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Money Matters:
Consumption Volatility Across the Income Distribution

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Money Matters:
Consumption Volatility Across the Income Distribution

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Abstract: Using the Consumer Expenditure Survey, we document the level and volatility of quarterly consumption across the socioeconomic distribution. While the measurement of well-being is focused on income, the secular and policy discourse prioritizes income-adequacy to meet family needs. This concern over income-adequacy centers on the capacity of families to predictably consume minimally acceptable levels of basic needs, and the social and economic mobility consequences of low consumption. Our results show a clear socioeconomic and demographic gradient of lower consumption amid higher consumption volatility for disadvantaged groups. Food and clothing exhibit relatively high levels of consumption volatility among low-income households.

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1. Introduction

The measurement of economic security in the United States has historically focused on income, while the secular and policy discourse prioritizes income-adequacy to meet family needs. Concerns over income-adequacy center on the capacity of families to predictably consume minimally acceptable levels of basic needs—food, clothing, shelter, utilities, and other essential goods—and the social and economic mobility consequences of low consumption (e.g., Duncan et al. 2011; Hardy et al. 2019; Hoynes, et al. 2016). In spite of the fact that both income and consumption help in characterizing the economic situation of families (Johnson 2004; Ziliak 2006, 2015), there is relatively little contemporary evidence on the level and volatility of consumption across income and socioeconomic status.

Consumption-based measures of well-being may be better aligned with economic models and forecasts, given that well-being within canonical models of economic behavior depend upon consumption, not income. Nonetheless, income maintains its status as the primary measure of well-being due to its widespread availability in surveys and administrative data; researchers very often admit income measures as an implied proxy for consumption. In recent years, the Census Bureau addressed these concerns by basing its threshold for a Supplemental Poverty Measure on contemporaneous food, clothing, shelter, and utilities expenditures (Citro and Michael, 1995; Fox, 2019).

Alternative approaches to poverty measurement and economic well-being rely directly upon consumption data (Meyer and Sullivan, 2012 and 2017; Fisher, Johnson, Marchand, Smeeding, and Torrey, 2009), and several consumption-based definitions of family resources produce lower poverty than income-based measures—suggesting that consumption among many low-income families exceeds their income. Federal statistical agencies in the United States

continue to evaluate producing a consumption-based poverty measure (Interagency Technical Working Group, 2021). A longer line of consumption inequality research finds that consumption inequality is lower than income inequality, but with mixed findings on whether consumption inequality increased with income inequality (Cutler and Katz, 1991; Heathcote, Perri, and Violante, 2010; Fisher, Johnson, and Smeeding, 2015) or failed to keep up with the growth in income inequality (Blundell, Pistaferri, and Preston, 2008; Krueger and Perri, 2006; Meyer and Sullivan, 2013). A more recent literature has attempted to understand whether consumption volatility increased along with income and earnings volatility (Davis and Kahn, 2008; Gorbachev, 2011; Dogra and Gorbachev, 2015).

To broaden our understanding of how consumption and income intersect, we examine both the level and volatility of consumption across the income and socio-economic distribution, and across several categories of consumption central to the daily lives of families, including food and clothing. To do this, we use the Consumer Expenditures (CE) Survey from 1984 to 2014, incorporating the imputed income data for the CE developed in Fisher, Johnson, and Smeeding (2015). This series imputes the components of income reported as received but where a dollar value was not provided. Unlike other surveys, the CE left this income value as missing before 2004. The Fisher et al. (2015) imputation creates a consistent measure of household income, allowing for respondents to be more accurately placed within income deciles.

We find a clear socioeconomic and demographic gradient: lower consumption levels and higher consumption volatility occur among families with lower income, less education, as well as for Black families. This is the case for all consumption categories except alcohol spending, and our findings are generally robust to the volatility measure. Among the categories we track,

food and clothing exhibit especially high levels of consumption volatility for low-income households.

Using this richer information on income, we contribute to a literature examining both the level and volatility of consumption in research using the short panel, within-year feature of the CE survey design. Up to this point, the CE has generally lacked consistent information on the income characteristics of sample respondents, while the design of longer panel data sets with rich information on income, such as the Panel Study of Income Dynamics (PSID), do not facilitate within-year volatility measurement, nor do they allow for a broader range of consumption categories over which to examine differences by income. Moreover, the inclusion of additional consumption categories in the PSID coincided with its transition into a biennial survey, making the study of consumption volatility even more precarious, as volatility is measured biennially as well.

We also add to the literature by introducing a broader categorical range, including but not limited to food expenditures; this addition augments PSID-based studies that have focused on food (Gorbachev 2011; Dogra and Gorbachev, 2015). We look necessities, including one durable, apparel (clothing), as well as luxuries. Volatility of a necessity such as food is expected to be lower than other consumption categories, and volatility of food may be different across the income distribution and socio-demographic characteristics.

Ultimately, our within-year examination of consumption fluctuations reveals stark gaps in consumption volatility among lower income families, families with less educated heads, as well as Black families. Peaks and valleys in consumption for categories such as food, especially for families with limited liquidity, has negative implications for well-being. This is especially true given the current design of tax and transfer programs in the U.S., which have increasingly

eschewed cash for in-kind benefits; the largest cash transfer to poor Americans occurs via refundable tax credits, received once via lump-sum in February through April. If made permanent, recently federally enacted child allowance provisions could provide helpful liquidity to smooth consumption of necessities on a periodic basis, such as food, that have been linked to improved socioeconomic outcomes. While the once-per-year earned income tax credit (EITC) provides important assistance, in any given year many low-income families experience income fluctuations, irregular scheduling, and job changes (Schneider and Harknett 2017, 2019; Ziliak et al. 2011) that interrupt stable consumption.

2. Recent Evidence on Consumption Volatility and Socioeconomic Well-Being

The volatility of consumption has long been of particular interest; if deprivation via low income translates to less predictable or unstable consumption of food, housing, and other necessities, this could have serious implications for well-being. A substantial literature on economic volatility has focused on both income (e.g., Carr and Wiemers 2018; Gottschalk and Moffitt 1994, 2009; Dahl, DeLeire, and Schwabish 2011; Ziliak, Hardy, and Bollinger 2011) and consumption (e.g., Davis and Kahn, 2008; Gorbachev 2011) separately, though fewer studies examine the evolution of consumption volatility across the income distribution (Gorbachev 2011). Consumption volatility is higher among low socioeconomic groups—as proxied by education—and the transfer system ostensibly insures against consumption shocks. Still, we know less about the subcomponents of this consumption volatility—which aspects of the household's consumption bundle are more or less unpredictable across the income distribution—and how this looks over a time horizon that captures the contemporary U.S. economy. This gap in knowledge stands in contrast to core justifications for income transfer and social insurance programs, namely that the

limited ability of low-income individuals and families to smooth consumption requires public policy interventions. Models of risk aversion predict that individual agents and, by consequence, households, would lower their own consumption amid volatile streams of income (Attanasio and Weber 2010). Thus, given evidence that income volatility is higher among relatively lower income households, it is plausible that the previously documented higher levels of consumption volatility result in lowered utility.

Our study builds upon previous research, which captures annual income and consumption volatility. While this feature is due largely to data availability, consumption varies within a month. Spending on food and, more importantly, consumption of food is sensitive to income receipt (Stephens, 2003; Shapiro, 2005; Hastings and Washington, 2010). For example, Hastings and Washington (2010) find that spending on food falls 20% between the week of SNAP receipt and the following week. When viewed from an annual perspective, spending may not appear volatile. However, weekly, monthly, or quarterly frequencies will likely reveal more volatility, and this increased volatility implies real utility loss (Blundell et al. 2008). By measuring volatility at a quarterly frequency, we capture volatility missed in annual measures. That said, we still miss weekly or monthly volatility that is smoothed out over three months, but some of this weekly or monthly volatility may be due to the difference between spending and consumption. Some food spending could be for non-perishable items consumed in the future. Observed volatility in apparel (clothing) also contains durable components, and quarterly measurement may better represent consumption volatility rather than natural swings in purchasing behavior. Our quarterly volatility analysis captures volatility induced by income shocks such as job loss, as well as any lags in the receipt of unemployment or other transfer program benefits. And, it reflects seasonal changes in income or within year income volatility.

