Firm Uncertainty and Household Spending

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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, we find that households adjust their consumption spending in response to labour income uncertainty, as proxied by employer-specific option-implied volatility. Households reduce average monthly consumption growth by 1.28 points in response to a one standard deviation increase in firm uncertainty. This negative 2nd moment firm uncertainty effect is larger than a positive 1st moment effect of firm stock returns. The intensity of the response increases in the forecast horizon window, lasts up to a year, and is more pronounced for low-income households. Retail spending is more responsive than groceries and restaurant purchases. Employees that work at firms that recently had low employee growth, high intangible investment, low return on assets, low Tobin's Q, and risky high CAPM β firms show pronounced consumption sensitivity to firm volatility shocks. Households randomly mapped to placebo employers show no response to firm uncertainty.

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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 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 mapping 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 examine the micro-level response of households to *income-labour uncertainty*, as proxied by forward-looking employer-specific volatility. To the best of our knowledge, our paper is the first to do this.[3]. Moreover, the large cross-section of publicly listed employers in our sample (780+ unique firms) allows us to classify households by firm characteristics (e.g., Tobin's Q, stock return, employee growth, investment rates, profitability, etc.,) and determine whether firm characteristics further matter in the response of households to uncertainty. Our findings show that not only do households pay attention to uncertainty confronted by their publicly listed employers but also to the fundamental characteristics these exhibit relative to other firms.

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

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

[2] which allows us to see and classify consumption transactions from daily purchases, such as at Starbucks, groceries at Walmart, online at Amazon.com, etc., This type of data has only until recently been made more widely available due to the development of fintech and big data

[3] by using firm option-implied volatility - an object largely exogenous for households- helps overcome concerns of endogeneity present in using households' own consumption volatility and/or income to measure uncertainty

increase in uncertainty about their future income and consumption streams. As long as jumps in employer volatility capture 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.[4] Our regression analysis below provides strong support for this response.

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 2.56 percentage points. 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 by 2 points is massive. Moreover, we find an offsetting positive effect in firm stock returns, but ranges in magnitude between 1/4 to 1/2 of the effect attributed to uncertainty shocks. These results are robust to different measures of uncertainty (e.g., option-implied vs. realized) and a battery of different regression specifications (e.g., multiple dimensions of fixed effects and clustering of standard errors).

Second, we find that the consumption response to uncertainty shocks is robust in the forecast horizon window and lasts up to 12 months. The affect grows in economic magnitude from short horizons of 1 and 3 months and peaks at 9 months. Our findings suggest that the adjustment behavior of households is not the strongest immediately following an uncertainty shock but rather builds over time. Moreover, our estimates at different horizons

[4] Atkeson, Eisfeldt, and Weill (2017) theoretically argue 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. Moreover, in real business cycle models of uncertainty with capital adjustment costs, it's optimal for firms to cut investment and employment due to real option effects

are economically larger when using forward-looking volatility measures from options than realized volatility.

Third, by classifying consumption expenditures by categories, we find that retail purchases exhibit the strongest response relative to groceries and restaurants. Moreover, when we look at transactions strictly categorized as durable consumption related to automobile and home improvements, we find a robust negative response that is also stronger than that of groceries and restaurants (yet weaker than broad retail which largely is a mix of durables and non-durables). Fourth, when we split our sample of households by groups according to income-levels, we find that low-income households respond more intensively than high-income, where for durables the response from low-income is 7 times as large.

Fifth, we document novel dynamics in the intensity of responses across households classified by the characteristics of their employers. In particular, using common company fundamental and financial data from Compustat we classify households by the characteristics of firms in the preceding year. This allows us to examine whether households that work for firms that recently experienced, say, low employment growth (e.g., firms with layoffs) respond differently to uncertainty than households whose employers experienced recent high employment growth (e.g., hiring expansions). We document that the intensity is highly pronounced amongst households that work for firms with recent low employment growth, high intangible investment (arguably seen by employees as undertaking risky projects), low investment opportunities (as proxied by Tobin's Q), high covariance with the market portfolio return (i.e., risky high CAPM beta firms), and low stock returns (i.e., past "loser" firms as in the momentum literature in asset pricing).

Lastly, we perform falsification tests where we randomly map households to false placebo firms also listed in the stock market. Using the placebo firms' volatility shocks instead of the true employers' volatility (in 50 multiple iterations), we find no response of household consumption to placebo employer uncertainty. This largely validates that our findings in the paper arise from the novel link we construct in our data between firms' option-implied

volatility and household consumption.

To our knowledge, our paper is the first to examine the household consumption response to firm uncertainty shocks using both detailed financial administrative data to measure consumption and market-driven firm volatility to proxy for labour-income uncertainty. Whereas the literature largely utilizes the household's own subjective expectations of future outcomes to proxy for uncertainty (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 firm-specific shocks largely driven by covariances with aggregate variables 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 (largely 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.

The closest related paper using similar financial administrative data to examine consumer spending is Baker (2018). In a similar setting linking employers listed in the stock market to employees, the paper examines the effect of household income shocks on spending. Moreover, household debt levels are shown to further influence the spending response to income shocks. We differ in that we control for income shocks (a 1st moment effect) and focus on the uncertainty surrounding future income shocks as proxied by firm volatility shocks (a 2nd moment effect). We show that forward-looking employer-specific volatility shocks have an economically large effect on future household spending above and beyond both household income shocks (both current and lagged) and employer stock returns. Therefore, our paper complements Baker (2018) by focusing on the role of 2nd moment income uncertainty rather than 1st moment realized income shocks.

Another related paper is Fagereng, Guiso, and Pistaferri (2017), who using Norwegian population data also match consumers with their employers to test a precautionary savings

motive in consumption. However, in contrast to our high-frequency transaction data used in measuring and classifying consumption, Fagereng et al. (2017) do not observe consumption directly but rather infer it from the annual-frequency budget constraint of households (so called "imputed" consumption). As Baker, Kueng, Meyer, and Pagel (2018) argue discrepancies can occur between imputed and actual spending between two annual snapshots. Another related paper 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 *intention* to reduce their future consumption, which is consistent with our results. However, we connect households to firms and instead of relying on expectations about future consumption behavior, we measure it directly from realized transactions. Moreover, Knotek and Kahn (2011) and Fulford (2015) find that uncertainty does not have an important role in influencing 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 firm uncertainty shocks using administrative data instead of survey data as is in 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. We differ in that our uncertainty measure is not aggregate and that we explore consumption behavior and how it differs across employer characteristics.

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 52,228 unique households and 784 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, data-rich, and 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, which in turn further helps our data resemble the U.S Census. 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, as seen in terms by market capitalization and number of employees. We also have a good distribution of both growth and value firms, according to book-to-market equity ratios.

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.[5] For restaurants, we also use an equivalent list for the top 100 restaurants.[6] 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. The average monthly consumption is $966. For our measure of durable consumption, we use the categorization provided by the online account aggregator, which includes categories for automobile-related expenditures,

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

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

home improvement, and home maintenance. We find similar results when we use an alternative measure of durables based on key word searches in transactions at top 10 hardware stores (which include Lowe's, Home Depot, etc.,). Our measures of durables can further be expanded to include items such as clothing, toys, etc.[7], which only strengthens the results in our baseline durable measure. Therefore, our baseline results for durables are likely a lower bound.

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 (2017) 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.[8] 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 (a 1st moment control to disentangle from 2nd moment uncertainty effects), household income shocks (both current and lagged), the households' mortgage payment-to-income ratio (that accounts for debt effects in households' budget constraint), and a local cost-of-living measure that control for local economic shocks unrelated to the shocks affecting the firm. This cost-of-living measure is calculated following Baugh et al. (2018) by computing the mean expenditures of gas, restaurant, groceries and retail for each city, for every month from the unmatched 2.7 million households in our underlying household data.

