

Recession Fear and the Price of Cash-flow Risk

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Abstract

The price of cash-flow risk rises when professional forecasters fear a recession, whether or not consumption has fallen. Past consumption and unemployment explain only 12% of this fear, which sets it apart from the consumption history behind habit models. Between its 10th and 90th percentiles, unexplained fear raises the price of payout cash-flow risk across stocks by more than five times its average; consumption history has little effect. In a model in which fear raises the price of consumption risk, the rise is largest where payout shares persist, as in the data. The value premium also falls with fear.

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I. Introduction

Stocks whose cash flows fall when aggregate consumption falls should earn a premium ([Bansal et al., 2005](#); [Hansen et al., 2008](#); [Da, 2009](#)). When that premium is high is less clear. In habit models the price of risk rises after consumption has fallen relative to its past ([Campbell and Cochrane, 1999](#); [Menzly et al., 2004](#)), so cash-flow risk is priced most in recessions ([Santos and Veronesi, 2010](#)). Alternatively, the price of risk may rise when investors fear a recession, whether or not consumption has fallen. If fear were a function of past consumption, the two explanations would be observationally equivalent. They can be distinguished because fear also varies independently of consumption. In November 2022, the Survey of Professional Forecasters' average probability of a decline in real GDP in each of the next four quarters was 46.5 percent, the highest since the survey began in 1968, while consumption was growing, unemployment was below 4 percent, and no recession followed.

Three facts about recession fear and stock returns call for an explanation. First, the price of cash-flow risk, the premium per unit of covariance between a firm's payout and consumption, rises with fear that realized conditions do not explain. Such fear is pervasive: forecasters overstate the risk of a recession, past consumption and unemployment explain only 12 percent of the variation in their fear, and changes in fear are nearly uncorrelated with consumption growth. I call this unexplained part the fear residual. Moving it from its 10th to its 90th percentile raises the price of cash-flow risk across individual stocks by five to six times its characteristic-adjusted average, while a habit state built from consumption history, which drives the price of risk in habit models, has little effect. Second, the rise in the price of cash-flow risk with fear is concentrated among firms whose payout shares are persistent, although persistence and cash-flow risk are unrelated across stocks. Third, the fear residual lowers the value premium. A higher price of cash-flow risk cannot produce this by itself: value stocks have at least as much payout cash-flow risk as growth stocks, so it would, if anything, raise the value premium. Under habit, fear that consumption does not explain should leave the value premium unchanged.

To explain these facts, I propose a model in which fear is a state variable with its own news. A representative investor has logarithmic utility, scaled by a preference shock that rises with fear in the manner of the valuation-risk model of [Albuquerque et al. \(2016\)](#). When the correlation between shocks to fear and bad news about consumption lies between zero and one, fear moves partly with consumption and partly on news of its own, and two things follow. First, bad consumption news

also raises fear, and fear moves more when it is high, so consumption risk, and with it cash-flow risk, is priced more highly when fear is high. Second, the investor prices fear's own news, more so when fear is high, and that news moves the prices of long-duration claims most, so the value premium falls with fear. Both effects respond to the part of fear that consumption history does not explain, which under habit would have no effect. In the data, fear and consumption are only weakly correlated, suggesting most of the variation in fear is news of its own. My model, solved in closed form, yields four predictions that I test: the price of cash-flow risk rises with fear, with consumption history mattering only through its correlation with fear; high-risk stocks fall when fear rises; the value premium falls with fear; and the fear effect is concentrated in firms whose payout shares persist.

I measure fear with the probability of a decline in real GDP reported in the Survey of Professional Forecasters (SPF), and the fear residual is the part of it not explained by five lags of consumption growth, a habit state built from forty quarters of consumption history and the real-time Sahm indicator. A firm's cash-flow risk is the covariance of the four-quarter growth of its total payout share with consumption growth, using only the statements that had been reported by each formation date. The main test is a monthly cross-sectional regression across individual stocks, with market-equity weights and standard characteristics as controls: one standard deviation of the fear residual raises the price of payout cash-flow risk by 0.10 percent a month per standard deviation of risk. This result is robust to the same month's factor returns, one-step-ahead residuals, a bootstrap that re-estimates the fear residual on every draw, a correction for the small-sample bias of persistent predictors, numerous controls for financial conditions, risk appetite, uncertainty and intermediary capital, and the exact nonlinear habit state of the model at every calibration examined. Portfolios show the magnitudes: the decile of stocks whose payouts covary most with consumption earns 7.4 percent a year more than the decile whose payouts covary least ($t = 3.2$), and this spread is 13.4 percentage points a year higher at the 90th percentile of the fear residual than at the 10th. When fear rises between two surveys, high-risk stocks fall relative to low-risk stocks.

The effect of fear is concentrated where the model says it should be. That a persistent share carries a larger premium per unit of cash-flow risk follows from any model with mean-reverting shares (Menzly et al., 2004; Da, 2009); what is new is the test of it across firms, with persistence estimated from their payout shares, and the prediction that the rise of the premium with fear is concentrated in those firms. In the model, a firm's cash-flow risk is priced through the part of its value that its current payout share supports; when the share reverts quickly to its mean, that part

is small, and so is the premium. When I sort stocks on the persistence of their payout shares, estimated in real time, the average price of cash-flow risk in the persistent tercile is five times that in the transitory tercile and rises more with fear. The quintile spread on cash-flow risk within the persistent tercile earns 5.9 percent a year and rises with fear; and the value premium falls with fear only among persistent-share firms. Because persistence and cash-flow risk are unrelated across stocks, the sort tests the model's mechanism rather than merely reordering stocks by their risk.

Another place where fear and habit part ways is the value premium. If fear has news of its own, that news moves the prices of long-duration claims most, and its price rises with fear, so investors require more from growth stocks when fear is high and the value premium shrinks. Under habit, fear that past consumption does not explain should leave it alone. It does not. One standard deviation of the fear residual lowers the next quarter's value-minus-growth return by 1.15 percentage points, with the habit state in the regression, and the estimate changes little when I add valuation ratios, the value spread or measured uncertainty. The fall shows up within each tercile of payout cash-flow risk as well, so the duration channel is not the cash-flow risk channel in disguise.

One might worry that the premium reflects mistaken beliefs rather than risk. Forecasters do overstate recession risk, and investors who share their fear could push the prices of exposed firms too low, only for the prices to recover when the recession never comes. This story fits the cross-sectional results: high-risk stocks fall when fear rises, and their premium over low-risk stocks is larger when fear is high. It does not fit the duration result. Value stocks have shorter duration and at least as much payout cash-flow risk as growth stocks, so pessimism over the survey's horizon would depress them most, and value would outperform growth when fear is high; the opposite happens. Nor are analysts more pessimistic about high-risk firms when fear is high, and the fear-dependent premium is not earned in the months when firms announce earnings. These tests find no sign of the cash-flow pessimism that this story requires and point instead to discount rates.

I calibrate the fear process and the preferences to the moments of the market, holding the correlation between fear shocks and bad consumption news at 0.21. At these values the model gets the sign of every result above. Its premia are smaller than those in the data. This is a familiar outcome for consumption-based models taken to measured consumption, which understates the covariances that price risk. I therefore use the model for the mechanism and the signs, and ask what pricing kernel the data imply for the magnitudes. A kernel in which the price of consumption risk rises with fear, as it would if risk aversion rose with fear (Guiso et al., 2018; Cohn et al., 2015), matches the average market premium and the average payout premium. To match most of

the rise of the payout premium with fear, the kernel also needs payouts' exposure to consumption to rise with fear, as it does in the data. The model mechanism differs from time-varying disaster risk ([Barro, 2006](#); [Gabaix, 2012](#); [Wachter, 2013](#)). A higher probability of disaster also lowers the value premium. But it leaves the price of ordinary consumption risk unchanged, so it can raise the price of cash-flow risk only if firms with more cash-flow risk are also more exposed to disasters. In my model, fear raises the price of ordinary consumption risk itself. Because cash-flow risk is the covariance of a firm's payout with consumption, its price rises with fear regardless of which firms are exposed to disasters.

The paper speaks to three literatures. The first asks when cash-flow risk is priced. [Bansal et al. \(2005\)](#), [Hansen et al. \(2008\)](#) and [Da \(2009\)](#) show that the covariance of cash flows with consumption helps explain average returns, as does consumption risk measured over long horizons ([Parker and Julliard, 2005](#)), and [Campbell et al. \(2010\)](#) trace the value premium to cash-flow betas. [Gomes et al. \(2009\)](#) show that producers of durable goods, whose output is the most cyclical, earn a premium that is countercyclical. Closest to this paper, [Goetzmann et al. \(2025\)](#) document a premium for stocks whose cash flows move with expected GDP growth but leave open how it varies over time, while [Santos and Veronesi \(2010\)](#) show that habit models want it largest in bad times. My contribution is to show that the price moves with recession fear beyond what consumption history explains, and to locate the effect in the firms whose payout shares persist. The second literature concerns preference shocks and time-varying risk appetite ([Albuquerque et al., 2016](#); [de Groot et al., 2022](#); [Bekaert et al., 2010, 2022](#)). Preference shocks are hard to discipline and can explain almost anything unless their size is pinned down ([Zin, 2002](#)); here the shock is tied to a measured belief, so its timing can be observed, and its correlation with consumption is the one parameter that separates it from habit. The third literature studies beliefs and asset prices ([Greenwood and Shleifer, 2014](#); [Giglio et al., 2021](#); [Bordalo et al., 2019, 2024](#); [Bianchi et al., 2022](#); [Nagel and Xu, 2022, 2023](#); [Kozlowski et al., 2020](#); [Pflueger et al., 2020](#)). The SPF recession probability has been evaluated as a forecast by [Rudebusch and Williams \(2009\)](#), and [Zhou \(2017\)](#) prices innovations in the slope of its term structure. I use its level, or rather the part of its level that realized conditions do not explain, as a state variable for the price of risk, and the evidence points to discount rates rather than expected cash flows.

Section II sets out the model and its predictions. Section III explains how I measure fear and cash-flow risk. Sections IV and V contain the cross-sectional and duration tests, and Section VI asks whether what they find is risk or mispricing. Section VII calibrates the model, compares its

magnitudes with the data and estimates a fear-dependent pricing kernel. Section VIII provides robustness checks, and Section IX concludes.

II. A preference-shock economy with observable fear

This section describes an endowment economy in which fear of recession is a state variable with its own news, derives prices in closed form, shows that the economy collapses to a habit model when fear is spanned by consumption, and states the predictions that the empirical sections test.

A. Consumption, fear and preferences

Aggregate consumption C_t and the fear state x_t follow

$$\frac{dC_t}{C_t} = \bar{\mu} dt + \sigma_C dZ_t^C, \quad (1)$$

$$dx_t = \kappa (\bar{x} - x_t) dt - \nu (x_t - \underline{x}) \left[\omega dZ_t^C + \sqrt{1 - \omega^2} dZ_t^p \right], \quad (2)$$

where Z_t^C and Z_t^p are independent Brownian motions. Z_t^C carries consumption news and Z_t^p carries recession news that consumption does not reveal; both are signed so that a positive shock is good news. The parameter $\bar{\mu}$ is mean consumption growth and σ_C is consumption volatility. Fear mean-reverts at speed κ toward its long-run mean $\bar{x}$, stays above its lower bound $\underline{x} < \bar{x}$, and has volatility $\nu(x_t - \underline{x})$, which rises with its level. The parameter $\omega \in [0, 1]$ is the correlation between fear shocks and bad consumption news, $-dZ_t^C$. When $\omega = 1$, fear moves only with consumption, rising exactly when consumption news is bad; when $\omega = 0$, fear moves only on its own news.

A representative investor maximizes

$$E_0 \int_0^\infty e^{-\rho t} g_t \log C_t dt, \quad g_t = 1 + a(x_t - \bar{x}), \quad (3)$$

where ρ is the rate of time preference and g_t is a preference shock that raises the marginal utility of consumption when fear is high, with sensitivity $a > 0$. I assume $a(\bar{x} - \underline{x}) < 1$, which keeps g_t positive. The pricing kernel is

$$M_t = e^{-\rho t} \frac{g_t}{C_t}. \quad (4)$$

The shock is a valuation shock in the sense of [Albuquerque et al. \(2016\)](#): it changes how much the investor values consumption today relative to the future, without changing the curvature of utility. Lifetime utility and the prices below are finite. What distinguishes this model from a model with an external habit is the correlation ω . I make the assumption, maintained throughout, that the fear state moves with the recession probabilities that forecasters report, which makes this correlation parameter measurable.

B. Prices of risk

Proposition 1 (Pricing kernel). *The pricing kernel follows $dM_t/M_t = -r_t dt - \Lambda_{C,t} dZ_t^C - \Lambda_{p,t} dZ_t^p$, with*

$$\Lambda_{C,t} = \sigma_C + \frac{a \nu \omega (x_t - \underline{x})}{g_t}, \quad \Lambda_{p,t} = \frac{a \nu \sqrt{1 - \omega^2} (x_t - \underline{x})}{g_t}, \quad (5)$$

$$r_t = \rho + \bar{\mu} - \sigma_C^2 + \frac{a \kappa (x_t - \bar{x})}{g_t} - \frac{a \nu \omega \sigma_C (x_t - \underline{x})}{g_t}. \quad (6)$$

Because $a(\bar{x} - \underline{x}) < 1$, the ratio $(x_t - \underline{x})/g_t$ increases with x_t . Hence $\Lambda_{C,t}$ increases with fear if and only if $\omega > 0$, and $\Lambda_{p,t}$ increases with fear whenever $\omega < 1$.

The proofs of this and the following propositions are in [Appendix A](#). The price of consumption risk $\Lambda_{C,t}$ equals the volatility of consumption, as under log utility, plus a term that appears only when fear moves with consumption. The price of recession news $\Lambda_{p,t}$ is positive: an asset that falls when fear rises on news of its own earns a premium, and an asset that rises when fear rises is a hedge. The price of recession news rises with fear whenever $\omega < 1$, but the price of consumption risk depends on fear only through ω . This is the central property of the economy. If fear moves on its own news ($\omega = 0$), fear raises the price of its own news and leaves the price of consumption risk at σ_C .

C. Dividend shares and cash-flow risk

Firm j pays dividends $D_t^j = s_t^j C_t$, where the dividend share s_t^j follows

$$ds_t^j = \phi^j (\bar{s}^j - s_t^j) dt + s_t^j \left[\sigma_{sC}^j dZ_t^C + \sigma_{sp}^j dZ_t^p + \sigma_{si}^j dZ_t^i \right], \quad (7)$$

with mean-reversion speed ϕ^j , long-run mean $\bar{s}^j$, loadings σ_{sC}^j and σ_{sp}^j on consumption news and recession news, and an idiosyncratic Brownian motion Z_t^j . Unlike [Menzly et al. \(2004\)](#) and [Santos and Veronesi \(2010\)](#), I do not require the shares of the firms to sum to one. Consumption also includes income that the firms do not pay out, such as labor income, $L_t = C_t - \sum_j D_t^j$, which is positive as long as the firms' shares sum to less than one. The investor consumes this income along with the dividends, so markets clear. This keeps each firm's price in closed form without further assumptions and lets the speed of mean reversion ϕ^j differ across firms.