In our study, we examine the level and volatility of consumption for the following categories: food, food away from home, food at home, apparel (clothing), entertainment, and alcohol. Food and apparel (clothing) are commonly considered to be two of the three basic necessities within a family budget—the other being shelter (Citro and Michael 1995). We do not include shelter, as the CE is an address-based sample. Most shelter-related consumption volatility derives from a move and, because the CE does not survey families in their move to a new residence, there is relatively little shelter volatility.

The focus on these categories does not preclude an analysis into categories outside of basic needs. Seminal work on poverty measurement lead by the National Academies of Sciences argued for an updated threshold that would not only focus on these three broad basic necessity categories, but that would also provide some additional allowance for other needed expenses (Citro and Michael 1995). This additional allowance accounts for expenditures on personal care, household supplies, and non-work-related transportation. Accordingly, we have included personal care, entertainment, and alcohol.

The level and volatility of consumption reflects the constrained choices of family heads, especially so for resource-poor families. And, while the literature on consumption volatility has rightly focused initially on food—given its importance for health and basic sustenance—low-income households alter consumption on more than just food in response to economic deprivation as well as social safety net programs operating as consumption insurance. Households may reduce food consumption as financial resources run low towards the end of the month, leading to increased hypoglycemia-related hospital admissions (Seligman et al. 2014). Food assistance programs such as the Supplemental Nutrition Assistance Program (SNAP) are well positioned to provide consumption insurance (e.g., Hoynes and Schanzenbach 2009) and,

increasingly, the EITC provides similar insurance against shocks to income and consumption. Having largely substituted for cash welfare (Hardy et al. 2018), evidence shows that the EITC increases spending on food (McGranahan and Schanzenbach, 2013), transportation (Barrow and McGranahan, 2000; Smeeding, Phillips, and O'Connor, 2000), and clothing (Romich and Weisner, 2000). Consumption also responds to other predictable income shocks, such as tax refunds (Johnson, Parker, and Souleles, 2006), retirement (Bernheim, Skinner, and Weinberg, 2001), layoffs (Ganong et al. 2020), and paying off debt (Coulibaly and Li, 2006), among others.

We anticipate different levels of volatility between necessities—food and apparel—versus luxuries like entertainment, and we want to understand whether differing consumption levels translate to differences in volatility across income and demographic characteristics. In the context of considering consumption levels as a benchmark for assessing poverty and economic well-being, it is important to consider shifts and swings in consumption, which could shape our appraisal of the daily lives of low and moderate-income families.

3. Data & Model

3.1 Data

The data used in the study come from the 1984-2014 Consumer Expenditure Survey, providing quarterly accounts of household-level expenditures. The data also include information on household income and socio-demographic characteristics. While the CE contains a full suite of data on durables and non-durables alike, we focus on the following expenditure categories: overall food consumption, food at home, food away from home, apparel (clothing), personal care, entertainment, and alcohol. The frequency of the data is quarterly, which is an important contribution in order to better understand household consumption volatility within the year. Each

household is surveyed for four consecutive quarters so that, for example, a household initially interviewed in April would be asked about their prior spending in January, February, and March. Income is not asked on a quarterly basis, and instead is asked at the last interview and represents the retrospective calendar year. The income reported covers the same twelve months captured by the expenditure questions. The sample design consists of a rolling, within-year panel, in which people are interviewed each month of the year. Ultimately, the final data are a repeated cross-section of within-calendar year observations.

Within the consumption category of food, we further divide this into food at home and food away from home. Apparel includes clothing for all household members, all footwear, watches, and jewelry. Personal care includes items such as haircuts and other personal care services, electronic personal care appliances, and wigs. Entertainment includes fees such as golf, bowling, and gym memberships along with movie, sport, and concert tickets. It also includes spending on durables such as televisions, the purchase of music and movies, and the purchase of sports equipment, hunting equipment, and camping equipment.

Bee, Meyer, and Sullivan (2015) compare aggregate spending in the CE to aggregate spending in the Personal Consumption Expenditures (PCE), finding that CE food at home aggregates match PCE aggregates. Food away from home, apparel, alcohol, and entertainment aggregates fall over time relative to the PCE.[1] This potential under-reporting matches broad patterns seen in U.S. surveys and applies equally to earnings and income (Bollinger et al. 2019). The potentially declining quality in consumption reporting is less problematic for our purposes, as long as a given household reports equally well across its four interviews.

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[1] Li, Schoeni, Danziger, and Charles (2010) compare PSID consumption categories to CE categories and find that the PSID and CE match, indicating that the CE and PSID consumption are of similar quality.

We improve upon previous work by incorporating an imputed income series from Fisher, Johnson, and Smeeding (2015). Prior to 2004, the CE did not impute income for those who reported having a source of income but failed to report the dollar value. Fisher et al. (2015) use the same imputation methodology the CE has utilized since 2004 to impute income back to 1984, allowing for a consistent income measure over our entire sample. With imputed income, the CE income distribution matches the CPS income distribution well. In addition, Fisher et al. (2015) provide an after-tax income measure, which is important when using data from over a time period with large changes in the tax structure. Davis and Kahn (2008) also measure quarterly consumption volatility in the CE by income decile from 1984-2004, but they do not use imputed income and they use before-tax income.

3.2 Model

The conceptual framework builds off of work by Blundell et al. (2008) and Gorbachev (2011) by estimating the predictors of transitory consumption volatility, defined as

$$\text{Volatility} = \text{var}(v_i) = V_i = \left(\frac{1}{Q_i-1}\right) \sum_{q=1}^{Q_i=m} (c_{iq} - \bar{c}_i)^2, \qquad (1)$$

where V_i serves as the primary dependent variable in a series of regression models, estimated as:

$$V_{itq} = \alpha + \beta \sum_{d=1}^{d=10} I_{i,d} + \mathbf{X}\delta + \rho + \mu_q + \varepsilon_i, \qquad (2)$$

where V_{itq} represents consumption volatility across individual household respondents i for t categories of consumption, as measured between quarters q.[2] The construction of an income distribution consists of income deciles backcasted. These deciles are characterized additively, as $\beta \sum_{d=1}^{d=10} I_{i,d}$. We use after-tax income plus cash transfers and SNAP benefits as our income

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[2] We restrict to households that participate in all four waves of the CE Survey.

measure. We finally control for a vector of socio-economic characteristics **X**, such as race, education, marital status, and family structure; family structure controls include the number of dependent children as well as adults.[3] Finally, all models control for year fixed effects ρ, interview month fixed effects μ_q to control for seasonality, and the monthly state unemployment rate. In unreported results, we test the robustness of our consumption volatility measures to summary measures of volatility, including the total variance as well as percent changes.

4. Consumption Expenditure Levels Across the Income Distribution

Concerns over the downside consequences of consumption volatility are warranted insofar as low- and moderate-income families may simultaneously consume lower levels of goods and services, some of which are considered to be basic needs—food and apparel—as well as fairly standard expenditures on entertainment and alcohol. In Figure 1, we assess differences in average expenditures across income deciles, pooled over the full sample. Income deciles are created within a year. Here, we find clear income gradients across all categories. Interestingly, the largest income gaps in family-size adjusted expenditures occur for Food, Apparel, and Entertainment. Disaggregating food, the income gap in food expenditure—100 percent higher for the 10th versus 1st decile—is driven by expenditures on food away from home (Food Away). Respondents in the 1st decile spend $200 per quarter on Food Away, whereas respondents in the 7th decile spend two times more, and those in the 10th decile spend almost four times more. Income-based differences in expenditures on Apparel are similar to the gaps depicted for Food Away. In percent terms, there are large gaps in expenditures on personal care, though even the

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[3] We capture predictable life-cycle changes in consumption in the creation of transitory volatility following Blundell, et al. (2008) and Gorbachev (2011).

most affluent families spend, on average, $360 on Personal Care. Finally, Alcohol spending

follows a clear income gradient as well, with higher income families spending more.