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

[7]which are clearly more durable items than groceries and restuarant transactions, but perhaps less so than strict hardware items

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

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 return, the continuous 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 spending after rises in uncertainty, our baseline regressions are forecast of changes in average monthly consumption from a 6-months period 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:

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

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, 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 Mortgage-Income$_{i,t-6}$ is the mortgage-to-income ratio of the household, and household income shocks, where we include both the contemporaneous and lagged by 6-months household income growth, ΔIncome$_{i,t}$ and ΔIncome$_{i,t-6}$, 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 the time-varying Cost of Living Index at the city level for households. Standard errors are clustered at the employer level, however, we show robustness to double clustering at the employer and/or industry level and time.

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 one standard deviation shock in the independent variable.

3 Results

3.1 Uncertainty and Consumption

Table 3 presents our main results for spending in retail, restaurants, and groceries. In column 1, we find that households reduce consumption growth by 1.49 points in response to a standard deviation shock in firm employer uncertainty (significant at the 1%), as measured by option-implied volatility shocks. Equivalently, the response amounts to a 2.98% drop in consumption given a two standard deviation firm uncertainty shock. Column 2 adds the

firms' stock return 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 (-1.33% 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 one standard deviation increase in the stock return of the employer results in a 0.51 point increase in household consumption growth. 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 households' mortgage-to-income ratio and income shocks of households which a priori could correlate with firm uncertainty shocks and subsume its effect. Differences in debt effects across households is controlled by the mortgage-to-income ratio. Our baseline specification with full set of controls is in column 5, where we find that households reduce consumption by 0.95 points when the mortgage-to-income ratio increases by one standard deviation, and reduce consumption by 5.8 points in response to a standard deviation decrease in the households' current income growth. Moreover, in response to a standard deviation decrease in lagged income growth, the household reduces consumption growth by 2 points, yet the effect of lagged uncertainty shocks remains significant at the 1%.

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 points is massive. Our micro level evidence suggests that a one standard deviation shock to uncertainty in column 5 translates to a

1.28 point 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 3.6 point drop in consumption growth at the household level (from coefficients in columns 5) given a two standard deviation increase 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 standard 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 5% level.

In Panel B on the right of Table 4, we use the change in 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 on household consumption are robust regardless of how uncertainty is measured, yet the coefficients are smaller in magnitude when using realized volatility (e.g., column (1) vs (1A) coefficients of -1.28 and -0.968 both significant at the 1% level, respectively). The smaller coefficient results for realized uncertainty relative to implied uncertainty is consistent with the findings in Alfaro et al. (2017) 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 concern 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 one standard deviation increase in the lagged by 6-month level of uncertainty faced by firms leads to households employees reducing their consumption growth by 1.58 points. When looking at concurrent levels of uncertainty in column 4, we find that a one standard deviation increase in the contemporaneous uncertainty level leads to a reduction in consumption growth by 2.91 points. Using realized volatility in columns (1A), (2A), (3A), and (4A), gives similar inferences as using implied volatility, yet smaller in magnitude.

3.2 Uncertainty and the horizon of Consumption Growth Forecasts

In Table 6, we adjust the horizons in the forecast of household consumption growth predicted by lagged firm uncertainty shocks. 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 much smaller at -0.16 points and only significant at the 10% level (in column 1). However, from a 3-month interval onward the results become more pronounced and the effects grow monotonically at longer horizons up to 9 months. At a full 1-year ahead in column (5), we find that a one standard deviation increase in firm volatility leads to a -1.11 point drop in household consumption

growth. From the results in Table 6 we document that firm employer uncertainty appears to have an increasingly long-lived impact on household consumption, lasting up to a year. Moreover, results in Table 6 also show that the offsetting 1st moment effects of stock returns have a reversed U-shaped pattern over time on consumption growth, peaking at 6 months. Using realized volatility in columns (1A), (2A), (3A), (4A), and (5A), gives similar inferences as using implied volatility, yet smaller in magnitude.

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

3.3 Uncertainty and Retail, Restaurant, and Grocery 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 response might differ in intensity depending on the characteristics of purchases, such as the durability of purchased goods. In Table 7, we look at the three consumption categories that comprise our baseline measure of household consumption: consumption at retail, restaurant, and groceries. While spending at restaurant and grocery stores tend to be non-durable, spending at retailers are more likely to be items that are durable in nature, such as electronics, clothing, and other household items. We examine durable consumption using a different definition in the next section, but here we find that the consumption response to uncertainty tends to be in items that are more durable in nature. For implied volatility, we find that a one standard deviation increase in firm volatility leads to a -1.32 point in retail spending. The decrease in spending at restaurants and groceries are much smaller, by -0.381 and -0.430, respectively. For sensitivity to the firm's stock returns, only retail spending is statistically significant. The results are similar when looking at realized volatility.

3.4 Durable Consumption

In Table 8 we examine the response of durable goods to uncertainty shocks. Here we include transactions related to automobile expenses, home improvement, and home maintenance. Table 8 documents that durable consumption is responsive to uncertainty shocks. A one standard deviation uncertainty shock forecasts a 0.667 point drop in durable consumption growth, while a one standard deviation increase in the employers' stock return increases durable growth by 0.308 points (column 3), though the results for returns are not significant. 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 -0.667 in column (3) of durables in Table 8 vs. -1.28 in column (5) in Table 3). We note, however, that the results for durables are stronger if we expand its definition to include retail purchases of clothing, toys, etc,. (which are more durable than groceries, but perhaps less so than automobile-related). Thus, Table 8 results are likely a lower bound on the response of durable consumption to uncertainty shocks. In addition, results in Table 8 show a U-shaped pattern for volatility and reversed U-shaped pattern for returns over time.

3.5 Placebo Tests

The results so far show a robust response of household spending to employer uncertainty shocks. Our findings suggest a strong precautionary savings response to labour-income uncertainty. To validate that our results are driven by a truly idiosyncratic income-labour uncertainty channel between employers and employees we perform falsifications test in this section. In particular, the experiment is that if we replace the true employer of the household in our sample with a placebo employer, we should not find any response from households to the placebo firm uncertainty shocks. We do so in Table 9, where we show the results from 50 iterations of random mapping of households to placebo firms. In columns (2), (4),

(6), (8), and (10), we show the average coefficients and standard errors from 50 regressions based on random matches (with different seeds and with replacement from a pool of over 1,700 placebo firms with required data in our sample). For the all the dependent variables of interest, we find that the placebo regression coefficients are not significant on average and their economic magnitude are much smaller and are mostly in the opposite direction, which the exception of restaurant spending. Moreover, we also report the number of times from the 50 placebo regressions where we saw significant (at the 5%) negative coefficients on the placebo vol shock and at the same time positive coefficients on the placebo stock return. This occurs zero times in our placebo regressions, which validates that not even by random chance did any of the placebo regressions give us the directions and significance obtained in our main regressions.

3.6 Intensity Response Across Household Income Levels

Household consumption response to uncertainty might differ across household income levels. In Table 10 we classify households into terciles 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 8, which includes expenditures on automobile-related expenses, home improvement, and home maintenance. We find that low-income households are more sensitive to uncertainty shocks compared to higher-income households. The results hold for both our main consumption measure and for durable consumption. However, for durables the low-income households are 7.3 times as response to uncertainty shocks than high-income. This is intuitive in that low-income household behave much like less wealthy individuals highly reliant on their jobs to sustain their livelihoods, and thus much more responsive to income risk. In contrast, high-income households are much like wealthy individuals that may have other means and/or buffers (i.e., asset holdings) to mitigate potential negative shocks to their income streams.

