely enough, most economics textbooks fail to state the actual purpose of an economy. It is difficult to know whether or not an economy is doing a good job if it is not clear on what an economy is supposed to be doing in the first place.

Within the neoclassical argument, the purpose of economic activity is for the efficient allocation of resources to their highest valued use. As long as markets clear, then the highest possible price was obtained, and resources were allocated efficiently. Neoclassical definitions fail to address whether markets clear justly, that all people in society were able to participate in the market, or in a way that assures social mobility. Markets clear in a mathematical manner where price, as a scarcity index, is flexible based on the supply of goods and services demanded. This definition is convenient in that it does not require the addressing of poverty, oligopolies, government sponsored monopolies (such as utilities), or the desire for survival. Those who can participate in the market do so in a way that clears those markets. Neoclassical economics is concerned only with market and economic activities as shown through the people who participate in them; it is not concerned with those who do not, or cannot participate in economic activity.

Within new Keynesian views, that take the neoclassical synthesis approach, the defining issue in the purpose of the economy is effective demand that creates near-full employment. However, new Keynesians never really discuss where the effective demand comes from, or the purpose of full employment. Some new Keynesians believe that

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effective demand can come from anywhere, and not just an aggregate of households. Of course, the more households that create more effective demand, which in turn creates closer to full employment levels is best for the overall economy. However, a few households creating enough demand for near-full employment levels can mathematically work as well for new Keynesians.

Within the Heterodox view, as well as the classical political economy view, the purpose of economic activity is for the provisioning of economic resources for the physical well being of society. This speaks to a household’s ability to consume for its own survival. Economic activity is not an event, but a process of social provisioning. There is interdependency between those that produce and those that consume goods and services, especially between institutions. Without consumption, there is no profit in the business enterprise, and without profit in the business enterprise, there is no consumption. In addition, those that consume also participate in the production processes for wages.

In all three cases; neoclassical, new Keynesian, and Heterodox (or post Keynesian) views of the economy, because the purpose of the economy is not so clearly defined, it is difficult for these schools of thought to describe what happens, or what might happen, when things go wrong in the economy. Any flavor of Keynesian comes close to knowing the bad things that happen when the economy breaks; that high unemployment and economic depressions are bad for people in general. People suffer. This comes from John Maynard Keynes himself not just in his analysis of the Great Depression in his seminal book “The General Theory of Employment, Interest and

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49 Paul Krugman, “Do We Really Need a Middle Class?,” *New York Times*, December 17 2008.
Money,” but also from Keynes witnessing people starving on the streets of Germany after World War I (Keynes, Economic Consequences of the Peace, 1920). State intervention to moderate booms and busts is important to Keynes. Keynesians understand that it is important to prevent bad things from happening to people in the general populous, yet Keynesians are elusive on the everyday purpose of economic activity.

Within the opposing views, or views that are never clearly defined within the economics discipline itself as to the purpose of economic activity, lies the intersection of economics and sociology in searching for the defined purpose of economic activity. If a household fails to consume, then it fails to survive as a social and economic unit. The result of a household’s inability to consume lies beyond the suffering of Keynes, and lies beyond the impacts to the institutional economics of Veblen; it completely obliterates both the economic and social unit of the household. Families and kinship groups fall apart. The purpose of economic activity therefore, must include the social aspect of the household unit. The economy exists for household consumption not just because it creates full employment, or clears markets, but because the very survival of households is dependent upon the economy. The economy exists for household consumption.

**Multigenerational Consequences to households**

The social consequences to households in its inability to consume for its survival leave multigenerational effects and is reinforcing across generations. Since socioeconomic status is based on education, occupation, and income, then access to

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52 S. Bowles.
education, and supporting occupations that pay enough for consumption are important, especially to social mobility. When access to pay, education or employment is unavailable for a household, a culture of survival permeates the household members.\textsuperscript{54} These survival techniques not only prevent upward social mobility in socioeconomic status, but can also force downward mobility, resulting in legal problems, and engagement with the criminal justice system.\textsuperscript{55}

When a household cannot feed its children, authorities intervene, and in some cases remove the children from the home. If there are elderly members of the household that cannot consume, they are often forced into taxpayer funded care homes. These events obliterate the social unit of the family and household. Unemployed families can become stigmatized within their communities.\textsuperscript{56,57} Households that fail to consume because of lack of employment or income are often blamed for their inability to pay for its consumption: if they would just get a job, or if they would just go back to school, they wouldn’t be such a drain on the economy (vis-à-vis social safety nets). If they were just smarter with their money, saving it instead of spending it.

Households that cannot consume goods and services in an economy also face greater health risks, instances of suicide, and other mental health problems\textsuperscript{58} because they cannot gain access to goods and services in healthcare. Chronic illness, or even the death of household members also destroys the household unit.

\textsuperscript{54} S. Alkire, "A Multidimensional Approach: Poverty Measurement and Beyond."
\textsuperscript{55} G. Falk, \textit{The American Criminal Justice System: How It Works, How It Doesn't, and How to Fix It} (Praeger Publishing, 2010).
\textsuperscript{57} Goffman.
\textsuperscript{58} Gordon.
Representative Agency

Each household member that consumes is a representative agent of the household unit with any business enterprise that provides goods and services for household members to consume. Additionally, the wage earners of the household are representative agents with the business enterprise that employs them, since wages earned are specifically for the purpose of consumption, either in the present, or in the future. This type of representative agency however, is not limited to purely economic activity, but is also social. In this sense, representative agency of the household cannot be measured as a form of methodological individualism since social interaction for economic purposes also depends on norms, values, social forces, organic solidarity, kinship groups, alienation within and between social classes, as well as other factors. There can be no one representative agent for all household economic activity in the aggregate, be it wage earners, or consumers. Instead, representative agency can only be applied to each individual household unit. Because of factors such as culture, norms, values, kinship groups, and individual circumstances within a household, the wage earner or consumer from Household A cannot be a representative agent for Household B. However, the wage earner or consumer from any household can be a representative agent for her or his particular household as a unit.

Examples of representative agency for a household unit can be seen on many levels. One example is an infant who consumes diapers. Diapers are a required good for

59 Marx.
60 Émile Durkheim, Division of Labor in Society, trans., George Simpson (Eastford, CT: Martino, 2012).
infants. Parents purchase diapers from a business on behalf of the infant, thus becoming representative agents of their household (and the infant) in the transactions of diaper purchases from a business enterprise. The purchase of food is also a required good for the survival of household. Those purchasing food from a business enterprise do so as representative agents of their household for the purpose of the household’s survival, even if the size of the household is just one person. The wage earner is the representative agent of her or his household implicitly with employers. In this role, the agent choses which business enterprises to apply to, based securing an inflow of income for the household consumption, and also based on scheduling, transportation, distance, time and other factors. In these examples, the representative agent is not representative of all households (methodological individualism) but only of her or his household.

A view of the representative agents of households can be viewed in the following way:

\[\text{Business Enterprise} \longleftrightarrow \text{Business Enterprise}\]

\[\text{Workers as household agents} \longleftrightarrow \text{Consumers as household agents}\]

Within this framework, we can see that the worker as the household agent engages the business enterprise for the purpose of securing income for household consumption. Since the worker is also a consumer, there is an interdependent relationship between the two roles as agents of the household. Business enterprises are interdependent
in both intermediate goods, as well as in competition for the business of the consumer. The business enterprise is also has interdependency with the consumer since the purpose of the business enterprise is to achieve profit for its survival, while the purpose of the household is to consume goods and services from the business enterprise for its survival.

**Theoretically Defining Poverty**

The definition of poverty can fall within the realm of some factor breaking the interdependent relationship between household agents and business enterprise, either economically or socially. In economics, poverty is a quantitative measure of income in relative terms to inflation as measured through the Consumer Price Index. However, as will be shown, the quantitative measure of income is only a relative reference based on vague criteria of prices of only certain items, and fails to address the actual survival needs of households in real terms. For its survival, households need to consume more than a limited basket of items from the limited basket of items calculated in the Consumer Price Index for which the quantitative measures of poverty cannot account for. This has lead to problems in the definition of poverty and the calculus on how to measure it.\(^{63}\) Poverty is often measured in relative terms (failure to meet some income threshold) or absolute terms (failure to provide for basic economic needs). All economic measures of poverty fail to address quality of life issues, or that households and their agents have social and cultural needs.

