

**EFFECT OF INCOME INEQUALITY ON HOUSEHOLDS' DESIRE TO LIVE BEYOND
THEIR MEANS IN THE UNITED STATES**

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ABSTRACT

This paper shows that, consistent with Veblen's signaling-by-consuming model, rising income inequality contributes to an increase in household conspicuous consumption. We use the Consumer Expenditures Survey (CEX) and state-level income inequality data across six different years (1994, 1995, 1998, 1999, 2002 and 2003) to estimate the impact of income inequality on conspicuous consumption at different points along the income distribution. The various goods and services consumed annually by households are divided into two categories, *visible* and *invisible*, based on their Vindex (Heffetz 2004), a measure ranking the visibility of consumer expenditures. We explore the varying effects of income inequality and provide evidence linking it with households' decisions to spend beyond their means in order to maintain their relative standing in society.

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I. Introduction and Motivation

In general, we prefer to live a materially rich life rather than a poor one. However, Easterlin (1974, 1995) explores the idea that material richness is relative—we cannot feel materially rich if those around us are richer than us. In *Falling Behind: How Rising Inequality Harms the Middle Class*, Robert Frank (2007) explores the meaning of happiness and prosperity in America by defining a concept called subjective well-being, which means happiness depends on context and should be measured in relative terms. To put it another way, one's happiness depends not only on one's own consumption, but also on how that compares to the consumption of one's neighbor or friend. The terms *relative social standing* or *relative position* in this paper refer to the relative distance between households in terms of income. For example, assume Household A, Household B, and Household C have the same income. If Household A's income increases and Household B and C's do not, the distance between A and B, as well as between A and C, in terms of income, increases. Although Household B still has the same social standing or position relative to Household C, both B and C have lost their position relative to Household A. This is what is meant by relative standing or position. The tendency to desire higher relative positions, or higher social status, coupled with the upward trends in income inequality in the United States (Piketty and Saez 2003, and Frank, M. W. 2009) can have significant economic implications. For example, studies have shown that greater inequality influences an individual's allocation of time between labor and leisure. On average, rising inequality induces people to work longer hours, presumably to accumulate more income to finance their consumption and improve their relative standing (Bowles and Park 2005). Longer working hours are the mechanism by which people could increase their income to afford the items that signal success to

their peers. This is referred to as *keeping up with the Joneses* (Christen and Morgan, 2005). The details of this study will be discussed later.

It is clear that income inequality can impact our relative standing in society. Since we derive utility from our relative standing in society, income inequality can impact our decisions to accumulate income (presumably so we can consume more). What happens, however, when we do not have the luxury of increasing our income? Holding income constant, can income inequality affect our consumption choices in a manner that causes us to live beyond our means? In other words, can income inequality alter the basket of goods we purchase to increase the visibility of our consumption to our peers. This hypothesizes that greater inequality leads to higher household spending on goods and services that are visible to others and thus more likely to transmit signals of wealth, and that this relationship will vary depending on where one lies on the income distribution. Rising income inequality will have a significant positive effect on spending on visible goods, but the effect will increase at a decreasing rate as households move up the income distribution. Using the Consumer Expenditures Survey (CEX) and state-level income inequality data, we conclude that such a relationship does exist. Income inequality at the state-level is significant in determining a household's spending on visible as opposed to invisible goods, and this relationship holds for multiple inequality measures.

The remainder of this paper is organized as follows: Section two presents a brief background of the literature on the linkages between income inequality and conspicuous consumption. Section three develops the conceptual framework for our model. Section four discusses the econometric model and the methods used to analyze the relationship. Section five

provides an analysis and interpretation of the results of our research. The final section summarizes our conclusions and presents policy implications.

II. Background

The neoclassical view on income inequality is that an individual's well-being is based solely on the amount of goods and services that he/she consumes and not what others consume. This is the basis for the conservative opinion that inequality itself is of no consequence, and if we want to help the poor, we should increase the size of the pie, rather than redistributing the pie—a rising tide lifts all boats, so to speak. However, there has been growing literature demonstrating that inequality matters. In particular, there is extensive evidence linking equality and consumption, with growing inequality being positively correlated with increased consumption (Frank, 2007; Frank and Cook, 1995). This is especially true for “conspicuous consumption,” a term describing the acquisition and display of possessions with the intention of gaining social status (Veblen, 1899). Studies have shown that consumers purchase products for both functional utility and social meaning (Solomon, 1983; Bagwell and Bernheim, 1996), but little work has been done to examine aggregate level implications of conspicuous consumption. The most common explanation for why inequality increases conspicuous consumption is that consumers are *keeping up with the Joneses* (Christen and Morgan, 2005). The impetus for Christen and Morgan's study is the unprecedented growth in household debt in the last 25 years. Various explanations for the rise in household debt have been proposed, such as increased credit supply (Debelle, 2004). Christen and Morgan find a strong positive effect of income inequality on household debt relative to disposable income, and argue that the effect of income inequality on