3.7 Intensity Response Across Firm Characteristics

In Table 11, we classify households into terciles based on the characteristics of the firm that employ them. In particular, using common company fundamental and financial data from Compustat we classify households by the characteristics of firms in the preceding year. This allows us to examine whether households that work for firms that recently experienced, say, low employment growth (e.g., firms with layoffs) respond differently to uncertainty than households whose employers experienced recent high employment growth (e.g., hiring expansions). We look at 12 firm characteristics: (1) the change in the number of employees at the firm, (2) investment - defined as capital expenditures over lagged plant, property, and equipment, (3) return on assets, (4) Tobin's Q, (5) CAPM β, (6) sales, (7) past 12 month returns, (8) change in intangibles expenses, (9) the Whited-Wu financial constraints index, (10) the Sales-Age financial constraints index, (11) 12 month implied volatility, and finally (12) 12 month realized volatility.

We find that households that work in firms that previously had low employment growth are the ones most sensitive to firm uncertainty shocks. Indeed, it seems that households that work for firms that have seen layoffs become more attentive to uncertainty shocks than households working for firms with recent increased hiring rates. Moreover, the same group of households with employers that have seen layoffs show sensitivity to the firm's stock returns, yet the middle group of household in column 2 indicate that they are the most responsive to 1st moment stock returns - yet not to uncertainty shocks. These results highlight potential avenues for rich heterogenous agent models, in which agents respond differentially to employer characteristics, where for some households the primary concern is a firm 1st moment shock rather a 2nd moment shock, and viceversa. For investments the results for uncertainty and returns are a different. Households that work for high and mid investment firms show response to uncertainty, while households that work for low and mid investment firms response to returns. If we look at intangible investment (potentially seen as risky investment by employees), we see a more clear pattern on the response to uncertainty,

where there is a monotonic increase in the response from low to high R&D firms.

In terms of investment opportunities, households working for firms with low Tobin's Q are the most responsive to uncertainty shocks, while high Q firm employees mostly respond to firm returns. For CAPM β, we find that the households that work for firms with high risk are the ones most sensitive to both uncertainty shocks and firm returns.

When looking at size, we find that households that work for medium and large firms are sensitive to uncertainty shocks, while households that worked for smaller firms are more sensitive to the firm past returns. When looking at the firm's past 12 month returns, we find that households that work at firms with poor stock market performance are most sensitive to uncertainty shocks, but not to firm returns. When looking at the financial constraints measures of Whited and Wu (2006) and Hadlock and Pierce (2010) - WW and Size&Age indexes-, we find that the households that work for firms that are moderately financially constrained are the most sensitive to uncertainty shocks. Finally, when splitting households by the level of uncertainty of their employers in the past year, we find the strongest response to uncertainty shocks for employees at the highest uncertainty levels, as expected.

4 Conclusion

We map rich microdata from linked financial accounts of US households to employers listed in the US stock market. We use this employer-employee panel, comprising 784 listed firms and 52,288 households over a 4.5-year period, to examine detailed household consumption responses to labour income uncertainty, as proxied by employer-specific option-implied volatility.

We document that households robustly reduce their spending in response to 2nd moment firm uncertainty shocks above and beyond firm 1st moment effects. Our forward-looking option-implied results are robust to using realized volatility from CRSP stock returns. With regard to timing, it takes about 3 months for the firm uncertainty shocks to influence house-

hold consumption dynamics, the impact is more pronounced at longer horizons, and lasts up to 12 months in the future. The negative uncertainty effects on consumption are not subsumed by the positive 1st moment effect of employer stock returns nor by household-specific income shocks (both current and lagged). Durable consumption is also highly responsive to uncertainty shocks.

Moreover, we find differences in intensity across household classified by income-levels and by firm characteristics. Low-income employees are more responsive to employer uncertainty shocks than high-income. In addition, the intensity to uncertainty shocks is highly pronounced amongst households that work for firms with recent low employment growth, high intangible investment (firms arguably undertaking risky projects), low investment opportunities (as proxied by Tobin's Q), high covariance with the market portfolio return (i.e., risky high CAPM beta firms), and low performing firms in the stock market.

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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.

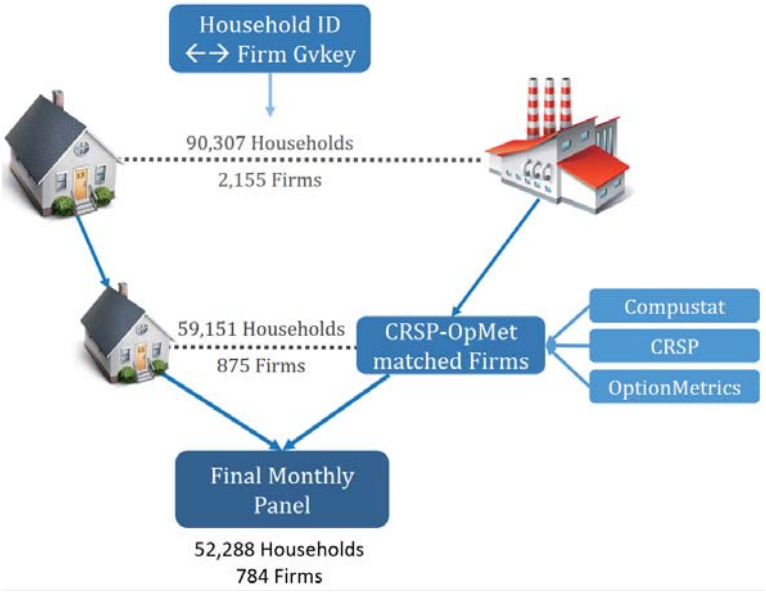


Figure 2. Distribution of annual income

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.