If the purpose of the economy is to facilitate the consumption of households, then given the agency of households in the economy, poverty must be defined as the inability of households to consume to a level which not only limits their socioeconomic mobility,  

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\(^{63}\) Foster, "Counting and Multidimensional Poverty Measurement."
but also threatens the very survival of the household as a social and economic unit, even if the household is a unit of one member. This definition also addresses the fact that those households whose survival is threatened have agents that are powerless to change their conditions and cannot command the resources needed for both improvement and survival.\(^{64}\) It also addresses the social needs of the household, especially as the primary social kinship unit.

While not every aspect of social life can be quantified, there are cultural aspects to households that can be when it comes to consumption spending. For example, kinship groups that are spread over wide areas may want to gather for celebrations, and as such will spend money on travel. In everyday life, having quality day care service while workers earn income may be more important than having the lowest cost day care service, forcing families to spend more for the service.

Within terms of poverty, there has already been a well-documented history of “food deserts,” where the availability of good food is lacking because there is no business that sells within a geographic area. Thus families turn to cheap alternatives for survival, which deteriorates the physical health of the household.\(^{65}\) In the case of food deserts, it is not that the household does not have the means to engage a business enterprise for basic needs, but rather the business enterprise refuses to engage the household (and specifically, the household agents) by refusing to establish business within certain neighborhoods. Business enterprises refusing to sell to certain geographic areas are not limited to food. For example, in Buffalo, N.Y. there are no banks that serve the inner city

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neighborhoods, effectively denying access to basic banking services to those households. Also in Buffalo, N.Y. there are no Costcos (or other wholesale stores), Walmarts, Target stores, Best Buys, or other large big-box retailers. The only Wal-Mart on a public transportation line accessible to city residents is closing, and rebuilding outside of the public transportation system. There are also no major car dealers inside the city limits for city residents to purchase cars should they have the means. These business enterprises lay on the periphery of the city, only in the suburbs, despite the offer of tax incentives to build within the city limits. For those households without adequate transportation, they simply cannot engage business enterprises to meet their needs. Buffalo, N.Y. is not unique in this sense as other cities face the same issues. Business enterprise deserts is an example of household agents who are powerless to address the needs of the households that they represent. It is also an example of the break of interdependency between certain households and business enterprises. This means that even if households have the ability to consume to a level for their own survival economically, they may not have the ability to consume socially.

The idea of the household as the basic social and economic unit with the purpose of economic consumption as a going concern, along with the idea of poverty being defined along the lines of households’ ability to meet its social and economic needs through interdependencies with business enterprises as facilitated by agency, is supported by economic, social and political theory.

**Current Data**

**Federal Calculus of Poverty**
Whether using the Census calculus, or the HHS calculus, the federal poverty levels for each is as follows, using the “lower 48 state” rule established by HHS.

Table 1: Annual Federal Poverty level income limit comparisons of the U.S. Census Bureau and U.S. Department of Health and Human Services, effective 2014

<table>
<thead>
<tr>
<th>Number of Persons</th>
<th>U.S. Census Guidelines</th>
<th>U.S. HHS Threshold</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$12,316</td>
<td>$11,670</td>
<td>-$646</td>
</tr>
<tr>
<td>2</td>
<td>$15,853</td>
<td>$15,730</td>
<td>-$123</td>
</tr>
<tr>
<td>3</td>
<td>$18,518</td>
<td>$19,790</td>
<td>+$1,272</td>
</tr>
<tr>
<td>4</td>
<td>$24,418</td>
<td>$23,850</td>
<td>-$568</td>
</tr>
<tr>
<td>5</td>
<td>$25,447</td>
<td>$27,910</td>
<td>+$2,463</td>
</tr>
<tr>
<td>6</td>
<td>$33,869</td>
<td>$31,970</td>
<td>-$1,899</td>
</tr>
<tr>
<td>7</td>
<td>$38,971</td>
<td>$36,030</td>
<td>-$2,941</td>
</tr>
<tr>
<td>8</td>
<td>$43,586</td>
<td>$40,090</td>
<td>-$3,496</td>
</tr>
</tbody>
</table>

Data: U.S. Census and U.S. Dept. of Health and Human Services

Table 1 assumes no children in the household, and all people less than 65 years of age. This is because the U.S. Census Bureau gives weight to children or elderly in the house, while the Department of Health and Human Services give no weight to children in the household. The HHS measure is the measure that determines eligibility for federal programs to aid the poor.

As can be seen from Table 1, there is no linearity between the differences between the HHS calculation and the Census calculation. This suggests that while HHS does not disclose that certain weights are given to certain household demographics, unknown weights are being applied statistically. It also suggests that since these dollar amounts are based on the application of CPI-U (Consumer Price Index for all items, urban), that the CPI-U formula is not being applied equally, or such formula may be skewed because of other weighted measures.

To place Table 1 into context, Table two is the weekly income limit breakdown.
Table 2: Weekly Federal Poverty level income limit comparisons of U.S. Census Bureau and U.S. Department of Health and Human Services, effective 2014

<table>
<thead>
<tr>
<th>Number of Persons</th>
<th>U.S. Census Guidelines</th>
<th>U.S. HHS Threshold</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$236.84</td>
<td>$224.42</td>
<td>-$12.42</td>
</tr>
<tr>
<td>2</td>
<td>$304.86</td>
<td>$302.50</td>
<td>-$2.36</td>
</tr>
<tr>
<td>3</td>
<td>$356.11</td>
<td>$380.57</td>
<td>+$24.46</td>
</tr>
<tr>
<td>4</td>
<td>$469.57</td>
<td>$458.65</td>
<td>-$10.92</td>
</tr>
<tr>
<td>5</td>
<td>$489.36</td>
<td>$536.73</td>
<td>+$47.37</td>
</tr>
<tr>
<td>6</td>
<td>$651.32</td>
<td>$614.80</td>
<td>-$36.52</td>
</tr>
<tr>
<td>7</td>
<td>$749.44</td>
<td>$692.88</td>
<td>-$56.56</td>
</tr>
<tr>
<td>8</td>
<td>$838.19</td>
<td>$770.96</td>
<td>-$67.23</td>
</tr>
</tbody>
</table>

Data: U.S. Census and U.S. Dept. of Health and Human Services

It should be noted that all limits are based on a pre-tax income (gross income). Adjustments in Poverty guidelines and thresholds are not keeping up with inflation. Both the U.S. Census Bureau and the U.S. Department of Health and Human Services report that they adjust the poverty guidelines and thresholds (respectively) according to the Consumer Price Index for all goods, all urban consumers (CPI-U). The problems with this, is that CPI is defined to include only a sample number, or “basket” of goods in which an index is placed, with certain weights given for each item in the “basket.” CPI-U also only includes “urban” consumers, which is defined as urban areas with a population greater than 500,000. The U.S. Bureau of Labor Statistics in which CPI is determined administers a small sample survey of 7000 people. Using the CPI-U is problematic in its own rite. Both the Census and HHS poverty thresholds/guidelines fail to address the household’s ability to consume the basket of goods in the CPI-U. The poverty measures themselves only address how expensive those basket of goods are should the household

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66 Result obtained by dividing annual figures by 52 weeks
have the ability to consume them in relation to a certain level of income. The adjustments
to income therefore only adjust the ratio of income to the basket of goods, and not the
household’s ability to actually consume those goods.

Table 3 shows the differentiation between adjustments in both the poverty
guidelines and thresholds in relationship to CPI-U between 2009 and 2014, based upon a
family of four.