household indebtedness results from the need for consumers to maintain or improve their social position through conspicuous consumption. Their study is based on the fact that a household can only consume the sum of its current labor income, current net worth, and borrowing capabilities. If its current labor income and current net worth do not change, in order for a household to increase conspicuous consumption, it can only do two things: 1) alter its budget constraint to reallocate spending to more visible goods, or 2) consume more on credit.

Christen and Morgan directly test the effect of income inequality on conspicuous consumption by estimating the effect on two different categories of consumption: automobiles, and food. They contend that more people use automobiles as status symbols than food items, and they expect a positive effect of income inequality on automobile consumption as a percentage of total consumption. Since they could not reject their hypothesis, they refined their model using different techniques to estimate the effect and found a positive and significant effect of income inequality. They admit, however, that food and automobiles are not perfect indicators of conspicuous and inconspicuous consumption. Although their results are consistent with their claims, given that they use a relatively simple model of just two goods, their findings warrants further investigation with more comprehensive set of consumption goods.

This study uses a stronger model to test the effect of income inequality on conspicuous and inconspicuous consumption by categorizing all consumer purchases by an index of their visibility (Vindex) proposed by Heffetz (2004). Heffetz investigates the relationship between the visibility of expenditures measured by a visibility survey, and the survey-respondents' demographic characteristics. He asks: Do different demographic groups notice different expenditures, and if so, who sees what? Heffetz (2011) also shows that, consistent with a

signaling-by-consuming model, income elasticities can be predicted from the visibility of consumer expenditures.

The results of this study are consistent with that of Christen and Morgan's, but add strength to their existing study by including a wider range of expenditures in the two consumption baskets. This will be discussed in more detail in the *Data and Methods* section of this paper. In short, this paper has strong implications that will be significant to policy makers because it provides further evidence in support of Christen and Morgan's suggestion to include income inequality into debt forecasting models in order to improve prediction accuracy.

III. Conceptual Framework

The theoretical framework behind this paper is based on research by Frank (1985), who argues that preferences are shaped by the forces of natural selection. The success of individuals and their children depends largely on their relative standing in society. Since attributes, such as ability and intelligence, are difficult to observe, individuals engage in a signaling contest to attain a high relative position. Signals can take many forms, but in today's society, it is seen most clearly in the quality of the products people buy. For example, clothing designers typically place their name or logo visibly on their product. For higher end products, these logos stand as a symbol of sophistication and class, and their value is easily discernable by those who recognize the logo. From a purely practical standpoint, a \$1,000 purse from Gucci performs the same task as its \$20 generic counterpart from Target. However, the Gucci purse is recognizable and known to be of higher quality. The Gucci purse sends a very clear signal to your social circle: "I am either on par or higher standing in society and this is evidenced by my ability to spend \$1,000 on

this purse.” The theory driving this study stems from Veblen’s (1899) argument that all individuals crave for status, which is obtained by wasteful displays of wealth:

“In order to gain and hold the esteem of men, wealth must be put in evidence, for esteem is awarded only on evidence.”

Theoretically, the utility of the households in this study is a function of their own consumption of visible and invisible goods as well as the ratio of their visible consumption to the visible consumption of other households:

$$U_x = U[C_{Ix}, C_{Vx}, (C_{Vx}/C_{Vy})]$$

When incomes rise, spending on conspicuous goods as a proportion of income will increase relative to other goods (Becker, 1974). Theoretically, when the income and consumption of consumer A increases more rapidly than that of consumer B, assuming they associate with one another either as neighbors, friends, or colleagues, consumer B risks losing his perceived relative position in society. This example illustrates what happens when income inequality rises. Consumer B finds him or herself at a lower position in society relative to consumer A. Assuming consumer B derives utility from being perceived among his peers as wealthy, he will be incentivized to stretch his budget to keep up conspicuous consumption to maintain his successful reputation. The risk averse nature of some consumers may reduce the influence of income inequality on conspicuous consumption, but because we are operating in a

winner take all society, where the few at the top gain most of the benefit, risk aversion does not restrain risk taking (Gaba and Kalra 1999).