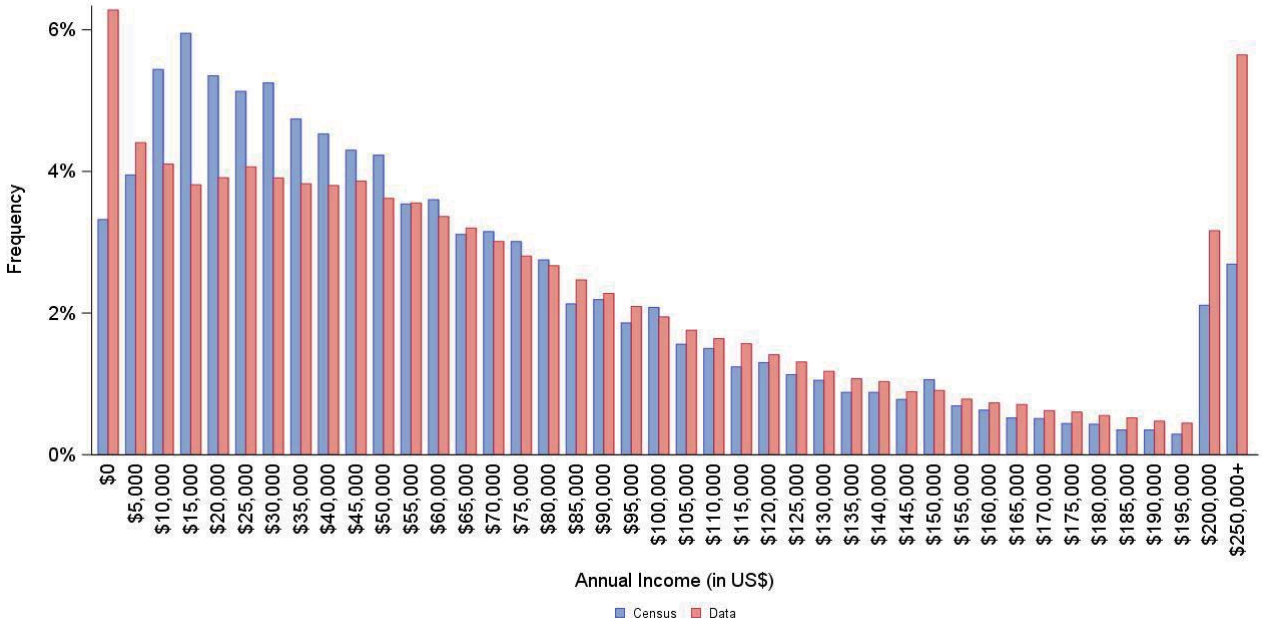


Figure 3. Distribution of firm market capitalization

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

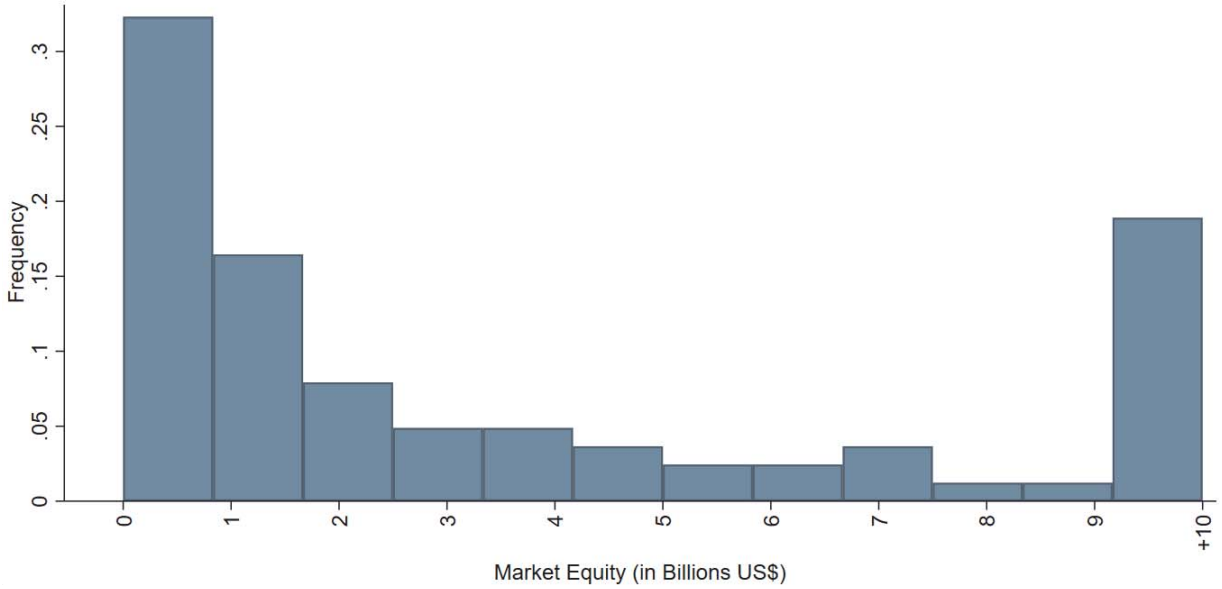


Figure 4. Distribution of firm employees

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

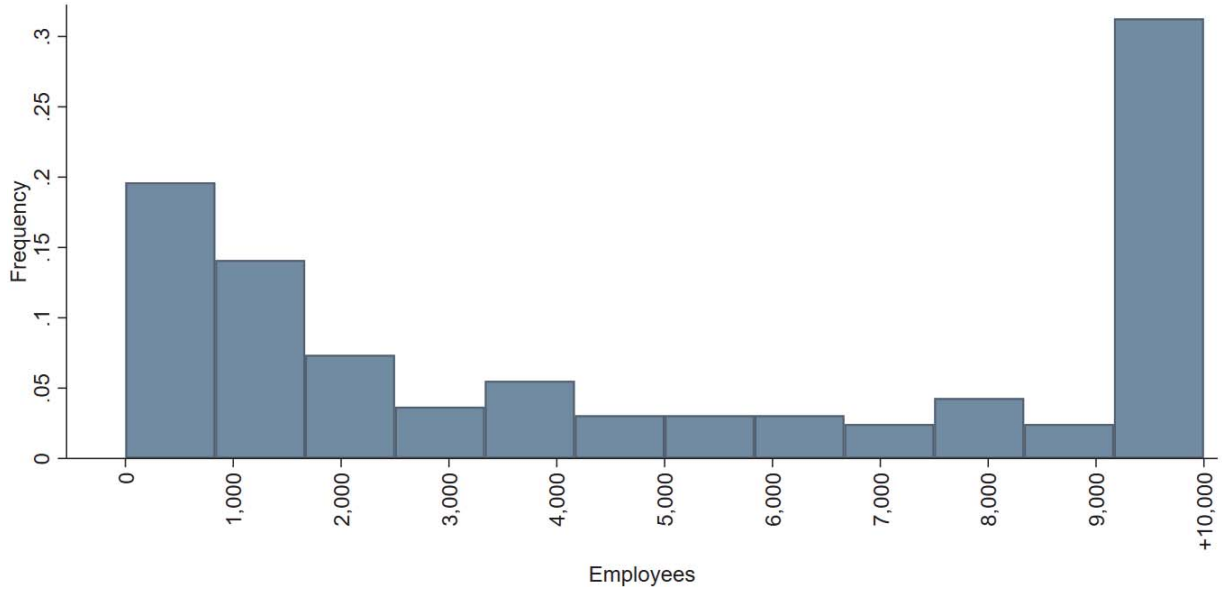


Figure 5. Distribution of firm book-to-market equity

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

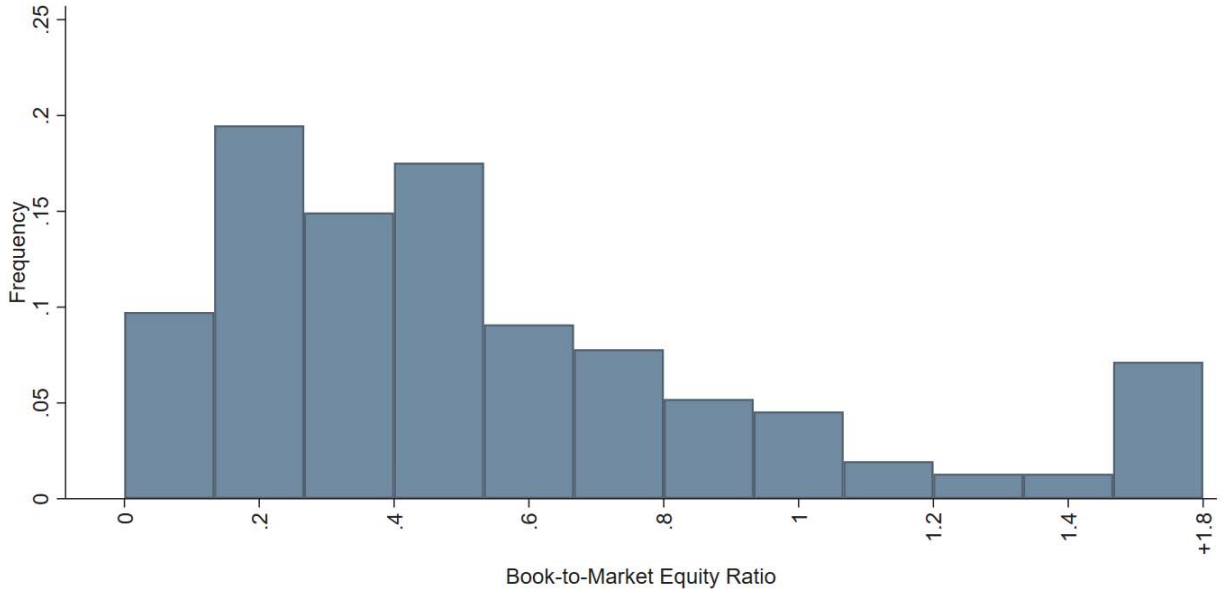
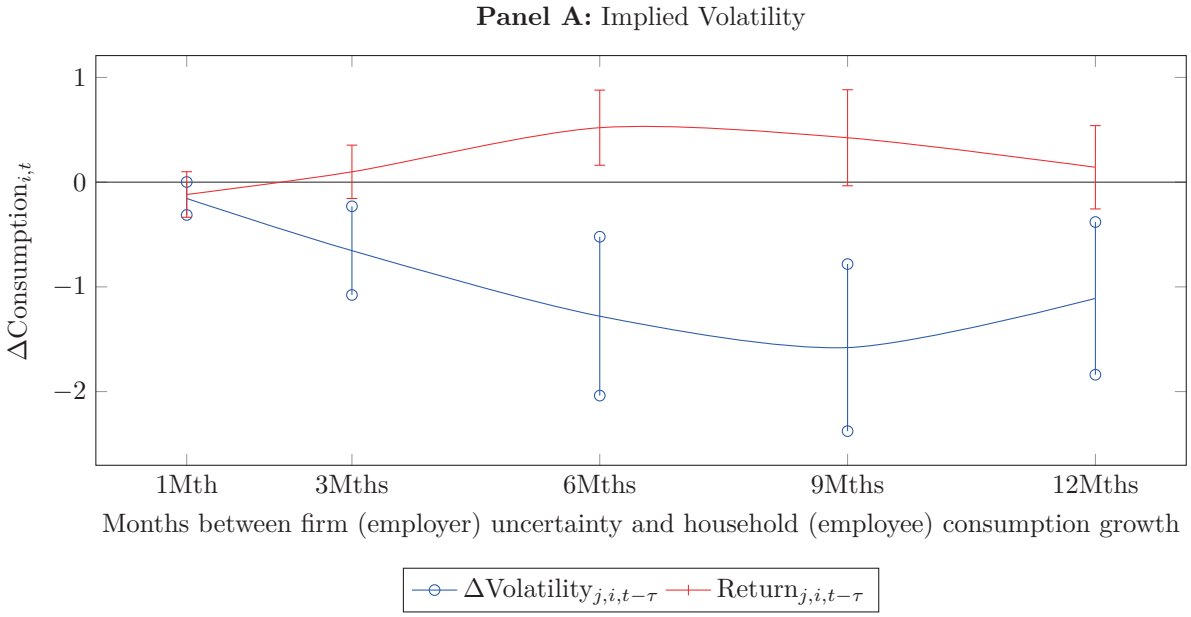


Figure 6. Forecasting employee consumption with firm uncertainty

This figure shows the coefficients at different forecast horizons of regressing (employee) household consumption on firms' (employer) uncertainty shocks and stock return. The point estimates are from Table 6. Panel A shows the coefficients for implied volatility and Panel B the coefficients for realized volatility. The y-axis is in percentage points and the x-axis is forecast horizon in months. 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 up to 9 months, and last up to 12 months.