Table 3: Adjustments for inflation in the federal poverty guidelines and thresholds in relation to Consumer
Price Index

<table>
<thead>
<tr>
<th>Year</th>
<th>Census Adjustment</th>
<th>HHS Adjustment</th>
<th>CPI Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>2.27%</td>
<td>2.88%</td>
<td>2.34%</td>
</tr>
<tr>
<td>1998</td>
<td>1.59%</td>
<td>2.49%</td>
<td>1.55%</td>
</tr>
<tr>
<td>1999</td>
<td>2.21%</td>
<td>1.52%</td>
<td>2.19%</td>
</tr>
<tr>
<td>2000</td>
<td>3.37%</td>
<td>2.1%</td>
<td>3.37%</td>
</tr>
<tr>
<td>2001</td>
<td>2.84%</td>
<td>3.52%</td>
<td>2.82%</td>
</tr>
<tr>
<td>2002</td>
<td>1.6%</td>
<td>2.55%</td>
<td>1.6%</td>
</tr>
<tr>
<td>2003</td>
<td>2.27%</td>
<td>1.66%</td>
<td>2.3%</td>
</tr>
<tr>
<td>2004</td>
<td>2.64%</td>
<td>2.45%</td>
<td>2.67%</td>
</tr>
<tr>
<td>2005</td>
<td>3.44%</td>
<td>2.65%</td>
<td>3.37%</td>
</tr>
<tr>
<td>2006</td>
<td>3.21%</td>
<td>3.36%</td>
<td>3.22%</td>
</tr>
<tr>
<td>2007</td>
<td>2.85%</td>
<td>3.25%</td>
<td>2.87%</td>
</tr>
<tr>
<td>2008</td>
<td>3.87%</td>
<td>2.66%</td>
<td>3.81%</td>
</tr>
<tr>
<td>2009</td>
<td>-1.1%</td>
<td>-2.6%</td>
<td>-0.32%</td>
</tr>
<tr>
<td>2010</td>
<td>2.5%</td>
<td>0.0%</td>
<td>1.64%</td>
</tr>
<tr>
<td>2011</td>
<td>3.2%</td>
<td>1.4%</td>
<td>3.14%</td>
</tr>
<tr>
<td>2012</td>
<td>2%</td>
<td>3%</td>
<td>2.1%</td>
</tr>
<tr>
<td>2013</td>
<td>1.47%</td>
<td>1.27%</td>
<td>1.46%</td>
</tr>
<tr>
<td>2014</td>
<td>3.3%</td>
<td>1.27%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>


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67 Results derived from previous years data using \( \frac{B-A}{A} \). CPI change is based on CPI data annualized by the U.S. Bureau of Labor Statistics. See Appendix 1.
It’s important to note that the increase percentage of each category is based on the same category’s previous data point. As can be seen, the percentage increase (or decrease) in the federal poverty guidelines and thresholds do not correspond to CPI-U. With the exception of the 2008 Great Recession and its immediate after effects however, the U.S. Census Bureau seems to have been more accurate with aligning its methodology with CPI. For the Department of Health and Human Service adjustments over time, there appears to be a large amount of variance that does not seem to be tied to CPI. This may suggest either a problem with their methodology, or a political directive. Increases and decreases in the consumer price index as a measure of inflation are not matching the adjustments in the HHS federal poverty threshold. This also suggests that adjustments in the federal poverty thresholds for federal program eligibility are not keeping up with inflation.

While the variation in Census adjustments could be explained by the variation in the 48-point weight matrix that is used by the Census Bureau, the explanation for the variation in HHS adjustments is elusive, especially in light of their claim that no weights are given in their formula. An examination of political issues of those time periods would be needed to determine the political impacts on the HSS adjustment variation.

Since the Heath and Human Service figure is used to determine eligibility, and they state that they do not use any weights, this is what the federal poverty threshold would be for a family of four if the HHS figure were actually based on CPI-U inflation:
Table 4: What federal poverty thresholds would be when adjusted for CPI-U

<table>
<thead>
<tr>
<th>Year</th>
<th>HHS Poverty Guideline for year</th>
<th>Inflation adjusted guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>$16,050</td>
<td>$16,425</td>
</tr>
<tr>
<td>1998</td>
<td>$16,450</td>
<td>$16,704</td>
</tr>
<tr>
<td>1999</td>
<td>$16,700</td>
<td>$17,066</td>
</tr>
<tr>
<td>2000</td>
<td>$17,050</td>
<td>$17,624</td>
</tr>
<tr>
<td>2001</td>
<td>$17,650</td>
<td>$18,147</td>
</tr>
<tr>
<td>2002</td>
<td>$18,100</td>
<td>$18,389</td>
</tr>
<tr>
<td>2003</td>
<td>$18,400</td>
<td>$18,823</td>
</tr>
<tr>
<td>2004</td>
<td>$18,850</td>
<td>$19,353</td>
</tr>
<tr>
<td>2005</td>
<td>$19,350</td>
<td>$20,001</td>
</tr>
<tr>
<td>2006</td>
<td>$20,000</td>
<td>$20,644</td>
</tr>
<tr>
<td>2007</td>
<td>$20,650</td>
<td>$21,243</td>
</tr>
<tr>
<td>2008</td>
<td>$21,200</td>
<td>$22,009</td>
</tr>
<tr>
<td>2009</td>
<td>$22,050</td>
<td>$21,979</td>
</tr>
<tr>
<td>2010</td>
<td>$22,050</td>
<td>$22,411</td>
</tr>
<tr>
<td>2011</td>
<td>$22,350</td>
<td>$23,052</td>
</tr>
<tr>
<td>2012</td>
<td>$23,050</td>
<td>$23,529</td>
</tr>
<tr>
<td>2013</td>
<td>$23,550</td>
<td>$23,895</td>
</tr>
<tr>
<td>2014</td>
<td>$23,850</td>
<td>$24,234</td>
</tr>
</tbody>
</table>


Since 1997, the adjustments to the Health and Human Services poverty guidelines have been consistently less than what they would be if they were truly adjusted for inflation, and show no pattern in relation to CPI. The Department of Health and Human Services does not disclose their methodology other than stating that the agency uses an unweighted measure attached to CPI. This methodology does not appear in the historical results.

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68 Results derived from multiplying the HHS poverty threshold by CPI change in Table 3
Social Safety Net Programs included and excluded from the federal poverty calculus

There are several federal and private programs that only use the Health and Human Services poverty threshold as a reference point for establishing levels above the threshold for determining whether people are eligible to receive benefits. Other services use the threshold, and allow “deductions” for certain expenses that bring the income below the threshold. In either case, an income-based approach is used, and if “deductions” are allowed by an agency, the formula can become complicated, and unrepresentative of real household consumption.

Supplemental Nutrition Assistance Program (SNAP)

A perfect example of an agency with an income based approach allowing “deductions” is the Supplemental Nutrition Assistance Program (SNAP), formerly known as Food Stamps, run by the U.S. Department of Agriculture.

SNAP first distinguishes between gross and net income, and applicants must meet both tests. Gross income limits are 130% of the HHS federal poverty threshold. Net income cannot exceed 100% of the poverty threshold. Net income is determined not by taxes, but by “allowed deductions,” which do not include taxes paid on earned income.

The monthly deductions allowed for SNAP are as follows:69

- 20% of earned income
- $155 per month standard deduction for households of 1-3 people
- $165 per month standard deduction for households of 4 or greater people
- $361 per month for child care expenses
- Medical expenses more than $35 per month ONLY if elderly or disabled live in household

• Up to $490 per month in total shelter costs ONLY if total shelter costs exceeds $\frac{1}{2}$ of gross monthly income

An additional resource limit of $2,250 is allowed in liquid assets. This formula only determines eligibility. After eligibility is determined, then the benefit is determined based on 30% of the calculated net income, subtracted from a maximum monthly allotment for SNAP dollars. Tables 5 and 6 show the SNAP income limits and maximum SNAP allotment per household.

Table 5: SNAP Income Thresholds

<table>
<thead>
<tr>
<th>Household Size</th>
<th>Gross Monthly Income (130% of poverty)</th>
<th>Net Monthly Income (100% of poverty)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1,265</td>
<td>$973</td>
</tr>
<tr>
<td>2</td>
<td>1,705</td>
<td>1,311</td>
</tr>
<tr>
<td>3</td>
<td>2,144</td>
<td>1,650</td>
</tr>
<tr>
<td>4</td>
<td>2,584</td>
<td>1,988</td>
</tr>
<tr>
<td>5</td>
<td>3,024</td>
<td>2,326</td>
</tr>
<tr>
<td>6</td>
<td>3,464</td>
<td>2,665</td>
</tr>
<tr>
<td>7</td>
<td>3,904</td>
<td>3,003</td>
</tr>
<tr>
<td>8</td>
<td>4,344</td>
<td>3,341</td>
</tr>
<tr>
<td>Each Additional Member</td>
<td>+440</td>
<td>+339</td>
</tr>
</tbody>
</table>

Data: U.S. Department of Agriculture, October 2014

Table 6: Maximum SNAP allotment subtracted from 30% of net income

<table>
<thead>
<tr>
<th>Household size</th>
<th>Maximum monthly SNAP allotment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$194</td>
</tr>
<tr>
<td>2</td>
<td>$357</td>
</tr>
<tr>
<td>3</td>
<td>$511</td>
</tr>
<tr>
<td>4</td>
<td>$649</td>
</tr>
<tr>
<td>5</td>
<td>$771</td>
</tr>
<tr>
<td>6</td>
<td>$925</td>
</tr>
<tr>
<td>7</td>
<td>$1,022</td>
</tr>
<tr>
<td>8</td>
<td>$1,169</td>
</tr>
<tr>
<td>Each Additional Member</td>
<td>$146</td>
</tr>
</tbody>
</table>

Data: U.S. Department of Agriculture, October 2014
The U.S. Department of Agriculture does not publish the methodology used in
determining deductions or the reason for needing both the gross and net income tests for
eligibility. In needed to meet both the gross and net income tests, a person could make
under the gross limit, but not have enough applicable deductions to meet the net income
test. Opposite gross versus net, a person could meet the net income limits but exceed the
gross based on having too many applicable deductions and expenses.