Figure 2, which depicts consumption as a share of income, offers clearer descriptive

evidence that low-and moderate-income families spend a meaningful proportion of their

resources on some basic needs; volatility of consumption is occurring on a low base of income

and consumption, and consumption takes up a sizable portion of the budget. Strikingly, Food

consumption comprises 19 percent of family income for the bottom decile, and roughly 6 percent

for the 2nd and 3rd income deciles. Consumption subsumes a disproportionate share of family

incomes at the bottom of the distribution with the exception of Personal Care and Alcohol; for

these two final categories, the differences are qualitatively small across income deciles. Taking

the results from Figures 1-2 together, very low-income families at the 10th decile—with mean

after-tax income of $7,220 and median of $9,180—spend a relatively large share of income on

basic needs and other routine consumption goods—including apparel, personal care, and

entertainment.[4]

In Figure 3, we depict consumption volatility by category and position in the after-tax

income distribution. These descriptive statistics show the trend in median transitory consumption

volatility (black bar), the 25th and 75th percentiles of transitory consumption volatility (end points

of the grey bar), and the upper and lower adjacent values (whiskers).[5] A general result is that

median transitory consumption volatility patterns are roughly similar across our categories

except alcohol. The dispersion in these consumption volatility patterns is apparent, particularly at

the 75th percentiles and the upper adjacent values. Lower income respondents consistently have a

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[4] Mean equivalent after-tax income in the bottom decile equals $5,850.
[5] The upper (lower) adjacent value (UAV) is the largest (smallest) observation that is less than or equal to the upper (lower) inner fence (UIF), which is defined as the third quartile plus 1.5 * (Inner Quartile Range). For the lower adjacent value, we censor at zero if the calculated values would otherwise be negative.

wider range of volatility values across the consumption categories and, comparatively, this is observable for Food at Home, Apparel, and Entertainment volatility patterns. There are also noteworthy differences in the level of consumption volatility across categories. Food Away, Personal care, Entertainment, and Apparel consumption volatility are all higher—at the median—than Food consumption volatility and one of its subcomponents, Food at Home. In some respects, this is consistent with how families would prioritize basic needs: there are more likely discretionary choices made in the decision to purchase the marginal Personal Care or Entertainment categorical item. Consumption volatility potentially reflects the instability of consumption that is dependent upon current-period economic circumstances. While Food consumption volatility among the poor is more volatile, families likely sacrifice consumption in other domains to fulfill one of the main basic needs.

Alcohol flips this narrative. Consumption volatility at the median and 75th percentile increases with income decile. Those with higher income exhibit greater transitory volatility in their alcohol consumption, though these differences are from a low spending base.

Our results diverge somewhat from similar work by Davis and Kahn (2008), who find higher non-durable consumption volatility at the top of the predicted consumption distribution, using predicted consumption as a proxy for permanent income. Although they also measure consumption volatility in the CE, they address a different issue – how consumption volatility differs across the permanent income distribution and over-time. We want to understand consumption volatility across the contemporaneous after-tax income distribution, which could help explain differences in results.

5. Consumption Volatility Across the Income Distribution

5.1 Food Volatility

Moving to Figure 4, we begin our discussion of the main results. Here, we provide a graphical exposition of the OLS results, and separately discuss demographic patterns, which are controlled for here. Coefficients and standard errors for the income decile variables are provided in Table A1. Given concerns within the social safety net about food security among the poor, we begin our inquiry into consumption volatility across the income distribution by focusing on food. Specifically, relative to the top income decile with a mean food volatility of 0.113, transitory consumption volatility ranges from 0.2038 higher (bottom decile) to 0.0296 lower (4th decile). The two bottom income deciles experience higher consumption volatility than the third through tenth deciles, indicating that there is potentially worrisome food volatility, not solely for the poorest of the poor, but also among the bottom 20 percent of the population. Interestingly, food volatility is higher at tenth decile than at the fourth through eighth deciles. This food volatility at the top is centered around mean spending of approximately $3,600 per quarter. There is no concern here about food insecurity or food sufficiency in the top income decile. Instead it may reflect that at the top of the income distribution, food spending can become a luxury and represent more than just food as sustenance. Within the income distribution, there is a relative flattening out of consumption volatility between income deciles 4 and 8, before rising slightly in deciles 9 and 10. Here, as before, it is worthwhile considering the level of consumption; the median level of food consumption at the 9th and 10th deciles is $2,600 and $3,170 per quarter, respectively. This, in comparison to a range of $1,110-$1,430 across the bottom three income deciles.

One might be concerned that outliers drive the Ordinary Least Squares results on transitory volatility across the income distribution (Jensen and Shore 2015). Figure 3 shows

smaller differences in median volatility but significantly larger differences at the 75th percentile

and higher. Table A2 shows that the income results hold using median regressions. While the

patterns are not as stark using the median, the volatility-income decile gradient remains the same

using the median for Food and for the other consumption categories.

5.2 Food at Home Volatility

Although food consumption at home may no longer occur as a realistic, daily option for many

working-poor or near-poor families (Ziliak 2016), home-based consumption has traditionally

been viewed as more cost-effective. Thus, it is interesting that the overall income gradient in

food volatility persists for home consumption. Specifically, food at home volatility (Figure 4,

Panel A) ranges from 0.273 higher (bottom decile) to 0.034 lower (8th decile) than the top

decile. Interestingly the middle 70 percent of the income distribution are indistinguishable from

the volatility experienced by the top decile. When considered within the context of low levels of

Food at Home expenditures—families in the first decile spend 20 percent of their income within

this category, on average—relatively higher levels of consumption expenditure volatility may

warrant continued attention from policymakers.

5.3 Food Away from Home Volatility

Predictors of consumption volatility for food away from home are shown in Figure 4, Panel B.

One concern surrounding food is that, as low-wage workers combine less-predictable, contingent

hours amid rising housing costs and longer commutes in many major metropolitan areas, these

workers and their families will become increasingly reliant on food away from home (Ziliak

2016). First, re-appraising the link between income level and consumption volatility shown in

Figure 1, food away from home exhibits perhaps the strongest income gradient across the various dimensions of consumption volatility. Returning to volatility, we find a range in Figure 4 from 1.632 higher (bottom decile) to 0.064 higher (9th decile) relative to mean volatility in the top decile of 1.244. This gradient suggests that, for the most vulnerable in the bottom three income deciles, away-from-home food consumption is highly variable and twice as high as volatility experienced by the top decile. Given the realities of low-wage work—including schedules more likely to be contingent upon demand—and limited access to high quality transportation, food consumption outside the home is a reality for many families.

5.4 Apparel (Clothing) Volatility

Apparel represents clothing for all household members, including footwear, watches, and jewelry. Compared to food, Apparel stands as another of the more immediate term needs that concern families. Because Apparel is a durable, we might expect it to be more volatile for low-income households given that we saw volatility in a non-durable necessity. Apparel as a durable also means lower income households may be able to forego apparel spending during lean times, which would lead to higher observed volatility. This category follows the pattern of food, insofar as consumption volatility for apparel is highest among the poorest CE respondents. Unlike some of the food categories, transitory volatility for apparel follows a clear path—with no hike among higher income respondents. As shown in Figure 4, Panel B the level of consumption volatility ranges from 0.823 (bottom decile) to 0.136 (decile 9) higher than the top decile. As expected because it is a durable, the income-volatility path is steeper, with higher relative volatility at low income levels. Here as before in the case of Food, it is worthwhile considering that Apparel volatility among the bottom three deciles of income occurs around a baseline level of equivalent

expenditures of roughly $300 per quarter (Figure 1, Panel A); for higher income families in deciles 8 and 9, expenditures are roughly $650-800 per quarter. Families in the 10th decile spend over $1,250 per quarter.