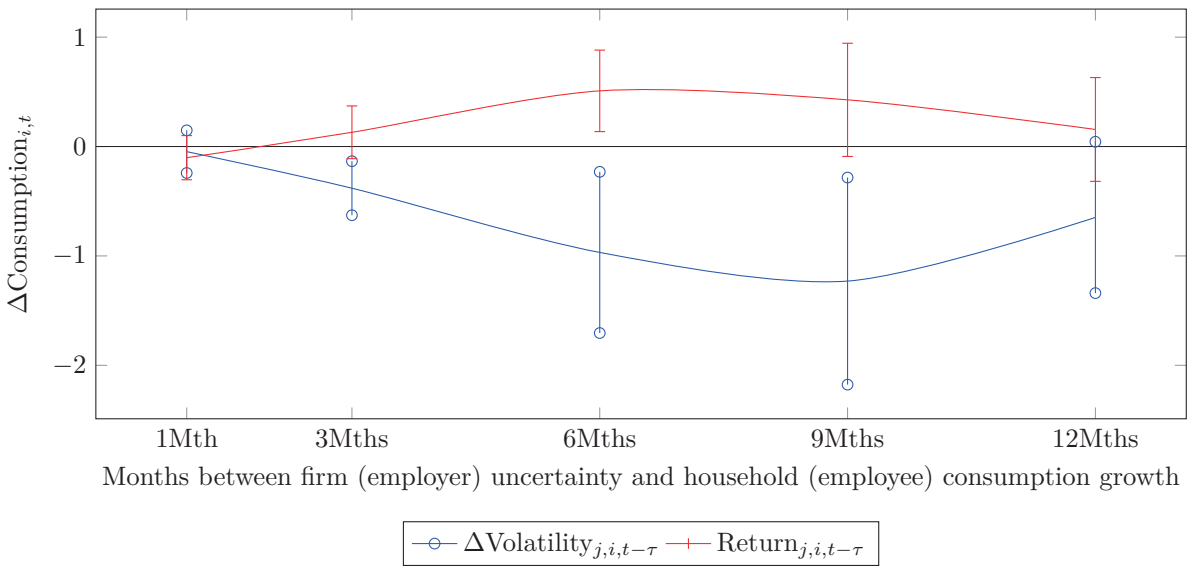


Table 1. Mapping of households to public firms

This table shows the number of unique households and firms that are matched each year to create our 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 784 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		588	630	647	674	630	784
Households in Baseline		39,031	45,114	45,319	43,242	39,099	52,288

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 $\text{Volatility}_{j,i,t}$ is the 6-month growth in the firm annual (365 day) realized volatility from CRSP. 6M $\text{Return}_{j,i,t}$ is the 6-month CRSP compounded cum-dividend stock return of sample firms. $\text{Mortgage-Income}_{i,t}$ is the mortgage-to-income ratio of the household. $\Delta\text{Income}_{i,t}$ is the 6-month change in average household income. $\text{Volatility}_{j,i,t}$ and Realized $\text{Volatility}_{j,i,t}$ are the levels of option-implied and realized volatility (annualized) of firms, respectively.