The dividend D_t^j stands for the cash flow of a claim to a fixed fraction of firm j : that fraction of its dividends and repurchases, less the same fraction of any new issue, which the holder buys to keep her fraction; P_t^j below is the value of this claim. Firm j 's contemporaneous cash-flow risk is the covariance of its dividend-share growth with consumption growth,

$$\theta^j \equiv \frac{1}{dt} \text{Cov}_t \left(\frac{ds_t^j}{s_t^j}, \frac{dC_t}{C_t} \right) = \sigma_{sC}^j \sigma_C. \quad (8)$$

A firm with $\theta^j > 0$ gains share of the economy when consumption rises and loses it when consumption falls. Its cash flows are therefore more cyclical than consumption itself. The loading σ_{sp}^j measures how its share responds to recession news, which I call fear-news cash-flow exposure.

Proposition 2 (Prices and expected returns). *Let $c^j = \omega \sigma_{sC}^j + \sqrt{1 - \omega^2} \sigma_{sp}^j$, $K^j = \kappa + \phi^j + \nu c^j$ and $S^j = \kappa + \nu c^j (1 - a(\bar{x} - \underline{x}))$, and assume $\rho + K^j > 0$. The price of firm j is*

$$P_t^j = \frac{C_t}{g_t} \left[c_0^j + c_x^j x_t + (c_q^j g_t + c_s^j) s_t^j \right], \quad (9)$$

with $c_x^j = a\phi^j \bar{s}^j / [(\rho + \kappa)(\rho + K^j)]$, $c_q^j = 1/(\rho + K^j)$, $c_s^j = S^j / [(\rho + \phi^j)(\rho + K^j)]$ and $c_0^j = [c_x^j \kappa \bar{x} + c_q^j (1 - a\bar{x})\phi^j \bar{s}^j + c_s^j \phi^j \bar{s}^j] / \rho$. Its expected excess return is

$$\frac{1}{dt} \mathbb{E}_t \left[\frac{dP_t^j + D_t^j dt}{P_t^j} \right] - r_t = \Lambda_{C,t} L_{C,t}^j + \Lambda_{p,t} L_{p,t}^j, \quad (10)$$

where, with F_t^j the bracket in (9), $\gamma_{x,t}^j = \partial \log F_t^j / \partial x_t$ and $\gamma_{s,t}^j = \partial \log F_t^j / \partial s_t^j$, the return loadings

are

$$\begin{aligned} L_{C,t}^j &= \sigma_C + \left(\frac{a}{g_t} - \gamma_{x,t}^j \right) v(x_t - \underline{x}) \omega + \gamma_{s,t}^j s_t^j \frac{\theta^j}{\sigma_C}, \\ L_{p,t}^j &= \left(\frac{a}{g_t} - \gamma_{x,t}^j \right) v(x_t - \underline{x}) \sqrt{1 - \omega^2} + \gamma_{s,t}^j s_t^j \sigma_{sp}^j. \end{aligned}$$

Cash-flow risk enters expected returns in two places. The direct term $\gamma_{s,t}^j s_t^j \theta^j / \sigma_C$ in $L_{C,t}^j$ is priced at $\Lambda_{C,t}$, which moves with fear only if $\omega > 0$. The indirect term works through K^j and S^j , which depend on θ^j only through c^j , again only if $\omega \neq 0$. Duration enters through $\gamma_{x,t}^j$: a firm whose share is expected to grow, with $s_t^j < \bar{s}^j$, has more of its value in distant dividends, and its price is more sensitive to fear.

D. Habit as a special case

Proposition 3 (Equivalence with habit). *Suppose $\omega = 1$ and $v = \alpha \sigma_C$ for some $\alpha > 0$. Let $x^* = \bar{x} - 1/a$ and $y_t = x_t - x^*$. Then $g_t = a y_t$,*

$$dy_t = \kappa (\bar{y} - y_t) dt - \alpha (y_t - \underline{y}) \left(\frac{dC_t}{C_t} - \bar{\mu} dt \right), \quad \bar{y} = \frac{1}{a}, \quad \underline{y} = \underline{x} - x^*,$$

and $M_t \propto e^{-\rho t} y_t / C_t$. This is the pricing kernel of [Menzly et al. \(2004\)](#), in which y_t is the inverse of the surplus consumption ratio. Every asset price in the economy equals the corresponding price in their habit model with mean $\bar{y}$ and lower bound $\underline{y}$.

When fear moves only with consumption, it is a weighted history of past consumption shocks, and the preference shock is a habit. Proposition 3 shows that this case cannot be distinguished from [Menzly et al. \(2004\)](#), whatever the remaining parameters. The economy differs from habit only through $\omega < 1$, that is, through the part of fear that consumption does not reveal. That part is what surveys can measure.

E. Predictions

Propositions 1 to 3 give the following predictions. Predictions 1 to 3, 5 and 7 are numerical results at the calibration of Section VII, on a grid of states x_t and correlations ω ; Table 8 and Section VII

report the magnitudes for Predictions 1 and 3, and Section VII the coefficients that the tests of Sections IV and V recover in samples simulated from the model.

Prediction 1 (Fear and the price of cash-flow risk). The expected return of high- θ firms relative to low- θ firms rises with fear if $\omega > 0$, by more the larger ω is. At $\omega = 0$ it depends on fear only slightly, through the weight of the dividend share in the firm's value.

Prediction 2 (Fear news and realized returns). If $0 < \omega < 1$, recession news that raises fear lowers the return of high- θ firms relative to low- θ firms, holding consumption news fixed.

Prediction 3 (Duration). The value premium is lower when fear is high. Consider a value firm, whose dividend share is above its long-run mean (short duration) and whose cash-flow risk is high, and a growth firm, whose share is below its mean (long duration) and whose cash-flow risk is low (Lettau and Wachter, 2007). When fear has news of its own, that news moves the price of the long-duration claim more, so the growth firm loads more on it, and because the price of fear news rises with fear (Proposition 1), the growth firm's expected return rises more as fear rises. The rising price of the value firm's higher cash-flow risk works the other way; at the calibration of Section VII, the duration effect dominates over 97 percent of the stationary distribution of fear.

Prediction 4 (Fear versus habit). If $\omega = 1$, fear is a function of past consumption, so the part of measured fear that past consumption does not explain has no effect on the price of cash-flow risk, while a state that summarizes past consumption does. If $0 < \omega < 1$, that part of fear raises the price of cash-flow risk, and past consumption matters only through its correlation with fear.

The next two predictions relate the dynamics of firms' cash flows, the persistence of their payout shares and their idiosyncratic risk, to the effect of fear on returns, and the last concerns the market as a whole. As in Kogan and Papanikolaou (2013), where a firm's exposure to a priced shock depends on how its value divides between assets in place and growth opportunities, exposure here depends on how much of the firm's value its current payout share supports.

Prediction 5 (Share persistence). The premium per unit of cash-flow risk, and its rise with fear, are larger for firms whose dividend shares are more persistent. A shock to the share of firm j moves its price through $\gamma_{s,t}^j s_t^j = (c_q^j g_t + c_s^j) s_t^j / F_t^j$, which falls with the speed of mean reversion ϕ^j because a transitory share carries little of the firm's value, so the same covariance θ^j earns a smaller premium and responds less to fear. The fall of the value premium with fear is also larger for persistent shares.

Prediction 6 (Idiosyncratic risk). Idiosyncratic cash-flow risk is not priced. The loading σ_{si}^j raises the volatility of the firm's dividend and of its return but enters neither $L_{C,t}^j$ nor $L_{p,t}^j$, so the expected return, the premium for cash-flow risk and its rise with fear do not depend on it, at any level of fear.

Prediction 7 (The market premium). The expected excess return of the market, the claim to aggregate consumption, rises with fear, because both prices of risk do. Under habit the market premium rises with the habit state in the same way, so the test again turns on which part of fear moves it.

In the tests, the part of fear that past consumption does not explain is the residual of a linear projection of measured fear on recent consumption growth, a habit state and the Sahm indicator, estimated on expanding windows. Under habit, the fear state is a nonlinear function of past consumption, so this residual need not be exactly zero, which is one reason the tests also control for the habit state. Sections IV and V test these predictions.

III. Measuring fear and cash-flow risk

A. Survey fear

The Survey of Professional Forecasters, run by the Federal Reserve Bank of Philadelphia since 1990 and by the American Statistical Association and the NBER before that (Croushore, 1993), asks each panelist for the probability that real GDP will decline in the current quarter and in each of the next four. I use the 229 surveys from 1968Q4 to 2025Q4, with a median of 34 forecasters per survey. My measure of fear is the mean probability of a decline over the next four quarters,

$$p_t = \frac{1}{4} \sum_{h=1}^4 p_t^{(h)}, \quad (11)$$

where $p_t^{(h)}$ is the cross-forecaster mean probability, in percent, that real GDP declines in quarter $t+h$, reported in the survey of quarter t . The survey deadline falls in the middle of the quarter, when consumption for quarter $t-1$ and unemployment for the first month of quarter t are known, and I measure all returns after it.

To isolate fear that realized conditions do not explain, I regress p_t on realized conditions at the

survey date, measured with current-vintage data:

$$p_t = \pi_0 + \sum_{k=1}^5 \pi_k \Delta c_{t-k} + \pi_6 h_t + \pi_7 \text{Sahm}_t + v_t. \quad (12)$$

Here π_0 is a constant, in percent, and Δc_{t-k} is the log growth of real per-capita consumption of nondurables and services in quarter $t - k$, in percent, computed as a Törnqvist aggregate of the BEA quantity indexes. The habit state $h_t = -\sum_{j=1}^{40} \phi^j \Delta c_{t-j} / \sum_{j=1}^{40} \phi^j$, with $\phi = 0.965$ per quarter, is minus a weighted average of past consumption growth, in percent per quarter, so it is high in bad times. It plays the role of the inverse surplus consumption ratio of [Campbell and Cochrane \(1999\)](#). Sahm_t is the real-time Sahm indicator for the first month of quarter t , in percentage points: the three-month average unemployment rate minus its lowest three-month average over the previous twelve months ([Sahm, 2019](#)). The residual v_t , in percentage points, is the fear residual. I estimate (12) on expanding windows of at least 40 quarters, so that v_t uses only surveys and data up to t , although in their current vintage; it starts in 1978Q3. A second version, v_t^{oos} , uses coefficients estimated strictly before t , so it is a one-step-ahead forecast error.

Current-vintage consumption data contain revisions that were not known at the survey date. The real-time fear residual v_t^{rt} removes the revisions to the real consumption series; the nominal shares that weight nondurables and services and the population series stay current vintage, because the real-time data set does not carry nominal nondurables and its population vintages begin in 1998.¹ I denote the habit state built from these vintages by h_t^{rt} ; the Sahm indicator is already real time. The one-step-ahead version of the real-time residual is $v_t^{rt,oos}$. Every test below reports results with both the expanding-window residual v_t and the real-time residual v_t^{rt} , each with the habit state measured in the same way.

Table 1 summarizes the measure. Fear averages 18.6 percent and ranges from 5.7 to 46.5 percent. Forecasters overstate the risk of a decline. Over the 225 surveys from 1968Q4 to 2024Q4 whose four target quarters are realized, fear averages 18.4 percent while real GDP declined in 12.9 percent of the target quarters (13.3 percent in the first release of each quarter’s data), a gap

¹Section IA.N of the Internet Appendix shows that even crude replacements of these two inputs leave the residual and the tests nearly unchanged. It is the residual of (12) estimated on the same expanding windows, but with the regressors of each survey $s \leq t$ computed from the consumption data published by the time of survey s : $\Delta c_{s-1}, \dots, \Delta c_{s-5}$ and the habit state come from the vintage of quarter s of the Real-Time Data Set for Macroeconomists of the Federal Reserve Bank of Philadelphia ([Croushore and Stark, 2001](#)), which records the data available in the middle of the quarter, when the survey is taken.

Table 1. Survey fear

Panel A: Fear and the probability of a decline in real GDP (%)				
	Fear p_t	Benchmark	Difference	
Share of quarters with a decline, 1968Q4 to 2024Q4	18.4	12.9	5.5 (2.7)	
Objective probability, 1974Q2 to 2024Q4	18.7	13.1	5.6 (1.8)	
Panel B: Fear p_t , 1968Q4 to 2025Q4				
Mean (%)			18.6	
Standard deviation (pp)			8.5	
Minimum and maximum (%)			5.7 and 46.5	
Correlation with an NBER recession			0.43	
Correlation with Δc_{t-1} , h_t , $Sahm_t$			-0.19, -0.12, 0.09	
Panel C: Fear residual, regression (12) of p_t on realized conditions				
	Current vintage		Real time	
	Coefficient	t -statistic	Coefficient	t -statistic
Constant	15.421	8.04	14.032	7.12
Δc_{t-1}	-2.682	-2.51	-1.955	-2.18
Δc_{t-2}	-2.198	-2.63	-1.843	-2.12
Δc_{t-3}	-1.367	-1.82	-1.149	-1.46
Δc_{t-4}	-0.068	-0.10	-0.197	-0.30
Δc_{t-5}	0.510	0.74	0.436	0.72
Habit state h_t	-13.350	-2.23	-16.170	-2.34
Sahm indicator $Sahm_t$	-0.760	-0.90	-0.458	-0.49
R^2	0.12		0.10	
Surveys	229		229	
Standard deviation of v_t or v_t^{rt} (pp)	7.4		7.4	
Correlation of v_t with v_t^{rt}	0.90			

Fear p_t is the mean SPF probability, in percent, of a decline in real GDP in each of the next four quarters. Panel A uses the surveys whose target quarters are realized by 2025Q4; the objective probability is an expanding-window probit of a decline on the term spread, the Baa minus Aaa spread, $Sahm_t$ and Δc_{t-1} ; [Newey and West \(1987\)](#) standard errors with 8 lags in parentheses. Panel C estimates (12) on the full sample with current-vintage or real-time regressors, with [Newey and West \(1987\)](#) t -statistics (4 lags); v_t and v_t^{rt} are the expanding-window residuals, from 1978Q3. Δc is real per-capita consumption growth of nondurables and services and h_t the habit state, both in percent a quarter; $Sahm_t$ is in percentage points.

of 5.5 percentage points with a standard error of 2.7 that allows for the overlap of consecutive surveys' targets (Newey and West (1987), 8 lags; 5.1 points against first releases, and 6.3 points with a standard error of 2.2 at the one-quarter horizon). As a benchmark I also estimate, at each survey, an expanding-window probit of declines on the term spread, the credit spread, the Sahm indicator and lagged consumption growth, using the target quarters realized by then. This objective probability starts in 1974Q2. Over the 203 surveys to 2024Q4 it averages 13.1 percent, against 18.7 percent for fear, so forecasters sit 5.6 points above it (standard error 1.8), while the probit itself lands within 2.0 points of the realized share (standard error 2.6).

In the full-sample version of (12), realized conditions account for 12 percent of the variance of fear; with real-time data the figure is 10 percent. Recent consumption growth lowers fear. The habit state enters with a negative and significant coefficient, so that, holding recent growth fixed, fear is lower after a decade of weak consumption, but a one-standard-deviation change in the habit state moves fear by only 2.2 percentage points (2.6 with real-time data), and the Sahm indicator is insignificant. Overall, 88 percent of the variance of fear is not explained by realized consumption, the habit state or unemployment. The pandemic quarters weigh on this fit, since consumption collapsed in 2020 before fear rose: without the surveys of 2020 and 2021, realized conditions explain 26 percent of the variance of fear (22 percent with real-time data), and the residual estimated without them is almost identical elsewhere (correlation 0.99), so the tests below are unchanged by the choice. The expanding-window residual has a standard deviation of 7.4 percentage points and a correlation of 0.91 with the full-sample residual. The real-time residual has a standard deviation of 7.4 percentage points and a correlation of 0.90 with v_t ; the largest differences between the two are in 1980 to 1982 and 1991 to 1993.

