Firm Uncertainty and Household Consumption

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Abstract

We map rich micro-data from financial accounts of US households to employers listed in the US stock market. Using banking and credit card transaction data of employees, we show a robust response of household consumption to labour income uncertainty, as proxied by employer-specific option-implied volatility. We find that households reduce average monthly consumption growth by 1.44% in response to a two standard deviation increase in firm uncertainty. This negative 2nd moment effect of uncertainty on consumption is larger than a positive 1st moment effect of firm stock returns. The intensity of the response is larger at longer horizons of consumption forecasts. Low-income households are more responsive in adjusting durables than high-income.

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1 Introduction

There is an increasing body of literature addressing the question of whether fluctuations in uncertainty affect economic behavior (Bloom (2014) provides a thorough discussion). Uncertainty is a key component of buffer stock models of consumption of Deaton (1991) and Carroll (1997) and key driver of aggregate asset pricing models, such as Bansal and Yaron (2004) who model *income uncertainty* in a long-run risk framework. Despite the surge in interest in uncertainty after the Great Recession and the increased availability of data to proxy for uncertainty, micro-level evidence of household-level response to uncertainty remains, surprisingly, largely undocumented.[1] This paper aims at closing this gap by using rich high-frequency banking and credit transaction data for thousands of US individuals.[2]

By matching this household financial data to employers publicly listed in the US stock market (with Compustat, CRSP, and OptionMetrics data), we create a rich employee-employer panel data to test whether micro-level consumption responds to *income-labour uncertainty*, as proxied by employer-specific volatility. To the best of our knowledge, this paper is the first to do this.

The motivation for the response of consumption to uncertainty is a classical precautionary savings motive, in which risk averse households adjust their consumption downward upon an increase in uncertainty about their future income and consumption streams. As long as jumps in the employer volatility captures increases in the likelihood of households observing potential negative shocks to their income streams (e.g., layoffs, Chapter 7 and 11 bankruptcy, increased doubts in receiving performance bonuses and/or option payments, etc.,), rational households should respond negatively to employer-specific uncertainty.[3] Our regression analysis below provides strong support for this response.

[1] primarily because of the lack of household-level data to measure both consumption and income sources

[2] where even small consumption transactions such as purchases of coffee at Starbucks, groceries at Walmart, and online Amazon purchases are directly observable in our data. This type of data has only until recently been made more widely available due to the development of fintech and big data

[3] Atkeson, Eisfeldt, and Weill (2017) theoretically show that firm equity volatility is closely tied to the distance to insolvency and distance to default of firms. Empirically they use firm volatility to identify the degree of financial distress of firms in meeting their financial obligations

Our main findings can be summarized as follows. First, household (employee) consumption responds negatively to firm (employer) uncertainty shocks. A two standard deviation shock to firm uncertainty decreases future consumption growth of households employed by that firm by 1.4%. This result is robust to controlling for the firms' stock return (as a 1st moment control to disentangle from the 2nd moment effect of uncertainty), household indebtedness, and household income shocks. This effect is economically meaningful and comparable to the size of the effect attributed to a similar lagged negative shock to the income of the household. Moreover, for comparison, an aggregate drop in US consumption growth of 2% is massive. Moreover, we find an offsetting positive effect of firm stock returns, which is economically and statistically significant, but ranges in magnitude between 1/4 to 1/2 of the effect attributed to uncertainty. These results are robust to different measures of uncertainty (option-implied vs. realized, and shocks vs. levels), and to a battery of different regression specifications.

Second, we find that the consumption response to uncertainty shocks takes about three months to become statistically significant and that the consumption effects tend to grow larger over the forecasting horizon of consumption growth, and is largely significant at twelve month horizons. Our findings suggest that households do not immediately respond in their consumption adjustments (e.g., month-by-month adjustments),but take some time in adjusting their consumption forward following uncertainty shocks.

Third, we find similar results when examining consumption transactions strictly categorized as durable consumption (e.g., automobile-related and home improvements). The magnitude of the response of durables to uncertainty shocks is smaller than our baseline measure of consumption that includes both durable and non-durable consumption. Fourth, when we split our sample of households by groups according to income-levels, we find that low-income households respond more intensively in cutting down durable good consumption than high-income households. Yet, the same low-income households are not as responsive to cutting down on predominantly non-discretionary goods such as groceries. These results

combined suggest a possible pecking order in the adjustment of consumption goods in response to uncertainty, where lower-income groups drop durable consumption first before deciding to downward-adjust other types of consumption goods such as groceries.

To our knowledge, our paper is the first to examine the household consumption response to firm uncertainty shocks using detailed financial administrative data, which is not self-reported by the households (e.g., not reliant on answering survey questions). Whereas the literature on household uncertainty largely utilizes the household's own subjective expectations of future outcomes (Dominitz and Manski (1997), Guiso, Jappelli, and Pistaferri (2002), Jappelli and Pistaferri (2000)), none of the variables used in our paper are reported by the household. The consumption data is as how the financial institutions record the transactions on their books, and the uncertainty shocks are shocks to the firm largely driven by covariances with aggregate sources and not endogenously influenced by the household employees in our data. That is, in contrast to, say, measuring income uncertainty based on the time-series standard deviation of household income (clearly an endogenous choice for the household), we rely on a largely exogenous object to the household when measuring income uncertainty: the employers' option-implied volatility.

Perhaps the closest related paper to ours is Ben-David, Elyas, Kuhnen, and Li (2018), who using household-level survey data find that households with more uncertain expectations about the future indicate their *intentions* to reduce consumption in the future, which is consistent with our results. Moreover, Knotek and Kahn (2011) and Fulford (2015) find that uncertainty does not have an important role in deciding household consumption. Our paper differs from these papers in that we are testing the consumption response at the household level instead of at the aggregate level, as is in Knotek and Kahn (2011), and that we are able to track the consumption response to the shocks to firm uncertainty using administrative data instead of survey data as is in Ben-David et al. (2018) and Fulford (2015). Another related paper is Agarwal, Aslan, Huang, and Ren (2019) who find that households reduce their stock market participation after shocks to political uncertainty. Our main outcome variable

consumption is not examined in that paper, thus our work complements their findings.

2 Data and Empirical Methodology

The household banking and credit card transaction data comes from an online account aggregator. This online service helps households manage their budgeting, bill payments, savings, and investments in a convenient fashion. Households provide their login information of the various banks and credit card services that they are using to the website, and in turn the website retrieves the information from each financial institution for the household. The data used in this paper is the same as Baugh, Ben-David, and Park (2018). Recent papers that use similar data include Baker (2018), who provides an extensive overview of the characteristics of this type of data.

The data contains the details of daily transactions for approximately 2.7 million households from June 2010 to May 2015. For each transaction, we are able to observe the date, the amount, whether the transaction was an inflow or an outflow, the categories provided by the online aggregator, and the transaction description. It is similar to looking at a bank or credit card statement. Since we are able to observe bank transactions, we observe income that comes into the household's bank account from its employers.

For many of these income transactions we can identify the names of the employers, which allows us to link the household to both private and public firms. This study focuses on the link from household to publicly listed firm in the US stock market, for which we exploit forward-looking option-implied volatility of firms to proxy for labor-income uncertainty. We use a fuzzy matching algorithm to match the employer names of the household data to the company names on Compustat. Table 1 and Figure 1 shows the mapping. In the first row of Table 1, we show the number of households that are matched to Compustat throughout our sample period. In total, we can identify 90,307 households that we can link to Compustat firms. The universe of Compustat firms is larger than that of firms in CRSP and

OptionMetrics, from which we use stock returns and option-implied volatilities, respectively. After dropping households with only limited daily transaction information and after merging the household employees to their employers listed in the US stock market (having Compustat, CRSP, and Optionmetrics data) we are left with 46,605 unique households and 785 unique publicly listed firms. This mapping comprises the sample used in our regression analysis. The reason that the number seems low compared to the 2.7 million households in the sample as a whole is because for many households the income description only contains the word "payroll" or "direct deposit" and does not have any information on the employer. Other households work for private firms, non-profits, or the government, which we cannot link to Compustat, or do not link the income-receiving bank account to the online account aggregator. Nonetheless, the resulting household number is large and data-rich for our exploration of the effects of firm employer uncertainty on household consumption.