IV. Data and Methods

The econometric model is based on the understanding that consumption equals disposable income minus savings plus change in debt:

$$C_t = Y_t - S_t + \Delta D_t$$

If one's income stays the same or increases less relative to others, in order to maintain relative ranking, one must increase consumption today at the expense of future consumption possibilities, i.e., a reduction in savings or an increase in debt to finance today's consumption. To determine the effect of income inequality on consumption, this study uses two different household consumption baskets as the dependent variables of interest for our econometric model.

This study uses data from the CEX collected by the U.S. Bureau of Labor Statistics (BLS). The CEX is based on a nationally representative quarterly survey which asks respondents for detailed information on their income and purchases over the preceding three months. The National Bureau of Economic Research (NBER) has condensed this data into aggregate categories of income and expenditures. The expenditure and income data are analyzed on the family level to account for sharing of resources across members of the same family. The data also include demographic characteristics of the family head and his or her spouse. This study makes use of six years of CEX data (1994, 1995, 1998, 1999, 2002, and 2003). Although a

longer timeline would provide more variation across variables, complete data for the years before 1994 and after 2003 were not readily available. Nonetheless, the chosen years provide adequate variation in spending and inequality patterns.

The household expenditures are categorized using a Visibility Index (Vindex) (Heffetz 2004). The Vindex was constructed to provide an empirical resource for measuring conspicuous consumption, and predicts up to one-third of the observed variation in elasticities across consumption categories in US data (Heffetz 2011).

Heffetz divides household expenditure in the US as reported in the CEX into thirty-one consumption categories, and places each category along a visibility scale based on how visible the related expenditure is to society (table 1). For the purposes of this study, visibility is defined as, observable, displayable or otherwise knowable to people other than those directly engaged in its consumption. The visibility survey is a national random survey of 480 people over the age of 18 conducted at Princeton University's Survey Research Center (PSRC) from May 2004 to February 2005. Heffetz's survey question is:

Imagine that you meet a new person who lives in a household similar to yours. Imagine that their household is not different from other similar households, except that they like to, and do, spend more than average on [title of category]. Would you notice this about them, and if so, for how long would you have to have known them, to notice it? Would you notice it almost immediately upon meeting them for the first time, a short while after, a while after, only a long while after, or never?

Table 1: Expenditure Categories and Corresponding Vindex

Expenditure	Vindex
Clothing	.70
Cars	.69
Jewelry	.68
Furniture	.68
Recreation	.67
Alcohol home	.63
Barbers etc	.61
Alcohol out	.60
Other recreation	.60
Food out	.59
Books etc	.57
Education	.53
Food home	.51
Air travel	.47
Hotels etc	.45
Public transport	.44
Cell phone	.44
Rent/home	.44
Car repair	.41
Gasoline	.39
Health care	.34
Laundry	.33
Charities	.32
Home phone	.26
Home utilities	.26
Legal fees	.25
Car insurance	.18
Life insurance	.13
Home insurance	.13

Source: Heffetz (2004)

Categories that are noticed immediately are more visible than others, and thus will have a higher Vindex. The Vindex ranges from zero to one (one is highly visible and zero is highly invisible). This study divides the categories into *visible* (Vindex at or above .53) and *invisible* (Vindex at or below .41) categories. The Vindex cutoffs were set at .53 and .41 to eliminate ambiguous expenditures that are in the middle range of visibility.

The *visible* category includes the following expenditures: jewelry and watches, recreation and sports equipment¹, alcohol for home-use, drinks and alcohol at restaurants, other recreational services², dining out at restaurants, clothing, shoes, new and used motor vehicles, furniture and durable household equipment, barbers, beauty parlors, and health clubs. The *invisible* category includes the following: religious activities, life and auto insurance, car repair, gas, medical costs, home utilities, telephone and dry cleaning.