	Obs.	Mean	S.Dev	Min	P1	P25	P50	P75	P99	Max
$\Delta\text{Consumption}_{i,t}$	1,364,114	0.061	0.563	-1.536	-1.435	-0.261	0.053	0.387	1.468	1.681
$\Delta\text{Durables}_{i,t}$	1,117,418	0.004	0.777	-1.768	-1.714	-0.499	0	0.511	1.730	1.803
$\Delta\text{Volatility}_{j,i,t}$	1,364,114	-0.034	0.091	-0.285	-0.223	-0.090	-0.041	0.016	0.239	0.333
ΔRealized $\text{Volatility}_{j,i,t}$	1,364,114	-0.040	0.186	-0.628	-0.490	-0.157	-0.041	0.056	0.534	0.718
6M $\text{Return}_{j,i,t}$	1,364,114	0.086	0.213	-0.730	-0.447	-0.025	0.090	0.202	0.678	1.433
$\Delta\text{Income}_{i,t}$	1,364,114	0.009	0.363	-1.459	-1.088	-0.145	0.005	0.166	1.087	1.288
$\text{Mortgage-Income}_{i,t}$	1,364,114	0.162	0.315	0	0	0	0	0.238	1.814	2.784
$\text{Volatility}_{j,i,t}$	1,364,114	0.319	0.114	0.157	0.168	0.238	0.287	0.378	0.720	0.888
Realized $\text{Volatility}_{j,i,t}$	1,364,114	0.309	0.142	0.127	0.141	0.209	0.265	0.370	0.770	0.932

Table 3. Employer 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, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{Mortgage-Income}_{i,t-6}$ is the mortgage-to-income ratio of the household. $\Delta\text{Income}_{i,t}$ is the 6-month change in average household income, 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)
$\Delta\text{Volatility}_{j,i,t-6}$	-1.49***	-1.33***	-1.33***	-1.26***	-1.28***
	(0.407)	(0.396)	(0.396)	(0.388)	(0.387)
$\text{6M Return}_{j,i,t-6}$		0.511***	0.511***	0.559***	0.520***
		(0.189)	(0.189)	(0.184)	(0.183)
$\text{Mortgage-Income}_{i,t-6}$			-0.334*	-1.15***	-0.947***
			(0.178)	(0.166)	(0.165)
$\Delta\text{Income}_{i,t}$				4.71***	5.80***
				(0.387)	(0.350)
$\Delta\text{Lag Income}_{i,t-6}$					2.01***
					(0.134)
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	1,363,246	1,363,246	1,363,246	1,363,246	1,363,246
R^2	0.135	0.136	0.136	0.142	0.142

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, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{Mortgage-Income}_{i,t-6}$ is the mortgage-to-income ratio of the household, 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)
$\Delta\text{Volatility}_{j,i,t-6}$	-1.28***	-1.28***	-1.27***	-1.28***	-1.28**	-0.968**	-0.968**	-0.918**	-0.968***	-0.968**
	(0.387)	(0.425)	(0.413)	(0.265)	(0.495)	(0.376)	(0.389)	(0.381)	(0.208)	(0.467)
$\text{6M Return}_{j,i,t-6}$	0.520***	0.520***	0.511***	0.520***	0.520**	0.509***	0.509***	0.508***	0.509***	0.509**
	(0.183)	(0.189)	(0.184)	(0.149)	(0.199)	(0.190)	(0.189)	(0.185)	(0.134)	(0.201)
$\text{Mortgage-Income}_{i,t-6}$	-0.947***	-0.947***	-0.943***	-0.947***	-0.947***	-0.939***	-0.939***	-0.935***	-0.939***	-0.939***
	(0.165)	(0.160)	(0.161)	(0.175)	(0.144)	(0.163)	(0.158)	(0.158)	(0.170)	(0.142)
$\Delta\text{Income}_{i,t}$	5.80***	5.80***	5.79***	5.80***	5.80***	5.81***	5.81***	5.81***	5.81***	5.81***
	(0.350)	(0.354)	(0.354)	(0.156)	(0.407)	(0.336)	(0.343)	(0.342)	(0.157)	(0.394)
$\Delta\text{Lag Income}_{i,t-6}$	2.01***	2.01***	2.01***	2.01***	2.01***	1.98***	1.98***	1.97***	1.98***	1.98***
	(0.134)	(0.138)	(0.137)	(0.130)	(0.145)	(0.131)	(0.135)	(0.135)	(0.128)	(0.144)
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	1,363,246	1,363,246	1,363,246	1,363,246	1,363,246	1,429,048	1,429,048	1,429,049	1,429,048	1,429,048
R^2	0.142	0.142	0.141	0.142	0.142	0.144	0.144	0.142	0.144	0.144

Table 5. Uncertainty measured in shocks and in levels, current and lagged

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), (4), volatility is from the employer firms' *option-implied* volatility (365-day horizon from OptionMetrics) and in columns (1A), (2A), (3A), (4A), 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 $\text{Mortgage-Income}_{i,t-6}$ is the mortgage-to-income ratio of the household, 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)	(4)	(1A)	(2A)	(3A)	(4A)
$\Delta\text{Volatility}_{j,i,t-6}$	-1.28***				-0.968**			
	(0.387)				(0.376)			
$\text{Volatility}_{j,i,t-6}$		-1.58**				-1.98**		
		(0.665)				(0.788)		
$\Delta\text{Volatility}_{j,i,t}$			-0.856***				-0.472*	
			(0.308)				(0.262)	
$\text{Volatility}_{j,i,t}$				-2.91**				-1.76***
				(1.15)				(0.640)
$\text{6M Return}_{j,i,t-6}$	0.520***	0.760***	0.587***	0.585***	0.509***	0.519***	0.605***	0.454**
	(0.183)	(0.238)	(0.211)	(0.190)	(0.190)	(0.196)	(0.229)	(0.196)
$\text{Mortgage-Income}_{i,t-6}$	-0.947***	-0.945***	-1.01***	-1.00***	-0.939***	-0.933***	-0.998***	-1.00***
	(0.165)	(0.166)	(0.171)	(0.170)	(0.163)	(0.162)	(0.168)	(0.167)
$\Delta\text{Income}_{i,t}$	5.80***	5.78***	5.86***	5.85***	5.81***	5.81***	5.88***	5.88***
	(0.350)	(0.347)	(0.361)	(0.361)	(0.336)	(0.338)	(0.350)	(0.350)
$\Delta\text{Lag Income}_{i,t-6}$	2.01***	2.00***	2.04***	2.04***	1.98***	1.98***	2.02***	2.02***
	(0.134)	(0.136)	(0.137)	(0.139)	(0.131)	(0.133)	(0.136)	(0.135)
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	1,363,246	1,374,289	1,284,141	1,289,816	1,429,048	1,431,767	1,339,388	1,339,388
R^2	0.142	0.142	0.141	0.141	0.144	0.144	0.142	0.142

Table 6. Uncertainty and the horizon of consumption growth forecasts

This table shows the effect of firm (employer) uncertainty shocks 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 $\Delta\text{Volatility}_{j,i,t-\tau}$ is the employer j's 6-month growth in the option-implied volatility (at 365-day horizon from OptionMetrics) and is measured with a τ-month lag from 1- to 12-months. Similarly, realized volatility shocks are the lagged growths in the firm annual (365 day) *realized* volatility of the firm's CRSP stock return. We further control for household debt effects, where $\text{Mortgage-Income}_{i,t-\tau}$ is the mortgage-to-income ratio of the household. 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.