5.5 Personal Care, Entertainment, and Alcohol Volatility

We close our summary of the main results with a discussion of personal care, entertainment, and alcohol consumption volatility in Panels B and C of Figure 4. These measures further characterize how low-income households do or do not smooth consumption. Personal care, entertainment, and alcohol are distinct from food, in that personal care, entertainment, and alcohol have a higher income elasticity. For entertainment, the bottom decile exhibits higher consumption volatility relative to the top decile, followed by a gradual decline in volatility until volatility at deciles 8 and 9 are indistinguishable from volatility at the top of the income distribution. Importantly, mean entertainment consumption (Figure 1, Panel B) rises noticeably with family income, from roughly $320 (decile 1) to almost $1,750 (decile 10).

Personal care and alcohol represent a departure from all previous results, as consumption volatility of these two categories is not highest for the first income decile. The point estimate is highest for the second decile for personal care (Figure 4). The third through ninth deciles show a slow decline in volatility such that we still observe that personal care volatility is higher for the bottom six income deciles than the top decile.

Alcohol reverses the results. Relative to decile 10, alcohol volatility is lower at all deciles and lowest in the bottom decile. That said, alcohol consumption is a tiny fraction of after-tax income (Figure 2).

6. Demographic Predictors of Consumption Volatility

While the focus of our inquiry sought to examine consumption volatility across the income distribution, the results also lend itself to a broader socioeconomic examination of the consumption volatility patterns. Specifically, we can now assess how a broader set of socio-demographics are correlated with consumption volatility *after* accounting for income. We specifically discuss the role of educational attainment and family structure. These are important for several reasons. Educational attainment is widely proffered as an actionable policy intervention and tool to promote upward economic mobility, economic stability, and well-being (Autor 2014; Mazumder 2005; Rothstein 2019). This is especially so given anti-poverty policy interventions aimed at improving labor market skills and targeted towards families with dependent children headed by an unmarried parent—families with a significantly higher poverty rate. Is consumption volatility higher for these families, after controlling for other socioeconomic and demographic characteristics?

Starting with education where those with a terminal high school degree are the omitted category, those with less than a high school degree exhibit greater consumption volatility across all categories, except alcohol, than those with higher levels of education (Table 1). Those with a college degree or higher display lower volatility than those with lower education for all consumption categories. The education gradient (which is highly correlated with income and race) could be proxying for exposure to labor market risk in an increasingly bifurcated, hollowed-out market where higher-level credentials lead to greater employment stability (e.g., Autor 2014; Jaimovich and Siu 2020). For example, lower-wage workers—usually with fewer formal skills—have higher volatility in hours worked, reflecting lowered union bargaining power and worker protections (LaBriola and Schneider 2020).

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Those who are divorced or single display higher consumption volatility or the same volatility than those who are married, again with a fairly consistent pattern across the consumption categories. Lastly, those with children appear to exhibit less volatility than those with no children, except for personal care and alcohol. These last two results perhaps have more to do with selection into marriage and childbearing, which has increasingly and disproportionately become the domain of socioeconomically advantaged adults, with higher incomes and educational credentials (Hardy and Marcotte 2020; Shafer and James 2013). Like education, this result may again reflect greater exposure to economic risk, on average, among non-married family heads and those without children.

Households headed by Black individuals or by other non-white individuals have higher volatility than households headed by a white individual, except for alcohol for Black individuals.[6] Importantly, this is consistent with findings from the income volatility literature, which generally finds a similar sociodemographic pattern (Hardy 2017; Ziliak, Hardy, and Bollinger 2011; Keys 2008). This evidence is a useful complement to work showing that Blacks, on average, have lower access to credit and lower wealth to buffer against labor market volatility (Emmons and Ricketts 2017; Hamilton et al. 2015; Morduch and Schneider, 2017). They are also more likely to be exposed to broader labor market risks to hours stability associated with low-wage work (LaBriola and Schneider 2020).

We estimated regressions interacting income decile and race to understand if the income gradient persists across all races. We find that the volatility-income gradient exists for all races (Appendix Table A3). The higher volatility for Black individuals from Table 1 appears to come

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[6] The CE Survey has limited information on race and ethnicity before 2003. The CE Survey introduced the Hispanic origin question in 2003, and race was limited to white, Black, Asian, or American Indian/Alaskan Native before 2003.

from the middle and top of the income distribution more so than the bottom fifth. Consumption volatility is relatively lower for Black individuals than white individuals in the bottom decile. This finding suggests, as have others, that broader characterizations of well-being beyond income level are required to more fully capture economic security across race. Importantly, many ostensibly middle and higher-income Black families lack the cushion from wealth to absorb income fluctuations and smooth consumption (Pfeffer and Killewald 2018; Darity, Addo, and Smith, 2021).

7. Conclusion

Using data from the 1984-2014 CE, we estimate the link between income, demographics, and the volatility of food, apparel, entertainment, and alcohol consumption. We also report consumption levels across the income distribution to get a better sense for how consumption volatility might matter for households with unequal income and consumption levels. Our findings provide convincing evidence that some of the most essential categories of consumption exhibit the highest volatility among lower income households—households that were already consuming at relatively low baseline levels. Specifically, the finding that food away from home is highly volatile for poor and lower income households is particularly concerning, given that the nature of work schedules has shifted time use away from food preparation (Ziliak 2016). These results are broadly consistent with similar findings by Blundell et al. (2008) and Gorbachev (2011), and we complement these PSID-based studies by exploiting the within-panel characteristics of the CE to examine how consumption volatility relates to the income distribution.

Consumption volatility among America's lower-income and socioeconomically disadvantaged families has potentially serious consequences for overall economic security.

Blacks are overrepresented among the poor and near-poor, and higher consumption volatility among Black families—after accounting for income level—as well as those with less formal educational attainment strongly suggests economic insecurity is unevenly distributed across society. This is broadly consistent with evidence of racial and educational inequality in access to economic security. This has been confirmed for the incidence of income volatility (Hardy and Ziliak 2014; Hardy 2017); income volatility amid low wealth and income levels (Hardy et al. 2020); economic mobility using income, consumption, and wealth measures (Fisher et al. 2018); and consumption responses to income shocks (Ganong et al. 2020).

Food consumption volatility could lead to food insufficiency and food insecurity (Jolliffe and Ziliak 2008), and food insecurity related to varied consumption patterns has generally been linked to lowered health outcomes (Gundersen and Ziliak 2015), including increased hypoglycemic episodes (Seligman et al. 2014). More generally, food insecurity is associated lowered educational performance (e.g., Hoynes, et al. 2016; Jyoti et al. 2005). Apparel (clothing) matters as well. Employment advocates for lower income and less credentialed workers have long sought subsidies for professional clothing; for children, clean clothing that is not degraded or otherwise overly worn can both protect from the elements (cold), and may provide a boost to self-esteem and school attendance (Rueb 2019).

The results have important implications for how we interpret a more recent stylized fact: that low-income households report baseline consumption *levels* corresponding to income-based definitions that would appear to leave many above poverty. In other words, consumption-based definitions of poverty can yield lower poverty rates than income-based definitions. Such snapshots of consumption levels in the context of poverty and economic well-being do not account for the within-year swings in consumption that are apparent within this population. This

is consistent with research showing important consumption volatility based on income flows (e.g. Hastings and Washington 2010), with important societal and economic implications. As a result, for point-in-time conceptions of well-being, it may very well be that yearly consumption volatility, as estimated in the PSID, is biased downward relative to quarterly volatility via the CE; the CE represents a better approximation for monthly or daily consumption volatility. Higher levels of consumption volatility amid low levels of income and liquidity raise concerns about the timing of consumption, and how overall economic well-being might be impacted. This is consistent with evidence of consumption spikes on and around the renewal of SNAP benefits (Shapiro, 2005; Hastings and Washington, 2010). Accordingly, it will be instructive to continue to explore the concurrence of low income and both the level and volatility of consumption.