The independent variable of interest is income inequality. This study uses six measures of U.S. state-level income inequality data compiled by Mark Frank (2008) based off of data published in the IRS's *Statistics of Income* on the number of returns and adjusted gross income (before taxes) by state: top 10% income share, the relative mean deviation; the Gini coefficient; the Atkinson index; and the Theil index. Evaluating the inequality ratio at the state level, rather than the national level, allows for a large degree of variance in inequality across states, and recognizes that individual consumption patterns are likely driven by more local indicators of inequality.

¹ Computers, games, video, audio, musical and sports equipment.

² Cable TV, pets and veterinarians, sports, movies, concerts.

Observation of income inequality within a household's circle of influence is ideal, but to do so would require county or census-tract level data. Localized inequality information such as this is limited. Perhaps, future research can help fill this gap.

This study controls for a series of variables including: household income, age, race, occupation, marital status, household size, and other demographic variables. Table 2 presents statistics summarizing the demographics of the households in our dataset.

An after-tax income variable was constructed by NBER using income and tax data gathered by the CEX. This variable includes all wages, salaries, business profits, rent profits, dividends received, interest earned, government/private pensions, social security income, unemployment compensation, worker's compensation, veteran's benefits, public assistance, scholarships, and food stamps minus all federal, state, local, personal property, and other taxes. Table 3 presents statistics summarizing the income and expenditures of the households in the dataset. Visible and Invisible spending constitute only about 38% and 24% of total spending because expenditures such as rent, mortgage, interest, and education are excluded.

To control for the diminishing marginal effect of income, we include a squared term for *income*. Controls for a series of demographic variables and state and year fixed effects are also included. It is important to include state and year fixed effects in order to identify differences in spending within states over time. Figure 1 shows the within-state trends in inequality over time. The trends differ substantially across states, allowing for identification that is different from national inequality trends. Although inequality data is available for all 50 states, the regressions only include 42 states because expenditure information was not available for some of the lesser populated states.

Table 2: Demographic Summary Statistics

Demographics	%
Male	54.87%
Married	51.05%
White	82.53%
Black	12.09%
Education Level	
No High School Degree	15.97%
High School Degree	28.55%
Some College	28.50%
Post Graduate Work	26.98%
Occupation	
Managerial and Professional Specialty	18.79%
Technical, Sales, and Administrative	14.08%
Service	6.91%
Farming, Forestry, and Fishing	0.41%
Precision Production, Craft, and Repair	3.47%
Operator, Fabricator, and Laborer	7.15%
Armed Forces	0.40%
Self Employed	5.05%
Not Working	7.97%
Retired	15.30%
Over 65	67.17%
Unreported	20.47%

Source: Author's calculations using Survey of Consumer Expenditures data

Table 3: Income and Expenditure Summary Statistics

	Mean	Min	Max	Median
Income	\$60,449	\$1	\$1,067,874	\$44,350
Expenditures	\$45,315	\$0	\$1,608,909	\$23,412
Visible	\$8,312	\$0	\$229,983	\$4,069
Invisible	5,343	\$0	548,278	\$3,977

Figure 1: State-Level Income Inequality (Top 10% Income Share) by Year



The relationship between consumption and inequality is measured using the following model:

$$C_1 = \beta_0 + \beta_1(\text{IE}) + \beta_2(\text{Inc}) + \beta_3(\text{Inc}^2) + \beta_4(\text{X}) + \beta_5(\text{State FE}) + \beta_6(\text{Year FE}) + \beta_7(\text{IE} * \text{Inc}) + \beta_8(\text{IE} * \text{Inc}^2) + \varepsilon$$

In this equation, C_1 is the consumption of a specific basket of goods (visible or invisible goods); IE is the selected inequality measure; Inc is after-tax disposable income; X is a series of demographic variables of the head-of-household (Age, Age squared, Gender, Marital status, Education level, Occupation, and Household size).

The first regression regresses the sum total of visible and invisible expenditures on the top 10% income inequality measure to determine whether inequality has a significant effect on spending in general. The second set of regressions are on each of the classifications mentioned earlier (visible and invisible goods) to determine the strength of the effect on the two expenditure categories. The first regression for each consumption classification does not include the interaction terms. We expect the relationship between income inequality and the consumption level of each of the two previously mentioned classifications of expenditures to be positive for reasons mentioned in the conceptual model section. We analyze the relative change in consumption at different points along the income distribution to determine where the effect is the strongest. The effect of income inequality will not be clear on those whose income is relatively high because they may face relatively weaker budget constraints. The effect will also be weaker for those at the lowest end of the income distribution, since their budgets are likely stretched to the limit on primarily necessities, and they probably lack access to credit markets to be able to spend beyond their available income.