Our sample of matched households is largely representative of the US population. In Figure 2, we show the distribution of income in our sample, compared to the distribution of income in the 2010 U.S. Census. The income in our sample is similar to the distribution in the U.S. Census, but our measure of income is after withholdings such as tax and contributions. In that context the income for our sample should be considered to be larger than what is shown on the figure. Moreover, the matched public firms in our sample are not restricted to small firms, rather they show a nice distribution in characteristics. In Figures 3, 4, and 5, we show how the matched firms are distributed along market equity, number of employees, and book-to-market equity ratios. Our sample includes firms that are large and small, in terms of market capitalization and the number of employees. We also have a good distribution of both growth and value firms.

In Table 2, we provide the summary statistics of the variables used in this paper. We define our baseline household consumption variable using expenditures at retailers, restaurants, and grocery stores. We observe potentially multiple of these transaction per household every day. We aggregate the US$ dollar consumption transactions to the monthly level every

month for each household. In identifying the consumption transactions we use the transactions that we can identify at major retailers and grocery stores from a list of the top 100 retailers during the sample period.[4] For restaurants, we also use a similar list of top 100 restaurants.[5] We augment this list by searching for relevant keywords such as burger, taco, pizza, grill, steak, and etc. These type of transactions comprise our main measure of consumption in the paper. We prefer this measure of consumption because it is a based on a clean set of transactions that are likely not misclassified. In Figure 6, we show the distribution of monthly household consumption from the data. The average monthly consumption is $811. Our results are robust to different measure of consumption, such as using the consumption categories directly identified by data provider online aggregator (which does a careful job in classifying expenditures into categories). For our measure of durable consumption, we use the categorization provided by the online account aggregator, which includes categories for automobile-related expenditures, home improvement, and home maintenance.

Our baseline measure of uncertainty uses the option-implied volatility of firms from OptionMetrics. In particular, our measure of implied volatility of firms follows Alfaro, Bloom, and Lin (2019) and is measured as the 252-trading-day average of daily implied volatility values from at-the-money 365-day forward call options, from OptionMetrics. Moreover, we also measure uncertainty using realized stock return volatility from CRSP, where realized volatility is the annualized standard deviation of daily CRSP cum-dividend stock returns within a 365-day window.[6] As shown below, We document robust results to either measure, but stronger using implied volatility. We find similar results when using option-implied volatilities from at-the-money 91-day forward call options.

As controls, we include the firm's cumulative 6 month stock returns, the households income, and indicator variable that equals one if the mortgage payment-to-income ratio for the household in that month is greater than 10%, and a local cost-of-living measure that

[4]http://www.stores.org/2012/Top-100-Retailers

[5]http://nrn.com/us-top-100/top-100-chains-us-sales

[6]to annualize we multiply the realized volatility by the square root of 252 (average number of trading days in a year)

attempts to control for local economic shocks, unrelated to the shocks affecting the firm. This cost-of-living measure is calculated by computing the mean expenditures of gas, restaurant, groceries and retail for each city, for every month.

In our regressions most variables are measured in terms of growth rates. For the growth, we follow Davis and Haltiwanger (1992), where for any variable x_t, the growth is calculated as $\Delta x_t = (x_t - x_{t-1})/(\frac{1}{2}x_t + \frac{1}{2}x_{t-1})$. This growth measure has the nice feature of being bounded between -2 and 2 for positive values of x (such as volatility and US$ dollar consumption values). The variables that do not use this measure are the CRSP stock returns, the indicator variable for high mortgage-to-income ratios, and the levels in firm volatility. Table 2 shows that all variables in our sample have well-behaved statistical distributions. All regression variables are winsorized at the 1 and 99 percentiles every month.

Our main regression specifications test whether an increase in the option-implied uncertainty of the firm for which a household works for is associated with future downward adjustments in household consumption. Given that households may take some time in gradually adjusting their monthly consumption after rises in uncertainty, our baseline regressions are forecast of changes in average monthly consumption from 6-months periods to the next 6-months. However, we show below that the results are robust to decreasing or increasing the window length in measuring changes in average monthly consumption.

Therefore, our main regression specification is as follows:

$$\begin{aligned}\Delta\text{Consumption}_{i,t} = {} & \beta_0 + \beta_1 \times \Delta\text{Volatility}_{j,i,t-6} + \beta_2 \times \text{6M Return}_{j,i,t-6} \\ & + \beta_3 \times \text{D}_{i,t-6}^{Mortgage-Income} + \beta_4 \times \Delta\text{Income}_{i,t} + \beta_5 \times \Delta\text{Lag Income}_{i,t-6} \\ & + \text{Cost of Living Index}_{c,t} + \alpha_i + \gamma_j + \delta_t + \epsilon_{i,t}\end{aligned}$$

This regression examines the forecasting effect of firm (employer) uncertainty shocks on future household (employee) consumption growth. Frequency of all variables is monthly. $\Delta\text{Consumption}_{i,t}$ is the 6-month growth in average monthly consumption of retail, restaurant, and groceries at the household i level (employees). For each household we measure

consumption every month over a 6-month period, obtain the average monthly consumption over this span, and construct the growth into to the next 6-months. Our main uncertainty variable, referred to as uncertainty shocks, $\Delta\text{Volatility}_{j,i,t-6}$ is the 6-month growth in the option-implied volatility (365-day horizon from OptionMetrics) of the corresponding employer j of each household. The timing of these employer uncertainty shocks is lagged by a full 6-months with respect to the LHS outcome.

Moreover, to disentangle between the predictive effect of 2nd moment uncertainty shocks and first moment effects, we control for the lagged stock return of the employer, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{D}_{i,t-6}^{Mortgage-Income}$ is a lagged household indicator variable equal to one if the 6-month average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise, and household income shocks, where we include both the contemporaneous and lagged by 6-months household income growth, $\Delta\text{Income}_{i,t}$ and $\Delta\text{Income}_{i,t-6}$, respectively. α_i, γ_j, δ_t are household, firm, and time fixed effects, respectively. Moreover, to account for the effect of cost-of-living differences all specifications include a time-varying Cost of Living Index, calculated from the mean expenditures of gas, restaurant, groceries and retail for each city, for every month.

Table 3 presents the results, which we describe below, where the continuous independent variables are standardized to make coefficients comparable across regressor variables. The results are fully robust to using unstandardized regressors. The coefficients estimates and standard errors are scaled ($\times 100$) so that they imply a percentage point change in the household's consumption growth given a standard deviation shock in the independent variable.

3 Results

3.1 Uncertainty and Consumption

Table 3 presents our main results. In column 1, we find that households reduce consumption growth by 0.8% in response to a standard deviation increase in firm employer uncertainty (significant at the 1%), as measured by option-implied volatility shocks. Equivalently, the response amounts to a 1.6% drop in consumption given a two standard deviation firm uncertainty shock. Column 2 adds the firm's stock returns as control variable to disentangle between 2nd moment uncertainty and 1st moment effects. The household consumption response to uncertainty shocks remains negative and similar in magnitude (-0.7% coefficient), yet the direction of the response to the stock return of the firm is positive - offering an offsetting effect to uncertainty.

Looking at the consumption response to the firm's stock returns, we find that a two standard deviation increase in the stock return of the employer results in a 0.66% increase in household consumption. Household consumption is positively related to the employer's stock returns as we would expect. What is perhaps surprising is that the 2nd moment effect of uncertainty shocks on consumption is more than twice as large as the 1st moment effect of stock returns on consumption. It seems that households are, indeed, risk averse and care more about uncertainty than the positive performance gains as captured by the employer's returns.

In columns 3 to 5 we add additional controls, including the income growth of households which a priori could correlate with firm uncertainty shocks. We also control for differences in debt effects across households by including a dummy which takes value one if mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise. Our baseline specification with full set of controls is in column 5, where we find that households reduce consumption by 0.9% when mortgage payments relative to income exceeds 10%, and reduce consumption by 4.2% in response to a standard deviation decrease in the household income

growth. Moreover, in response to a standard deviation decrease in lagged income growth, the household reduces consumption growth by 0.8%, which is similar in magnitude to the effect of lagged uncertainty shocks (which remains significant at the 5%).