B. Fear without recession

Figure 1 shows that fear rises in recessions but also outside them. The fear residual exceeded its 85th percentile, 6.1 percentage points, with no NBER recession in the following year in five episodes: 1978Q3 to 1979Q1, 2021Q4, 2022Q2 to 2024Q1, 2024Q3, and 2025Q2 to 2025Q4.² The longest peaked in the 2022Q4 survey, when fear reached 46.5 percent and the residual 26.9 percentage points, the largest in the sample. The real-time residual selects nearly the same episodes. The opposite case is 2020: the pandemic recession began before any survey could register it, and

²NBER recession quarters are those of the FRED series USRECQ, which starts a recession in the quarter after the peak. If the peak quarter is also counted, the 1978 episode ends in 1978Q4; the others are unchanged.

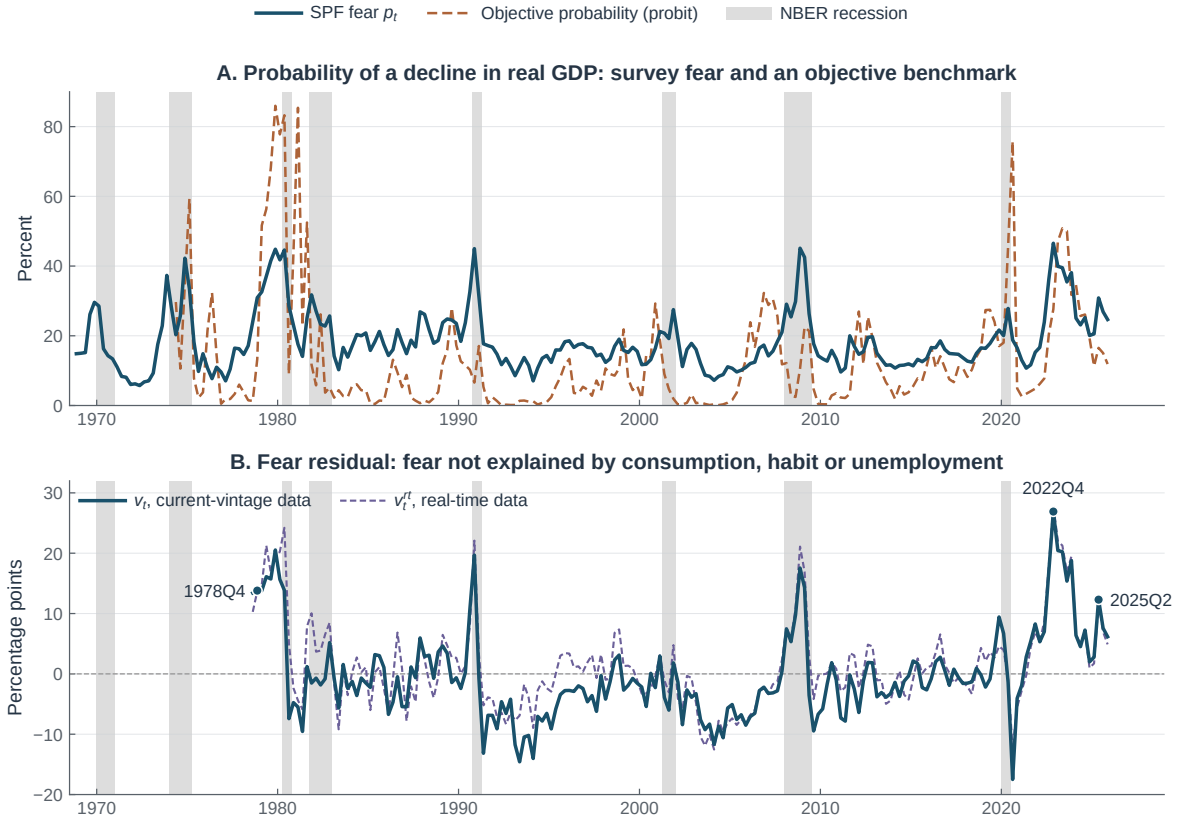


Figure 1. Survey fear. Panel A shows SPF fear p_t , the mean probability of a decline in real GDP in each of the next four quarters, and an objective probability from expanding-window probits of declines on the term spread, the credit spread, the Sahm indicator and lagged consumption growth, both in percent. Panel B shows the fear residual v_t from (12), from current-vintage data, and the real-time residual v_t^{rt} , from the consumption data available at each survey, in percentage points. Labeled quarters are the peaks of the three episodes of Section III.B whose residual exceeded 10 percentage points; in these episodes v_t stayed above its 85th percentile with no NBER recession within the following year. Shaded areas are NBER recessions.

the residual fell as realized conditions deteriorated faster than fear. The one-step-ahead residuals, which extrapolate coefficients from earlier surveys, reached -81 percentage points in 2020Q3, far outside the range of v_t and v_t^{rt} .

C. Is fear spanned by consumption?

Realized conditions explain little of fear (Figure 2). Over the full sample, consumption growth accounts for 10 percent of the variance of fear, the habit state for 3 percent and the Sahm indicator

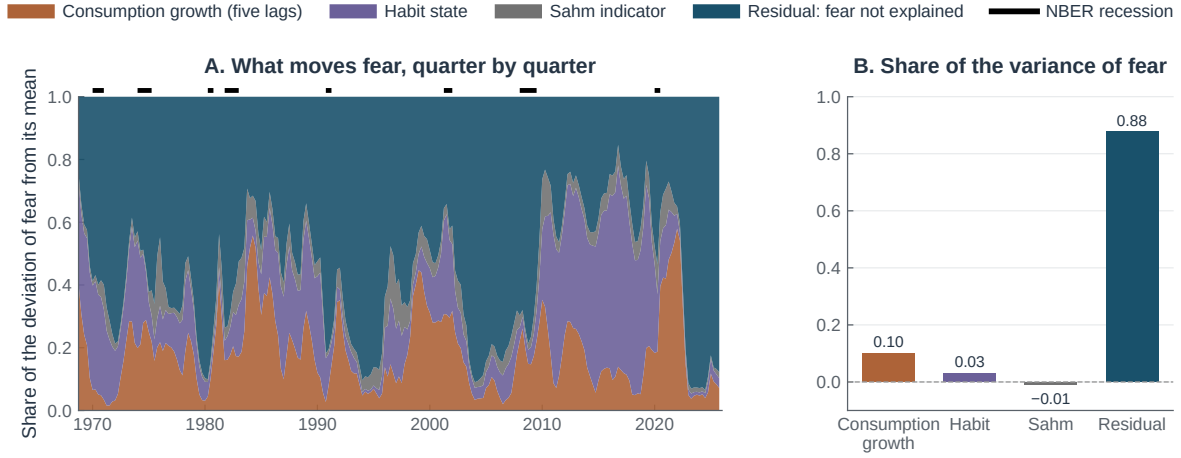


Figure 2. What moves fear. Components of SPF fear p_t from the full-sample regression (12) (Table 1, Panel C), 1968Q4 to 2025Q4. The contribution of consumption growth (five lags), the habit state or the Sahm indicator is its coefficient times the regressor’s deviation from its sample mean, and the residual is the rest of the deviation of fear from its mean. Panel A: each component’s absolute contribution as a share of the sum of the four absolute contributions, averaged over four quarters; black bars mark NBER recessions. Panel B: each component’s share of the variance of fear, the covariance of its contribution with fear divided by the variance of fear; the shares sum to one.

for none, and the residual for 88 percent. Quarter by quarter, the residual is on average the largest component, 57 percent of the deviation of fear from its mean; consumption and habit matter most around recessions, in the low-fear years of the 2010s and in 2021, while the high fear of 2022 to 2025 is almost entirely residual. When the VIX, available from 1990, is added to the regression, it accounts for 22 percent of the variance of fear and the residual for 70 percent.

Proposition 3 makes ω , the correlation between fear shocks and bad consumption news, the parameter that separates the model from habit, which requires $\omega = 1$. What do the data say about ω ? The correlation between the quarterly change in fear and contemporaneous consumption growth is -0.18 over 1968Q4 to 2025Q4, with a 95 percent block-bootstrap interval from -0.31 to -0.02 . The correlation with the previous quarter’s growth is 0.10, and at the annual frequency, fourth quarter to fourth quarter, it is -0.04 over 57 years. Quarterly correlations of this kind are pulled toward zero by time aggregation and by survey noise, so in Section VII I recover ω by indirect inference: it is the value at which the model, with the correlation measured exactly as in the data, reproduces the -0.18 . That gives $\omega = 0.21$, with an interval from 0.03 to 0.36. Fear is therefore close to the case $\omega = 0$, and far from the case $\omega = 1$ that habit requires. Without the quarters of

2020 and 2021 the correlation is -0.11 , which gives $\omega = 0.13$ with an interval from -0.03 to 0.28 .

D. Cash-flow risk

Firm cash flows. I take quarterly fundamentals from Compustat: 1,874,701 firm-quarters of 39,685 firms from 1961 to 2025. The cash flow is total payout, the sum of cash dividends and purchases of common and preferred stock over the trailing four quarters. It is the cash flow to the firm's shareholders whatever its division between dividends and repurchases (Miller and Modigliani, 1961), D_t^j in the model, and the measure of cash flows to equity holders used by Boudoukh et al. (2007) and Larrain and Yogo (2008); dividends alone miss repurchases, which have substituted for dividends since the 1980s (Grullon and Michaely, 2002) and were 51 percent of total payout from 1990 to 2025, and which fell by 63 percent from 2007 to 2009 against 18 percent for dividends. Compustat reports the payout items year-to-date, so I difference them within the fiscal year, set negative quarterly flows to zero, and sum them over the trailing four quarters. Each statement becomes usable on its report date; when the report date is missing or implausible, I assume 90 days after the end of the quarter, which affects 35 percent of firm-quarters.

Cash-flow share growth. The model's cash-flow risk is the covariance of dividend-share growth with consumption growth. For firm j in quarter τ , I measure the four-quarter growth of its cash-flow share as

$$\Delta_4 s_\tau^j = g_\tau^j - \Delta_4 \log C_\tau^{nom}, \quad (13)$$

where C_τ^{nom} is aggregate nominal spending on nondurables and services in quarter τ , in dollars, and g_τ^j is the four-quarter growth of the firm's payout CF_τ^j , summed over quarters $\tau - 3$ to τ , in dollars. Both growth rates, and hence $\Delta_4 s_\tau^j$, are in decimal units. Payout is often zero, so I use the growth rate of Davis et al. (1996), $g_\tau^j = (CF_\tau^j - CF_{\tau-4}^j) / (\frac{1}{2}|CF_\tau^j| + \frac{1}{2}|CF_{\tau-4}^j|)$, which lies between -2 and 2 and equals the log growth rate to first order. I winsorize g_τ^j at the 1st and 99th percentiles of each quarter.

Firm cash-flow risk. Firm j 's cash-flow risk at the end of quarter t is

$$\hat{\theta}_t^j = \frac{1}{n_t^j - 1} \sum_{\tau=t-W+1}^t \left(\Delta_4 s_\tau^j - \overline{\Delta_4 s^j} \right) \left(\Delta_4 c_\tau - \overline{\Delta_4 c} \right), \quad (14)$$

where $\Delta_4 c_\tau = \sum_{k=0}^3 \Delta c_{\tau-k} / 100$ is the four-quarter log growth of real per-capita consumption, $W = 40$ quarters, the sum runs over the $n_t^j \geq 20$ quarters in the window in which both growth rates are available, and bars are means over those quarters. Because both growth rates are four-quarter changes, $\hat{\theta}_t^j$ is an annual covariance, in the same units as θ^j in (8).

Shrinkage. Each firm estimate is a covariance over at most 40 quarters of overlapping four-quarter growth rates, about ten independent observations, so its sampling error is large relative to the true differences in cash-flow risk across firms: the weight w_t^j defined below, the share of the cross-sectional variance of the estimates within an industry that is not sampling variance, has a median of 0.09, so that for the typical firm the sampling variance of $\hat{\theta}_t^j$ is about ten times the dispersion of true cash-flow risk in its industry. Sorting on the raw estimates would sort stocks mostly on estimation error. I therefore use the empirical Bayes estimator of [Efron and Morris \(1973\)](#), the posterior mean of a firm's cash-flow risk under a normal prior centered on its industry, which minimizes the expected squared error across firms and moves each estimate toward the prior in proportion to its imprecision. I shrink the estimates toward the mean of their two-digit SIC industry, using at each formation month the latest estimate of every firm reported by the end of the month, at most four quarters old, so that the shrinkage target and weights also use only information available at formation. After winsorizing $\hat{\theta}_t^j$ at the 1st and 99th percentiles of each quarter, the shrunk estimate is $\tilde{\theta}_t^j = m_{\ell,t} + w_t^j(\hat{\theta}_t^j - m_{\ell,t})$, where $\ell = \ell(j)$ is the industry of firm j , $m_{\ell,t}$ is the industry mean, $w_t^j = \psi_{\ell,t}^2 / (\psi_{\ell,t}^2 + \hat{V}_t^j)$, $\hat{V}_t^j$ is the sampling variance of $\hat{\theta}_t^j$ under normality with $n_t^j/4$ effective observations, and $\psi_{\ell,t}^2$ is the cross-sectional variance of $\hat{\theta}_t^j$ in the industry net of the average sampling variance, floored at a tenth of the cross-sectional variance. Industries with fewer than ten firms in a quarter use the whole cross-section. The sorts therefore rely heavily on industry information; two-digit industries explain three quarters of the cross-sectional variance of the shrunk estimates.

Stock returns and portfolios. Monthly returns come from CRSP in its new format, for U.S. common stocks listed on the NYSE, NYSE American and Nasdaq, through December 2025. Monthly returns in this format include delisting returns. At the end of each month, each stock receives the latest shrunk estimate whose report date has passed, provided it is at most four quarters old. I sort stocks into deciles using NYSE breakpoints and compute value-weighted returns over the following month. Excess returns subtract the three-month Treasury bill rate. The deciles

start in April 1990, because Compustat's quarterly payout items begin in the mid-1980s and each estimate needs 20 quarters of four-quarter growth rates; they contain a median of about 1,650 stocks a month.

Portfolio-level cash-flow risk. Firm-level estimates are noisy even after shrinkage, so the tests use the cash-flow risk of each decile measured from its aggregate cash flows. For decile d and quarter τ , I sum the cash flows of the firms in the decile at the end of quarter τ that report in both τ and $\tau - 4$, compute the four-quarter growth $g_{d,\tau}$ of the sum with the same formula as for firms, and estimate

$$\hat{\theta}_{d,t}^P = \frac{1}{n_{d,t} - 1} \sum_{\tau} \left(\Delta_4 s_{d,\tau} - \overline{\Delta_4 s_d} \right) \left(\Delta_4 c_{\tau} - \overline{\Delta_4 c} \right), \quad \Delta_4 s_{d,\tau} = g_{d,\tau} - \Delta_4 \log C_{\tau}^{nom}, \quad (15)$$

over the last 40 quarters (at least 20) that ended at least three months before formation month t . Here $\hat{\theta}_{d,t}^P$ is decile d 's cash-flow risk known at the end of month t , an annual covariance; $g_{d,\tau}$ and $\Delta_4 s_{d,\tau}$ are in decimal units, as for firms; and $n_{d,t}$ is the number of quarters used.