Although there is evidence for a causal claim, the omission of certain variables may have caused some bias. For example, there is no variable identifying urbanization. The concern regarding urbanization is that states with more urban centers will likely have more inequality, and people in urban areas may be likely to spend more on visible goods. The result is that the omission of an urbanization variable is placing a positive bias on the effect of income inequality.

V. Results and Analysis

The final estimation results are reported in the tables below. Table 4 displays the results of an OLS regression of total expenditures on the top 10% income share. The results show that inequality has a positive and statistically significant ($p < .1$) effect on total spending.

The income inequality measure, *Top 10%*, ranges from 0 to 1, therefore the \$96,432 coefficient represents a change from zero income share to a 100% income share. Thus, the impact of a one percentage point increase in inequality is \$964. The magnitude of the effect of a one percent change in inequality drops from \$964 to about \$289 between Columns 1 and 2 of Table 4. This is because Column 1 includes the interactions between inequality and income in order to determine whether the effect of inequality is different depending on where households are on the income distribution. The interaction term in Column 2 is positive and significant at the ten percent level. Based on these results, it is clear that inequality has a significant effect on total spending. The next regression drills down to determine its effect on our two subsets of spending, *visible* and *invisible*.

Table 4: Regression of Total Expenditures on Top 10% Income Inequality Measure

	(1) Expenditures	(2) Expenditures
Top 10%	96,432* (59,136)	28,865 (61,132)
Income	0.496*** (0.0147)	0.0432 (0.138)
Income ²	-2.48e-07*** (3.33e-08)	-9.88e-09 (3.61e-07)
Age	593.8*** (142.4)	611.2*** (142.4)
Age ²	-5.817*** (1.443)	-5.946*** (1.443)
Married	7,602*** (1,161)	7,650*** (1,160)
Male	-1,878** (894.9)	-1,838** (894.7)
Top 10% * Income		1.068*** (0.321)
Top 10% * Income ²		-5.89e-07 (8.34e-07)
Constant	-65,072*** (23,367)	-37,361 (24,228)
Observations	32,276	32,276
R-squared	0.193	0.194
Number of state	42	42

Model controls for state and year fixed effects, race, occupation, education level, and household size

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 is the main focus of the analysis. It displays the results of an OLS regression of the two consumption baskets, *visible* and *invisible*, on income inequality. When regressing the two consumption baskets on the top 10% income share measure for inequality, holding income and other demographic variables constant, and controlling for state and year fixed effects, income inequality has a positive significant ($p<.01$) effect on spending on visible goods, and a positive insignificant effect on spending on invisible goods.

Table 5: Regression of Visible and Invisible Goods on Top 10% Measure

	(1) Visible	(2) Visible	(3) Invisible	(4) Invisible
Top 10%	20,453*** (7,880)	16,477** (8,149)	2,793 (4,520)	2,019 (4,674)
Income	0.0876*** (0.00196)	0.0565*** (0.0184)	0.0376*** (0.00113)	0.0273*** (0.0105)
Income ²	-4.75e-08*** (4.44e-09)	-5.12e-09 (4.81e-08)	-5.82e-09** (2.54e-09)	2.94e-08 (2.76e-08)
Age	131.7*** (18.97)	132.7*** (18.98)	124.6*** (10.88)	124.8*** (10.88)
Age ²	-1.320*** (0.192)	-1.328*** (0.192)	-0.636*** (0.110)	-0.637*** (0.110)
Married	1,015*** (154.7)	1,019*** (154.7)	831.6*** (88.71)	832.6*** (88.72)
Male	-22.85 (119.2)	-20.14 (119.3)	69.20 (68.39)	70.05 (68.40)
Top 10% * Income		0.0731* (0.0428)		0.0240 (0.0246)
Top 10% * Income ²		-1.00e-07 (1.11e-07)		-8.15e-08 (6.37e-08)
Constant	-12,815*** (3,114)	-11,176*** (3,230)	-6,299*** (1,786)	-5,972*** (1,852)
Observations	32,276	32,276	32,276	32,276
R-squared	0.291	0.291	0.288	0.288
Number of states	42	42	42	42