In all, Table 3 shows that the effect of uncertainty on household consumption is significant and large in magnitude, e.g., much larger than the first moment effect of the firm's stock returns and comparable with the direct impact to lagged household income. For comparison, an aggregate drop in US consumption growth of 2% is massive. Our micro level evidence suggests that a two standard deviation shock to uncertainty in column 5 translates to a 1.45% drop in household-level consumption growth. Thus, the effect is economically meaningful. Moreover, an increase in uncertainty combined with a decrease in returns (e.g., double negative shock as in the financial crisis) further combine to negatively affect household consumption, for a combined effect of about 2% drop in consumption growth at the household level (from coefficients in columns 5) given a 2 standard deviation shock to uncertainty and returns.

In Table 4, we implement a battery of robustness tests to see if our results hold under different specifications. Panel A on the left uses option-implied volatility from OptionMetrics as in Table 3, and panel B on the right uses realized volatility from CRSP. Column (1) in Table 4 replicates the baseline regression with full set of controls in column (5) of Table 3. In column 2, we cluster the standard errors by time as well as by firm and find that the results remain almost identical. In column 3, we use industry fixed effects instead of firm fixed effects, and again results are similar. In column 4, we cluster by household and time instead of firm and time and find the results to be much more strongly significant than in the baseline specification. In column 5, we cluster errors by industry (3-digit Standard Industry Classification codes) and time, which is a strong test accounting for error clustering at a high industry dimension, and find that uncertainty remains significant at the 10%.

In Panel B on the right, we use the change realized volatility of the firm's stock returns as a proxy for the shocks to the firm's uncertainty. This to address some concerns in the

uncertainty literature whether option-implied volatility is a better measure of uncertainty than realized volatility. Our results when using realized volatility hold and show that uncertainty remains an important concern for household consumption regardless of how it is measured, yet the coefficients are smaller in magnitude when using realized volatility (e.g., column (1) vs (1A) coefficients of -0.726 and -0.598 both significant at the 5%, respectively). The smaller coefficient results for realized uncertainty relative to implied uncertainty is consistent with the findings in Alfaro et al. (2019) on the causal effect of uncertainty shocks on firm investment and capital structure outcomes. Table 4 shows that uncertainty effects on household consumption is robust across all 10 specifications explored in the Table.

One question could be whether it matters if we measure the effect of uncertainty in shocks or in levels. Another question is if uncertainty only matters when measured in lags and not contemporaneously to consumption growth. We address both questions in Table 5, where we look at the effects of the levels in uncertainty on household consumption growth. That is, instead of looking at the shocks to uncertainty as in the results so far, we examine the effect of cross-sectional high and low levels of uncertainty on household consumption. We find that levels of uncertainty are just as important as the shocks to uncertainty, and in fact are even stronger than those documented in Tables 3 and 4. For instance, in column 2 of Table 5, we find that a two standard deviation increase in the lagged by 6-month level of uncertainty faced by firms leads to households employees reducing their consumption growth by 2.70%. When looking at concurrent levels of uncertainty in column 3, we find that a two standard deviation increase in the contemporaneous uncertainty level leads to a reduction in consumption growth by 4%. Using realized volatility in columns (1A) (2A) and (3A), gives similar inferences as using implied volatility, yet smaller in magnitude.

3.2 Uncertainty and the timing of consumption growth forecasts

In Table 6, we adjust the horizons for the forecast of household consumption growth linked to lagged firm uncertainty. We do so to examine whether the precautionary savings

motive effect of uncertainty kicks-in at shorter horizons and whether it's more pronounced at longer horizons. We find that at the high frequency of one-month intervals in consumption growth, the effect of uncertainty on consumption is only significant at the 10% level. However, from a 3-month interval onward the results become more pronounced and the effects grows monotonically at longer horizons. At a full 1-year ahead consumption growth predictability in column (5), we find that a 2 standard deviation increase in firm volatility leads to a 4% drop in household consumption. From the results in Table 6 we document that firm employer uncertainty appears to have an increasingly long-lived impact on household consumption. Moreover, the results in Table 6 also show that the offsetting 1st moment effects of stock returns also increase monotonically over time on consumption growth, yet only about 1/4th as large at longer horizons relative to uncertainty (e.g., 12months in column (5)).

We plot the results from Table 6 in Figure 7, which show the monotonic increase in the point estimates at longer horizons for both uncertainty and return effects. The confidence intervals are also shown.

3.3 Durable Consumption

The results so far are consistent with a precautionary savings motive that induces risk averse households to cut down consumption in response to uncertainty. However, the type of consumption goods that are cut down might differ in intensity depending on characteristics such as the durability of purchased goods. In Table 7 we examine the response of durable goods to uncertainty shocks. As stated earlier, we include transactions related to automobile expenses, home improvement, and home maintenance. Table 7 documents that durable consumption is highly responsive to uncertainty shocks (at the 1% across all columns). A two standard deviation uncertainty shock forecasts a 1.21% drop in durable consumption growth, while a two standard deviation increase in the employers' stock return increases durable growth by 0.7%. These directional responses to 2nd and 1st moment effects are in line with our baseline measure of consumption growth examined to this point in Tables 3

to 6. However, the economic magnitude of the average response of durable goods is smaller than that of the baseline consumption measure that includes groceries, restaurant, and retail (e.g., coefficient of -0.608 in column (5) of durables in Table 7 vs. -0.726 in column (5) in Table 3).[7].

3.4 Intensity response across household income levels

Household consumption response to uncertainty might differ across household income levels. In Table 8 we classify households into quartiles by their average income levels, and examine the response to uncertainty shocks for each household sub-sample. The left panel is for the baseline measure of consumption examined in Table 3, which includes retail, restaurant, and groceries, and the right panel is for durable consumption examined in Table 7, which includes expenditures on automobile-related expenses, home improvement, and home maintenance.

Table 8 documents some noticeable and interesting patterns across household income levels. First, a priori we would expect high income households to respond less intensively to uncertainty shocks than low income households (as high-income are relatively more wealthy individuals with potentially other means of overcoming negative shocks to their income streams). Going from high income to less income from columns (4) to (2) we find that, indeed, the response to uncertainty is less intensive in magnitude for high income households, as seen by the downward monotonicity in the point estimates from (2) to (4). Second, the lowest income households in column (1) break the expected monotonicity and in fact are not responsive to uncertainty shocks. This is possibly because the low-income groups spend more of their income in non-discretionary goods such as groceries, which are items harder to adjust for daily subsistence. In contrast, all other groups have more flexibility to engage in

[7]our baseline measure of consumption that includes retail and groceries can be driven in part by purchases of durable goods in retail and grocery stores. Thus, it's a broad measure of consumption that includes both non-durables and non-durables. In ongoing work we are creating additional consumption variables that are largely non-durable in nature. Also, we are expanding the measure of durable goods beyond automobile and home-related expenditures

more retail, restaurant, and grocery expenditures that have a more discretionary aspect to them, making it easier to adjust in comparison. Third, we find that low-income households in groups (1A) and (2A) are more responsive in cutting down durable consumption than higher-income groups. This suggest a pecking order in the adjustment of consumption goods in response to uncertainty, where lower-income groups drop durable consumption first (e.g., column (1A)) before deciding to adjust downward other types of consumption (e.g., groceries as main driver for column (1)). We find similar patterns if we classify households into 2 or 3 groups by income levels.

4 Conclusion

We map rich microdata from linked financial accounts of US households to employers listed in the US stock market. Our novel employer-employee panel, comprising 785 listed firms and 46,605 households over a 4.5-year period, allows us to examine detailed household consumption responses to labour income uncertainty, as proxied by employer-specific option-implied volatility.