Share persistence. For firm j in quarter τ , let s_{τ}^j be its trailing four-quarter total payout over nominal consumption of nondurables and services over the same four quarters, the share of this section in levels. I estimate

$$\log s_{\tau}^j = a^j + \rho^j \log s_{\tau-4}^j + u_{\tau}^j, \quad (16)$$

where a^j is a constant, ρ^j is the annual persistence of the share, so that $\phi^j = -\ln \rho^j$ in the model's units of years, and u_{τ}^j is the error, by least squares on the expanding window of quarters with positive payout up to τ , from 1975, once at least 20 quarters are available. Firm estimates are noisy, so I shrink each toward the persistence of its two-digit SIC industry, estimated by pooling the within-firm deviations of all firms in the industry, with weight $n/(n+40)$ on the firm's own estimate, where n is its number of quarters. The estimate of quarter τ becomes usable one quarter later, so persistence, like cash-flow risk, is known at the formation month.

IV. Fear and the price of cash-flow risk

I first sort stocks into portfolios on cash-flow risk, which shows the size of the premium and of its rise with fear, and then estimate the price of cash-flow risk across individual stocks (Section [IVE](#)),

the more precise test.

A. Portfolios sorted on cash-flow risk

Table 2. Portfolios sorted on payout cash-flow risk

Deciles formed April 1990 to November 2025											
Decile	1	2	3	4	5	6	7	8	9	10	10 – 1
Excess return (% a year)	5.48	9.79	9.07	9.90	9.17	6.99	8.53	10.61	9.90	12.87	7.39 (3.19)
Market beta	0.85	0.83	0.88	0.91	0.95	0.95	0.94	0.97	1.00	1.08	0.22 (2.91)
CAPM alpha	–2.39	2.16	1.00	1.53	0.38	–1.71	–0.12	1.68	0.71	2.97	5.36 (2.03)
FF5 + MOM alpha	–1.86	0.30	–0.71	0.70	–0.46	–2.75	–1.32	0.24	–0.97	1.50	3.36 (1.43)
Firm average $\tilde{\theta}$ ($\times 10^3$)	–0.56	–0.09	0.17	0.39	0.57	0.75	0.92	1.15	1.45	2.14	2.70
Portfolio estimate $\hat{\theta}^P$ ($\times 10^3$)	–0.33	0.58	0.63	0.64	0.85	1.39	1.48	1.32	1.29	2.47	2.80

Each month, stocks are sorted into deciles on their cash-flow risk $\tilde{\theta}$, estimated from the statements reported by the end of the month, using NYSE breakpoints, and decile returns are value weighted over the next month. Excess returns subtract the three-month Treasury bill rate and are annualized. Alphas, in percent a year, are the intercepts of (17) from regressions of each decile’s excess return, and of the spread, on the market excess return (CAPM) or on the five factors of Fama and French (2015) and momentum (Carhart, 1997) (FF5 + MOM). Market betas are from regressions of decile excess returns on the value-weighted CRSP market excess return. The column 10 – 1 reports decile 10 minus decile 1, with Newey and West (1987) t -statistics (12 lags) in parentheses. Firm $\tilde{\theta}$ is the value-weighted average estimate of the decile’s stocks; portfolio $\hat{\theta}^P$ is (15), estimated from the decile’s aggregate payout. Both are annual covariances of payout share growth with real per-capita consumption growth, multiplied by 1,000, averaged over formation months; $\hat{\theta}^P$ needs 20 quarters of portfolio payout and is averaged from June 1995.

Table 2 describes the deciles. Cash-flow risk estimated from each decile’s aggregate payout, $\hat{\theta}^P$, rises from -0.33×10^{-3} in decile 1 to 2.47×10^{-3} in decile 10, and average excess returns rise from 5.5 to 12.9 percent a year, while market betas rise only from 0.85 to 1.08. The spread of decile 10 over decile 1 averages 7.39 percent a year ($t = 3.2$). Its alpha in

$$R_{t+1}^{HL} = \alpha + b'F_{t+1} + \epsilon_{t+1}, \quad (17)$$

where R_{t+1}^{HL} is the spread and F_{t+1} the factor returns of month $t + 1$, b the factor loadings and ϵ_{t+1} the error, all in percent a month, and α is reported multiplied by 12, is 5.36 percent a year against the CAPM ($t = 2.0$) and 3.36 percent against the five factors of Fama and French (2015) plus

momentum (Carhart, 1997) ($t = 1.4$). These are unconditional effects. The focus of this paper is the conditional effect: how the price of cash-flow risk, and with it the spread, varies with fear.

B. Fear and cash-flow risk

Each month I estimate the price of cash-flow risk from the cross-section of the ten deciles,

$$R_{d,t+1}^e = \lambda_{0,t+1} + \lambda_{t+1} z_{d,t} + \varepsilon_{d,t+1}, \quad d = 1, \dots, 10, \quad (18)$$

where $R_{d,t+1}^e$ is decile d 's value-weighted excess return in month $t + 1$, in percent; $z_{d,t}$ is its portfolio cash-flow risk $\hat{\theta}_{d,t}^P$ standardized across the deciles at the end of month t ; $\lambda_{0,t+1}$ is an intercept and $\varepsilon_{d,t+1}$ the error, both in percent a month. The slope λ_{t+1} is the return, in percent a month, per cross-sectional standard deviation of cash-flow risk. I test Predictions 1 and 4 with

$$y_{t+1} = c_0 + c_1 v_t + c_2 h_t + c_3 \text{Sahm}_t + \eta_{t+1}, \quad (19)$$

where y_{t+1} is λ_{t+1} or the decile 10 minus decile 1 return R_{t+1}^{HL} , both in percent a month; c_0 is a constant in the same units; v_t is the fear residual of the latest survey whose deadline precedes the end of month t , in percentage points; h_t is the habit state of the same survey, in percent a quarter; Sahm_t is the real-time Sahm indicator known at the end of month t , in percentage points; and η_{t+1} is the error, in percent a month. The real-time version replaces v_t and h_t with v_t^{rt} and h_t^{rt} , and the one-step-ahead versions use v_t^{oos} and $v_t^{rt,oos}$. Standard errors are Newey and West (1987) with 12 lags. Fear predicts $c_1 > 0$; habit predicts $c_1 = 0$ and, since h_t is high in bad times, $c_2 > 0$.

Table 3 shows that the premium for cash-flow risk rises with fear and does not rise with the habit state, as the fear model predicts and the habit model does not. A one-percentage-point increase in the fear residual raises the next month's spread by 0.070 percent ($t = 2.5$, column 2). The effect is large relative to the premium itself: a move from the 10th to the 90th percentile of the residual raises the spread by 13.4 percentage points a year, 1.8 times its average, so the premium for cash-flow risk varies over time by more than its mean. The price of cash-flow risk λ_{t+1} rises in the same proportion, by 0.012 percent a month per percentage point of fear ($t = 1.6$, column 1), so that one standard deviation of fear raises it by as much as its average of 0.085; this estimate is less precise because the ten portfolio estimates of risk are noisy, and Section IV.E measures the price from individual stocks. Revisions to the consumption data are not behind this. With the real-time

Table 3. Fear, habit and the price of payout cash-flow risk

Dependent variable	Without factor controls		Factor controls in $t + 1$	
	(1) Price λ_{t+1}	(2) Spread R_{t+1}^{HL}	(3) Price λ_{t+1}	(4) Spread R_{t+1}^{HL}
Panel A: Coefficient on fear				
Fear residual v_t	0.0116 (1.59)	0.0695 (2.54)	0.0164 (2.64)	0.0854 (3.38)
Real-time residual v_t^{rt}	0.0107 (1.46)	0.0614 (2.02)	0.0154 (2.62)	0.0772 (3.04)
One-step-ahead residual v_t^{oos}	0.0010 (0.14)	0.0395 (1.64)	0.0044 (0.72)	0.0508 (2.43)
One-step-ahead real-time residual $v_t^{rt,oos}$	0.0013 (0.21)	0.0334 (1.29)	0.0044 (0.78)	0.0429 (1.95)
Panel B: Effect of a one-standard-deviation increase in fear (% a month)				
Fear residual v_t	0.09	0.51	0.12	0.63
Real-time residual v_t^{rt}	0.08	0.45	0.11	0.57
Panel C: Coefficient on habit, in the regressions of the first two rows of Panel A				
Habit state h_t	0.028 (0.09)	-0.769 (-0.66)	0.089 (0.38)	-0.558 (-0.63)
Real-time habit state h_t^{rt}	-0.021 (-0.06)	-1.051 (-0.79)	-0.083 (-0.33)	-1.308 (-1.29)
Months	366	428	366	428

Estimates of (19). Each entry in Panel A comes from a separate regression of the dependent variable on one fear measure, the habit state and the Sahm indicator $Sahm_t$, in percentage points; the rows with v_t and v_t^{oos} , the expanding-window and one-step-ahead fear residuals from current-vintage consumption data, use the habit state h_t , and the rows with v_t^{rt} and $v_t^{rt,oos}$, the same residuals from the real-time consumption data available at each survey, use the real-time habit state h_t^{rt} . Fear is in percentage points and habit in percent a quarter. λ_{t+1} is the monthly slope from (18) on payout cash-flow risk, in percent a month per standard deviation of $\hat{\theta}^P$; R_{t+1}^{HL} is the payout decile 10 minus decile 1 return in percent a month. Columns (3) and (4) add the month $t + 1$ returns on the market, SMB, HML, RMW, CMA and momentum factors as controls, so that the fear coefficient measures the part of the variation in the price of cash-flow risk that these factor spreads do not span. Formation months t run from June 1995 (columns (1) and (3), which need 20 quarters of portfolio cash flows) or April 1990 (columns (2) and (4)) to November 2025. Panel B multiplies the coefficient by the standard deviation of the quarterly fear series from 1978Q3 to 2025Q4, 7.394 percentage points for v_t and 7.374 for v_t^{rt} . Table IA.1 of the Internet Appendix reports the coefficients on $Sahm_t$ and on habit in the remaining regressions. Constants are not reported. Newey and West (1987) t -statistics with 12 lags in parentheses.

residual, built only from what was known at each survey, the coefficients are 0.061 for the spread ($t = 2.0$) and 0.011 for the price ($t = 1.5$). Nor is consumption history. The habit state enters the spread regressions with the wrong sign for a habit story and is never significant (Panel C). The Sahm indicator does predict the spread, by 0.37 percentage points a month per standard deviation ($t = 2.6$), which is less than the 0.51 for fear; the labor market and fear both carry information about the price of payout risk, and fear carries more of it.

Could the fear effect be a time-varying exposure to known factors? Columns 3 and 4 add the month $t + 1$ returns of the market and five other factors, which would absorb such an exposure. The fear coefficient goes up rather than down, to 0.085 for the spread ($t = 3.4$) and 0.016 for the price ($t = 2.6$), and to 0.077 and 0.015 with real-time data ($t = 3.0$ and 2.6). Letting every factor loading depend on fear, habit and the Sahm indicator leaves it at 0.084 ($t = 4.4$) and 0.016 ($t = 3.7$). The standard factor spreads do not span the fear-dependent price of cash-flow risk. The one-step-ahead residuals, which rely only on coefficients estimated from earlier surveys, give smaller estimates ($t = 1.6$ for the spread and 0.1 for the price; 2.4 and 0.7 with factor controls). The difference comes from the surveys of 2020Q2 to 2021Q4, when those coefficients extrapolate far outside their sample and the residual reaches -81 percentage points; without the 21 formation months that use those surveys, the coefficients are 0.072 ($t = 2.9$) and 0.014 ($t = 2.3$), close to those on v_t in the same months.

Figure 3 shows these results graphically. Months in the two highest quintiles of the fear residual are followed by spreads of 10.3 and 13.8 percent a year, against 2.0 to 5.6 percent in the three lowest quintiles (4.2 and 14.1 percent in the lowest and highest quintiles of the real-time residual). Sorted by the habit state, the spread shows no pattern. The premium for cash-flow risk is concentrated in months of high fear, and these are not the months in which consumption has fallen.

Finally, a nonlinear habit state does not absorb the fear residual. The projection (12) removes a linear function of past consumption growth, while the habit state of Proposition 3 is nonlinear in consumption history. I therefore filter the exact habit state from consumption growth for 25 combinations of its persistence κ , from 0.04 to 0.64, and its sensitivity α , from 5 to 120, which include the calibrations of Campbell and Cochrane (1999) and Menzly et al. (2004). The exact state explains at most 7 percent of the variance of fear. When it replaces h_t in (12) and (19), together with the expected return that the habit model implies at that state, fear is identified only from variation that the habit model cannot produce. The fear coefficient remains significant for all 25 calibrations: for the spread, t -statistics are between 1.7 and 3.4; for the firm-level price of

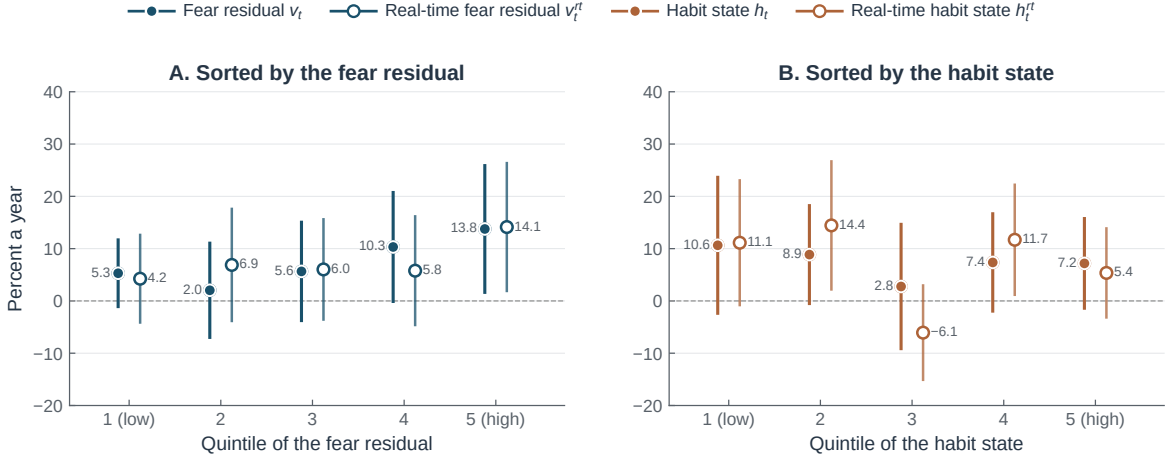


Figure 3. The payout cash-flow risk spread by state. Months from April 1990 to November 2025 are sorted into quintiles of the fear residual (Panel A) and of the habit state (Panel B), each measured from current-vintage data (v_t and h_t , filled dots) and from real-time data (v_t^{rt} and h_t^{rt} , hollow dots). Each dot is the average return of payout decile 10 minus decile 1 in the following month, in percent a year, and each bar is its 95 percent confidence interval, from Newey and West (1987) standard errors with 3 lags.

Section IV.E, between 3.5 and 4.2; and for the duration test of Section V, between -2.1 and -2.8 . With a flexible function of the state (its level, log and squared log) as controls, the firm-level and duration coefficients remain significant for 25 and 21 of the calibrations, and the spread for 6. Fear therefore carries information about the price of risk beyond the habit states tested here, most robustly in the firm-level and duration tests.