Model controls for state and year fixed effects, and other demographics

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

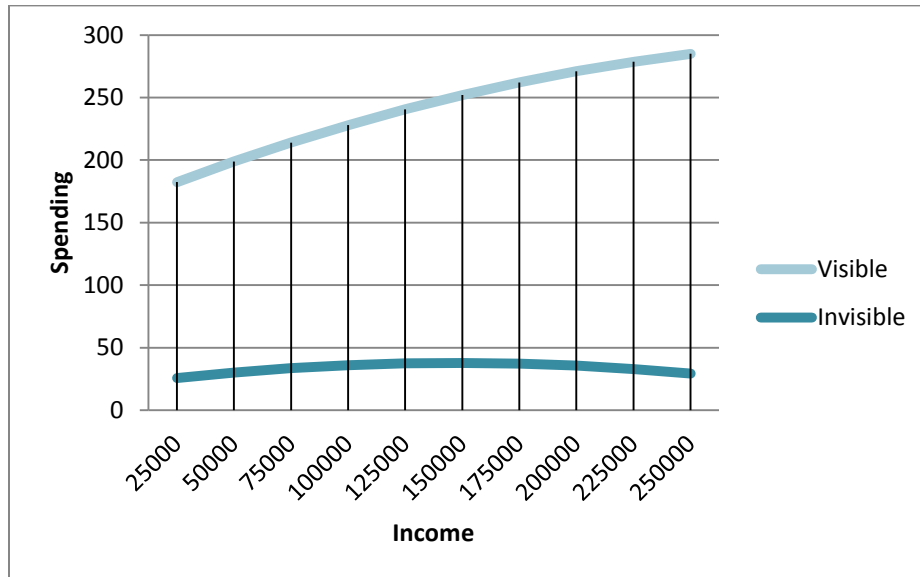
First, controlling for income is important, as consumption is highly correlated with income. Including an income variable while controlling for state fixed-effects prevents income inequality from picking up a bias related to income level. Income is significant at the one percent level across all specifications. Age is an important determinant of spending because older individuals have presumably worked longer, and should have theoretically accumulated more wealth and savings that they can use to consume. The age variables are also significant at the one percent level across all specification.

The results in Column 2 of Table 5 show that a \$1 increase in income is associated with about a \$0.06 increase in *visible* consumption, while Column 4 of Table 5 shows that the same change in income is associated with only about a \$0.03 increase in *invisible* consumption. It is worth noting that although *visible* consumption constitutes only about 60% of total consumption, it accounts for 68% of the change in consumption when income increases by \$1, holding all else equal.

Column 2 includes variables that interact *Top 10%* with *income* to determine whether the effect of inequality on visible goods spending is non-linear. In Column 2 this interaction variable is statistically significant at the ten percent level. The results are consistent with our hypothesis. The model suggests that, holding income and other demographic variables constant, an increase in the income held by the top 10% of income earners in the U.S. has a stronger effect on spending on visible goods for households in the upper-middle range of the income distribution. To be clear, a rise in income inequality has the highest absolute effect for households in the middle range of the income distribution, but as a percentage of income, the effect is highest for those on the lower end of the income distribution. Figure 2 shows the marginal effect of an increase of inequality by one percentage point at various income levels.

Consistent with the hypothesis, the marginal effect of inequality increases at a decreasing rate as households move up the income distribution. The magnitude of the effects of income inequality in both Columns 1 and 2 are seven to eight times higher than that of Columns 3 and 4, which regress invisible spending on income inequality.

Figure 2: Marginal Effect of 1% Increase in Inequality



In Column 2, the results indicate that, all else equal, a one percentage point increase in income inequality is associated with a \$165 increase in household spending on visible goods, while Column 4 shows an increase of only \$20 on invisible goods. The spending on visible goods is more than eight times greater than that of invisible goods. However, keeping in mind that the effect varies depending on where a household lies on the income distribution, we evaluate the effect on households at different income levels.