We document that households reduce their consumption in response to uncertainty shocks. The results are robust to using realized volatility of firm from CRSP stock returns. Regardless of whether we measure uncertainty using changes in option-implied volatility, realized volatility, or just the levels of volatility, households show a strong response in their consumption decisions. With regard to timing, it takes about 3 months for the firm uncertainty shocks to influence household consumption dynamics, and the impact is more pronounced at longer horizons. The uncertainty 2nd moment negative effect on consumption is not subsumed by the positive 1st moment effect of stock returns. Durable consumption is also highly responsive to uncertainty shocks. Lastly, we find differences in intensity to the response of consumption and durables across household income-levels, where low-income groups are more responsive in adjusting durables than high-income groups.

Our results raise questions about evidence in the literature on deviations from rational behavior and precautionary savings motives. Various surveys and anecdotal news reports on household consumption and savings have generally found that households under-save Lusardi, Schneider, and Tufano (2011). This seems to be at odds with our novel finding that households are sensitive to future income uncertainty as proxied by employer volatility, and that they adjust consumption in a rational way going forward. The lack of savings of households, at least on the surface, seems inconsistent with rational behavior, while our findings are consistent with it. A possible explanation is that households have other means of savings or insurance that they can rely on which lead to a lack of liquid savings picked up on surveys.

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Figure 1. Mapping of households to public firms

This figure shows the number of unique households (employees) in the online account aggregator data that are mapped to unique publicly listed firms (employers) having financial reports (Compustat), returns (CRSP), and option-implied volatilities (OptionMetrics). The resulting panel is after applying filters to our data.

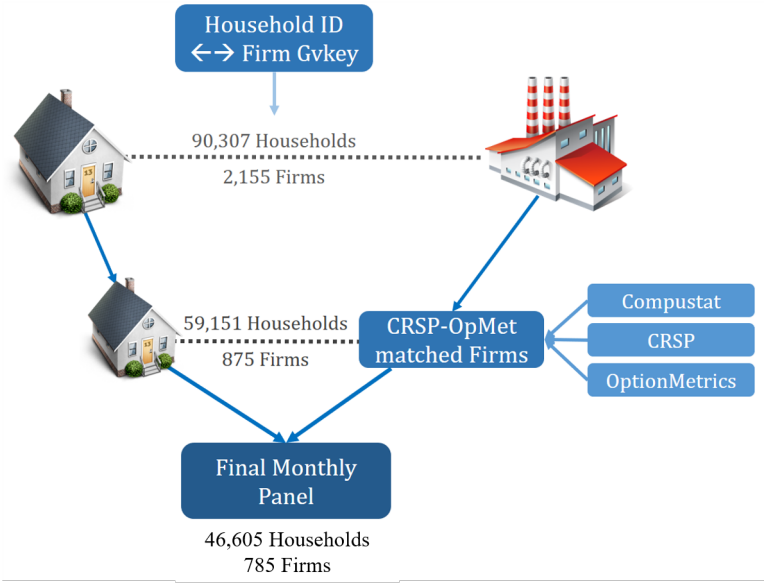

Figure 2. Distribution of annual income

This figure compares the distribution of annual income for households in our sample (red) to the 2010 U.S. Census (blue). Note that income in our sample is after withholdings, such as income taxes, healthcare contributions, and retirement contributions. These omissions understate the actual household income, before withholdings. Nonetheless, our sample is largely representative of US household income.

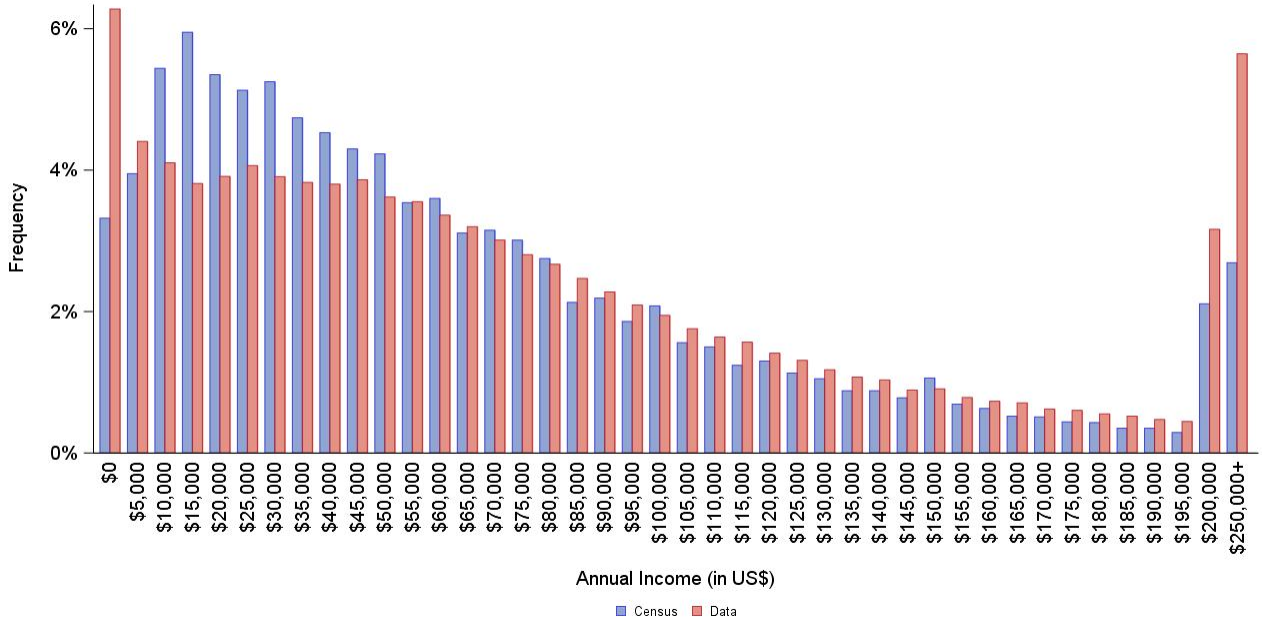

Figure 3. Distribution of firm market capitalization

This figure shows the distribution of public firms in our regression sample according to their market equity (in Millions of US$).

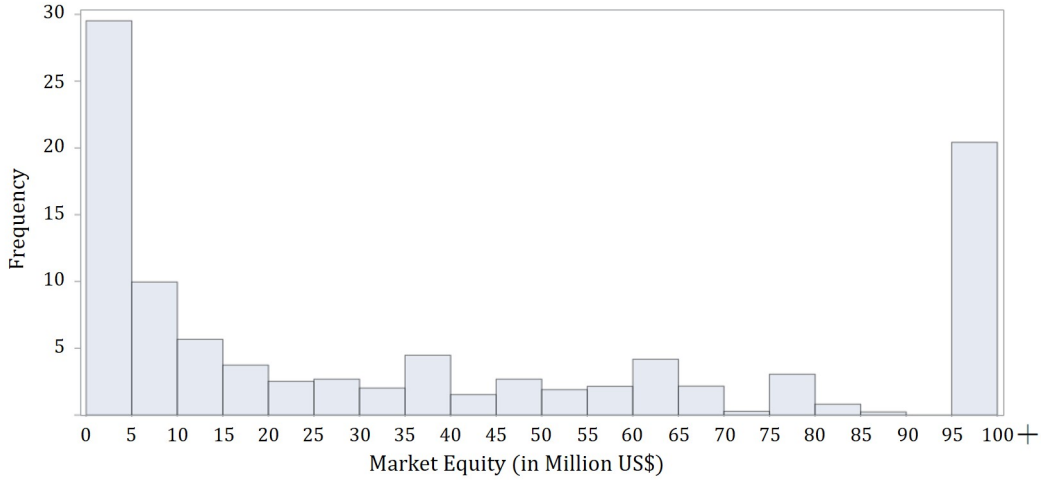

Figure 4. Distribution of firm employees

This figure shows the distribution of public firms in our regression sample according to their number of employees.