C. Prices and quantities of risk

Because $z_{d,t}$ in (18) is standardized each month, λ_{t+1} is the price per cross-sectional standard deviation of cash-flow risk, and the spread is the return on deciles whose difference in cash-flow risk varies over time. A positive fear coefficient could therefore arise because high-risk and low-risk stocks differ more in cash-flow risk when fear is high, at an unchanged price per unit of risk. Table 4 separates this quantity of risk from its price. Both rise with fear. When fear is high, the cross-section of cash-flow risk is more dispersed (Panel A): the difference in $\hat{\theta}^P$ between deciles 10 and 1 at formation rises by 0.07×10^{-3} per percentage point of fear ($t = 3.4$), from an average of 2.81×10^{-3} , so that it is about 40 percent wider at the 90th percentile of fear than at the 10th; the cross-sectional standard deviation of firm estimates rises by 0.016×10^{-3} ($t = 2.7$), also about

Table 4. Prices and quantities of payout cash-flow risk

	Average	Change per pp of fear	
		Current vintage	Real time
Panel A: Quantities of risk at formation ($\times 10^3$)			
Decile 10 minus decile 1 gap in $\hat{\theta}^P$	2.81	0.070 (3.44)	0.078 (4.52)
Standard deviation of $\hat{\theta}^P$ across deciles	0.83	0.025 (3.60)	0.025 (3.80)
Standard deviation of $\tilde{\theta}$ across stocks	0.66	0.016 (2.68)	0.014 (2.33)
Panel B: Prices per 10^{-3} of risk (% a month)			
Spread per unit of the decile gap		0.031 (3.44)	0.028 (3.12)
Firm-level price, with characteristics	0.00	0.013 (2.03)	0.018 (2.80)
Pooled regression, market-equity weights	0.08	0.019 (4.20)	0.018 (4.07)

Formation months April 1990 to November 2025 (June 1995 for the rows that use $\hat{\theta}^P$). Panel A: the dependent variable of (19) is a quantity of cash-flow risk at the end of month t : the gap in portfolio cash-flow risk $\hat{\theta}^P$ between deciles 10 and 1, its standard deviation across the ten deciles, and the market-equity-weighted standard deviation of the firm estimates $\tilde{\theta}$ across stocks, all multiplied by 1,000; the coefficient on fear is in these units per percentage point. Panel B: the spread row estimates $R_{t+1}^{HL} = c + \text{gap}_t (b_0 + b_1 v_t + b_2 h_t + b_3 \text{Sahm}_t) + \eta_{t+1}$, with R_{t+1}^{HL} in percent a month and gap_t the decile 10 minus decile 1 gap in $\hat{\theta}^P$ in units of 10^{-3} ; the fear columns report b_1 . The firm-level row estimates (21) with $z_{j,t}$ the firm estimate in units of 10^{-3} instead of its standardized value, in the specification of column (2) of Table 6, and then (19) on the monthly slope; the pooled row estimates (22) with the same $z_{j,t}$, with market-equity weights and Driscoll and Kraay (1998) standard errors with 12 lags; Average is the mean monthly slope in the firm-level row and b_0 , the price at average states, in the pooled row. Each real-time column uses v_t^{rt} and h_t^{rt} . Newey and West (1987) t -statistics with 12 lags in parentheses, except in the pooled row.

40 percent between the same percentiles. The price per unit of risk rises as well (Panel B). In a regression of the spread on the decile gap whose slope is linear in fear, the habit state and the Sahm indicator, the return per 10^{-3} of the gap rises by 0.031 percent a month per percentage point of fear ($t = 3.4$; 3.1 in real time). Across stocks, where the slope of (21) is measured per 10^{-3} of the firm estimate, the price rises by 0.013 percent a month per percentage point of fear with the characteristics as controls ($t = 2.0$; 2.8 in real time), and by 0.019 in the pooled regression (22) ($t = 4.2$; 4.1 in real time). The firm-level and pooled estimates hold the quantity of risk fixed, so they measure the change in its price.

D. Fear news and realized returns

Prediction 2 states that recession news that raises fear lowers the return of high- θ firms relative to low- θ firms, holding consumption news fixed: a rise in fear raises the discount rate on the cash

flows of high- θ firms relative to those of low- θ firms, so their relative price falls when the news arrives. I test it between consecutive surveys $q - 1$ and q . Let λ_q be the slope of the deciles' compounded returns from the month of survey $q - 1$ to the month of survey q on their standardized cash-flow risk at the start of the interval, in percent over the interval per standard deviation of cash-flow risk. I estimate

$$\lambda_q = d_0 + d_1 \Delta v_q + d_2 \Delta c_q + d_3 v_{q-1} + d_4 R_q^m + \xi_q, \quad (20)$$

where $\Delta v_q = v_q - v_{q-1}$ is the change in the fear residual between the two surveys and v_{q-1} its level at the start of the interval, which separates fear news from the higher expected return that a high level of fear predicts, both in percentage points; Δc_q is the average consumption growth of quarters $q - 1$ and q , in percent a quarter; R_q^m is the value-weighted market return over the interval, in percent; and d_0 and the error ξ_q are in the units of λ_q . The real-time version uses Δv_q^{rt} and v_{q-1}^{rt} . The prediction is $d_1 < 0$. Because the change in the residual also contains the predictable reversion of fear and the revisions of (12), I also use the fear innovation v_q , in percentage points: the part of the change in the full-sample residual that is orthogonal to its lagged level and to the macroeconomic news of the interval (consumption growth in quarters $q - 1$ and q , real GDP growth in quarter $q - 1$ and the change in the Sahm indicator). The innovations v_q^p and v_q^{rt} apply the same projection to raw SPF fear and to the real-time residual.

Table 5 confirms the prediction. A one-percentage-point rise in the fear residual between two surveys lowers the return of high-risk relative to low-risk stocks by 0.075 percent per standard deviation of cash-flow risk ($t = -2.5$; -0.101 , $t = -3.2$, in real time). The coefficient is negative in every row of the table; controlling for the market return, with the change in raw SPF fear, and with each fear innovation, it lies between -0.058 and -0.121 (t between -1.8 and -3.4). So high-risk stocks lose value when fear rises, and they do so for reasons that the interval's macroeconomic news cannot account for: a one-standard-deviation innovation in fear costs them 0.47 percent of relative return per standard deviation of cash-flow risk.

E. Firm-level regressions

Firm-level regressions test whether the fear effect reflects a characteristic known to predict returns, the weighting of the deciles or the portfolio estimates of risk. Each month I estimate the cross-

Table 5. Fear news and the returns of high-risk stocks

	Current vintage	Real time
Panel A: Change in the fear residual		
Without the market return	−0.075 (−2.49)	−0.101 (−3.23)
With the market return	−0.058 (−1.77)	−0.090 (−2.28)
without crisis quarters	−0.062 (−1.77)	−0.096 (−2.36)
surveys up to 2001	−0.069 (−0.43)	−0.173 (−1.58)
surveys from 2002	−0.042 (−1.12)	−0.064 (−1.59)
Panel B: Fear innovation, net of the level of fear and the news of the interval		
Without the market return	−0.121 (−3.44)	−0.103 (−2.66)
With the market return	−0.113 (−2.69)	−0.089 (−1.92)
Panel C: Raw SPF fear		
Change Δp_q , with the market return	−0.092 (−2.36)	−0.094 (−2.32)
Innovation v_q^p , without the market return	−0.097 (−2.56)	
Innovation v_q^p , with the market return	−0.084 (−1.83)	
Intervals, full sample	121	121

Coefficient d_1 of (20) for payout cash-flow risk, in percent per standard deviation of portfolio cash-flow risk per percentage point of fear news. In Panel A the fear variable is the change in the expanding-window residual, Δv_q with v_{q-1} as a control (current-vintage data), or Δv_q^r with v_{q-1}^r (real-time data); Δc_q is always included and the market return R_q^m where the row says so. The indented rows either drop the crisis quarters (2008Q3 to 2009Q2 and 2020Q1 to 2020Q2) or split the intervals at 2001, in which case the first subsample runs from 1995Q4 to 2001Q4 only. In Panel B the fear variable is instead the innovation in the full-sample residual, v_q , or in the real-time residual, v_q^r , and the only control is the market return where stated. Panel C replaces the change in the residual by the change in SPF fear Δp_q , with the controls of Panel A, or by the innovation in SPF fear v_q^p , which does not depend on the vintage. Intervals run from 1995Q4 to 2025Q4. [Newey and West \(1987\)](#) t -statistics with 4 lags in parentheses.

sectional regression ([Fama and MacBeth, 1973](#))

$$r_{j,t+1} = \lambda_{0,t+1}^F + \lambda_{t+1}^F z_{j,t} + \sum_{k=1}^8 \zeta_{k,t+1} x_{k,j,t} + \epsilon_{j,t+1}, \quad (21)$$

where $r_{j,t+1}$ is the excess return of stock j in month $t+1$, in percent; $z_{j,t}$ is the latest estimate $\tilde{\theta}^j$ of the stock's cash-flow risk known at the end of month t , winsorized at the 1st and 99th percentiles and standardized across stocks, so that the slope λ_{t+1}^F is the return, in percent a month, per standard deviation of cash-flow risk; $x_{k,j,t}$ are eight characteristics at the end of month t , standardized in the same way (log market equity, log book-to-market, the return over months $t-11$ to $t-1$, the return in month t , operating profitability, asset growth, CAPM beta and dividend yield), with slopes

$\zeta_{k,t+1}$ in percent a month per standard deviation; and the intercept $\lambda_{0,t+1}^F$ and the error $\varepsilon_{j,t+1}$ are in percent. I estimate (21) with market-equity weights, as in the deciles, and then (19) with λ_{t+1}^F as the dependent variable.

Table 6. Firm-level prices of cash-flow risk

	Current-vintage fear v_t , habit h_t			Real-time fear v_t^{rt} , habit h_t^{rt}		
	(1)	(2)	(3)	(4)	(5)	(6)
Eight characteristics	No	Yes	Yes	No	Yes	Yes
Total payout yield	No	No	Yes	No	No	Yes
Panel A: Average price of cash-flow risk						
Mean price $\bar{\lambda}^F$	0.104 (2.31)	0.039 (1.25)	0.035 (1.11)	0.104 (2.31)	0.039 (1.25)	0.035 (1.11)
Panel B: Coefficient on fear in (19)						
Baseline	0.0175 (2.88)	0.0137 (3.71)	0.0146 (3.94)	0.0178 (2.90)	0.0162 (4.90)	0.0168 (5.07)
Factor returns of month $t + 1$ as controls	0.0191 (3.19)	0.0128 (3.40)	0.0138 (3.67)	0.0195 (3.53)	0.0155 (4.45)	0.0163 (4.67)
Without the surveys of 2022Q2 to 2024Q1	0.0095 (1.23)	0.0113 (1.94)	0.0129 (2.22)	0.0098 (1.29)	0.0156 (2.97)	0.0169 (3.27)
One-step-ahead residual	0.0117 (2.33)	0.0102 (2.75)	0.0109 (2.86)	0.0108 (2.02)	0.0111 (2.99)	0.0117 (3.07)
Panel C: Habit and magnitude in the baseline regression						
Coefficient on habit	0.014 (0.05)	0.399 (2.16)	0.402 (2.22)	-0.119 (-0.38)	0.353 (1.77)	0.357 (1.84)
Rise of the price, 10th to 90th percentile of fear	0.28	0.22	0.23	0.26	0.24	0.25

Market-equity weights, all stocks, formation months April 1990 to November 2025 (428 months). Each month, (21) gives the price λ_{t+1}^F of firm cash-flow risk, in percent a month per cross-sectional standard deviation of risk, with the controls marked in the table: the eight characteristics of (21) (log market equity, log book-to-market, the return over months $t - 11$ to $t - 1$, the return in month t , operating profitability, asset growth, CAPM beta and dividend yield) and the total payout yield (dividends plus repurchases over the trailing four quarters over market equity). Panel A: the average of λ_{t+1}^F . Panel B: the coefficient c_1 on fear in (19) with λ_{t+1}^F as the dependent variable and the habit state and Sahm indicator as controls, in percent a month per percentage point of fear; the variants add the six factor returns of month $t + 1$, drop the formation months of the surveys of 2022Q2 to 2024Q1, or use the one-step-ahead residual. Panel C: the coefficient on habit in the baseline regression, and the baseline fear coefficient times the distance between the 10th and 90th percentiles of fear (16.08 percentage points for v_t , 14.74 for v_t^{rt}), in percent a month. Newey and West (1987) t -statistics with 12 lags in parentheses. Table IA.4 of the Internet Appendix reports equal-weighted and within-industry versions.

Table 6 shows that fear raises the price of cash-flow risk across individual stocks and that standard characteristics do not account for it. A one-percentage-point increase in the fear residual raises the price by 0.018 percent a month per standard deviation of risk ($t = 2.9$, column 1), and by

0.014 and 0.015 controlling for the eight characteristics and the payout yield ($t = 3.7$ and 3.9 ; 4.9 and 5.1 in real time). The characteristics absorb most of the average price, which falls from 0.104 to 0.039 percent a month, but little of its rise with fear, which is the object of the tests: from the 10th to the 90th percentile of fear, the price rises by 0.22 percent a month, 5.7 times its average. The effect survives the same month's factor returns and the one-step-ahead residuals, and without the surveys of 2022Q2 to 2024Q1 it is 0.011 ($t = 1.9$; 0.016, $t = 3.0$, in real time). A pooled regression with month fixed effects gives the same result:

$$r_{j,t+1} = \mu_{t+1} + z_{j,t} (b_0 + b_1 \tilde{v}_t + b_2 \tilde{h}_t + b_3 \widetilde{\text{Sahm}}_t) + \sum_{k=1}^8 \zeta_k x_{k,j,t} + e_{j,t+1}, \quad (22)$$

where μ_{t+1} is a month fixed effect, in percent; $\tilde{v}_t$, $\tilde{h}_t$ and $\widetilde{\text{Sahm}}_t$ are the fear residual, the habit state and the Sahm indicator minus their sample means, in percentage points, percent a quarter and percentage points; b_0 is the price of cash-flow risk at average states, in percent a month per standard deviation of risk, and b_1 to b_3 its sensitivities per unit of each state; ζ_k are constant slopes on the characteristics; and $e_{j,t+1}$ is the error, in percent. With market-equity weights and [Driscoll and Kraay \(1998\)](#) standard errors, $b_1 = 0.018$ ($t = 2.9$; 0.018, $t = 3.2$, in real time), and 0.012 ($t = 2.3$) when all eight characteristics also interact with the three states.

With equal weights and without microcaps (Table [IA.4](#) of the Internet Appendix), the coefficient is about half as large (t between 1.3 and 1.9), as the model predicts: smaller firms have less persistent payout shares, and Section [IV.F](#) shows that the fear effect is concentrated in firms with persistent shares. Two-digit industries explain three quarters of the variance of the shrunk estimates, and within industries the coefficient is 0.011 ($t = 1.4$), so the premium that fear raises is largely one for industry cash-flow risk; no single industry drives it, as leaving out any one of the twelve Fama-French industries gives t -statistics between 2.2 and 3.9. The habit state enters with the sign habit predicts ($t = 2.2$; 1.8 in real time) but a smaller effect than fear per standard deviation, 0.06 against 0.10 percent a month.