Our findings suggest that low-income coincides with higher levels of consumption volatility. If qualitative data on family consumption patterns are to be believed (Morduch and Schneider 2018), higher frequency data on consumption volatility could potentially yield even higher estimates among lower income households. Given that basic necessities as well as fairly common consumption goods appear to be consumed at lower levels and with higher variability among low-income families, studies examining well-being using multiple dimensions—income and consumption—potentially enrichen our understanding of economic well-being across the economic spectrum.

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Figure 1: Mean Equivalent Quarterly Spending by Consumption Category and After-Tax Income Decile
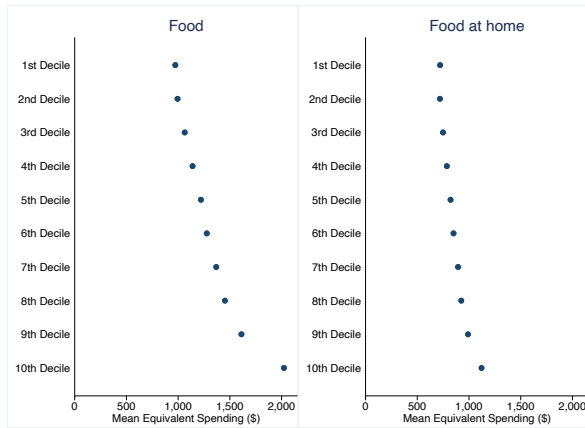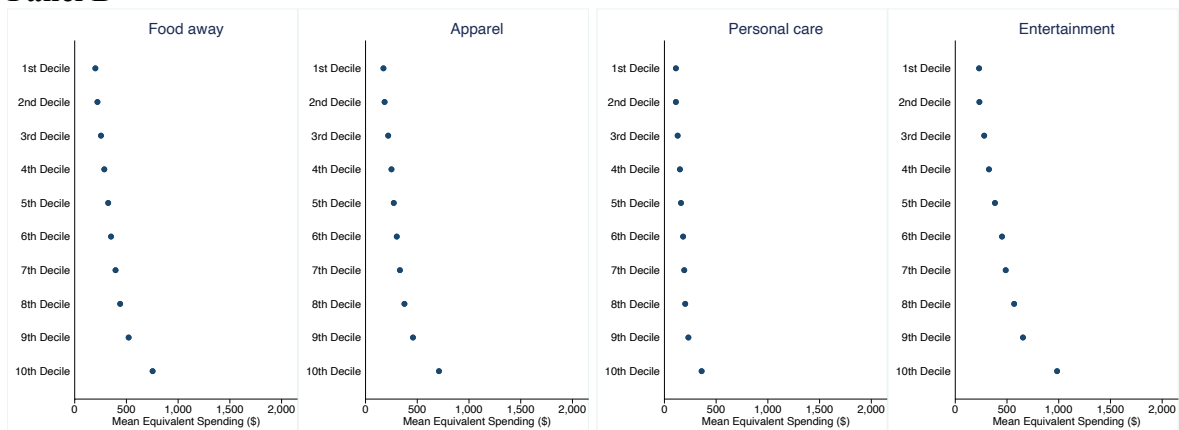
Panel A

Panel B

Panel C
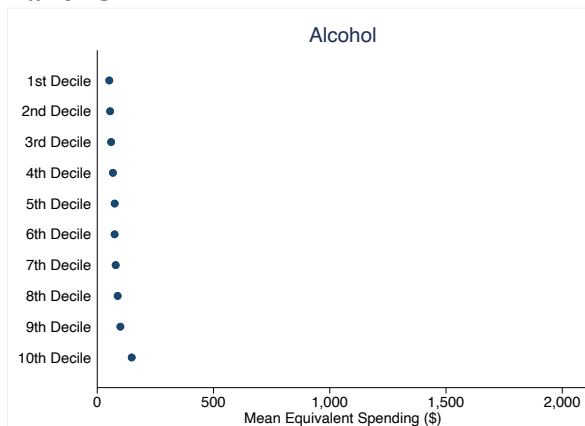
Notes: We use the square root of family size as the equivalence scale. N = 313,732.
Source: Authors' calculations based on 1984-2014 Consumer Expenditure Surveys.

Figure 2: Quarterly Spending as Share of Annual Income by Consumption Category and After-Tax Income Decile
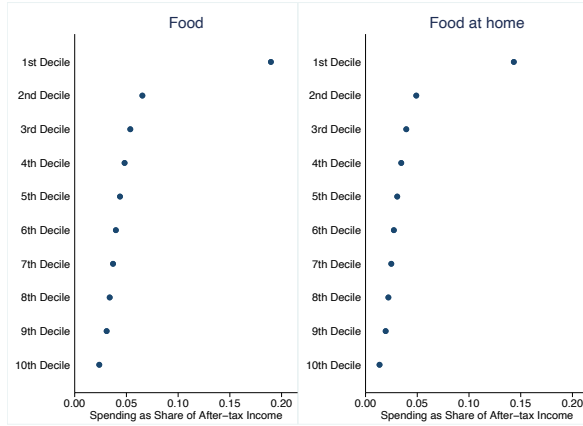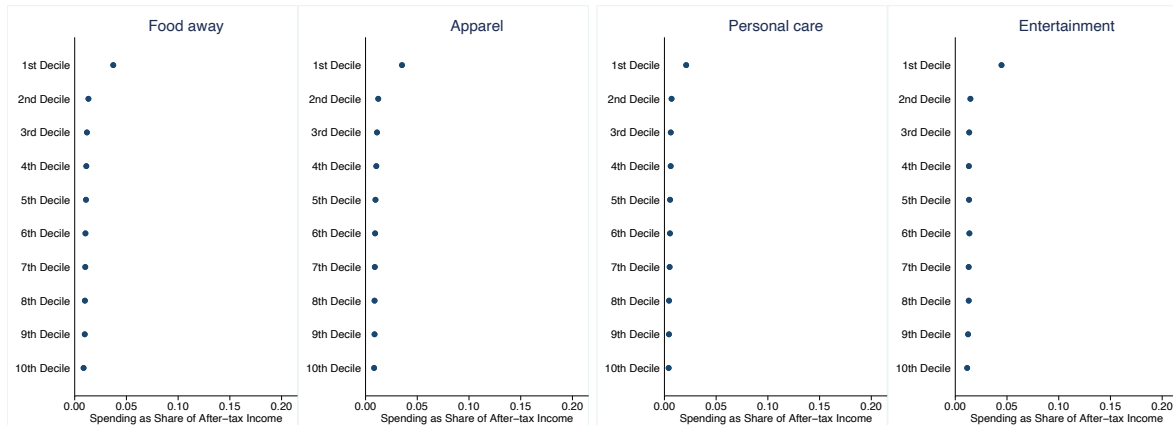
Panel A
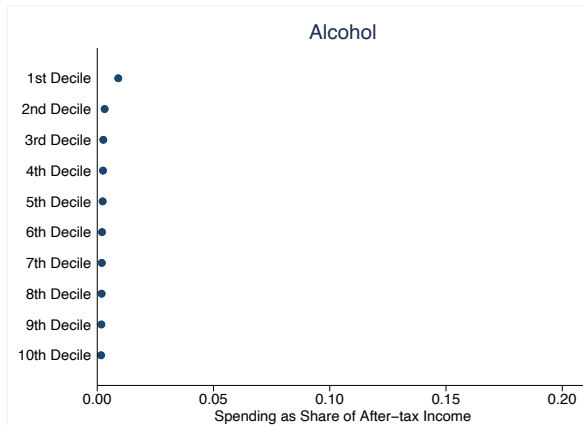
Panel B

Panel C

Notes: N = 313,732

Source: Authors' calculations based on 1984-2014 Consumer Expenditure Surveys.