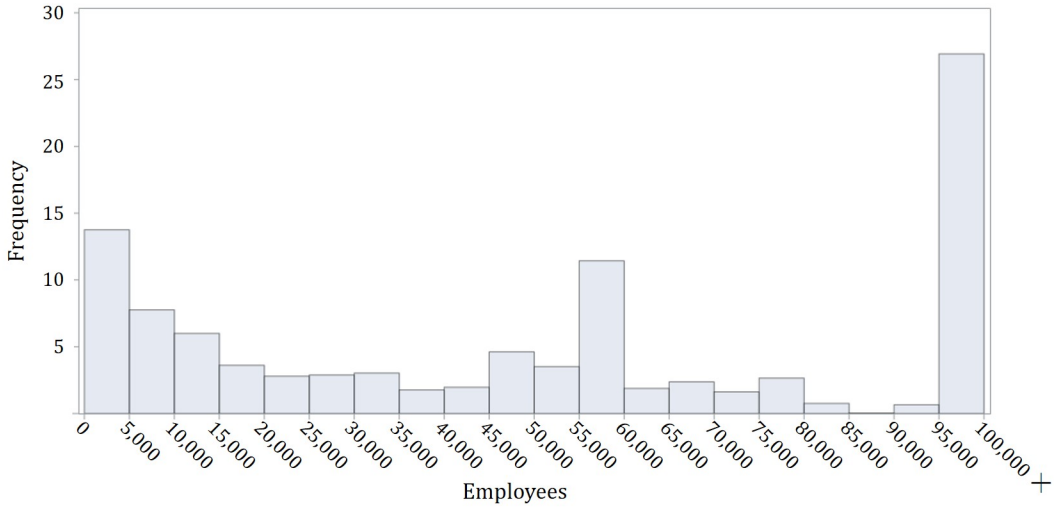

Figure 5. Distribution of firm book-to-market equity

This figure shows the distribution of public firms in our regression sample according to their book-to-market equity ratios.

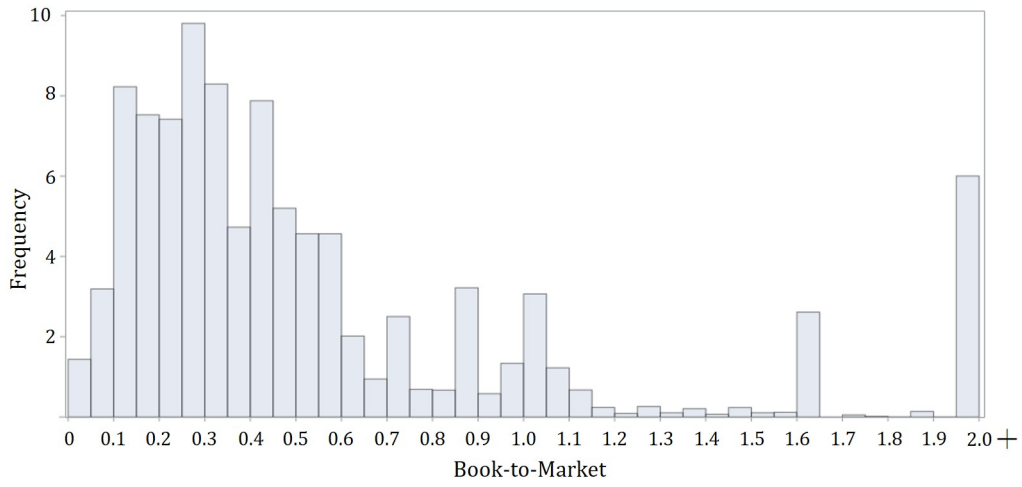

Figure 6. Distribution of monthly consumption

This figure shows the distribution of monthly consumption in US$ from the data in our regression sample. The average monthly consumption is $811. This measure of consumption includes spending at retail, restaurant, grocery stores.

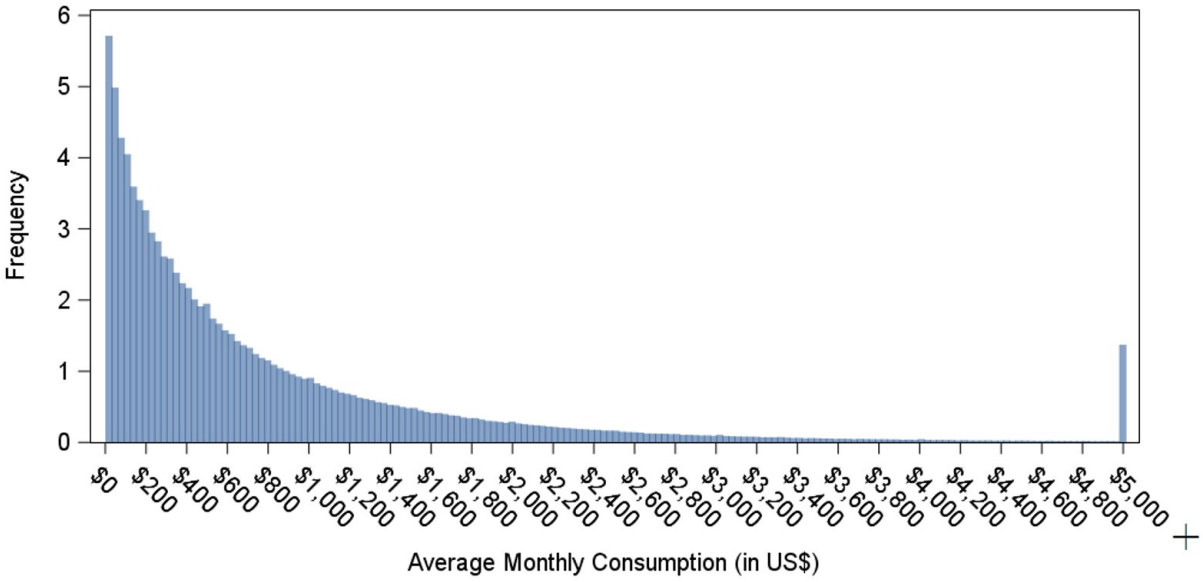

Figure 7. Forecasting employee consumption with firm uncertainty

This figure shows the regression coefficients of household's consumption response to firm (employer) uncertainty at different horizons. The point estimates are from Table 6. The negative effect of firm volatility on future consumption growth is in blue, while the positive offsetting effect of the firms' stock return is in red. The vertical lines above and below the coefficients represent 95% confidence intervals. The response of consumption to firm uncertainty is more intensive at longer horizons.

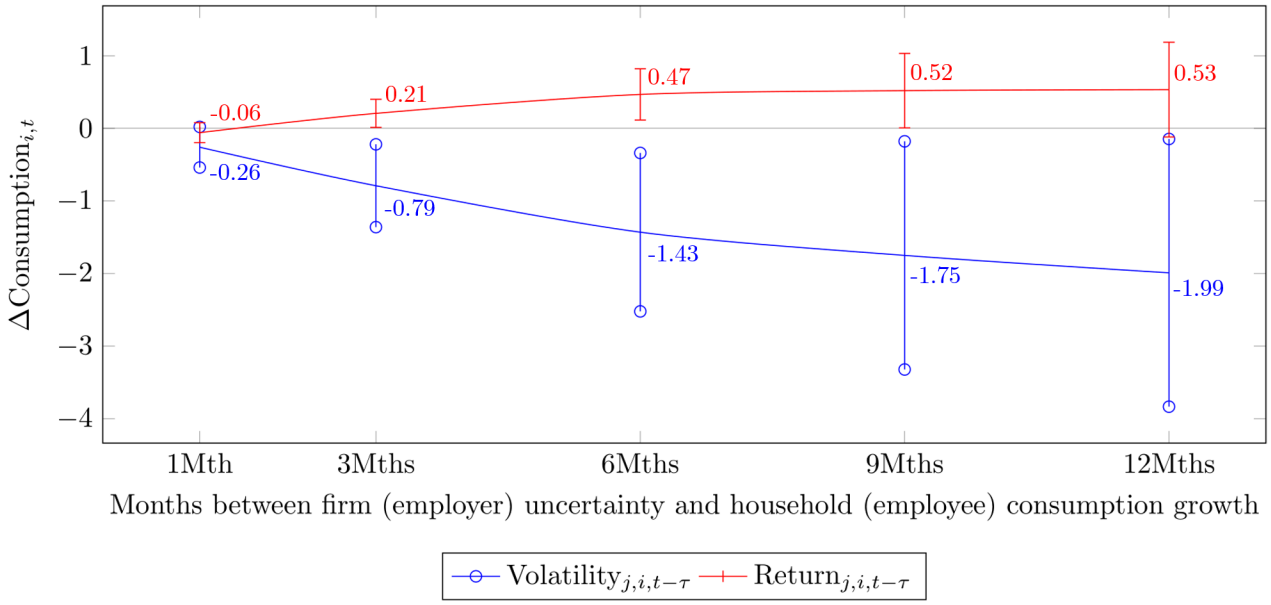

Table 1. Mapping of households to public firms

This table shows the number of unique households and firms that are matched each year to create our rich employee-employer panel data. Households and firms are matched based on a textual fuzzy matching algorithm that uses Compustat company names and the household income descriptions that identifies the employer's company name. Our baseline regression panel further uses firm data from CRSP and OptionMetrics for returns and implied volatilities, respectively. This gives a final mapping to 785 unique listed firms (employers) in our sample. We perform a manual inspection and filtering of resulting mapped firms based on the textual matching.