F. Share persistence

Prediction [5](#) states that the premium per unit of cash-flow risk, and its rise with fear, are larger for firms whose dividend shares are more persistent, because a firm's cash-flow risk is priced through the part of its value that its current share supports, which is small when the share reverts quickly.

The prediction does not separate fear from habit; it tests whether cash-flow risk is priced through the mechanism of the model. Each month I sort stocks into terciles of the share persistence ρ^j of Section III.D. The median persistence is 0.26, 0.45 and 0.65 in the three terciles, half-lives of 0.5, 0.9 and 1.6 years; the persistent tercile holds about 60 percent of market equity, and persistence is unrelated to cash-flow risk across stocks (average correlation -0.03).

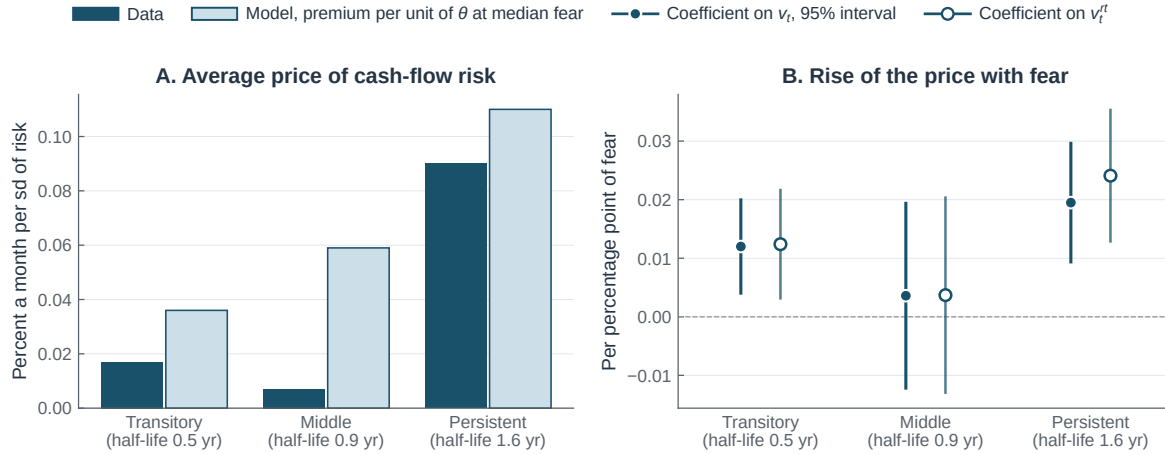


Figure 4. Cash-flow risk, fear and share persistence. Stocks are sorted each month into terciles of the persistence ρ^j of their payout shares, from April 1990 to November 2025; each tercile is labeled with its median half-life. Panel A shows the average firm-level price of cash-flow risk λ_{t+1}^F of (21), with market-equity weights and the eight characteristics, in percent a month per standard deviation of cash-flow risk (dark bars), and the model's premium per unit of θ^j at median fear at the tercile's median half-life, from Proposition 2 at the calibration of Section VII (light bars, in the model's units; the comparison is of the ordering across terciles). Panel B shows the coefficient on fear in (19) with λ_{t+1}^F as the dependent variable, per percentage point of the fear residual, with 95 percent confidence intervals from Newey and West (1987) standard errors with 12 lags, for v_t (filled dots) and the real-time residual v_t^F (hollow dots).

Table 7 and Figure 4 show that the fear effect is concentrated in firms with persistent payout shares. Among them, the average price of cash-flow risk is 0.090 percent a month per standard deviation, five times the 0.017 among transitory-share firms, and it rises by 0.020 per percentage point of fear ($t = 3.7$; 0.024, $t = 4.1$, in real time) against 0.012 ($t = 2.9$) (Panel A). Within the persistent tercile, the quintile spread on cash-flow risk earns 5.9 percent a year and rises with fear (0.080, $t = 2.5$), against 1.5 percent and 0.024 ($t = 1.2$) within the transitory tercile (Panel B); and the value premium falls with fear only among persistent-share firms, by 1.2 percentage points per standard deviation ($t = -1.8$), against no change among transitory-share firms (Panel C). Panel D tests the difference in one regression over all stocks, extending (22) with the standardized

Table 7. Cash-flow risk, fear and the persistence of payout shares

	Current-vintage fear v_t		Real-time fear v_t^{rt}	
	Transitory	Persistent	Transitory	Persistent
Payout share				
Median persistence ρ^j (half-life, years)	0.26 (0.5)	0.65 (1.6)	0.26 (0.5)	0.65 (1.6)
Panel A: Firm-level price of cash-flow risk, (21) with the eight characteristics				
Average price $\tilde{\lambda}^F$	0.017	0.090	0.017	0.090
Coefficient on fear	0.0120	0.0195	0.0124	0.0241
	(2.86)	(3.68)	(2.57)	(4.13)
Rise from 10th to 90th percentile of fear	0.19	0.31	0.18	0.36
Model: premium per unit of θ^j at median fear	0.036	0.110	0.036	0.110
Panel B: Top minus bottom quintile of cash-flow risk within the tercile				
Average spread	0.126	0.495	0.126	0.495
Coefficient on fear	0.0235	0.0795	0.0261	0.0787
	(1.23)	(2.46)	(1.21)	(2.31)
Panel C: Next quarter's value minus growth within the tercile				
Coefficient on fear	0.00	-1.22	-0.18	-1.22
	(-0.01)	(-1.75)	(-0.26)	(-1.81)
Panel D: Pooled regression (23), all stocks				
d_0 , rise in the price per sd of persistence	0.090 (2.96)		0.095 (3.15)	
d_1 , rise in its fear coefficient per sd of persistence	0.0091 (1.87)		0.0069 (1.40)	

Persistence is ρ^j of (16), the annual autocorrelation of the firm's log payout share, estimated on an expanding window of at least 20 quarters, shrunk toward its two-digit SIC industry with weight $n/(n+40)$, and known one quarter after the share's quarter; stocks are sorted into terciles each formation month, from April 1990 to November 2025 (602,452 stock-months, 4,755 firms). Transitory and persistent are the bottom and top terciles; Table IA.5 of the Internet Appendix adds the middle tercile. The coefficient on fear is from (19), with the habit state and Sahm indicator as controls: v_t and h_t in the current-vintage columns, v_t^{rt} and h_t^{rt} in the real-time columns. Panel A: the monthly price λ_{t+1}^F of (21) with market-equity weights, in percent a month per standard deviation of cash-flow risk; its average; its coefficient on fear, per percentage point of fear; and that coefficient times the distance between the 10th and 90th percentiles of fear. The model row is the premium per unit of θ^j at the median of fear, from Proposition 2 at the calibration of Section VII and the terciles' median half-lives. Panel B: the value-weighted return of the top minus the bottom quintile of cash-flow risk within the tercile, in percent a month. Panel C: the next quarter's value-weighted return of the top minus the bottom book-to-market tercile within the persistence tercile, in percent, per standard deviation of fear, controlling for the standardized habit state and Sahm indicator of the survey quarter, 1990Q3 to 2025Q3 (141 quarters). Panel D: (23) with market-equity weights that sum to one in each month, with Driscoll and Kraay (1998) standard errors. t -statistics in parentheses, with 12 lags (4 in Panel C).

persistence $\tilde{\pi}_{j,t}$:

$$r_{j,t+1} = \mu_{t+1} + z_{j,t}(b_0 + b_1 \tilde{v}_t + b_2 \tilde{h}_t + b_3 \widetilde{\text{Sahm}}_t) + z_{j,t} \tilde{\pi}_{j,t}(d_0 + d_1 \tilde{v}_t) + \tilde{\pi}_{j,t}(e_0 + e_1 \tilde{v}_t) + \sum_{k=1}^8 \zeta_k x_{k,j,t} + e_{j,t+1}, \quad (23)$$

where $\tilde{\pi}_{j,t}$ is the persistence estimate minus its sample mean, in units of its standard deviation; d_0 is the change in the price of cash-flow risk per standard deviation of persistence, in percent a month per standard deviation of risk, and d_1 the change in its fear sensitivity, per percentage point of fear; e_0 and e_1 are the premium on persistence itself and its fear sensitivity, in percent a month; and the other terms are as in (22). The price of cash-flow risk rises by 0.090 percent a month per standard deviation of persistence (d_0 , $t = 3.0$; 0.095, $t = 3.2$, in real time), and its fear sensitivity by 0.009 (d_1 , $t = 1.9$; 0.007, $t = 1.4$), while persistence itself carries no premium (e_0 and e_1 , $t = 0.3$ and 0.8).

The model gives the same ordering (last row of Panel A): the premium per unit of cash-flow risk is 3.1 times larger at a half-life of 1.6 years than at half a year, and its rise with fear 2.8 times larger; in the data the ratios are 5.4 and 1.6, so the data place more of the persistence effect in the level of the price than in its fear sensitivity, and the middle tercile (Table IA.5) does not lie between the other two. Cash-flow risk is priced, and its price rises with fear, in the firms whose shares persist, as it should be if a firm's exposure is priced through the value that its share supports.

G. Idiosyncratic risk

Prediction 6 states that idiosyncratic cash-flow risk is not priced, so the fear effect should not depend on it. The prediction also separates a price of risk from mispricing: premia that reflect sentiment or overreaction are concentrated in stocks that are costly to arbitrage, which idiosyncratic volatility measures (Stambaugh et al., 2015), whereas a price of risk applies to all stocks. I measure idiosyncratic volatility as the standard deviation of the residual of a regression of the stock's monthly excess return on the market excess return over the previous 36 months (at least 24), in percent a month, and sort stocks into terciles each month (Table IA.6 of the Internet Appendix). The fear effect is present among the stocks that are cheapest to arbitrage: within the tercile with the lowest idiosyncratic volatility, the quintile spread on cash-flow risk rises by 0.044 percentage points a month per percentage point of fear ($t = 2.6$; 0.040, $t = 2.1$, in real time), and the firm-level

price of cash-flow risk with characteristics by 0.010 ($t = 2.6$; 0.010, $t = 2.2$). The effect is larger among the most volatile stocks, where the spread itself is larger, but it does not rise with the cost of arbitrage: in the pooled regression (23) with standardized idiosyncratic volatility in place of persistence, the interaction of cash-flow risk, idiosyncratic volatility and fear is insignificant (d_1 , $t = -1.2$; -1.3 in real time). Idiosyncratic volatility itself carries no premium that moves with fear: the coefficient of its Fama-MacBeth slope, with the characteristics, on fear is 0.018 ($t = 1.4$), and 0.015 ($t = 1.6$) without microcaps. The fear effect is therefore a price of risk rather than a premium confined to stocks that are hard to arbitrage; Section VI examines mispricing directly.

H. The market premium

Prediction 7 states that the expected excess return of the market rises with fear, because both prices of risk do; under habit it rises with the habit state instead. I regress the excess return of the value-weighted market over the twelve months after the survey, in percent, on the fear residual, the habit state and the Sahm indicator of the survey quarter, with Newey and West (1987) standard errors with 18 lags for the overlap. A one-percentage-point increase in the fear residual raises the next twelve months' market excess return by 0.40 percentage points ($t = 2.6$; 0.52, $t = 3.1$, in real time), so the market premium is 7.2 percentage points higher at the 90th percentile of the residual than at the 10th (8.8 in real time). The habit state also predicts the market ($t = 2.7$), as it should if both states move the price of risk; the two are nearly uncorrelated, so the fear coefficient does not reflect habit. Over the next month alone, the fear coefficient is positive but insignificant ($t = 0.7$; 1.2 in real time). The slope of the security market line moves in the same direction: the Fama-MacBeth slope of next-month returns on market beta rises by 0.034 percent a month per standard deviation of beta per percentage point of fear ($t = 2.4$; 0.044, $t = 2.9$, in real time), and by 0.019 ($t = 1.4$) controlling for the characteristics. In the model, at the calibration of Section VII, the market premium rises from 2.5 percent a year at the 10th percentile of fear to 5.3 percent at the 90th, 2.8 percentage points against 7.2 in the data; Section VII uses this rise as one of the moments that discipline the fear-dependent pricing kernel.

V. Duration

Fear affects long-duration claims more than short-duration claims, because more of their value lies in dividends that will be discounted under future states of fear. In the model, a firm with a dividend share below its long-run mean, $s_t^j < \bar{s}^j$, is expected to grow into its share, so it pays little now and has long duration, like a growth stock; a firm with $s_t^j > \bar{s}^j$ is a value stock. I calibrate $s_t^j/\bar{s}^j$ to the average dividend yields of the lowest and highest book-to-market deciles of Kenneth French's data library from 1963 to 2025, which gives 0.98 for growth and 2.44 for value, and their cash-flow risk to the covariance of the deciles' annual dividend-share growth with consumption growth, -0.22×10^{-3} and 0.65×10^{-3} in the model's units. Total payout shares yield similar results (Section IA.K of the Internet Appendix).

Panel A of Table 8 shows the model's prediction. At the benchmark, $\omega = 0.21$, the value premium falls from -0.07 percent a year at the 10th percentile of fear to -0.66 percent at the 90th: high fear raises the discount rate on the long-duration claim more than on the short-duration one. Under habit, the premium rises with the state only if value firms have far more cash-flow risk than growth firms, above about 1.1×10^{-3} (Santos and Veronesi, 2010); more importantly, fear that past consumption does not explain has no effect on it. The test therefore rests on the fear residual (Prediction 3). The model fixes the sign of the test, not its size: in samples of the paper's length it gives the regression below a coefficient of -0.10 , against -1.15 in the data (Section VII).

I test the prediction with

$$r_{t+1}^D = b_0 + b_v v_t + b_h h_t + b_s \text{Sahm}_t + u_{t+1}, \quad (24)$$

where r_{t+1}^D is the return in quarter $t + 1$, the sum of its monthly returns in percent, on the value-weighted top 30 percent minus bottom 30 percent, or top decile minus bottom decile, book-to-market portfolios. The fear residual v_t , the habit state h_t and the Sahm indicator Sahm_t come from the survey of quarter t and are standardized, so the coefficients are in percent a quarter per standard deviation; and b_0 and the error u_{t+1} are in percent a quarter. The real-time version uses v_t^{rt} and h_t^{rt} . Fear predicts $b_v < 0$; habit predicts $b_v = 0$.