Figure 3: Box Plot of Transitory Consumption Volatility by Consumption Category and After-Tax Income Decile
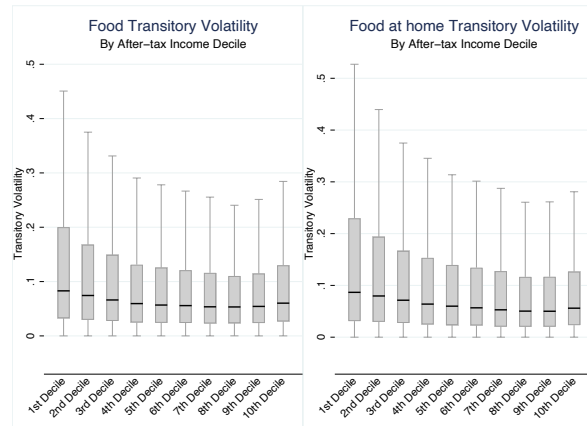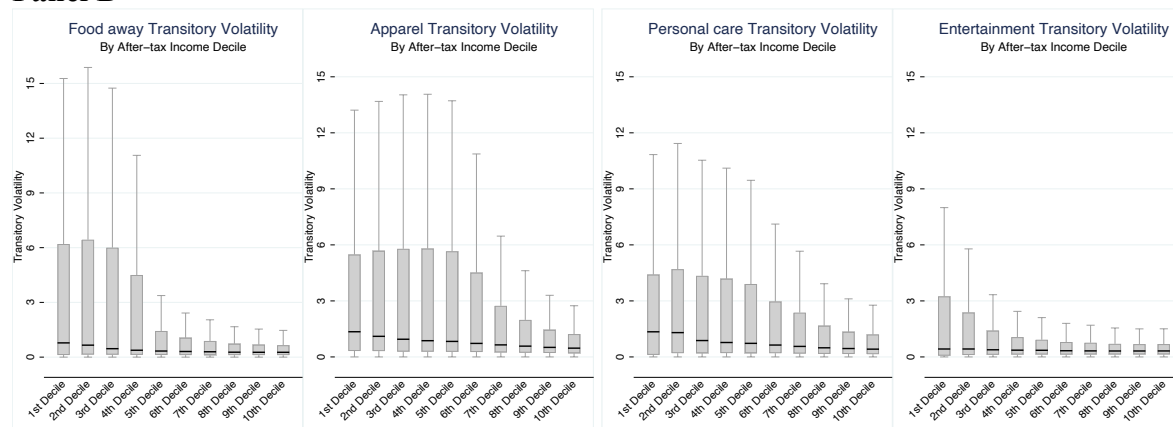
Panel A

Panel B

Panel C
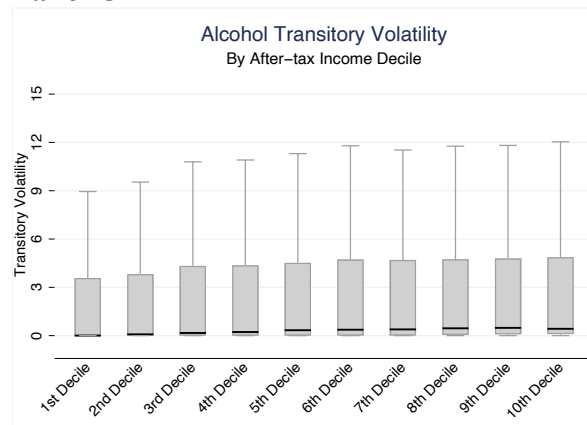
Notes: N = 78,433. We use one observation per household when measuring transitory volatility. Source: Authors' calculations based on 1984-2014 Consumer Expenditure Surveys.

Figure 4: OLS Coefficients on After-Tax Income Decile, by Consumption Category
Panel A
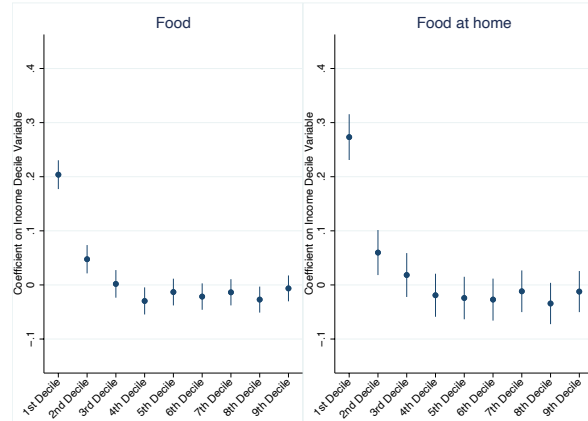
Panel B
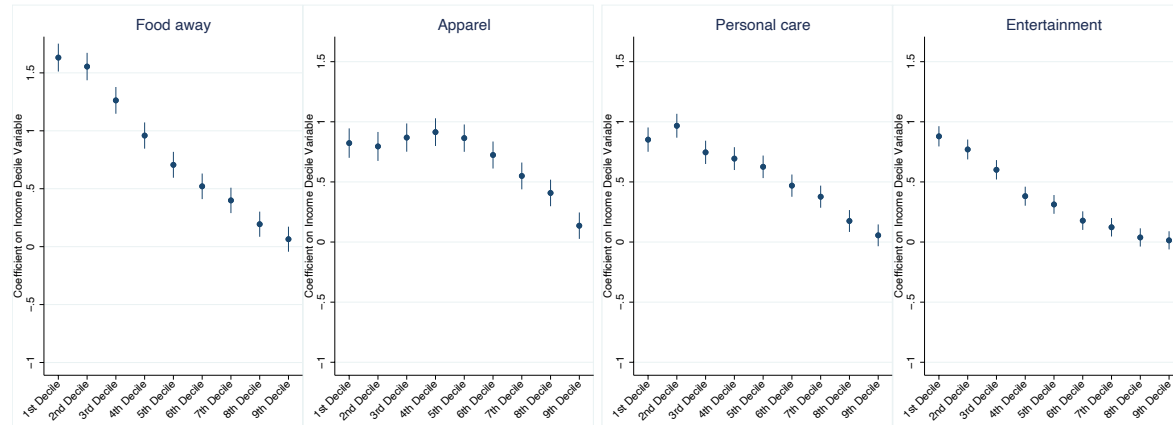
Panel C

Note: The top decile is the omitted category. The lines represent the 95% confidence interval. N = 78,433. Coefficients and standard errors available in the appendix Table A1.
Source: Authors' calculations based on 1984-2014 Consumer Expenditure Surveys.

Table 1: OLS regression results for other coefficients; dependent variable is transitory volatility