	Jun 2010	Dec 2011	Dec 2012	Dec 2013	Dec 2014	May 2015	Unique
Household ID $\leftrightarrow$ Firm Gvkey	59,029	84,927	86,328	84,364	79,969	70,565	90,307
CRSP - OpMet Firms	592	680	698	710	724	678	875
Matched Households	30,749	50,899	51,841	50,708	48,625	41,332	59,151
Firm in Baseline		572	630	645	672	636	785
Households in Baseline		30,663	38,353	38,816	37,389	31,325	46,605

Table 2. Summary statistics

This table shows the summary statistics of the variables used in the main regression analysis. Frequency of all variables is monthly. $\Delta\text{Consumption}_{i,t}$ is the 6-month growth in average monthly consumption of retail, restaurant, and groceries at the household i level (employees in our sample). For each household we measure consumption every month over a 6-month period, obtain the average monthly consumption over this span, and construct the growth into to the next 6-months. Similarly, $\Delta\text{Durables}_{i,t}$ is the 6-month growth in durable consumption. $\Delta\text{Volatility}_{j,i,t}$ is the 6-month growth in the option-implied volatility (365-day horizon from OptionMetrics) of employers j in our sample. ΔRealized Volatility$_{j,i,t}$ is the 6-month growth in the firm annual (365 day) realized volatility from CRSP. 6M Return$_{j,i,t}$ is the 6-month CRSP compounded cum-dividend stock return of sample firms. $\text{D}_{i,t}^{Mortgage-Income}$ is a household indicator variable equal to one if the 6-month average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise. $\Delta\text{Income}_{i,t}$ is the 6-month change in average household income. Volatility$_{j,i,t}$ and Realized Volatility$_{j,i,t}$ are the levels of option-implied and realized volatility of firms, respectively.

	Obs.	Mean	S.Dev	Min	P1	P25	P50	P75	P99	Max
$\Delta\text{Consumption}_{i,t}$	1,206,168	0.066	0.444	-1.187	-1.078	-0.204	0.060	0.337	1.145	1.389
$\Delta\text{Durables}_{i,t}$	1,128,524	0.007	0.733	-1.698	-1.639	-0.465	0	0.478	1.654	1.713
$\Delta\text{Volatility}_{j,i,t}$	1,419,469	-0.031	0.086	-0.299	-0.219	-0.084	-0.035	0.013	0.221	0.299
ΔRealized Volatility$_{j,i,t}$	1,419,461	-0.046	0.181	-0.628	-0.480	-0.158	-0.051	0.048	0.533	0.718
6M Return$_{j,i,t}$	1,419,469	0.089	0.214	-0.729	-0.438	-0.025	0.092	0.207	0.691	1.432
$\Delta\text{Income}_{i,t}$	1,419,469	0.236	0.807	-2	-2	-0.097	0.045	0.423	2	2
$\text{D}_{i,t}^{Mortgage-Income}$	1,419,469	0.359	0.479	0	0	0	0	1	1	1
Volatility$_{j,i,t}$	1,419,469	0.304	0.115	0.153	0.167	0.224	0.270	0.353	0.750	0.891
Realized Volatility$_{j,i,t}$	1,419,469	0.310	0.140	0.126	0.141	0.212	0.269	0.369	0.770	0.931

Table 3. Uncertainty shocks and future household consumption

This table shows the forecasting regression effect of firm (employer) uncertainty shocks on future household (employee) consumption growth. Frequency of all variables is monthly. $\Delta\text{Consumption}_{i,t}$ is the 6-month growth in average monthly consumption of retail, restaurant, and groceries at the household i level (employees). For each household we measure consumption every month over a 6-month period, obtain the average monthly consumption over this span, and construct the growth into to the next 6-months. $\Delta\text{Volatility}_{j,i,t-6}$ is the 6-month growth in the option-implied volatility (365-day horizon from OptionMetrics) of the corresponding employer j of each household. The timing of these employer uncertainty shocks is lagged by a full 6-months with respect to the LHS outcome. To disentangle between the predictive effect of 2nd moment uncertainty shocks and first moment effects, we control for the lagged stock return of the employer, 6M $\text{Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{D}_{i,t-6}^{Mortgage-Income}$ is a lagged household indicator variable equal to one if the 6-month average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise, and household income shocks, where we include both the contemporaneous and lagged by 6-months household income growth, $\Delta\text{Income}_{i,t}$ and $\Delta\text{Income}_{i,t-6}$, respectively. To account for the effect of cost-of-living differences all specifications include a time-varying Cost of Living Index, calculated from the mean expenditures of gas, restaurant, groceries and retail for each city, for every month. The continuous independent variables are standardized to make coefficients comparable and show the effect of a standard deviation increase. Coefficients and standard errors ($\times 100$) are reported for each independent variable. Variables are winsorized at the 1 and 99 percentiles each month. Firm, household, and time fixed effects are included. The standard errors are clustered at the firm level and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

$\Delta\text{Consumption}_{i,t}$	(1)	(2)	(3)	(4)	(5)
$\Delta\text{Volatility}_{j,i,t-6}$	-0.819***	-0.729**	-0.724**	-0.730**	-0.726**
	(0.307)	(0.298)	(0.298)	(0.291)	(0.289)
6M $\text{Return}_{j,i,t-6}$		0.326**	0.324**	0.304**	0.297**
		(0.148)	(0.148)	(0.149)	(0.149)
$\text{D}_{i,t-6}^{Mortgage-Income}$			-1.33***	-0.831***	-0.892***
			(0.148)	(0.154)	(0.155)
$\Delta\text{Income}_{i,t}$				4.07***	4.23***
				(0.154)	(0.143)
$\Delta\text{Lag Income}_{i,t-6}$					0.816***
					(0.133)
Cost of Living Index	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	1,205,349	1,205,349	1,205,349	1,205,349	1,205,349

Table 4. Uncertainty shocks and future household consumption, alternative specifications