	Implied Volatility					Realized Volatility				
$\Delta\text{Consumption}_{i,t}$	1Mth (1)	3Mths (2)	6Mths (3)	9Mths (4)	12Mths (5)	1Mth (1A)	3Mths (2A)	6Mths (3A)	9Mths (4A)	12Mths (5A)
$\Delta\text{Volatility}_{j,i,t-\tau}$	-0.156*	-0.654***	-1.28***	-1.58***	-1.11***	-0.0468	-0.381***	-0.968**	-1.23**	-0.648*
	(0.0802)	(0.216)	(0.387)	(0.407)	(0.372)	(0.0995)	(0.126)	(0.376)	(0.483)	(0.353)
$\text{Return}_{j,i,t-\tau}$	-0.118	0.0985	0.520***	0.424*	0.142	-0.102	0.130	0.509***	0.427	0.156
	(0.111)	(0.130)	(0.183)	(0.234)	(0.203)	(0.103)	(0.123)	(0.190)	(0.264)	(0.242)
$\text{Mortgage-Income}_{i,t-\tau}$	-0.392***	-0.667***	-0.947***	-1.09***	-0.945***	-0.378***	-0.674***	-0.939***	-1.13***	-1.05***
	(0.0896)	(0.128)	(0.165)	(0.230)	(0.320)	(0.0863)	(0.128)	(0.163)	(0.223)	(0.312)
$\Delta\text{Income}_{i,t}$	3.55***	4.68***	5.80***	5.05***	5.54***	3.57***	4.67***	5.81***	5.09***	5.62***
	(0.231)	(0.337)	(0.350)	(0.368)	(0.392)	(0.225)	(0.337)	(0.336)	(0.355)	(0.378)
$\Delta\text{Lag Income}_{i,t-\tau}$	1.89***	1.37***	2.01***	0.618***	0.228	1.89***	1.37***	1.98***	0.619***	0.287
	(0.132)	(0.143)	(0.134)	(0.132)	(0.207)	(0.126)	(0.144)	(0.131)	(0.129)	(0.200)
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	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,638,463	1,459,070	1,363,246	938,170	611,085	1,715,714	1,465,744	1,429,048	982,127	638,462
R^2	0.029	0.069	0.142	0.263	0.420	0.029	0.069	0.144	0.264	0.420

Table 7. Uncertainty and retail, restaurant, grocery consumption

This table shows the forecasting regression effect of firm (employer) uncertainty shocks on future household (employee) retail, restaurant, and grocery 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. In columns (1), (2), (3), volatility is from the employer firms' *option-implied* volatility (365-day horizon from OptionMetrics) and in columns (1A), (2A), (3A), 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 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. Similarly, realized volatility shocks are the lagged 6-month growths 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, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{Mortgage-Income}_{i,t-6}$ is the mortgage-to-income ratio of the household, 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		
$\Delta\text{Consumption}_{i,t}$	Retail (1)	Restaurant (2)	Grocery (3)	Retail (1A)	Restaurant (2A)	Grocery (3A)
$\Delta\text{Volatility}_{j,i,t-6}$	-1.32***	-0.381*	-0.430*	-1.03**	-0.081	-0.500**
	(0.422)	(0.208)	(0.226)	(0.448)	(0.158)	(0.239)
$\text{6M Return}_{j,i,t-6}$	0.336*	0.163	0.0470	0.343*	0.151	0.005
	(0.204)	(0.140)	(0.162)	(0.203)	(0.138)	(0.160)
$\text{Mortgage-Income}_{i,t-6}$	-0.748***	-0.192	-0.337	-0.774***	-0.183	-0.297
	(0.195)	(0.171)	(0.216)	(0.193)	(0.168)	(0.213)
$\Delta\text{Income}_{i,t}$	5.43***	5.31***	2.67***	5.45***	5.35***	2.67***
	(0.357)	(0.310)	(0.210)	(0.342)	(0.298)	(0.205)
$\Delta\text{Lag Income}_{i,t-6}$	1.69***	2.05***	1.03***	1.70***	2.05***	0.982***
	(0.169)	(0.165)	(0.182)	(0.163)	(0.158)	(0.178)
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	1,213,647	1,120,955	647,601	1,273,263	1,176,864	678,223
R^2	0.138	0.106	0.152	0.139	0.106	0.152

Table 8. 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. Similarly, realized volatility shocks are the lagged 6-month growths 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, $\text{6M Return}_{j,i,t-6}$, 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 (×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				
$\Delta\text{Durables}_{i,t}$	1Mth (1)	3Mths (2)	6Mths (3)	9Mths (4)	12Mths (5)	1Mth (1A)	3Mths (2A)	6Mths (3A)	9Mths (4A)	12Mths (5A)
$\Delta\text{Volatility}_{j,i,t-6}$	-0.005	-0.352**	-0.667***	-0.597*	-0.258	0.298**	0.136	-0.431*	-0.689**	-0.452
	(0.100)	(0.167)	(0.229)	(0.334)	(0.384)	(0.122)	(0.181)	(0.254)	(0.319)	(0.350)
$\text{6M Return}_{j,i,t-6}$	0.038	0.003	0.308	0.161	-0.258	0.028	0.010	0.381**	0.314	-0.103
	(0.161)	(0.126)	(0.190)	(0.280)	(0.289)	(0.148)	(0.117)	(0.187)	(0.258)	(0.287)
$\text{Mortgage-Income}_{i,t-6}$	-0.804***	-1.03***	-1.46***	-2.36***	-2.87***	-0.785***	-1.04***	-1.40***	-2.32***	-2.83***
	(0.122)	(0.157)	(0.314)	(0.385)	(0.597)	(0.121)	(0.153)	(0.285)	(0.374)	(0.578)
$\Delta\text{Income}_{i,t}$	2.42***	3.41***	4.13***	3.76***	4.65***	2.43***	3.40***	4.16***	3.82***	4.66***
	(0.207)	(0.305)	(0.329)	(0.308)	(0.422)	(0.203)	(0.299)	(0.320)	(0.305)	(0.410)
$\Delta\text{Lag Income}_{i,t-6}$	1.29***	1.12***	1.86***	0.846***	0.616*	1.26***	1.08***	1.87***	0.760***	0.473
	(0.160)	(0.136)	(0.229)	(0.217)	(0.351)	(0.153)	(0.132)	(0.224)	(0.218)	(0.361)
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	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,040,428	1,387,864	1,116,247	744,795	484,108	1,088,685	1,454,345	1,170,085	779,333	505,528
R^2	0.021	0.039	0.087	0.179	0.340	0.021	0.038	0.087	0.179	0.340

Table 9. Placebo tests

This table shows results from placebo falsification tests. We replace the true employer of the household in our sample with a placebo employer, where the null is that there is no response from household consumption to placebo employer uncertainty shocks. Under placebo columns, we show the average results from 50 iterations of random mapping of households to placebo firms. In particular, in columns (2), (4), (6), (8), and (10), we show the average coefficients and standard errors from 50 regressions based on random matches (with different seeds and with replacement from a pool of over 1,700 placebo firms with required data in our sample). In row "Count: Vol & Return", we also report the number of times from the 50 placebo regressions where we saw significant (at the 5%) negative coefficients on the placebo vol shock and at the same time positive coefficients on the placebo stock return. Frequency of all variables is monthly. $\Delta\text{Volatility}_{j,i,t-6}$ 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 (×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.