The Department of Agriculture does not state the reasoning behind not allowing
medical expenses as deductions unless someone is elderly or disabled, even though such
deductions are allowed on tax returns to calculate adjusted gross income. A household
may not be disabled, but have out-of-pocket medical expenses that may not allow them to
purchase food (such as those with Diabetes or Hypertension). This situation presents
itself as households having to choose between food and medicine. It directly speaks to a
household’s inability to consume basic needs.

The reasoning for the $490 limit on total shelter costs is also not disclosed, nor is
the calculus for the limited personal deduction of $155-165 per month ($1860-1980 per
annum) when the IRS allows a cost-of-living adjusted personal deduction nearly 3 times
that amount.

What is also puzzling is that while the formula for determining eligibility by two
separate income tests based on poverty thresholds. While these poverty thresholds are
supposed to be adjusted for inflation, like HHS, the SNAP program increases in
allotments over time have followed a different trajectory than the adjustments in poverty
thresholds set by HHS, as shown in Table 7. As was shown in Table 3, while the U.S.
Department of Health and Human Services has not met the rate of inflation for the
poverty threshold for programs, the U.S. Department of Agriculture has had its own inflation-adjusted benefits since 2004, sometimes exceeding inflation. Table 7 shows the SNAP benefit change for a single person, for which each additional person in the household has seen an $8 increase over time from the single person rate.

Table 7: SNAP Benefit Changes 2005-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>CPI Change</th>
<th>SNAP Benefit</th>
<th>SNAP Benefit change (Single Person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>+3.4%</td>
<td>$149</td>
<td>+5.7%</td>
</tr>
<tr>
<td>2006</td>
<td>+3.2%</td>
<td>152</td>
<td>+2%</td>
</tr>
<tr>
<td>2007</td>
<td>+2.9%</td>
<td>155</td>
<td>+0.7%</td>
</tr>
<tr>
<td>2008</td>
<td>+3.8%</td>
<td>162</td>
<td>+4.5%</td>
</tr>
<tr>
<td>2009</td>
<td>-0.32%</td>
<td>176</td>
<td>+8.6%</td>
</tr>
<tr>
<td>2010</td>
<td>+1.64%</td>
<td>200</td>
<td>+13.6%</td>
</tr>
<tr>
<td>2011</td>
<td>+3.14%</td>
<td>200</td>
<td>0%</td>
</tr>
<tr>
<td>2012</td>
<td>+2.1%</td>
<td>200</td>
<td>0%</td>
</tr>
<tr>
<td>2013</td>
<td>+1.46%</td>
<td>200</td>
<td>0%</td>
</tr>
<tr>
<td>2014</td>
<td>+1.6%</td>
<td>189</td>
<td>-5.5%</td>
</tr>
</tbody>
</table>


While SNAP eligibility standards have not been inflation adjusted since the HHS poverty thresholds were not inflation adjusted, the SNAP benefits paid exceeded inflation adjustments for 3 years prior to 2011. From 2011 to 2013, there were no increases or decreases in SNAP benefits. With an income means test program that allows for little deviation in household expenses since 2004 however, since 2008, there has been a significant increase in both participants, and dollars spent in the SNAP program, indicating significantly increased levels of abject poverty, as Figure 1 shows. In Figure 1, the increase in total benefits paid where they exceed the number of persons enrolled in SNAP is due to the American Reinvestment and Recovery Act of 2009, also known as “Stimulus,” in which SNAP benefits were increased by 23% in the middle of the fiscal year in response to the Great Recession.
**Women, Infants & Children (WIC) food supplement program**

In addition to SNAP, the U.S. Department of Agriculture also provides a food supplement program called Woman, Infants, and Children (WIC), which provides additional food resources to said group, and for children up to age 5. The age 5 cutoff age is presumed that the child will be enrolled in school and receive free school lunch meals. Unlike SNAP however, WIC, run by the same agency as SNAP, has a completely different set of income guidelines for the provision of services to poor households with young children. Instead of means testing gross and net incomes separately, like SNAP does, WIC simply determines eligibility based on gross income at 185% of the federal poverty threshold. Unlike SNAP however, WIC benefits are limited to “healthy” foods as determined by the Department of Health and Human Services, regardless if recipients actually have access to healthy food markets. In other words, WIC not only provides some ability for households to consume food, but also tells them which food to consume, on the presumption that such food is socially available. Additionally, states are free to lower income thresholds to no less than 100% of the poverty guidelines.

Figure 2 shows the increase and percent change of WIC participation. 8.7 million people currently receive WIC benefits with not much growth since 2010. There can be many explanations for this trend that are socially driven.

WIC was started as a pilot program in 1972 in response to a public health outbreak of malnourished pregnant mothers in extreme poverty. By 1975, WIC was established as a permanent, national program by congressional legislation (P.L. 94-105). Various

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modifications to the program have been made since, that include addressing nutritional concerns for target populations, including breastfeeding mothers and mothers with cultural sensitivity to food items (such as Kosher for Jewish populations).

**Earned Income Tax Credit**

The Earned Income Tax Credit (EITC) is the single most cited reference in the alleviation of child poverty.\(^{71,72}\) Yet for 2013, the average distributed tax credit was $2,400 per household regardless of the number of children, when the maximum tax credit is $3,305 for one child in the house. The maximum income allowed claiming the EITC is $38,511 for a single parent.\(^{73}\) There are no available data that addresses the question as to why people in low-income jobs at or below the poverty guidelines cannot claim the full tax credit, other than a myriad of qualifying conditions that include:\(^{74}\)

- Must file a tax return as single, or married filing jointly
- Cannot have investment income (including 401(k)) of more than $3,300
- Cannot have foreign income
- Pass an age test
- Pass a relationship test
- Pass a joint return filing test

These qualifications suggest that not everyone who is low income will receive the EITC. The EITC is a benefit that is claimed on a tax return every year as a refundable tax credit. The payout, or reduction in adjusted gross income is only realized annually.

Statistically there is evidence that the EITC has reduced child poverty, however, families

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or households who have expenses throughout the year, and not just once per year do not largely see the realization of that money.
Figure 1: SNAP Participation and Benefit Cost 1969-2013
Figure 2: WIC Participation and change: 1974-2013

WIC Participation Rates: 1974-2013

Thousands of persons (left)  Annual Percent Change (right)

Data: U.S. Department of Agriculture  © 2015 David Ashelman
Rethinking the calculus

A new approach to measuring poverty in relation to a household’s ability to consume will be proposed here, based on a combination of the British and Canadian models. It has been shown so far that the U.S. federal calculus for measuring poverty guidelines based on income first, and then consumption, for receiving services is flawed, as there is no mathematical formula that such determinations are based on. The confusion between agencies as to what constitutes a true need of consumption by households becomes skewed when matched against income limits. Using the income approach to provide social safety nets to households has not been fruitful in the alleviation of poverty in the United States when compared against other advanced, capitalist economies. This is partly because it does not address the consumption needs of the household, nor allows room for socioeconomic mobility. The closest the United States comes in addressing consumption needs is through the WIC program, which identifies specific nutritional needs of consumption of pregnant women, and mothers of newborns. However, the program is very limited in scope, allows states to restrict access, and dictates what the consumer needs, regardless of cultural values, special medical requirements, or problems with access to business enterprises that actually sell the required items. Additionally, the United States makes no adjustments for regional variations in cost of living, or comparative incomes for cost of living, which does not address the ability of households to consume.

Comparatively, the United Kingdom and Canada have more advanced programs that specifically address consumption needs (as a human right) of households, but are more arbitrary in their formulas. This leads to confusion in both poverty measurement and program eligibilities.
Both the United Kingdom and Canada also do not address regional variations in income in relation to cost of living, or consumption. Both countries however, acknowledge the basic consumption needs of the household, such as food, clothing, shelter and medical care for which the Untied States does not. In the net analysis, the Untied Kingdom fails to ask whether people can afford ancillary needs based on regional variations in price and income, such as transportation to a job, or day care. Canada asks the question of affordability on a net basis, but either does not make adjustments for regional variations in price, or cannot determine which social safety nets to apply to a given situation based on consumption needs. One example of this is the Northern Food crisis in which prices for milk exceed $10 per gallon and exceed $26 per gallon for orange juice because of 2011 changes in government transportation subsidies.  