According to our results, all else equal, a household at the 25th percentile, i.e., a household that earns \$20,786 per year, will increase visible and invisible goods spending by \$179.53 and \$24.82, respectively, when income inequality increases by one percentage point. Meanwhile, a household at the 75th percentile, i.e., a household that earns \$81,814 per year will increase visible and invisible goods spending by \$217.88 and \$34.37, respectively, when income inequality increases by one percentage point. It is clear that an increase in income inequality has

a disproportionate effect on spending on visible goods compared to invisible goods. The effect of a one percentage point increase in income inequality on visible goods spending for the household at the 25th percentile is equivalent to an increase in annual income of about \$2,058.81. The effect on the household at the 75th percentile is about \$2,498.60. Conversely, on invisible goods spending, the effect would be equivalent to an increase in annual income of \$664.17 and \$919.48, respectively. The effect of a rise in income inequality is disproportionately larger for households at the 25th percentile compared to households at the 75th. All else equal, households at the 75th percentile earn about three times more than those at the 25th percentile, yet they only spend about 21% and 38% more on visible and invisible goods respectively, when income inequality rises by one percentage point.

To ensure that the results are robust to different specifications, a variety of robustness checks were run by regressing the two consumption baskets on the four other inequality measures, the Theil index, the Atkinson index, relative mean deviation, and the Gini coefficient. All of the models control for state and year fixed effects, and other demographics. Table 6 displays the results of our model when regressed on the Theil index. The results show that the Theil index is significant at the five percent level and has a positive effect on consumption of visible goods. The effect on invisible goods spending is negative and insignificant. These results are substantively similar to those using the Top 10% income share in that there is a strong positive effect on visible spending but no significant effect on invisible spending.

Table 7 displays the results of our model when regressed on the Atkinson index. The results show that the Atkinson index is significant at the ten percent level and has a positive effect on consumption of visible goods. The effect on invisible goods spending is negative and

insignificant. Table 8 displays the results of our model when regressed on relative mean deviation (RMD). Again, the results show significance at the ten percent level and a positive relationship between inequality and consumption of visible goods. In this regression, the effect on invisible goods spending is over eight times smaller than visible goods. Lastly, Table 9 displays the results of our model when regressed on the Gini coefficient. Although, the Gini coefficient is not significant for any of the specifications, the interactions in Column 2 are significant at the five percent and 10 percent levels respectively.

The results of the regressions on the other four inequality measures are consistent with the results from the *Top 10%* inequality measure, in terms of significance and direction of the effect of income inequality on visible and invisible spending. Further analysis also shows that the inequality measures are relatively similar in magnitude as well. Holding income at the mean (\$60,449), a one standard deviation increase in the Top 10% inequality measure results in a \$760 and \$117 increase in visible and invisible spending, respectively. A one standard deviation increase in the Theil Index results in a \$470 and \$69 increase. Similarly, for the Atkinson Index, the results are a \$499 and \$52 increase, and for real mean deviation, the results are a \$570 and \$124 increase. The Gini Index is the only measure to show inconsistent results (\$233 for visible and \$120 for invisible), but this is expected since the Gini coefficient showed no significant effect on visible or invisible spending.

Table 6: Regression of Visible and Invisible Spending on Theil Index

	(1) Visible	(2) Visible	(3) Invisible	(4) Invisible
Theil	2,928** (1,355)	2,303 (1,435)	78.79 (777.0)	-163.4 (822.6)
Income	0.0876*** (0.00196)	0.0775*** (0.00841)	0.0376*** (0.00113)	0.0252*** (0.00482)
Income ²	-4.75e-08*** (4.44e-09)	-3.20e-08 (2.09e-08)	-5.81e-09** (2.54e-09)	5.76e-08*** (1.20e-08)
Theil * Income		0.0119 (0.00959)		0.0142*** (0.00549)
Theil * Income ²		-1.84e-08 (2.35e-08)		-7.21e-08*** (1.34e-08)
Constant	-6,960*** (1,091)	-6,463*** (1,154)	-5,265*** (625.5)	-5,048*** (661.4)
Observations	32,276	32,276	32,276	32,276
R-squared	0.291	0.291	0.288	0.288
Number of state	42	42	42	42

Model controls for state and year fixed effects, and other demographics

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regression of Visible and Invisible Spending on Atkinson Index