	Consumption		Durables		Retail		Restaurant		Grocery	
	Sample (1)	Placebo (2)	Sample (3)	Placebo (4)	Sample (5)	Placebo (6)	Sample (7)	Placebo (8)	Sample (9)	Placebo (10)
$\Delta\text{Volatility}_{j,i,t-6}$	-1.28***	0.061	-0.667***	0.027	-1.32***	0.064	-0.381*	-0.011	-0.430*	0.057
	(0.387)	(0.337)	(0.229)	(0.250)	(0.422)	(0.371)	(0.208)	(0.171)	(0.226)	(0.212)
$\text{6M Return}_{j,i,t-6}$	0.520***	0.064	0.308	0.022	0.336*	0.063	0.163	0.037	0.047	0.048
	(0.183)	(0.222)	(0.190)	(0.210)	(0.204)	(0.254)	(0.140)	(0.145)	(0.162)	(0.161)
$\text{Mortgage-Income}_{i,t-6}$	-0.947***	-0.945***	-1.46***	-1.47***	-0.748***	-0.747***	-0.192	-0.193	-0.337	-0.343
	(0.165)	(0.166)	(0.314)	(0.312)	(0.195)	(0.195)	(0.171)	(0.171)	(0.216)	(0.216)
$\Delta\text{Income}_{i,t}$	5.80***	5.81***	4.13***	4.14***	5.43***	5.44***	5.31***	5.31***	2.67***	2.68***
	(0.350)	(0.349)	(0.329)	(0.328)	(0.357)	(0.355)	(0.310)	(0.310)	(0.210)	(0.209)
$\Delta\text{Lag Income}_{i,t-6}$	2.01***	2.02***	1.86***	1.86***	1.69***	1.69***	2.05***	2.05***	1.03***	1.02***
	(0.134)	(0.136)	(0.229)	(0.229)	(0.169)	(0.168)	(0.165)	(0.166)	(0.182)	(0.182)
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	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Count: Vol & Return		0/50		0/50		0/50		0/50		0/50
Observations	1,363,246	1,363,246	1,116,247	1,116,247	1,213,647	1,213,647	1,120,955	1,120,955	647,601	647,601
R^2	0.142	0.142	0.087	0.087	0.138	0.138	0.106	0.105	0.152	0.152

Table 10. 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 8 ($\Delta\text{Durables}_{i,t}$), 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 (3) and (3A). 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, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{Mortgage-Income}_{i,t-6}$ is the mortgage-to-income ratio of the household, 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)	(1A)	(2A)	(3A)
$\Delta\text{Volatility}_{j,i,t-6}$	-1.44***	-1.07***	-0.830**	-0.952**	-0.860**	-0.130
	(0.507)	(0.385)	(0.376)	(0.432)	(0.365)	(0.288)
$\text{6M Return}_{j,i,t-6}$	0.600**	0.363	0.386*	0.776**	-0.131	0.211
	(0.284)	(0.225)	(0.232)	(0.331)	(0.281)	(0.332)
$\text{Mortgage-Income}_{i,t-6}$	-1.59***	-1.14***	-0.521*	-2.29***	-1.32***	-1.36***
	(0.373)	(0.252)	(0.280)	(0.795)	(0.416)	(0.289)
$\Delta\text{Income}_{i,t}$	8.14***	4.79***	4.66***	4.50***	4.68***	4.19***
	(0.402)	(0.231)	(0.259)	(0.481)	(0.281)	(0.460)
$\Delta\text{Lag Income}_{i,t-6}$	1.15***	0.805***	1.90***	0.487	0.800***	2.61***
	(0.203)	(0.179)	(0.223)	(0.360)	(0.305)	(0.320)
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	454,348	454,460	454,433	334,049	373,448	408,739
R^2	0.178	0.138	0.124	0.104	0.085	0.082

Table 11. Consumption response to uncertainty shocks, by firm characteristics

This table shows the difference in intensity of the response of future household (employee) consumption to firm (employer) uncertainty shocks by employer characteristics. In particular, using common company fundamental and financial data from Compustat we classify households by the characteristics of firms in the preceding year. This allows us to examine whether households that work for firms that recently experienced, say, low employment growth (e.g., firms with layoffs) respond differently to uncertainty than households whose employers experienced recent high employment growth (e.g., hiring expansions). We look at 12 firm characteristics: (1) the change in the number of employees at the firm, (2) investment - defined as capital expenditures over lagged plant, property, and equipment, (3) return on assets, (4) Tobin's Q, (5) CAPM β, (6) sales, (7) past 12 month returns, (8) change in intangibles expenses, (9) the Whited-Wu financial constraints index, (10) the Sales-Age financial constraints index, (11) past calendar year 12 month implied volatility, and finally (12) past calendar year 12 month realized volatility. Frequency of all variables is monthly. The dependent variable is our 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). Consumption growth is measured as the 6-month growth in average monthly spending, 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, $\text{6M Return}_{j,i,t-6}$, defined as the CRSP compounded 6-month cum-dividend stock return. We further control for household debt effects, where $\text{Mortgage-Income}_{i,t-6}$ is the mortgage-to-income ratio of the household, 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.

	Employment growth			Investment			Return on assets		
	Low		High	Low		High	Low		High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta\text{Volatility}_{j,i,t-6}$	-2.27***	-0.828	-0.150	-0.266	-1.02**	-0.640*	-1.42***	-0.381	-1.13*
	(0.598)	(0.616)	(0.425)	(0.433)	(0.487)	(0.365)	(0.488)	(0.672)	(0.591)
$\text{6M Return}_{j,i,t-6}$	0.736**	0.937**	0.167	0.792***	0.556**	0.421*	0.193	0.389	0.716**
	(0.351)	(0.408)	(0.295)	(0.296)	(0.259)	(0.215)	(0.296)	(0.284)	(0.351)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	444,613	447,290	441,392	445,258	443,357	438,676	447,854	443,553	445,197
R^2	0.193	0.253	0.224	0.226	0.193	0.165	0.141	0.177	0.185

Table 11. Consumption response to uncertainty shocks, by firm characteristics (Continued)

	Tobin's Q			CAPM β			Sales		
	Low		High	Low		High	Low		High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ΔVolatility$_{j,i,t-6}$	-2.19***	-0.262	-0.609	-0.008	-0.246	-1.84***	-0.311	-0.655**	-2.36**
	(0.531)	(0.369)	(0.424)	(0.428)	(0.428)	(0.476)	(0.379)	(0.329)	(1.01)
6M Return$_{j,i,t-6}$	0.269	0.290	0.526**	0.241	0.276	0.695***	0.530**	0.156	0.379
	(0.284)	(0.308)	(0.232)	(0.412)	(0.271)	(0.235)	(0.242)	(0.210)	(0.635)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	445,559	449,548	441,381	458,892	432,143	445,031	445,678	448,825	441,823
R^2	0.158	0.210	0.166	0.214	0.229	0.173	0.163	0.150	0.167

	12 month returns			Intangible Invest.			WW-index Finan. Const.		
	Low		High	Low		High	Low		High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ΔVolatility$_{j,i,t-6}$	-1.30**	-0.493	0.0930	0.090	-1.20*	-1.47*	-0.653	-1.83**	-0.206
	(0.577)	(0.374)	(0.453)	(0.400)	(0.724)	(0.769)	(0.420)	(0.841)	(0.366)
6M Return$_{j,i,t-6}$	0.322	0.693***	0.411	0.498	1.01**	0.436	0.715**	0.299	0.644***
	(0.326)	(0.246)	(0.325)	(0.449)	(0.492)	(0.359)	(0.324)	(0.445)	(0.229)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	450,292	442,712	442,315	169,881	163,181	166,408	448,179	435,998	441,000
R^2	0.268	0.245	0.288	0.259	0.261	0.234	0.120	0.174	0.169

	SA-index Finan. Const.			Implied volatility			Realized volatility		
	Low		High	Low		High	Low		High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ΔVolatility$_{j,i,t-6}$	-0.196	-2.60**	-1.03**	-0.632	-0.647	-1.52***	0.407	-0.338	-1.62***
	(0.368)	(1.11)	(0.430)	(1.01)	(0.523)	(0.513)	(0.611)	(0.607)	(0.525)
6M Return$_{j,i,t-6}$	0.590	0.519***	0.432	-0.328	0.621**	0.600**	0.183	0.579**	0.592**
	(0.358)	(0.190)	(0.278)	(0.254)	(0.279)	(0.257)	(0.334)	(0.291)	(0.262)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	476,327	423,530	436,784	444,774	445,047	444,451	454,662	435,699	445,147
R^2	0.173	0.159	0.159	0.210	0.243	0.185	0.234	0.277	0.210