Government agencies in Canada are not quite sure what to do about the problem because of both their lack of poverty measure, and their affordability-of-consumption framework.

Adjusting income thresholds with inflation is also a flawed approach, and something that neither Canada nor the United Kingdoms does. This is because inflation is determined by demand in the macro economy, which is limited by personal income. This creates a vicious cycle of low-income creates low demand which creates low income. One of the main theorized reasons the United States is seeing stagnant inflation is because of stagnant median incomes. If median income maintains a certain level, then inflation will be relative to that income. This inflation includes localized inflation. This is why the British formula, attaching poverty to median

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incomes is attractive; it allows for adjustments in poverty guidelines with fluctuations in the business cycle, fiscal policy, or monetary policy that impact the median.

The 60% of median income approach that is used by the United Kingdom is intriguing but presents no methodology on why they decided on 60% of net income below the median gross income. This is not a standard distribution nor does it allow income and price variation by regions.

The Canadian approach to net household and medical expenses is also intriguing. This approach accounts for consumption, and for local economic pressures such as higher housing costs per region, and higher utility costs per province. However, household consumption is weighed against an arbitrary (non-official) income guideline depending on which agency is providing services. Within the framework however, there is the sense that Canada uses a consumption-based approach in its statistical measurement.

A combination of the United Kingdom method with the Canadian method is may be may be modified for the United States to have a unit of measure that calculates a household’s ability to consume goods and services for both its survival, and socioeconomic mobility.

**Current Statistical Methods problems**

Many counties, plus the OECD, World Bank and United Nations use averages and medians with respect to incomes and expenses for households with no further elaboration. Statistically, medians and averages are only useful in determining other measures. For example, medians determine the normal distribution of something. Averages determine the deviations from the median (Standard Deviation). Deviations and averages are used to determine standardizations (Z-Scores), and calculate the volatility (variance) of something. Averages and medians mathematically are rarely used as their own measures statistically. This is what makes
the British model attractive. As median incomes rise and fall with business cycles, so does the poverty threshold. They are using the median household income to measure something else; poor households, which is a more sound statistical methodology. Unlike the United States’ poverty threshold, the British poverty threshold model can be expressed mathematically as a set of standard deviations of the median, since 60% of median would create a left tail on a normal distribution. The problem with this model mathematically however is that the British model uses net income versus median gross income. In order to make the British model work, a modifier to the British poverty threshold model then has to be used find a standard deviation of a household’s gross income from the median/mean.

Assuming median household income is a zero point on a normal distribution, and then using Untied States data, where the median household income is $51,939, under the British model of at 60%, then the poverty threshold for a family of 4 should be $31,163. The current poverty threshold in the U.S. for a family of 4 is $23,550. This is a difference of +$7,613.

Z-Scoring the 60% of median under a normal distribution is difficult because mean is not known, and there are not enough samples to determine variance. This makes using a standardized score in the British model problematic mathematically. However, in the British model, 60% of the normal distribution in the Bell Curve could be calculated with more data points. This shows that it is mathematically possible to establish a poverty threshold that is part of a normal distribution and in relationship with the median.

**Using a Normal Distribution**

U.S. income data is extensive, and can be broken down by demographics easily. Median incomes by household size separated by state are readily available from the U.S. Census Bureau. This allows for multiple data points that can be used to calculate variance, especially by state.
Once a variance is obtained, and placed into a mathematical framework, standardization can be calculated within a normal distribution curve. Once a standardized score of median incomes by state and household size is obtained, any given point of data (such as an individual household’s income) can be scored in relation to deviations from the median. Determining other factors, such as the household’s ability to consume beyond basic needs, or the household’s ability to have disposable income, can then be compared to the number of standard deviations from the median income for their household size and state. Any other considerations, such as how many standard deviations from the median based on state and household size should a household be before being considered in poverty, becomes purely a political question.

Calculating poverty thresholds, and have a relationship with consumption as well as social mobility will be tested using a standard deviation approach, using median income data by state and household size from the U.S. Census Bureau,\(^77\) along with comparisons to the British and Canadian frameworks of percentage of median income. Since both the British and the Canadian frameworks use a percentage of the median in their poverty statistic, Z scoring from the median is used.

**Statistical Methodology**

In standardization, the mean is zero and standard deviation is one. If the mean is zero, then the median is also zero, making the mean and median the same. This allows for the usage of the median in variance calculations.

Each state has their own median income because of regional variations in inflation and cost of living, which can be broken down into median incomes based on household size.\(^78\) This

\(^77\) See Table 10
\(^78\) ibid
provides both variation and enough data points to create a variance. The formula can be represented by:

**Equation 1: Variance based on specific size and number of observations**

\[
\sigma^2 = \frac{\sum_i^n (x + \mu)^2}{N}
\]

Where:

N = the number of states
i = household size

For household sizes with 1-4 members for all 50 states, this can be expressed as:

**Equation 2: Variance by household size and states**

\[
\sigma_1^2 = \frac{\sum_{i=1}^{50} (x + \mu)^2}{50}
\]

\[
\sigma_2^2 = \frac{\sum_{i=2}^{50} (x + \mu)^2}{50}
\]

\[
\sigma_3^2 = \frac{\sum_{i=3}^{50} (x + \mu)^2}{50}
\]

\[
\sigma_4^2 = \frac{\sum_{i=4}^{50} (x + \mu)^2}{50}
\]

Less than 50 states can be used to account for multistate regional variations in median income. For example, if the northeast region of the United States, which accounts for 11 states, has some factor (such as natural disaster, or resource limitation) effect median income for that region only, then the variance formula can be written:
\[ \sigma_x^2 = \frac{\sum_{i=1}^{11}(x + \mu)^2}{11} \]

Once the variance for a specified household size is obtained, then a specific income for a household, or income threshold, can be z-scored to determine the number of standard deviations it is from the median. This can either be positive or negative.

**Equation 3: Z-Score of a single income to an N median**

\[ Z = \frac{x - m}{\sqrt{\frac{\sum_{i=1}^{N}(x + \mu)^2}{N}}} = \frac{x - m}{\sigma} \]

**Results**

**Regional Results**

Using the Northeast region example, regional variation of standard deviations from the national median can thus be expressed by:

**Equation 4: Z-Score of regional median income to the national median**

\[ Z = \frac{rm - m}{\sqrt{\frac{\sum_{i=1}^{11}(x + \mu)^2}{11}}} \]

Where \( rm \) = the regional median as a point of \( x \). For a specific household within a region, the formula would be:

**Equation 5: Z-Score of a single income with a regional median**

\[ Z = \frac{x - m}{\sqrt{\frac{\sum_{i=1}^{11}(x + \mu)^2}{11}}} \]
Table (8) shows the Northeast regional variation in median income using the above formula.

Table 8: Example of regional variation in Z-scored income to the national median

<table>
<thead>
<tr>
<th>Household Size</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecticut</td>
<td>$58,337</td>
<td>$72,878</td>
<td>$86,390</td>
<td>$102,530</td>
</tr>
<tr>
<td>Delaware</td>
<td>$48,284</td>
<td>$62,707</td>
<td>$73,284</td>
<td>$85,150</td>
</tr>
<tr>
<td>Maine</td>
<td>$41,488</td>
<td>$53,227</td>
<td>$60,425</td>
<td>$79,931</td>
</tr>
<tr>
<td>Maryland</td>
<td>$58,269</td>
<td>$73,685</td>
<td>$87,206</td>
<td>$108,915</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>$55,602</td>
<td>$67,443</td>
<td>$82,495</td>
<td>$103,624</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>$52,588</td>
<td>$65,830</td>
<td>$82,924</td>
<td>$99,457</td>
</tr>
<tr>
<td>New Jersey</td>
<td>$61,146</td>
<td>$69,697</td>
<td>$85,016</td>
<td>$103,786</td>
</tr>
<tr>
<td>New York</td>
<td>$47,790</td>
<td>$59,308</td>
<td>$69,052</td>
<td>$83,209</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>$47,439</td>
<td>$55,210</td>
<td>$68,848</td>
<td>$82,078</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>$46,896</td>
<td>$61,607</td>
<td>$76,864</td>
<td>$83,785</td>
</tr>
<tr>
<td>Vermont</td>
<td>$46,019</td>
<td>$61,702</td>
<td>$67,774</td>
<td>$85,750</td>
</tr>
</tbody>
</table>

Data: U.S. Census Bureau, American Community Survey, 2013. Dollar amounts are in 2013 inflation-adjusted dollars.