Table 8 confirms the prediction. A one-standard-deviation increase in the fear residual lowers the next quarter's value-minus-growth return by 1.15 percentage points for the 30 percent portfolios ($t = -2.5$) and by 1.53 for the deciles ($t = -2.2$), and by 1.39 and 1.87 with real-time data ($t = -3.3$ and -3.0). The one-step-ahead residuals give larger coefficients per standard deviation

Table 8. Fear and the value premium

Panel A: Model, expected return of value minus growth (% a year), by percentile of the fear state x						
	10th	25th	50th	75th	90th	99th
$\omega = 0.21$ (benchmark)	−0.07	−0.14	−0.27	−0.46	−0.66	−0.64
$\omega = 0$	−0.11	−0.19	−0.33	−0.54	−0.76	−0.79
$\omega = 1$ (habit)	0.06	0.03	−0.05	−0.17	−0.29	−0.10

Panel B: Data, coefficients of (24), 1978Q3 to 2025Q3 (189 quarters)				
	Top 30 minus bottom 30		Top 10 minus bottom 10	
	Current vintage	Real time	Current vintage	Real time
Coefficient on fear: expanding-window residual	−1.15 (−2.51)	−1.39 (−3.26)	−1.53 (−2.21)	−1.87 (−3.03)
one-step-ahead residual	−1.58 (−2.92)	−1.87 (−3.72)	−2.12 (−2.95)	−2.54 (−3.91)
one-step-ahead, without 2020Q2 to 2021Q4	−1.17 (−2.94)	−1.39 (−3.45)	−1.50 (−2.30)	−1.84 (−3.01)
Coefficient on habit	−0.69 (−1.34)	−0.56 (−1.12)	−1.16 (−1.30)	−1.03 (−1.34)
Coefficient on $Sahm_t$	0.83 (1.79)	0.81 (1.87)	1.64 (2.61)	1.60 (2.86)

Panel C: Data, top 30 minus bottom 30, coefficient on fear in subsamples		
Without 2008 and 2009 (181 quarters)	−1.04 (−2.25)	−1.30 (−3.07)
Without 2020 to 2024 (169 quarters)	−1.18 (−2.26)	−1.46 (−2.90)
1978Q3 to 2007Q4 (118 quarters)	−1.07 (−2.20)	−1.69 (−3.32)
1990Q1 to 2025Q3 (143 quarters)	−1.21 (−2.19)	−1.40 (−2.82)

Panel A uses Proposition 2 at the calibration of Section VII, with dividend shares relative to their means of 0.98 (growth) and 2.44 (value), cash-flow risk of -0.22×10^{-3} and 0.65×10^{-3} in the model's units, and no exposure to recession news ($\sigma_{sp}^j = 0$); with $\underline{x} = 0$ and $\bar{x} = 1$ (Section VII), the percentiles of x are 0.26, 0.37, 0.60, 1.04, 1.88 and 6.73. Panel B reports b_v , b_h and b_s of (24), in percent a quarter per standard deviation of each regressor, standardized over the regression sample; the current-vintage columns use v_t or v_t^{oos} with h_t , and the real-time columns v_t^{rt} or $v_t^{rt,oos}$ with the real-time habit state h_t^{rt} ; the habit and $Sahm_t$ rows are from the regressions with the expanding-window residual. Panel C reports b_v in subsamples, with habit and $Sahm_t$ in the regression and regressors standardized over the full sample. Table IA.2 of the Internet Appendix reports all coefficients and two more values of ω . Newey and West (1987) t -statistics with 4 lags in parentheses.

because they are more dispersed in 2020 and 2021; without those surveys they match v_t (-1.17 , $t = -2.9$). The habit coefficient is negative and insignificant. In subsamples without the financial crisis, without 2020 to 2024, from 1978 to 2007 and from 1990 to 2025, the fear coefficient stays between -1.04 and -1.21 (t between -2.2 and -2.3 ; -2.8 to -3.3 in real time) (Panel C).

The effect is neither a valuation effect nor one of payout cash-flow risk (Section [IA.K](#) of the Internet Appendix). Controlling for the term and default spreads, the market's dividend-price and book-to-market ratios or the value spread ([Cohen et al., 2003](#)) leaves the fear coefficient between -1.08 and -1.52 (t between -2.3 and -2.8), and -2.19 ($t = -3.8$) with all five. Value and growth stocks have the same payout cash-flow risk, and within each tercile of cash-flow risk the return of value minus growth falls with fear (-0.77 to -1.13 percentage points per standard deviation). The duration test thus reaches fear through a channel different from the cash-flow risk tests, and the habit state predicts neither.

VI. Risk or mispricing?

Forecasters' fear exceeds an objective probability of recession by 5.6 percentage points on average (Table 1), so when fear is high, investors may also be too pessimistic about the cash flows of the firms most exposed to a downturn. As in theories in which expectations overreact ([Lakonishok et al., 1994](#); [Bordalo et al., 2019, 2024](#)), the prices of those firms would then fall too far when fear rises and recover when the feared recession does not come. This pessimism channel fits both cross-sectional results of Section IV, that high-risk stocks fall when fear rises and that their premium over low-risk stocks is larger when fear is high, so these results alone cannot separate it from the risk channel of the model. To separate the two, I test four implications on which these explanations disagree. First, if pessimism depresses the prices of cyclical, short-duration value firms, value stocks should outperform growth stocks after fear rises; under the risk channel, high fear raises the discount rate on long-duration claims more, and the value premium falls. Second, if investors are too pessimistic, so are the analysts who forecast the same firms: their earnings forecasts for high-risk firms should be too low when fear is high, and the errors should be corrected as earnings are realized, at the survey's horizon or beyond it. Under the risk channel, forecast errors do not depend on fear. Third, a premium that reflects mispricing is earned when the news that corrects the error arrives, so the fear-dependent premium should be concentrated at firms' earnings announcements and on the days of macroeconomic releases; a premium for risk is earned on all days alike. Fourth,

and less sharply, mispricing should be largest where arbitrage is most costly, among small firms, while a price of risk applies to all firms.

Value underperforms when fear is high, the opposite of what pessimism predicts. Value stocks have shorter duration than growth stocks (Dechow et al., 2004; Weber, 2018; Gormsen and Lazarus, 2023), so more of their value lies in the cash flows of the next four quarters, the horizon of the survey question, and their payout cash-flow risk is no lower (Section V). Excessive pessimism over that horizon would therefore depress value prices more, and value would outperform growth as the error is corrected. Instead, value underperforms when fear is high (Table 8), within every tercile of cash-flow risk and with valuation ratios held fixed, as the model predicts. Only pessimism about the distant future would favor growth stocks, so the forecast tests below examine expectations at the survey’s horizon and beyond it.

Analysts are not too pessimistic about high-risk firms when fear is high. If investors are too pessimistic, analysts, whose forecasts are a common proxy for expected cash flows (Bordalo et al., 2019; De la O et al., 2024), should be too, and realized earnings should beat their forecasts. Each month t , I estimate

$$FE_{j,t} = g_{0,t} + g_t z_{j,t} + \sum_{k=1}^8 h_{k,t} x_{k,j,t} + e_{j,t}, \quad (25)$$

where $FE_{j,t}$ is the actual minus the I/B/E/S consensus forecast, made in month t , of firm j ’s earnings per share for its current fiscal year, in percent of the share price and winsorized at the 1st and 99th percentiles, so that it is positive when analysts were too pessimistic; $z_{j,t}$ and $x_{k,j,t}$ are the standardized payout cash-flow risk and characteristics of (21); g_t and $h_{k,t}$ are their slopes, in percent of the price per standard deviation; and $g_{0,t}$ and $e_{j,t}$ are an intercept and the error, in percent of the price. I then estimate (19) with g_t as the dependent variable, with Newey and West (1987) standard errors with 24 lags because consecutive forecasts overlap. Mispricing predicts a positive coefficient on fear. It is 0.0020 ($t = 0.8$) with market-equity weights and -0.0029 ($t = -0.8$) with equal weights. The slope rises instead with the habit state ($t = 2.0$ and 3.0), so any error in analysts’ forecasts seems to follow consumption history, not fear.

Forecasts of more distant cash flows show no fear-driven error either. The error of the next fiscal year’s forecast rises only weakly with fear (0.0089, $t = 1.6$, with market-equity weights; 0.0016, $t = 0.4$, with equal weights), and its revisions over the next twelve months do not move

with it (t between -0.4 and 0.9). Analysts lower long-term growth forecasts for high-risk firms somewhat when fear is high ($t = -0.8$ and -1.8) but do not raise them again over the following year (t between 0.1 and 1.1), as a correction would require.

The fear effect is not earned when firms announce earnings. If high-risk stocks are underpriced when fear is high, the correction should come with news about their cash flows, and the fear-dependent premium should be earned in announcement months, as for many anomalies (Engelberg et al., 2018). I let the price of cash-flow risk in (21) differ in those months:

$$r_{j,t+1} = \lambda_{0,t+1}^F + \lambda_{t+1}^F z_{j,t} + \lambda_{t+1}^{EA} z_{j,t} EA_{j,t+1} + \delta_{t+1} EA_{j,t+1} + \sum_{k=1}^8 \zeta_{k,t+1} x_{k,j,t} + \varepsilon_{j,t+1}, \quad (26)$$

where $EA_{j,t+1}$ is one if firm j reports quarterly earnings in month $t + 1$ and zero otherwise; λ_{t+1}^F is the price of payout cash-flow risk outside announcement months and λ_{t+1}^{EA} the additional price in them, both in percent a month per standard deviation of risk; δ_{t+1} is the additional return of announcing stocks, in percent; and the other terms are as in (21). The average premium is earned mostly in announcement months (λ_{t+1}^{EA} averages 0.13 percent a month, $t = 2.0$, against 0.01 outside them), but its rise with fear is not: the coefficient on v_t is 0.010 ($t = 2.1$) outside announcement months and 0.016 ($t = 2.3$) in them, a difference of 0.006 ($t = 0.9$; 0.004, $t = 0.5$, in real time). The same holds in the three days around each report: 85 percent of the fear effect is earned outside these windows (0.012, $t = 3.3$, against 0.002, $t = 1.4$, inside them).

A large part of the fear effect is earned around macroeconomic releases. A belief about a recession is a belief about the economy, so its correction could instead come with macroeconomic news. I split each month's return at the days of the employment report and of the GDP estimates, 24 scheduled releases a year, from August 1996 to 2025. Over the release day and the next trading day, 19 percent of trading days, the price of cash-flow risk rises with fear by 0.009 ($t = 4.7$; 0.008, $t = 4.8$, in real time), against 0.008 ($t = 2.1$) on all other days together. About half of the fear effect is earned in these windows, most of it on the day after a release, and the concentration holds without the pandemic surveys, from 1996 to 2019 and with equal weights. This fits the correction of excessive pessimism, but equally a premium for bearing macroeconomic risk, which is also earned largely on announcement days (Savor and Wilson, 2013, 2014, 2016; Ai and Bansal, 2018). The releases therefore do not separate the two readings; the duration and forecast tests do.

The effect is not concentrated among small firms. Mispricing tends to be strongest among small firms (Baker and Wurgler, 2006). The fear effect is, if anything, stronger among large firms: with equal weights and without microcaps the firm-level coefficient is about half as large as with market-equity weights, although the difference is not significant ($t = 1.5$, Section IV.E). Taken together, the evidence favors an effect of fear on discount rates, as in the model, over an effect through overly pessimistic expectations of cash flows.

VII. Calibration

The calibration disciplines the fear process and the preferences with asset prices, so that the model's predictions for the cross-section are not fitted to the cross-section. It has two steps; Table 9 reports the estimates.

Step 1: consumption and the correlation of fear with consumption. Over 1968Q4 to 2025Q4, real per-capita consumption growth has a mean of 1.7 percent and a volatility of $\sigma_C = 0.02$ a year. Expected growth does not depend on fear in the model, and in the data one standard deviation of fear lowers next-year growth by only 0.39 percentage points (R^2 of 0.04). I set ω , the correlation between fear shocks and bad consumption news, by indirect inference: it is the value at which the model reproduces the correlation of -0.18 between the quarterly change in SPF fear and consumption growth (Section III), measured in the model as in the data, with the survey read in the middle of the quarter and consumption growth as the log change of quarterly flows. This gives $\omega = 0.21$, with a 95 percent block-bootstrap interval from 0.03 to 0.36.

Step 2: fear process and preferences. With the market as the claim to aggregate consumption, I estimate the mean reversion κ and volatility scale v of fear, the sensitivity $A = a(\bar{x} - \underline{x})$ of the preference shock and the time preference ρ by the simulated method of moments on nine moments: the mean and volatility of the market excess return and of the real short rate, set to conventional values of 6, 18, 1 and 2 percent a year; the mean and standard deviation of the log price-dividend ratio, 3.69 and 0.45 (Bansal et al., 2012); and, from monthly data from 1947 to 2025, the ratio's 12-month and 36-month autocorrelations, 0.92 and 0.81, and the slope of the next year's excess return on it, -0.064 . Model moments are averages over 10,000 simulated paths of 100 years, and the weighting matrix is the inverse of the Newey and West (1987) covariance matrix of the data

moments, with 18 lags, tilted toward the four return and interest rate moments. The estimates are $\kappa = 0.051$, $v = 0.32$, $A = 0.80$ and $\rho = 0.017$. The model matches the volatility of the excess return (17.9 percent a year), the persistence of the price-dividend ratio (autocorrelations of 0.86 and 0.65) and its predictive slope (-0.071); it gives an equity premium of 4.1 percent a year, a real rate of 0.6 percent with a volatility of 3.1 percent, and a standard deviation of the log price-dividend ratio of 0.36.

The fear state. Prices depend on the fear state only through $(x_t - \underline{x})/(\bar{x} - \underline{x})$ and A , so the levels of the state are a choice of units: I set $\underline{x} = 0$ and $\bar{x} = 1$ and link the SPF probability to the state by rank. At the estimates, $x_t - \underline{x}$ is inverse gamma with shape 2 and scale 1, the limit at which the variance of fear is finite: its 10th, 50th and 90th percentiles are 0.26, 0.60 and 1.88, at which the SPF probability is 10.3, 16.5 and 30.4 percent. Matching the persistence of the price-dividend ratio makes fear more persistent in the model than in the survey, with a quarterly autocorrelation of 0.96 against 0.83. I also tried the obvious alternative of taking the SPF probability itself as the state, with its own persistence and dispersion. That specification delivers neither the equity premium nor the volatility of the market, so I let prices, rather than the survey's dynamics, discipline the fear process.

Measurement in the model. The estimator (15) of cash-flow risk returns $0.53\theta^j - 0.33\sigma_C^2$ on average for a claim with cash-flow risk θ^j , because overlapping four-quarter sums smooth the covariance and the growth rate carries a Jensen term. The estimator of the exposures after formation returns $0.58\theta^j - 0.32\sigma_C^2$, and the annual estimator $0.59\theta^j - 0.32\sigma_C^2$. The fear residual built as in (12) from the simulated survey and consumption has a rank correlation of 0.83 with the fear state. Lastly, in samples of the paper's length the model gives the duration regression (24) a coefficient on the fear residual of -0.10 , against -1.15 in the data, and c_1 in (19) a value of 0.004, against 0.070: the model implies the signs of the tests, not their sizes.

A. Quantitative implications

The calibrated model answers three questions. Does it match the signs of the findings? How large are its premia relative to the data, and what price of consumption risk would match them? And what pricing kernel do the data require?

Table 9. Calibration

	Target	Model
Panel A: Parameters		
κ , mean reversion of fear		0.051 (0.014)
ν , volatility scale of fear		0.319 (0.044)
$a(\bar{x} - \underline{x})$, sensitivity of the preference shock		0.804 (0.108)
ρ , time preference		0.0166 (0.0024)
ω , correlation of fear with bad consumption news		0.21
$\bar{x}$, $\underline{x}$, mean and lower bound of fear		1, 0
Panel B: Targeted moments		
Mean excess return (% a year)	6.00	4.12
Return volatility (% a year)	18.00	17.86
Mean real rate (% a year)	1.00	0.60
Volatility of the real rate (% a year)	2.00	3.09
Mean log price-dividend ratio	3.69	4.35
Std. of log price-dividend ratio	0.450	0.362
Autocorrelation of log P/D, 12 months	0.921	0.864
Autocorrelation of log P/D, 36 months	0.806	0.645
Predictability slope, one year	-0.064	-0.071

Annual frequency. Panel A: standard errors in parentheses; parameters without one are set in the first step. Panel B: the first four targets are round values; the mean and standard deviation of log P/D are from [Bansal et al. \(2012\)](#); the last three are monthly data from 1947 to 2025. Model moments are averages over 10,000 simulated paths of 100 years.