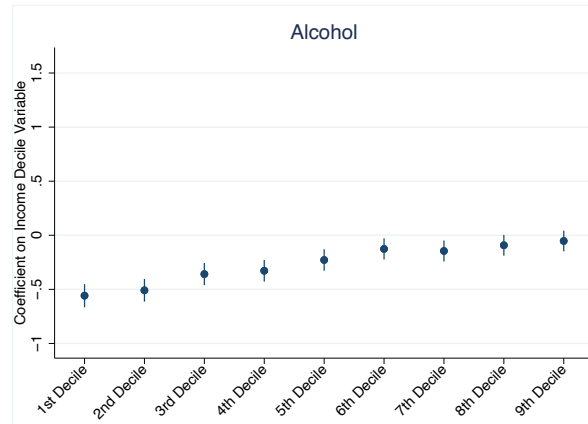|	(1) Food	(2) Food at home	(3) Food away	(4) Apparel	(5) Enter- tainment	(6) Personal care	(7) Alcohol
Black	0.0642***	0.0866***	0.7254***	0.2110***	0.5301***	0.4669***	-0.1348***
	(0.0088)	(0.0139)	(0.0397)	(0.0403)	(0.0277)	(0.0333)	(0.0351)
Other race	0.0603***	0.0653**	0.7891***	0.1863**	0.6573***	0.4709***	0.1567**
	(0.0135)	(0.0214)	(0.0610)	(0.0620)	(0.0426)	(0.0511)	(0.0540)
Divorced	-0.0059	0.0044	0.1510***	0.2621***	-0.0428	0.1310***	0.1501***
	(0.0090)	(0.0144)	(0.0409)	(0.0415)	(0.0286)	(0.0343)	(0.0362)
Single	0.0186	0.0782***	-0.0929*	0.0804	0.0021	0.1084**	0.1956***
	(0.0098)	(0.0155)	(0.0442)	(0.0450)	(0.0309)	(0.0371)	(0.0392)
Less than high school degree	0.0490***	0.0533***	0.6675***	0.2873***	0.5679***	0.1415***	-0.0328
	(0.0092)	(0.0146)	(0.0416)	(0.0423)	(0.0291)	(0.0349)	(0.0368)
Some college	-0.0167*	-0.0170	-0.3266***	-0.2410***	-0.2007***	-0.1793***	-0.0049
	(0.0073)	(0.0116)	(0.0331)	(0.0337)	(0.0232)	(0.0278)	(0.0293)
College plus	-0.0344***	-0.0516***	-0.5860***	-0.7255***	-0.3173***	-0.3557***	-0.0842**
	(0.0076)	(0.0121)	(0.0345)	(0.0351)	(0.0241)	(0.0289)	(0.0306)
Two adults	-0.0539***	-0.1703***	0.2681***	0.1435***	-0.1453***	0.0545	0.1909***
	(0.0089)	(0.0142)	(0.0405)	(0.0411)	(0.0283)	(0.0339)	(0.0358)
Three adults	-0.0649***	-0.2055***	0.7203***	0.4270***	-0.0638	0.2016***	0.3667***
	(0.0107)	(0.0170)	(0.0485)	(0.0493)	(0.0339)	(0.0407)	(0.0429)
One child	-0.0004	-0.0236*	-0.0949**	-0.3349***	-0.1065***	0.1353***	0.0668*
	(0.0074)	(0.0118)	(0.0336)	(0.0341)	(0.0235)	(0.0282)	(0.0297)
Two children	-0.0196*	-0.0351**	-0.1974***	-0.3285***	-0.0932***	0.1427***	0.0255
	(0.0076)	(0.0121)	(0.0345)	(0.0351)	(0.0241)	(0.0290)	(0.0306)
Three or more children	0.0354***	0.0248	0.0831	-0.3157***	0.1804***	0.3914***	0.0344
	(0.0094)	(0.0150)	(0.0426)	(0.0433)	(0.0298)	(0.0357)	(0.0377)
Adjusted R-sq	0.016	0.019	0.068	0.058	0.060	0.039	0.012
N	78433	78433	78433	78433	78433	78433	78433

Standard errors in parentheses. * p<0.05   ** p<0.01   *** p<0.001

Source: Authors' calculations based on the Consumer Expenditure Survey, 1984-2014.

Table A1: OLS regression results on income deciles; dependent variable is transitory volatility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Food	Food at home	Food away	Apparel	Enter-tainment	Personal care	Alcohol
Bottom decile	0.2038***	0.2732***	1.6320***	0.8228***	0.8792***	0.8517***	-0.5585***
	(0.0136)	(0.0216)	(0.0614)	(0.0625)	(0.0429)	(0.0515)	(0.0544)
Second decile	0.0475***	0.0598**	1.5547***	0.7952***	0.7699***	0.9672***	-0.5086***
	(0.0134)	(0.0212)	(0.0604)	(0.0614)	(0.0422)	(0.0507)	(0.0535)
Third decile	0.0019	0.0183	1.2627***	0.8688***	0.6009***	0.7460***	-0.3585***
	(0.0130)	(0.0207)	(0.0589)	(0.0599)	(0.0412)	(0.0494)	(0.0522)
Fourth decile	-0.0296*	-0.0191	0.9592***	0.9140***	0.3812***	0.6939***	-0.3281***
	(0.0128)	(0.0203)	(0.0577)	(0.0587)	(0.0404)	(0.0484)	(0.0511)
Fifth decile	-0.0132	-0.0242	0.7065***	0.8641***	0.3129***	0.6255***	-0.2285***
	(0.0126)	(0.0200)	(0.0570)	(0.0580)	(0.0398)	(0.0478)	(0.0505)
Sixth decile	-0.0215	-0.0271	0.5208***	0.7236***	0.1781***	0.4690***	-0.1258*
	(0.0125)	(0.0198)	(0.0563)	(0.0573)	(0.0394)	(0.0473)	(0.0499)
Seventh decile	-0.0136	-0.0117	0.3992***	0.5497***	0.1228**	0.3771***	-0.1452**
	(0.0124)	(0.0196)	(0.0559)	(0.0569)	(0.0391)	(0.0469)	(0.0495)
Eighth decile	-0.0271*	-0.0343	0.1937***	0.4082***	0.0383	0.1749***	-0.0923
	(0.0123)	(0.0195)	(0.0554)	(0.0563)	(0.0387)	(0.0465)	(0.0491)
Ninth decile	-0.0064	-0.0123	0.0643	0.1361*	0.0141	0.0558	-0.0527
	(0.0122)	(0.0194)	(0.0551)	(0.0561)	(0.0385)	(0.0463)	(0.0488)
Adjusted R-sq	0.016	0.019	0.068	0.058	0.060	0.039	0.012
N	78433	78433	78433	78433	78433	78433	78433

Standard errors in parentheses   * p<0.05   ** p<0.01   *** p<0.001

Source: Authors' calculations based on the Consumer Expenditure Survey, 1984-2014.

Table A2: Median regression results on income deciles; dependent variable is transitory volatility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Food at home	Food away	Apparel	Entertainment	Personal care	Alcohol
	Food						
Bottom decile	0.0086***	0.0090***	0.4821***	0.6806***	0.0708***	0.7158***	-0.2859***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Second decile	0.0012***	0.0039***	0.3255***	0.3896***	0.0760***	0.6545***	-0.2707***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Third decile	-0.0024***	0.0027***	0.1523***	0.3138***	0.0265***	0.3269***	-0.2451***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Fourth decile	-0.0073***	-0.0017***	0.0831***	0.2617***	0.0063***	0.2733***	-0.1868***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Fifth decile	-0.0082***	-0.0038***	0.0485***	0.2519***	0.0069***	0.2117***	-0.0975***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Sixth decile	-0.0081***	-0.0035***	0.0195***	0.1597***	-0.0146***	0.1411***	-0.0593***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Seventh decile	-0.0079***	-0.0042***	0.0180***	0.1077***	-0.0077***	0.0882***	-0.0264***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Eighth decile	-0.0085***	-0.0069***	-0.0010***	0.0609***	-0.0127***	0.0230***	0.0284***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
Ninth decile	-0.0064***	-0.0061***	-0.0059***	0.0185***	-0.0092***	-0.0024***	0.0520***
	(0.0000)	(0.0000)	(0.0001)	(0.0004)	(0.0001)	(0.0003)	(0.0002)
N	78433	78433	78433	78433	78433	78433	78433

Standard errors in parentheses   * p<0.05   ** p<0.01   *** p<0.001

Source: Authors' calculations based on the Consumer Expenditure Survey, 1984-2014.