	(1) Visible	(2) Visible	(3) Invisible	(4) Invisible
Atkinson	14,746* (7,614)	14,433* (7,960)	-953.4 (4,367)	-1,356 (4,560)
Income	0.0876*** (0.00196)	0.0829*** (0.0134)	0.0376*** (0.00113)	0.0148* (0.00765)
Income ²	-4.75e-08*** (4.44e-09)	-2.39e-08 (3.56e-08)	-5.81e-09** (2.54e-09)	1.39e-07*** (2.04e-08)
Atkinson * Income		0.0167 (0.0479)		0.0797*** (0.0275)
Atkinson * Income ²		-8.39e-08 (1.26e-07)		-5.13e-07*** (7.23e-08)
Constant	-8,448*** (1,928)	-8,360*** (2,022)	-4,973*** (1,106)	-4,829*** (1,158)
Observations	32,276	32,276	32,276	32,276
R-squared	0.291	0.291	0.288	0.289
Number of state	42	42	42	42

Model controls for state and year fixed effects, and other demographics

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Regression of Visible and Invisible Spending on Relative Mean Deviation

	(1) Visible	(2) Visible	(3) Invisible	(4) Invisible
RMD	12,260* (6,343)	8,423 (6,567)	2,481 (3,638)	871.2 (3,766)
Income	0.0876*** (0.00196)	0.0219 (0.0294)	0.0376*** (0.00113)	0.00781 (0.0169)
Income ²	-4.76e-08*** (4.44e-09)	7.75e-08 (7.64e-08)	-5.83e-09** (2.54e-09)	6.20e-08 (4.38e-08)
RMD* Income		0.0793** (0.0354)		0.0360* (0.0203)
RMD* Income ²		-1.51e-07* (9.15e-08)		-8.16e-08 (5.25e-08)
Constant	-14,489*** (5,022)	-11,371** (5,209)	-7,164** (2,880)	-5,854* (2,987)
Observations	32,276	32,276	32,276	32,276
R-squared	0.291	0.291	0.288	0.288
Number of state	42	42	42	42

Model controls for state and year fixed effects, and other demographics

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Regression of Visible and Invisible Spending on Gini Coefficient

	(1) Visible	(2) Visible	(3) Invisible	(4) Invisible
Gini	7,075 (8,443)	2,192 (8,799)	3,328 (4,842)	418.4 (5,046)
Income	0.0876*** (0.00196)	0.0219 (0.0314)	0.0376*** (0.00113)	-0.00566 (0.0180)
Income ²	-4.75e-08*** (4.44e-09)	9.98e-08 (8.02e-08)	-5.83e-09** (2.54e-09)	1.12e-07** (4.60e-08)
Gini * Income		0.112** (0.0534)		0.0736** (0.0306)
Gini * Income ²		-2.50e-07* (1.36e-07)		-2.00e-07** (7.78e-08)
Constant	-8,827* (4,802)	-5,999 (5,011)	-7,092** (2,754)	-5,404* (2,873)
Observations	32,276	32,276	32,276	32,276
R-squared	0.291	0.291	0.288	0.288
Number of state	42	42	42	42

Model controls for state and year fixed effects, and other demographics

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

VI. Conclusion

Rising income inequality is a significant economic trend, not just in the US, but in many nations. The current debate on income inequality is about whether growing inequality is bad or if it even matters as long as there is overall growth in income. This paper demonstrates that inequality *does* matter by demonstrating that one's utility is impacted not only by one's own consumption, but also, in some degree, by the consumption of others. This study links income inequality and household spending on conspicuous consumption and thus provides further evidence for status-seeking behavior on the part of consumers, and does so using measurable variables rather than broad assumptions concerning tastes and preferences. Upon examining whether rising income inequality contributes to higher household spending on wealth signaling goods, this paper found that a rise in income inequality is not only associated with an increase in total consumption, but that it is specific only to those goods and services that signal wealth.

In addition to impacting spending overall, the results showed that the effect of a rise in income inequality varies based on income. The effect, as a percentage of income, is larger for households at the 25th percentile compared to households at the 75th. All else equal, households at the 75th percentile earn about three times more than those at the 25th percentile, yet they only spend about 21% and 38% more on visible and invisible goods respectively, when income inequality rises by one percentage point.

This paper makes two important contributions. First, it adds to the limited literature on the implications of income inequality by reinforcing the view that policy-makers should be doing more to reduce income inequality, especially if well-being is not just driven by personal consumption but also by relative consumption. Second, it provides further evidence on the

existence of a positive relationship between income inequality and household spending on wealth signaling goods. This is important because it adds strength to arguments made by previous studies, particularly Christen and Morgan's study on the effect of income inequality on household indebtedness. This is of significant importance to policy makers because their findings suggest that including income inequality into debt forecasting models can improve prediction accuracy.

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