Table 9: Author’s Calculations of regional data

<table>
<thead>
<tr>
<th>Household Size</th>
<th>( \frac{\sum_{i=1}^{11}(x+\mu)^2}{11} )</th>
<th>( \frac{\sum_{i=2}^{12}(x+\mu)^2}{11} )</th>
<th>( \frac{\sum_{i=3}^{13}(x+\mu)^2}{11} )</th>
<th>( \frac{\sum_{i=4}^{14}(x+\mu)^2}{11} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Median</td>
<td>$48,284</td>
<td>$62,707</td>
<td>$76,864</td>
<td>$85,750</td>
</tr>
<tr>
<td>US Median</td>
<td>$42,814</td>
<td>$56,089</td>
<td>$64,552</td>
<td>$75,656</td>
</tr>
<tr>
<td>Average</td>
<td>$51,260</td>
<td>$63,936</td>
<td>$76,389</td>
<td>$92,565</td>
</tr>
<tr>
<td>Variance</td>
<td>39506163.16</td>
<td>44824734.96</td>
<td>82107450.09</td>
<td>119798042.2</td>
</tr>
<tr>
<td>SD</td>
<td>6285.392841</td>
<td>6695.127703</td>
<td>9061.316135</td>
<td>10945.2292</td>
</tr>
<tr>
<td>Z Score (( \sigma ) from National Median)</td>
<td>0.870272</td>
<td>0.988480</td>
<td>1.358743</td>
<td>0.922228</td>
</tr>
</tbody>
</table>

Author’s calculations from Table 8
Results with current U.S., Great Britain, and Canada poverty guidelines

Table 10 is the median incomes per state by household size in 2013 inflation-adjusted dollars.\(^{79}\)

<table>
<thead>
<tr>
<th>State</th>
<th>1 earner</th>
<th>2 People</th>
<th>3 People</th>
<th>4 People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>$40,120</td>
<td>$49,163</td>
<td>$52,215</td>
<td>$64,700</td>
</tr>
<tr>
<td>Alaska</td>
<td>$53,804</td>
<td>$71,624</td>
<td>$82,198</td>
<td>$88,373</td>
</tr>
<tr>
<td>Arizona</td>
<td>$42,107</td>
<td>$55,118</td>
<td>$55,654</td>
<td>$61,023</td>
</tr>
<tr>
<td>Arkansas</td>
<td>$36,505</td>
<td>$46,333</td>
<td>$49,494</td>
<td>$56,591</td>
</tr>
<tr>
<td>California</td>
<td>$48,415</td>
<td>$63,030</td>
<td>$67,401</td>
<td>$75,656</td>
</tr>
<tr>
<td>Colorado</td>
<td>$49,549</td>
<td>$65,631</td>
<td>$72,259</td>
<td>$86,787</td>
</tr>
<tr>
<td>Connecticut</td>
<td>$58,337</td>
<td>$72,878</td>
<td>$86,390</td>
<td>$102,530</td>
</tr>
<tr>
<td>Delaware</td>
<td>$48,284</td>
<td>$62,707</td>
<td>$73,284</td>
<td>$85,150</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>$50,186</td>
<td>$81,960</td>
<td>$81,960</td>
<td>$81,960</td>
</tr>
<tr>
<td>Florida</td>
<td>$41,915</td>
<td>$51,760</td>
<td>$54,934</td>
<td>$65,260</td>
</tr>
<tr>
<td>Georgia</td>
<td>$41,214</td>
<td>$51,954</td>
<td>$56,189</td>
<td>$67,214</td>
</tr>
<tr>
<td>Hawaii</td>
<td>$49,919</td>
<td>$63,896</td>
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</tr>
<tr>
<td>Idaho</td>
<td>$41,785</td>
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<td>$50,506</td>
<td>$62,322</td>
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<td>Illinois</td>
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</tr>
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<td>Indiana</td>
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<td>$64,552</td>
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<td>$65,907</td>
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<td>Kentucky</td>
<td>$40,020</td>
<td>$46,815</td>
<td>$56,613</td>
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<td>Louisiana</td>
<td>$37,967</td>
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<td>$41,488</td>
<td>$53,227</td>
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<td>$41,092</td>
<td>$51,784</td>
<td>$59,549</td>
<td>$72,150</td>
</tr>
<tr>
<td>Montana</td>
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<td>$54,362</td>
<td>$56,977</td>
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</tr>
<tr>
<td>Nebraska</td>
<td>$41,861</td>
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<tr>
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<td>$55,674</td>
<td>$66,562</td>
</tr>
<tr>
<td>New Hampshire</td>
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<td>$65,830</td>
<td>$82,924</td>
<td>$99,457</td>
</tr>
<tr>
<td>New Jersey</td>
<td>$61,146</td>
<td>$69,697</td>
<td>$85,016</td>
<td>$103,786</td>
</tr>
<tr>
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<td>$51,965</td>
<td>$61,167</td>
</tr>
<tr>
<td>New York</td>
<td>$47,790</td>
<td>$59,308</td>
<td>$69,052</td>
<td>$83,209</td>
</tr>
<tr>
<td>North Carolina</td>
<td>$40,710</td>
<td>$51,812</td>
<td>$56,339</td>
<td>$64,983</td>
</tr>
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<td>North Dakota</td>
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<td>$68,688</td>
<td>$86,653</td>
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<td>Ohio</td>
<td>$42,814</td>
<td>$53,218</td>
<td>$60,960</td>
<td>$74,270</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State</th>
<th>ALL Median ($)</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oklahoma</td>
<td>$40,665</td>
<td>$51,575</td>
<td>$53,500</td>
<td>$64,374</td>
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<td>Oregon</td>
<td>$43,160</td>
<td>$55,057</td>
<td>$62,202</td>
<td>$67,315</td>
</tr>
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<td>Pennsylvania</td>
<td>$47,439</td>
<td>$55,210</td>
<td>$68,848</td>
<td>$82,078</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>$46,896</td>
<td>$61,607</td>
<td>$76,864</td>
<td>$83,785</td>
</tr>
<tr>
<td>South Carolina</td>
<td>$39,238</td>
<td>$50,548</td>
<td>$53,532</td>
<td>$61,388</td>
</tr>
<tr>
<td>South Dakota</td>
<td>$38,071</td>
<td>$57,188</td>
<td>$65,829</td>
<td>$73,960</td>
</tr>
<tr>
<td>Tennessee</td>
<td>$39,891</td>
<td>$48,617</td>
<td>$55,080</td>
<td>$65,038</td>
</tr>
<tr>
<td>Texas</td>
<td>$41,225</td>
<td>$55,895</td>
<td>$60,503</td>
<td>$67,296</td>
</tr>
<tr>
<td>Utah</td>
<td>$50,976</td>
<td>$56,089</td>
<td>$63,430</td>
<td>$66,590</td>
</tr>
<tr>
<td>Vermont</td>
<td>$46,019</td>
<td>$61,702</td>
<td>$67,774</td>
<td>$85,750</td>
</tr>
<tr>
<td>Virginia</td>
<td>$53,328</td>
<td>$65,930</td>
<td>$77,585</td>
<td>$91,661</td>
</tr>
<tr>
<td>Washington</td>
<td>$52,724</td>
<td>$65,123</td>
<td>$71,289</td>
<td>$83,270</td>
</tr>
<tr>
<td>West Virginia</td>
<td>$41,499</td>
<td>$44,536</td>
<td>$54,790</td>
<td>$66,756</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>$43,661</td>
<td>$58,668</td>
<td>$65,775</td>
<td>$81,296</td>
</tr>
<tr>
<td>Wyoming</td>
<td>$45,336</td>
<td>$63,193</td>
<td>$73,688</td>
<td>$78,733</td>
</tr>
</tbody>
</table>

Data: U.S. Census Bureau, American Community Survey, 2013. Dollar amounts are in 2013 inflation-adjusted dollars.