This table shows robustness of the forecasting effect in Table 3 of firm (employer) uncertainty on household (employee) future consumption. The baseline specification (1) includes all controls specified in column (5) in Table 3. Frequency of all variables is monthly. $\Delta\text{Consumption}_{i,t}$ is the 6-month growth in average monthly consumption of retail, restaurant, and groceries at the household i level (employees). For each household we measure consumption every month over a 6-month period, obtain the average monthly consumption over this span, and construct the growth into to the next 6-months. In columns (1), (2), (3), (4), (5), $\Delta\text{Volatility}_{j,i,t-6}$ is the 6-month growth in the *option-implied* volatility (365-day horizon from OptionMetrics) of the corresponding employer j of each household, over the six month period preceding the consumption growth. Similarly, in columns (1A), (2A), (3A), (4A), (5A), $\Delta\text{Volatility}_{j,i,t-6}$ is the lagged 6-month growth in the firm annual (365 day) *realized* volatility of the firm's CRSP stock return. To disentangle between the predictive effect of 2nd moment uncertainty shocks and first moment effects, we control for the lagged stock return of the employer, 6M $\text{Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{D}_{i,t-6}^{Mortgage-Income}$ is a lagged household indicator variable equal to one if the 6-month average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise, and household income shocks, where we include both the contemporaneous and lagged by 6-months household income growth, $\Delta\text{Income}_{i,t}$ and $\Delta\text{Income}_{i,t-6}$, respectively. To account for the effect of cost-of-living differences all specifications include a time-varying Cost of Living Index, calculated from the mean expenditures of gas, restaurant, groceries and retail for each city, for every month. The continuous independent variables are standardized to make coefficients comparable and show the effect of a standard deviation increase. Coefficients and standard errors (×100) are reported for each independent variable. Variables are winsorized at the 1 and 99 percentiles each month. The specifications below include a combination of firm, industry (3-digit Standard Industry Classification), household, and time fixed effects. Likewise the specifications explore robustness to clustering standard errors at one or multiple different dimensions. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Implied Volatility					Realized Volatility				
$\Delta\text{Consumption}_{i,t}$	(1)	(2)	(3)	(4)	(5)	(1A)	(2A)	(3A)	(4A)	(5A)
$\Delta\text{Volatility}_{j,i,t-6}$	-0.726**	-0.726**	-0.723**	-0.726***	-0.726*	-0.598**	-0.598**	-0.603**	-0.598***	-0.598*
	(0.289)	(0.308)	(0.309)	(0.179)	(0.378)	(0.256)	(0.264)	(0.264)	(0.154)	(0.329)
6M $\text{Return}_{j,i,t-6}$	0.297**	0.297*	0.298*	0.297***	0.297*	0.350**	0.350**	0.346**	0.350***	0.350*
	(0.149)	(0.148)	(0.149)	(0.110)	(0.171)	(0.151)	(0.148)	(0.148)	(0.101)	(0.174)
$\text{D}_{i,t-6}^{Mortgage-Income}$	-0.892***	-0.892***	-0.893***	-0.892***	-0.892***	-0.908***	-0.908***	-0.910***	-0.908***	-0.908***
	(0.155)	(0.150)	(0.150)	(0.155)	(0.125)	(0.154)	(0.147)	(0.147)	(0.150)	(0.114)
$\Delta\text{Income}_{i,t}$	4.23***	4.23***	4.23***	4.23***	4.23***	4.24***	4.24***	4.23***	4.24***	4.24***
	(0.143)	(0.148)	(0.147)	(0.108)	(0.182)	(0.137)	(0.143)	(0.143)	(0.106)	(0.168)
$\Delta\text{Lag Income}_{i,t-6}$	0.816***	0.816***	0.814***	0.816***	0.816***	0.803***	0.803***	0.802***	0.803***	0.803***
	(0.133)	(0.139)	(0.139)	(0.122)	(0.144)	(0.129)	(0.134)	(0.134)	(0.117)	(0.136)
Cost of Living Index	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	No	No	Yes	No	No
SE Clustering - Firm	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No
SE Clustering - Household	No	No	No	Yes	No	No	No	No	Yes	No
SE Clustering - Industry	No	No	No	No	Yes	No	No	No	No	Yes
SE Clustering - Time	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Observations	1,205,349	1,205,349	1,205,349	1,205,349	1,205,349	1,259,863	1,259,863	1,259,863	1,259,863	1,259,863

Table 5. Uncertainty measured in shocks and in levels

This table shows the effect of firm (employer) uncertainty when measured in levels on either future or contemporaneous household (employee) consumption. The baseline specifications of uncertainty shocks in (1) and (1A) include all controls specified in columns (5) and (5A) in Table 4. Frequency of all variables is monthly. $\Delta\text{Consumption}_{i,t}$ is the 6-month growth in average monthly consumption of retail, restaurant, and groceries at the household i level (employees). For each household we measure consumption every month over a 6-month period, obtain the average monthly consumption over this span, and construct the growth into to the next 6-months. In columns (1), (2), (3), volatility is from the employer firms' *option-implied* volatility (365-day horizon from OptionMetrics) and in columns (4), (5), (6), volatility is from the firm's annual (365 day) *realized* volatility of the firm's CRSP stock return. $\Delta\text{Volatility}_{j,i,t-6}$ is the 6-month growth in volatility over the six month period preceding the LHS consumption growth outcome. $\text{Volatility}_{j,i,t-6}$ is the level of firm volatility lagged by 6-months, and $\text{Volatility}_{j,i,t}$ is the volatility level measured at the same month t as the LHS outcome. To disentangle between the effect of 2nd moment uncertainty and first moment effects, we control for the lagged stock return of the employer, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{D}_{i,t-6}^{Mortgage-Income}$ is a lagged household indicator variable equal to one if the 6-month average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise, and household income shocks, where we include both the contemporaneous and lagged by 6-months household income growth, $\Delta\text{Income}_{i,t}$ and $\Delta\text{Income}_{i,t-6}$, respectively. To account for the effect of cost-of-living differences all specifications include a time-varying Cost of Living Index, calculated from the mean expenditures of gas, restaurant, groceries and retail for each city, for every month. The continuous independent variables are standardized to make coefficients comparable and show the effect of a standard deviation increase. Coefficients and standard errors ($\times 100$) are reported for each independent variable. Variables are winsorized at the 1 and 99 percentiles each month. Firm, household, and time fixed effects are included. The standard errors are clustered at the firm level and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	Implied Volatility			Realized Volatility		
$\Delta\text{Consumption}_{i,t}$	(1)	(2)	(3)	(1A)	(2A)	(3A)
$\Delta\text{Volatility}_{j,i,t-6}$	-0.726**			-0.598**		
	(0.289)			(0.256)		
$\text{Volatility}_{j,i,t-6}$		-1.35**			-1.37**	
		(0.537)			(0.576)	
$\text{Volatility}_{j,i,t}$			-2.00**			-1.25***
			(0.856)			(0.432)
$\text{6M Return}_{j,i,t-6}$	0.297**	0.444**	0.347**	0.350**	0.344**	0.299**
	(0.149)	(0.181)	(0.147)	(0.151)	(0.149)	(0.151)
$\text{D}_{i,t-6}^{Mortgage-Income}$	-0.892***	-0.899***	-0.872***	-0.908***	-0.906***	-0.907***
	(0.155)	(0.157)	(0.157)	(0.154)	(0.154)	(0.154)
$\Delta\text{Income}_{i,t}$	4.23***	4.22***	4.22***	4.24***	4.23***	4.23***
	(0.143)	(0.143)	(0.144)	(0.137)	(0.139)	(0.139)
$\Delta\text{Lag Income}_{i,t-6}$	0.816***	0.808***	0.812***	0.803***	0.799***	0.799***
	(0.133)	(0.135)	(0.135)	(0.129)	(0.130)	(0.129)
Cost of Living Index	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,205,349	1,215,369	1,219,800	1,259,863	1,262,094	1,262,094

Table 6. Uncertainty and the timing of consumption growth forecasts

This table shows the effect of firm (employer) uncertainty on household (employee) consumption using different time periods in between uncertainty and forecasted household consumption growth. Frequency of all variables is monthly. $\Delta\text{Consumption}_{i,t}$ is the growth in average monthly consumption of retail, restaurant, and groceries. We construct the growth at different horizons in this table. For instance, our baseline specifications in Tables 3, 4, 5, measure 6-month growths in average monthly household consumption, where for each household we measure consumption every month over a 6-month period, obtain the average monthly consumption over this span, and construct the growth into to the next 6-months. We vary this growth horizon, where in column (1) "1Mth" consumption growth is the growth from one month to the next, in column (2) "3Mths" growth is from a 3-month average monthly consumption to the next 3-month window, and in column (5) "12Mths" is the average monthly consumption growth forecast a full 1-year ahead. To disentangle between the predictive effect of 2nd moment uncertainty and first moment effects, we control for the lagged stock return of the employer, which uses an analogue window as to the forecasting growth of consumption. For instance, for column (2) the return is the 3-month compounded stock return of the firm lagged by 3 months with respect to the LHS outcome, and in (5) the return is the 12-month compounded return lagged by a full year. The main forecasting variable $Volatility_{j,i,t-\tau}$ is the employer's option-implied volatility measured in level (at 365-day horizon from OptionMetrics) and is measured with a τ-month lag from 1- to 12-months. We further control for household debt effects, where $\text{D}_{i,t-\tau}^{Mortgage-Income}$ is a τ-month lagged household indicator variable equal to one if the average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise. To account for the effect of cost-of-living differences all specifications include a time-varying Cost of Living Index, calculated from the mean expenditures of gas, restaurant, groceries and retail for each city, for every month. The continuous independent variables are standardized to make coefficients comparable and show the effect of a standard deviation increase. Coefficients and standard errors ($\times 100$) are reported for each independent variable. Variables are winsorized at the 1 and 99 percentiles each month. Firm, household, and time fixed effects are included. The standard errors are clustered at the firm level and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