Table A3: Pooled OLS regression results on income deciles by race; dependent variable is transitory volatility

	Food			Food at home		
	White	Black	Other race	White	Black	Other race
Bottom decile	0.1827***	0.1505***	0.0937*	0.2873***	0.0942**	0.0044
	(0.0146)	(0.0203)	(0.0422)	(0.0234)	(0.0325)	(0.0676)
Second decile	0.0447**	0.0897***	0.0552	0.0574*	0.1267***	0.0744
	(0.0143)	(0.0216)	(0.0452)	(0.0229)	(0.0345)	(0.0724)
Third decile	0.0040	0.0262	0.1341**	0.0364	-0.0286	0.0948
	(0.0138)	(0.0234)	(0.0436)	(0.0221)	(0.0375)	(0.0698)
Fourth decile	-0.0231	0.0356	0.0514	-0.0150	0.1027*	0.1151
	(0.0135)	(0.0257)	(0.0418)	(0.0216)	(0.0412)	(0.0669)
Fifth decile	-0.0090	0.0504	0.0208	-0.0208	0.1446***	0.0310
	(0.0132)	(0.0272)	(0.0438)	(0.0212)	(0.0435)	(0.0701)
Sixth decile	-0.0201	0.0198	0.1075*	-0.0145	0.0376	0.0623
	(0.0130)	(0.0301)	(0.0440)	(0.0209)	(0.0481)	(0.0704)
Seventh decile	-0.0102	0.0201	0.0591	-0.0028	0.0709	0.0136
	(0.0129)	(0.0314)	(0.0436)	(0.0207)	(0.0503)	(0.0699)
Eighth decile	-0.0240	0.0196	0.0152	-0.0303	0.0898	0.0472
	(0.0127)	(0.0341)	(0.0429)	(0.0204)	(0.0545)	(0.0686)
Ninth decile	-0.0124	0.1427***	0.0137	-0.0155	0.2338***	-0.0041
	(0.0127)	(0.0347)	(0.0386)	(0.0203)	(0.0556)	(0.0619)
Tenth decile		-0.0054	0.0378		0.0289	0.1097
		(0.0439)	(0.0362)		(0.0703)	(0.0580)
Adjusted R-sq	0.017			0.019		
N	78433			78433		

Standard errors in parentheses.   * p<0.05   ** p<0.01   *** p<0.001

Source: Authors' calculations based on the Consumer Expenditure Survey, 1984-2014.

Table A3 continued

	Food away			Apparel		
	White	Black	Other race	White	Black	Other race
Bottom decile	1.6404***	0.5687***	1.0011***	0.9311***	0.0907	-0.1511
	(0.0666)	(0.0927)	(0.1928)	(0.0679)	(0.0944)	(0.1963)
Second decile	1.5820***	0.5726***	0.9842***	0.8358***	0.2793**	0.0776
	(0.0653)	(0.0985)	(0.2066)	(0.0665)	(0.1003)	(0.2104)
Third decile	1.2112***	0.7725***	1.1449***	0.8495***	0.5455***	-0.1287
	(0.0630)	(0.1069)	(0.1992)	(0.0642)	(0.1089)	(0.2029)
Fourth decile	0.9430***	0.7995***	0.5277**	0.9780***	0.0665	0.2675
	(0.0617)	(0.1175)	(0.1910)	(0.0628)	(0.1196)	(0.1945)
Fifth decile	0.6898***	0.9911***	0.8278***	0.9325***	0.1787	0.0397
	(0.0604)	(0.1243)	(0.2002)	(0.0615)	(0.1266)	(0.2039)
Sixth decile	0.4506***	1.0642***	0.7812***	0.7434***	0.1987	0.3118
	(0.0595)	(0.1373)	(0.2010)	(0.0606)	(0.1399)	(0.2047)
Seventh decile	0.3699***	0.9320***	0.9748***	0.6005***	0.2220	0.2277
	(0.0590)	(0.1436)	(0.1994)	(0.0601)	(0.1462)	(0.2030)
Eighth decile	0.1588**	0.9298***	0.9701***	0.4192***	0.1459	0.5617**
	(0.0581)	(0.1556)	(0.1959)	(0.0592)	(0.1585)	(0.1995)
Ninth decile	0.0589	0.4723**	0.5216**	0.1971***	-0.0613	0.0730
	(0.0579)	(0.1587)	(0.1765)	(0.0589)	(0.1616)	(0.1798)
Tenth decile		0.4952*	0.5269**		0.3267	0.4823**
		(0.2008)	(0.1656)		(0.2044)	(0.1686)
Adjusted R-sq	0.069			0.058		
N	78433			78433		

Standard errors in parentheses.   * p<0.05   ** p<0.01   *** p<0.001

Source: Authors' calculations based on the Consumer Expenditure Survey, 1984-2014.

Table A3 continued

	Entertainment			Personal care		
	White	Black	Other race	White	Black	Other race
Bottom decile	0.8629***	0.6442***	0.8432***	0.8438***	0.4611***	0.2308
	(0.0467)	(0.0650)	(0.1352)	(0.0560)	(0.0778)	(0.1620)
Second decile	0.7832***	0.5944***	0.5424***	0.9848***	0.3448***	0.3749*
	(0.0458)	(0.0691)	(0.1448)	(0.0548)	(0.0827)	(0.1735)
Third decile	0.6479***	0.5356***	0.6581***	0.7492***	0.4672***	0.2920
	(0.0442)	(0.0750)	(0.1397)	(0.0529)	(0.0898)	(0.1673)
Fourth decile	0.4017***	0.5425***	0.6551***	0.6894***	0.4358***	0.4053*
	(0.0432)	(0.0824)	(0.1339)	(0.0518)	(0.0987)	(0.1604)
Fifth decile	0.3437***	0.4367***	0.3284*	0.6017***	0.6378***	0.3725*
	(0.0423)	(0.0871)	(0.1403)	(0.0507)	(0.1044)	(0.1682)
Sixth decile	0.1734***	0.6703***	0.7679***	0.4505***	0.4384***	0.4102*
	(0.0417)	(0.0963)	(0.1409)	(0.0500)	(0.1154)	(0.1688)
Seventh decile	0.1066**	0.5619***	0.6611***	0.3220***	0.7758***	0.9221***
	(0.0414)	(0.1006)	(0.1398)	(0.0496)	(0.1206)	(0.1675)
Eighth decile	0.0563	0.2952**	0.7804***	0.1659***	0.5214***	0.6293***
	(0.0407)	(0.1091)	(0.1374)	(0.0488)	(0.1307)	(0.1646)
Ninth decile	0.0226	0.4247***	0.6027***	0.0617	0.2445	0.4650**
	(0.0406)	(0.1113)	(0.1238)	(0.0486)	(0.1333)	(0.1483)
Tenth decile		0.2842*	0.6547***		0.5464**	0.5064***
		(0.1407)	(0.1161)		(0.1686)	(0.1391)
Adjusted R-sq	0.060			0.039		
N	78433			78433		

Standard errors in parentheses.   * p<0.05   ** p<0.01   *** p<0.001

Source: Authors' calculations based on the Consumer Expenditure Survey, 1984-2014.

Table A3 continued

| | **Alcohol** | | |
	White	Black	Other race
Bottom decile	-0.4505***	-0.3109***	-0.0842
	(0.0591)	(0.0821)	(0.1709)
Second decile	-0.4007***	-0.3196***	-0.1689
	(0.0579)	(0.0873)	(0.1831)
Third decile	-0.3206***	-0.1748	0.0623
	(0.0559)	(0.0948)	(0.1766)
Fourth decile	-0.2414***	-0.3056**	-0.1743
	(0.0547)	(0.1041)	(0.1693)
Fifth decile	-0.1975***	0.0048	0.3200
	(0.0535)	(0.1102)	(0.1774)
Sixth decile	-0.0894	-0.0369	0.0893
	(0.0528)	(0.1217)	(0.1781)
Seventh decile	-0.0937	-0.1584	0.2186
	(0.0523)	(0.1272)	(0.1767)
Eighth decile	-0.0912	0.3481*	0.3035
	(0.0515)	(0.1379)	(0.1736)
Ninth decile	-0.0320	0.1308	0.2714
	(0.0513)	(0.1407)	(0.1565)
Tenth decile		0.3758*	0.6159***
		(0.1779)	(0.1468)

Adjusted R-sq	0.011		
N	78433		

Standard errors in parentheses.

Source: Authors' calculations based on the Consumer Expenditure Survey, 1984-2014.