### Household Size

<table>
<thead>
<tr>
<th>Household Size</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL Median ($m$)</td>
<td>$42,814</td>
<td>$56,089</td>
<td>$64,552</td>
<td>$75,656</td>
</tr>
<tr>
<td>Average median ($\mu$)</td>
<td>$45,186</td>
<td>$57,804</td>
<td>$65,254</td>
<td>$76,814</td>
</tr>
<tr>
<td>Variance</td>
<td>34941428.06</td>
<td>66352961.65</td>
<td>117100423.9</td>
<td>160921976.7</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>5911.127478</td>
<td>8145.732726</td>
<td>10821.29493</td>
<td>12685.50262</td>
</tr>
<tr>
<td>Current HHS Poverty Guidelines</td>
<td>$11,770.00</td>
<td>$15,930.00</td>
<td>$20,090.00</td>
<td>$24,250.00</td>
</tr>
<tr>
<td>U.S. Poverty Threshold z-scores</td>
<td>-5.25178</td>
<td>-4.930066</td>
<td>-4.108750</td>
<td>-4.052342</td>
</tr>
<tr>
<td>British 60% of Median Income</td>
<td>$25,688.40</td>
<td>$33,653.40</td>
<td>$38,731.20</td>
<td>$45,393.60</td>
</tr>
<tr>
<td>Canadian 54.7% (pre tax) of median</td>
<td>$23,419.26</td>
<td>$30,680.68</td>
<td>$35,309.94</td>
<td>$41,383.83</td>
</tr>
</tbody>
</table>

Author’s calculations from Census table

The resulting calculations were completed with Microsoft Excel using the above formulas.

As can be seen from Table 10, even with high negative z-scores, both the British and Canadian values represent a significant increase in poverty threshold/guidelines in the United States. Figure 3 illustrates the British and Canadian average z-score distribution. The United States is not shown because the average Z score exceeds 3 standard deviations (-4.58).
Figure 3: Normal distribution showing Canada and Great Britain's average poverty threshold
Great Britain’s 60% of median income poverty formula represents the lowest 0.7% of income distribution. Canada’s 54.7% statistical poverty formula represents approximately the lowest 0.08% of income distribution. At -4.58 average standard deviations, the United State’s federal poverty threshold represents approximately the lowest 0.00007% of income distribution. This can be used as a measure of a household’s ability to consume at the current poverty thresholds. In the United States, the average household’s ability to consume at poverty levels is .00007% of the median. In this example, the resulting formula thus becomes:

**Equation 6: Average Z-Score on total household sizes factored**

\[
\text{Average } Z = \left( \frac{x - m}{\sqrt{\frac{\Sigma_{1}^{50} (x + \mu)^2}{50}}} \right) + \left( \frac{x - m}{\sqrt{\frac{\Sigma_{2}^{50} (x + \mu)^2}{50}}} \right) + \left( \frac{x - m}{\sqrt{\frac{\Sigma_{3}^{50} (x + \mu)^2}{50}}} \right) + \left( \frac{x - m}{\sqrt{\frac{\Sigma_{4}^{50} (x + \mu)^2}{50}}} \right)
\]

From Table 10, the Z-Scores for the U.S. Poverty Thresholds are obtained for each household size, and averaged:

\[
\text{Average } Z = \frac{\Sigma (-5.25178 + -4.930066 + -4.10875 + -4.052342)}{4} = -4.585737194
\]

Inversely, using this formula, one can find the z score of a household making above the poverty threshold as well in order to measure their ability to consume. Using the example of a household making $100,000 per year with a household size of four:

**Household Size: 4**
**Household Income: $100,000 per year**
**Median U.S. 4 member Household income (from Census Data): $75,656**
**Standard Deviation from Table 10: 12685.50262, or }\sqrt{\sigma^2} \text{ from Table 10.**}
\[
Z = \frac{x - m}{\sigma} = \frac{$100,000 - $75,656}{12685.50262} = +1.919
\]

The median income for household size is obtained from Table 10 from the U.S. Census data. The standard deviation is found from square root of the variance in Equation 2 based on household size. The resulting Z-Score shows that a household of 4 making $100,000 per year can consume 47% more than the median household of the same size. A household size of 4 with an income of $100,000 would be placed in the 95.4 percentile of income distribution for the household size, or in the top 4.6% of income distribution for household size.

**U.S. Poverty thresholds under the British and Canadian distribution**

With corresponding z-scores, it is now possible to compare what U.S. poverty thresholds would be under the British and Canadian formulas from Table 10, if U.S. income distribution followed those two countries. Table 11 compares the differences in poverty thresholds and guidelines in the United States if they follow the Canadian and British distributions.
Table 11: Comparative differences in U.S. Poverty Thresholds when Z Scored with Great Britain and Canadian formula

<table>
<thead>
<tr>
<th>Household Size</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Poverty Threshold</td>
<td>$11,670</td>
<td>$15,730</td>
<td>$19,790</td>
<td>$23,850</td>
</tr>
<tr>
<td>U.S. Poverty Threshold under British Z Score</td>
<td>$25,688.40</td>
<td>$33,653.40</td>
<td>$38,731.20</td>
<td>$45,393.60</td>
</tr>
<tr>
<td>Difference</td>
<td>$14,018.40</td>
<td>$17,923.40</td>
<td>$18,941.20</td>
<td>$21,543.60</td>
</tr>
<tr>
<td>U.S. Poverty Threshold under Canadian Z Score</td>
<td>$23,419.26</td>
<td>$30,680.68</td>
<td>$35,309.94</td>
<td>$41,383.83</td>
</tr>
<tr>
<td>Difference</td>
<td>$11,749.26</td>
<td>$14,950.68</td>
<td>$15,519.94</td>
<td>$17,533.83</td>
</tr>
</tbody>
</table>

**Limitations**

The major limitation in comparing the United States to Great Britain’s and Canada’s z-scores for median incomes versus poverty thresholds is that the British and Canadian z-scores are *after* basic needs are paid for; food, clothing, shelter and medical care. This is opposed to the United States’ z score that does *not* have basic needs accounted for. There is no clear way to separate pre and post basic needs from the three countries, as it requires extensive data from Canada and Great Britain that is just not available. Canada is especially troublesome to get specific data breakdowns, since universal medical care is delegated to the provinces, and real estate data for housing costs is guarded by various private entities.
Another limitation is in calculating the basket of goods in the United States that could be defined as needed by households to survive and grow beyond the basic needs of food, clothing, shelter, and medical care. The Cost of Living Index could be used to determine the basket of goods, however, the dataset is only available for purchase, and not readily available.

The limitations in the data can shed light into the lack of basic needs expense in the United States, and presents a household’s ability to consume as a factor of disposable income for Canada and Great Britain. For example, the post-basic-needs average standard deviation for Great Britain is -2.6 standard deviations, while the pre-basic-needs average for the United States is -4.58 standard deviations. This can suggest that the lack of accounting in the basic needs category for the United States is -1.98 standard deviations when compared to Great Britain. It signals that the cost of basic needs such as housing, food, clothing and medical care are throwing more people into lower levels of poverty in the United States.

There is a significant amount of data and literature that discusses discrimination based on class, as well as race, and gender. Economic discrimination is a social fact. This thesis does not address those factors, and matching poverty levels of women, single parents, African Americans (as well as other minorities) may show a significant shift in standard deviations from the median income for those population groups. This is an area for further study in its own rite, using the standardization method.

Policy Implications

The British Commonwealth difference

The largest difference in the British Commonwealth, including Canada, compared to the United States is that those societies view total housing cost, food, clothing and medical care
as basic human rights. As a result, the British Commonwealth automatically deducts those issues from poverty as they are accounted for in social safety net programs regardless of the political tone for (or against) such programs. Poverty becomes less of a basic-needs issue, and more of a socioeconomic mobility issue. A household’s ability to consume becomes a factor of income after basic needs are met. This may also allow for personal savings.

When using the standardization approach to poverty based on U.S. incomes, both Canada and Great Britain have poverty thresholds, which are within the normal distribution of the median income levels. This is pure disposable income that can be used for savings or extra consumption beyond basic needs, which aids in socioeconomic mobility.

The main feature of standardization within the British Commonwealth’s post-needs poverty measures is that it never has to be adjusted for inflation. As median incomes move recessionary forces, the household’s ability to consume does not change as a factor of standard deviation. If -2.6 standard deviations from the median is a measure of a household’s ability to consume within an economy, then -2.6 standard deviations from a median of $42,000 is the same as -2.6 standard deviations from $38,000 median. The only question that remains during recessions is what social safety nets, fiscal policies, and/or monetary policies will the government implement in order to strengthen the household’s ability to consume beyond basic needs?