$\Delta\text{Consumption}_{i,t}$	1Mth (1)	3Mths (2)	6Mths (3)	9Mths (4)	12Mths (5)
$\text{Volatility}_{j,i,t-\tau}$	-0.259*	-0.790***	-1.43**	-1.75**	-1.99**
	(0.143)	(0.291)	(0.557)	(0.802)	(0.941)
$\text{Return}_{j,i,t-\tau}$	-0.059	0.207**	0.468***	0.520**	0.534
	(0.070)	(0.099)	(0.180)	(0.262)	(0.333)
$\text{D}_{i,t-\tau}^{Mortgage-Income}$	-0.489***	-1.52***	-2.82***	-2.48***	-1.97***
	(0.142)	(0.212)	(0.314)	(0.481)	(0.554)
Cost of Living Index	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	1,338,314	1,250,837	1,215,369	917,820	691,640

Table 7. Uncertainty shocks and future household durable consumption

This table shows the forecasting regression effect of firm (employer) uncertainty shocks on future household (employee) *durable* consumption growth. Frequency of all variables is monthly. $\Delta\text{Durables}_{i,t}$ is the 6-month growth in average monthly expenditures on automobile-related expenses, home improvement, and home maintenance at the household i level (employees). For each household we measure durable consumption every month over a 6-month period, obtain the average monthly durable consumption over this span, and construct the growth into to the next 6-months. $\Delta\text{Volatility}_{j,i,t-6}$ is the 6-month growth in the option-implied volatility (365-day horizon from OptionMetrics) of the corresponding employer j of each household. The timing of these employer uncertainty shocks is lagged by a full 6-months with respect to the LHS outcome. To disentangle between the predictive effect of 2nd moment uncertainty shocks and first moment effects, we control for the lagged stock return of the employer, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{D}_{i,t-6}^{Mortgage-Income}$ is a lagged household indicator variable equal to one if the 6-month average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise, and household income shocks, where we include both the contemporaneous and lagged by 6-months household income growth, $\Delta\text{Income}_{i,t}$ and $\Delta\text{Income}_{i,t-6}$, respectively. To account for the effect of cost-of-living differences all specifications include a time-varying Cost of Living Index, calculated from the mean expenditures of gas, restaurant, groceries and retail for each city, for every month. The continuous independent variables are standardized to make coefficients comparable and show the effect of a standard deviation increase. Coefficients and standard errors ($\times 100$) are reported for each independent variable. Variables are winsorized at the 1 and 99 percentiles each month. Firm, household, and time fixed effects are included. The standard errors are clustered at the firm level and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

$\Delta\text{Durables}_{i,t}$	(1)	(2)	(3)	(4)	(5)
$\Delta\text{Volatility}_{j,i,t-6}$	-0.717***	-0.612***	-0.605***	-0.608***	-0.608***
	(0.206)	(0.199)	(0.199)	(0.199)	(0.201)
$\text{6M Return}_{j,i,t-6}$		0.381**	0.376**	0.368**	0.350**
		(0.176)	(0.175)	(0.178)	(0.176)
$\text{D}_{i,t-6}^{Mortgage-Income}$			-2.50***	-2.11***	-2.23***
			(0.223)	(0.229)	(0.234)
$\Delta\text{Income}_{i,t}$				3.02***	3.34***
				(0.294)	(0.258)
$\Delta\text{Lag Income}_{i,t-6}$					1.51***
					(0.245)
Cost of Living Index	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	1,127,325	1,127,325	1,127,325	1,127,325	1,127,325

Table 8. High and low-income households, consumption response to uncertainty shocks

This table shows the difference in intensity of the response of future household (employee) consumption to firm (employer) uncertainty shocks by household income levels. Frequency of all variables is monthly. The left panel is the baseline measure of consumption in Table 3 ($\Delta\text{Consumption}_{i,t}$), which includes retail, restaurant, and groceries expenditures at the household i level (employees). The right panel is for durable consumption presented in Table 7 ($\Delta\text{Durables}_{i,t}$), which includes expenditures on automobile-related expenses, home improvement, and home maintenance. We classify households into quartiles by their average income levels, from low-income columns (1) and (1A) to high-income (4) and (4A). Growth in the dependent variables are measured as the 6-month growth in average monthly expenditures for the corresponding consumption categories, where for each household we measure consumption every month over a 6-month period, obtain the average monthly consumption over this span, and construct the growth into to the next 6-months. $\Delta\text{Volatility}_{j,i,t-6}$ is the 6-month growth in the option-implied volatility (365-day horizon from OptionMetrics) of the corresponding employer j of each household. The timing of these employer uncertainty shocks is lagged by a full 6-months with respect to the LHS outcome. To disentangle between the predictive effect of 2nd moment uncertainty shocks and first moment effects, we control for the lagged stock return of the employer, 6M $\text{Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{D}_{i,t-6}^{Mortgage-Income}$ is a lagged household indicator variable equal to one if the 6-month average mortgage-to-income ratio of the household is equal to or greater than 10%, zero otherwise, and household income shocks, where we include both the contemporaneous and lagged by 6-months household income growth, $\Delta\text{Income}_{i,t}$ and $\Delta\text{Income}_{i,t-6}$, respectively. To account for the effect of cost-of-living differences all specifications include a time-varying Cost of Living Index, calculated from the mean expenditures of gas, restaurant, groceries and retail for each city, for every month. The continuous independent variables are standardized to make coefficients comparable and show the effect of a standard deviation increase. Coefficients and standard errors (×100) are reported for each independent variable. Variables are winsorized at the 1 and 99 percentiles each month. Firm, household, and time fixed effects are included. The standard errors are clustered at the firm level and are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	$\Delta\text{Consumption}_{i,t}$				$\Delta\text{Durables}_{i,t}$			
	Low-income			High-income	Low-income			High-income
	(1)	(2)	(3)	(4)	(1A)	(2A)	(3A)	(4A)
$\Delta\text{Volatility}_{j,i,t-6}$	-0.268	-0.891**	-0.685**	-0.607**	-0.748*	-0.809*	0.041	-0.425
	(0.389)	(0.357)	(0.275)	(0.304)	(0.384)	(0.439)	(0.352)	(0.372)
6M $\text{Return}_{j,i,t-6}$	0.290	0.560**	-0.025	0.369*	0.570*	0.479	0.010	0.275
	(0.291)	(0.234)	(0.199)	(0.202)	(0.324)	(0.329)	(0.322)	(0.331)
$\text{D}_{i,t-6}^{Mortgage-Income}$	-0.795**	-0.561*	-0.010***	-0.869***	-2.02***	-2.99***	-2.71***	-0.901**
	(0.375)	(0.304)	(0.271)	(0.295)	(0.503)	(0.449)	(0.496)	(0.373)
$\Delta\text{Income}_{i,t}$	4.48***	4.72***	4.20***	4.09***	3.21***	3.98***	3.64***	4.01***
	(0.209)	(0.253)	(0.260)	(0.300)	(0.379)	(0.398)	(0.329)	(0.474)
$\Delta\text{Lag Income}_{i,t-6}$	0.825***	0.562**	0.331	1.16***	1.25***	0.457	0.468	3.29***
	(0.199)	(0.275)	(0.295)	(0.324)	(0.367)	(0.508)	(0.570)	(0.394)
Cost of Living Index	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	301,225	301,323	301,286	301,287	281,568	281,790	281,879	281,922