**Impacts of changing U.S. poverty guidelines**

The poverty guidelines and thresholds for the United States have been skewed to such a degree that they have become non-functional in assuring a household’s ability to survive. However, standardizing the thresholds and shifting them to some factor of the median regardless
of whether or not they are pre or post basic needs expenses can be a step in a direction that facilitates socioeconomic mobility. People’s attitudes of and toward poverty could be less stigmatized.

The United States is the only G20 nation with food supplement programs, yet absolute poverty and hunger remain problematic. Instead of food supplement programs, the United States, like other advanced nations, could take a more holistic approach to household consumption by factoring in basic needs costs into a poverty calculus. However, this would require a redefinition of what poverty is (and is not) as a social construct for the United States. Once the basic needs of households are taken into consideration in the accounting, programs such as SNAP and WIC could effectively be eliminated, and households would be free to choose their own consumption needs, making them full participants in the market. Poor households are not only told what to consume, but because of market “deserts,” where various business enterprises refuse to exist in certain areas, poor households are told what to consume without any means to actually consume what is dictated to them. By making all households full participants in the market, with the freedom to choose between a basket of goods and services, poor households may become more empowered, especially in socioeconomic mobility.

Meeting household’s basic needs for survival frees household resources for additional consumption, which not only would assure the household’s interests, but also increase profits for business enterprises and stimulate economic activity.

Additionally, it does not make much sense to use CPI-U to adjust poverty levels based on a basket of goods and services, if people in poverty do not actually have access to the goods and services in the CPI-U basket. If the Unite States insists on using means testing income
thresholds, using a standardized comparison to the median to establish poverty thresholds can be very attractive in addressing social safety net services. Instead of using CPI-U to adjust poverty thresholds/guidelines, they would automatically adjust as the median income moves with peaks and troughs in the macro economy. Using a standardized income determination would also eliminate the politics of poverty in establishing thresholds for services that adjust more fluidly based on economic conditions.

**Defining the middle class**

Using the Z-Score of income distribution would de-politicize the middle class. Just as there is no clear definition of poverty, making it a social construct, the concept of the “middle class” is also a social construct. There are argumentative differences between what is the middle class as opposed to the working class. If the United States develops policy based on the income of the middle class idea, then it needs to be a range of income, and not purely the median income. A distribution, for policy purposes could be used to establish what the middle class is for policy, such as ±1 or ±0.5 standard deviations from the median. This would account for a range of income to establish the middle class as opposed to just relying on a fixed median income.

Using a range of standard deviations from the median to establish a quantitative definition of the middle class would de-politicize income limitations. Social and economic institutions using a standardized range to define middle class would also aid in the removal of the social construct that is seen in the general public, and aid in removing the stigma behind being poor.
**Effects on progressive tax policy**

Using a standardized income threshold that is above a median, or within a range of standard deviations from the median, as in the example of a household of four making $100,000 per year, can be used to establish a progressive tax policy. Instead of establishing a fixed income level in which taxes increase, as is the current U.S. policy, taxes could be established based on the number of standard deviations a household’s income is from the median, based on family size.

Taxing based on a standardized threshold measured in standard deviations based on household size as opposed to pure income limits could assure that a household’s tax rate would not inhibit its ability to consume if the appropriate set of standards were implemented. Instead of using a tax based on total household income minus deductions, taxation could be based on impacts to the household’s ability to consume, regardless of income. As households move farther to the right of the median for their household size, they would have the ability to pay more taxes. Inversely, as households move to the left of the median for their household size, they would have less ability to pay taxes based on its ability to consume.

**Effects on raising minimum wage**

One of the greater challenges in sociology and economics is the increase of the working poor population, and the underemployed population. There is no shortage of literature on raising minimum wage to a “living wage.” Yet both Sociologists and Economists have no consensus in the definition of a “living wage,” turning the issue into a social construct, along with poverty. $15 per hour is seen as a common ground for a living wage, but at what number of hours per week? Another number proposed is $9 per hour, but with how many jobs? How do
labor unions collectively bargaining for higher wages that are beyond the minimum wage rate factor into living wages for all?

The purpose of wages is so that a household can consume. Labor sells its power for a wage to assure their survival. Using a standardization approach in measuring the household’s ability to consume can be used in establishing a minimum wage that assures that a household does in fact have the actual ability to consume under the curve.

Conclusion

The purpose of business enterprise is to survive and grow through the production of goods and services that are consumed. The purpose of households is to consume those goods and services produced so that they can grow and survive. When households cannot consume, business enterprises produce less, invest less, and some do not survive. Due to the interdependent relationship between households and business enterprise, the concerns of one are the concerns of the other.

Poverty is a social construct that is only compared in relative terms to something else in the United States. Each organization or government entity has their own terms in which to compare poverty. For the United Kingdom and Canada, poverty is compared against a ratio of the median income when weighed against basic needs. The World Bank, using an income approach, developed an arbitrary income level to define poverty. In the United States, poverty definitions started out being related to food costs in the 1960s, but have become so politicized over time that current poverty measures have no quantitative economic meaning. The United States’ poverty measures also have no real meaning in the consumption needs of the household in order to survive.
Alternative poverty measures have been proposed, but have all been based on arbitrary income variables, or have not factored a true basket of goods that households need to survive. Since the alternative poverty measures have not produced results in actual poverty alleviations, authors of alternative poverty measures have criticized their own work.

People in poverty are stigmatized, and denied access to participate in markets. Food deserts, and business enterprise deserts that assure that households cannot purchase their basic needs even if they have the means to do so, disenfranchises the household based on class, and removes the power of the household to determine its own destiny. This contributes to the multigenerational aspect of poverty, and the culture of poverty.

Supplemental food programs in the United States have not helped alleviate poverty or hunger in light of the obstacles that they present to households. The two-level income tests (gross and net income) that have to be established, assure that only the poorest of the poor receive benefits. Then, regardless of income, each household is expected to contribute 30% of their gross income to food costs that they already cannot afford. Additionally, some food programs dictate what poor people consume, not factoring in culture, health concerns, or market availability of required food. Forcing people who need food into consuming food that may not be healthy for them, or not available, removes the basic human dignity of being able to freely choose consumption activity, participate in markets, or determine their own destiny on a daily basis.

Food is not a basic human right in the United States.

The United States has the opportunity to change course, so that it is not the last of the advanced nations to deal with child hunger/poverty, homelessness, or those dying from curable diseases. By standardizing incomes in relation to medians, either by region or nationally, it can
set the tone for empowerment among poor communities. Once incomes are standardized, the United States has a logical and quantifiable method to means test for programs, set tax policy, and establish a minimum wage policy that supports a household’s ability to consume as a measure of living wage.
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### Appendix 1: U.S. Poverty Guideline History

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>CPI Previous Year</th>
<th>CPI this year</th>
<th>CPI change</th>
</tr>
</thead>
<tbody>
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<td>2015</td>
<td>$11,770</td>
<td>15,930</td>
<td>20,090</td>
<td>24,250</td>
<td>28,410</td>
<td>32,570</td>
<td>36,730</td>
<td>40,890</td>
<td>232,962</td>
<td>236,712</td>
<td>1.61%</td>
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<td>2014</td>
<td>$11,670</td>
<td>15,730</td>
<td>19,790</td>
<td>23,850</td>
<td>27,910</td>
<td>31,970</td>
<td>36,030</td>
<td>40,090</td>
<td>229,600</td>
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<td>$11,490</td>
<td>15,510</td>
<td>19,530</td>
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<td>31,590</td>
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<td>30,970</td>
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<td>29,990</td>
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<td>37,630</td>
<td>214,565</td>
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<td>29,530</td>
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<td>37,010</td>
<td>215,254</td>
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<td>25,790</td>
<td>29,530</td>
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<td>37,010</td>
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<td>19,350</td>
<td>22,610</td>
<td>25,870</td>
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<td>32,390</td>
<td>184,000</td>
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<td>15,670</td>
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<td>25,210</td>
<td>28,390</td>
<td>31,570</td>
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<td>2.30%</td>
</tr>
<tr>
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<td>$8,980</td>
<td>12,120</td>
<td>15,260</td>
<td>18,400</td>
<td>21,540</td>
<td>24,680</td>
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<td>$8,860</td>
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<td>15,020</td>
<td>18,100</td>
<td>21,180</td>
<td>24,260</td>
<td>27,340</td>
<td>30,420</td>
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<td>2.82%</td>
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<td>2001</td>
<td>$8,590</td>
<td>11,610</td>
<td>14,630</td>
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