Model fit. At the benchmark calibration, with $\omega = 0.21$, the price of cash-flow risk rises with fear (Prediction 1), high-risk stocks fall when fear rises (Prediction 2), the value premium falls with fear over 97 percent of the stationary distribution of the fear state (Prediction 3), and consumption history matters only through its weak correlation with fear (Prediction 4). To compare magnitudes, I invert these relations to map the measured cash-flow risk into the model's units: the estimates of Table 2, 2.47×10^{-3} for decile 10 and -0.33×10^{-3} for decile 1, become 4.89×10^{-3} and -0.38×10^{-3} , and the exposures over the three years after formation become 3.03×10^{-3} and 2.01×10^{-3} . With dividend shares at their long-run means, so that the deciles differ only in cash-flow risk, the model's spread averages 0.36 percent a year at the benchmark and rises by 0.34 percentage points between the 10th and 90th percentiles of fear, whose values are 0.26 and 1.88 with the mean at 1; in the habit limit it averages 1.34 percent and rises by 1.39 points. In the data the spread averages 7.39 percent a year, or 3.36 percent after factor adjustment, and rises by 13.4 percentage points. As is common for consumption-based models evaluated with measured consumption, the model's premia are smaller than those in the data, both on average and in their

rise with fear; Santos and Veronesi (2010) document the same pattern for the value premium.

Part of the difference reflects the consumption data. Aggregate consumption from the national accounts is time-averaged and includes households that hold no stocks, so its volatility and its covariance with payouts understate those of the consumption that prices equity (Breedon et al., 1989; Mankiw and Zeldes, 1991; Parker and Julliard, 2005; Malloy et al., 2009). Since the model's premia scale with σ_C and with the measured covariances, they come out too small for this reason alone, and the risk aversion I back out below should be read as an upper bound.

Matching the data requires a higher price of consumption risk. At the median fear state, the extreme payout deciles differ in their return loading on consumption news by 0.044 with the mapped exposures. Matching the average spread then requires a price of consumption risk of 1.7, an effective risk aversion of 84 at $\sigma_C = 0.02$, or 38 for the factor-adjusted spread, against the model's average price of 0.067; matching the rise of the spread with fear requires that price to rise by about 3 between low-fear and high-fear months. Either effective risk aversion toward consumption risk is high and moves with fear, or the covariances of payouts with the consumption that prices risk exceed the measured ones, as models of long-run cash-flow risk (Bansal et al., 2005; Hansen et al., 2008) and the aggregation of consumption imply.

B. Fear that raises the price of consumption risk

A shock that scales the utility of consumption, as g_t does in (3), changes how much the investor values consumption now relative to later, but not how much she dislikes consumption risk. Under logarithmic utility, the price of consumption risk therefore equals σ_C apart from a term that comes from the comovement of fear with consumption, which is weak. The data ask for a price of consumption risk that is large on average and larger when fear is high.

A kernel with risk aversion that rises with fear delivers the signs. Consider

$$\frac{dM_t}{M_t} = -r_t dt - \Gamma(x_t) \sigma_C dZ_t^C - H(x_t) dZ_t^P, \quad (27)$$

where r_t is the real interest rate; Z_t^C and Z_t^P are the consumption and recession-news shocks of Section II; $\Gamma(x_t)$ is the effective risk aversion toward consumption risk, an increasing function of fear; and $H(x_t) > 0$ is the price of recession news, positive as $\Lambda_{p,t}$ is in Proposition 1. An asset

with return loadings $L_{C,t}^j$ and $L_{p,t}^j$ on consumption news and recession news has expected excess return $\Gamma(x_t)\sigma_C L_{C,t}^j + H(x_t)L_{p,t}^j$. Cash-flow risk raises $L_{C,t}^j$, so its premium rises with fear for any correlation between fear and consumption. Long duration raises the loading on recession news, because long-duration claims gain the most when fear falls, so the value premium falls with fear when the recession-news term outweighs the consumption-risk term. In the economy of Section II, the special case $\Gamma(x_t) = \Lambda_{C,t}/\sigma_C$ and $H(x_t) = \Lambda_{p,t}$, the recession-news term accounts for the whole fall of the value premium with fear. Because Γ depends on fear rather than on consumption history, the habit state has no role.

Several mechanisms can make risk aversion rise with fear. Risk aversion rises after bad news even for investors who lost nothing (Guiso et al., 2018) and when finance professionals are primed with a bust (Cohn et al., 2015); models of stochastic risk aversion (Bekaert et al., 2010) and measures of risk appetite (Bekaert et al., 2022; Pflueger et al., 2020) let the price of risk move partly independently of consumption; and a higher perceived probability of disaster (Wachter, 2013) raises the premia of exposed claims, which an estimate of (27) would read as a higher price of consumption risk if exposure to disasters and cash-flow risk go together. Nothing in this paper separates these mechanisms from one another. What the evidence does pin down is the state they respond to, which is the fear that forecasters report rather than the consumption that households have already lived through.

C. An estimated fear-dependent kernel

I estimate (27) with $\Gamma(x_t) = \gamma_0 + \gamma_1 q(x_t)$ and $H(x_t) = \eta q(x_t)$, where $q(x_t)$ is the bounded fear term of the preference shock, on six moments over the formation months of the payout tests: the average and the change between the 10th and 90th percentiles of fear of the market excess return, the payout spread and the book-to-market decile 10 minus decile 1 spread (Section IA.M of the Internet Appendix). The cash flows, the fear process and ω are those of the benchmark calibration, the exposures are the mapped ones, the market is a levered claim to consumption, and p -values come from a parametric bootstrap.

With constant exposures, the kernel matches the average market premium and the average payout spread with an effective risk aversion that rises from 56 at the 10th percentile of fear to 69 at the 90th, but it reproduces 1.4 of the 13.4 percentage points by which the payout spread rises with fear ($p = 0.09$; 0.04 in real time).

When the exposures of payouts to consumption rise with fear, with their average held at the measured values, the kernel fits 9.8 of the 13.4 points with a constant effective risk aversion of 41 and a market premium that does not move with fear, as in the data, where its change is 1.2 percentage points with a standard error of 6.5 ($p = 0.11$; 0.04 in real time). This is consistent with Section IV.C, where the dispersion of cash-flow risk widens when fear is high. Neither version reproduces the fall of the value premium with fear, which in the model comes from the price of recession news: these six moments do not identify that price (η has a bootstrap interval from 0 to 26).

VIII. Robustness

This section rules out six alternative explanations of the results: look-ahead in the fear measure, the inference problems of a persistent and estimated regressor, a single episode of high fear, other state variables that move with fear, the construction of the payout measure, and a premium for cyclicity in general. It also shows which horizon of fear matters and whose fear is measured.

The results do not rely on information that was not available at the time. The fear residual v_t uses only surveys up to t , but its regressors use current-vintage consumption data. The real-time residual v_t^{rt} uses only the data available at each survey, and every table reports both. With real-time data, the firm-level fear coefficient, the duration coefficient and the response to fear news are larger and more precise ($t = 4.9$, -3.3 and -3.2). Cash-flow risk also uses only the statements reported by each formation date; variants with historical industry codes, without imputed report dates, or with a longer imputation lag give firm-level t -statistics between 3.1 and 3.5. Survivorship does not drive the portfolio price either. The portfolio cash-flow risk of (15) is built from the firms in each decile at the end of a quarter, so firms that stop reporting during the four quarters drop out; building it instead from the firms in the decile at the start of each four-quarter change, with the payout of those that leave counted as zero, raises the fear coefficient of the price λ_{t+1} from 0.0116 ($t = 1.6$, Table 3) to 0.0157 ($t = 2.5$), and from 0.0107 to 0.0151 ($t = 2.4$) in real time.

Multiple testing, persistence and the estimated first stage. With two related portfolio tests, a Bonferroni bound at the 5 percent level requires $t > 2.24$, which the spread passes (2.54; 3.38 with factor controls) and the firm-level price passes by a wide margin (t between 3.7 and 5.1),

while the portfolio price does not (1.59). Block bootstraps under the null of no fear effect, one of which re-estimates the first stage (12) on every draw, give one-sided p -values of 0.01, 0.07 to 0.08 and below 0.001 for the spread, the portfolio price and the firm-level price (0.03, 0.09 to 0.10 and below 0.001 in real time); the first stage changes them by at most 0.002. The small-sample bias of a persistent regressor (Stambaugh, 1999) is between a twentieth and an eighth of each coefficient, and the reduced-bias estimates of Amihud and Hurvich (2004) have t -statistics of 2.6, 1.8 and 3.3 (2.0, 1.5 and 4.8 in real time).

No single episode drives the firm-level results. Between 1990 and 2020 the fear residual was in its top quartile in eight separate episodes, and dropping any one of them leaves the coefficients within about a third of their full-sample values. The most informative episode is the fear of 2022 and 2023, the largest episode of fear without a recession: without the surveys of 2022Q2 to 2024Q1, the spread's coefficient falls to 0.030 ($t = 1.2$), while the firm-level coefficient is 0.011 ($t = 1.9$), and 0.016 ($t = 3.0$) in real time. The duration test, which covers 1978 to 2025, is stable across subsamples (t between -2.2 and -2.5 ; -2.8 to -3.3 in real time).

Fear is not a proxy for financial conditions, risk appetite or uncertainty. The fear residual is orthogonal to consumption, the habit state and unemployment, but not to financial conditions. I add to (19), one at a time, fourteen controls measured at the end of the formation month: the term and credit spreads, the log dividend-price ratio, cay (Lettau and Ludvigson, 2001), realized variance, the variance risk premium, the VIX, the excess bond premium (Gilchrist and Zakrajšek, 2012), the risk-aversion and uncertainty indices of Bekaert et al. (2022), a price of volatile stocks (Pflueger et al., 2020), forecaster disagreement, macroeconomic uncertainty (Jurado et al., 2015) and the intermediary capital ratio (He et al., 2017). With each control, the firm-level fear coefficient stays between 0.012 and 0.019 (t between 2.5 and 4.5; 4.0 to 5.4 in real time), and the spread's between 0.048 and 0.096 (t between 1.6 and 3.2, the lowest with the term spread). With all fourteen at once, the t -statistics are 2.5 for the firm-level price (4.9 in real time) and 2.2 for the spread. Uncertainty itself does not raise the price of cash-flow risk: none of the macroeconomic, real or financial uncertainty indices of Jurado et al. (2015) and Ludvigson et al. (2021) predicts the spread or the firm-level price on its own (t between -1.3 and 1.5), and with each as a control the duration coefficient stays between -1.06 and -1.21 (t between -2.1 and -2.4 ; -2.6 to -3.1 in real time).

The effect comes from fear about the coming quarters. With the residual of the probability of a decline at a single horizon in place of v_t , one standard deviation of fear raises the next month's spread by 0.33 percentage points for the current quarter ($t = 1.4$) and by 0.48 to 0.51 for two to four quarters ahead (t between 2.1 and 2.8), and the firm-level price rises with fear at every horizon from the next quarter on (t between 2.8 and 3.6). The slope of the term structure of these probabilities (Zhou, 2017) adds little to the level.

The payout measure does not drive the results. Payout to common stock alone gives a spread coefficient of 0.096 ($t = 3.2$) and a firm-level t -statistic of 3.6. Payout per share, the cash flow of a shareholder who keeps her fraction of the firm and so absorbs dilution from issues, gives 0.104 ($t = 3.1$) and 3.5, and leaving out firms that issued more than 5 percent of their market equity gives 0.069 ($t = 2.6$) and 4.0. Leaving out the starts and stops of payout, about a fifth of the growth observations, gives 0.081 ($t = 2.0$) and 0.015 ($t = 3.7$). Payout net of issuance, which is dominated by the timing of issues, carries no fear effect ($t = -0.7$ and 0.7).

The premium is for payout cash-flow risk, not for cyclicity in general. Deciles sorted on the cash-flow risk of sales or of operating income have prices and spreads that do not move with fear (t between -0.5 and 0.5). Stated cyclicity, the share of the risk-factor sentences of each 10-K from 2006 to 2025 that mention the economy or the business cycle, ranks firms' realized cyclicity (the sales of its top decile are three times as sensitive to GDP growth as those of its bottom decile) but is only weakly related to payout cash-flow risk (rank correlation 0.07). Its price does not rise with fear ($t = -0.4$; 0.0 in real time), and with it as a control the fear coefficient for the price of payout cash-flow risk is 0.026 ($t = 4.4$; 0.024, $t = 3.9$, in real time).

Forecasters' fear carries information beyond consumers' expectations. The SPF panel consists of professional forecasters, not investors; if their fear differs from the priced state by unrelated noise, the estimates are biased toward zero. A Michigan fear residual, built from the Index of Consumer Expectations in the same way, is correlated with the SPF residual (0.56) and predicts the firm-level price on its own ($t = 2.2$), but with both in (19) the SPF residual keeps t -statistics of 2.8 for the spread and 2.4 for the firm-level price (2.5 and 3.7 in real time) while the Michigan residual is insignificant.

IX. Conclusion

Stocks whose cash flows fall in recessions should earn a premium. This paper asks when that premium is high. Habit models answer that it is high after consumption has fallen. I provide a different answer: the premium is high when professional forecasters fear a recession, whether or not consumption has fallen.

I measure that fear directly. The probability of a decline in real GDP that forecasters report every quarter is largely unrelated to past consumption and unemployment, and it rose several times without a recession, most clearly in 2022 and 2023. This independent variation separates fear from consumption history, and four results follow. First, stocks whose payouts move most with consumption earn little more than other stocks when fear is low and much more when fear is high. Across individual stocks, the price of this risk rises by more than five times its average between low and high fear, controlling for standard characteristics and factor returns, while consumption history adds little. Second, the effect is concentrated in firms whose payout shares are persistent, as the model predicts if a firm's cash-flow risk is priced through the value that its current payout supports. Third, high-risk stocks fall when fear rises, and the value premium falls when fear is high, the duration effect that a habit model does not produce. Fourth, the evidence points to discount rates rather than pessimistic expectations of cash flows. Analysts are not more pessimistic about high-risk firms when fear is high, and value stocks underperform rather than outperform after fear rises. The results hold with real-time data and are not explained by uncertainty, financial conditions, forecaster disagreement or a premium for cyclical risk in general.

These findings matter for three audiences. For asset pricing theory, they identify a state variable that moves the price of cash-flow risk beyond the consumption that households have already experienced: forward-looking fear of a recession. A model in which fear has news of its own produces the signs of all the results, and matching their size requires a price of consumption risk that rises with fear, a target for models of time-varying risk aversion and disaster risk. For empirical work, they show that survey probabilities of recession are informative conditioning variables for the cross-section of returns, beyond the consumption and financial variables usually used. For investors and policymakers, they imply that fear of a recession raises the cost of capital of firms with cyclical payouts even when the recession does not come.

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A. Proofs

Throughout, $g_t = 1 + a(x_t - \bar{x})$, so that $dg_t = a dx_t$.

Proof of Proposition 1. The investor's marginal utility of consumption at t is $e^{-\rho t} g_t / C_t$, which is the kernel M_t in (4). The proof applies Itô's lemma to the product $M_t = e^{-\rho t} g_t C_t^{-1}$ and reads off the drift and the two diffusion coefficients.

Step 1: the two factors. From (2) and $dg_t = a dx_t$,

$$\frac{dg_t}{g_t} = \frac{a}{g_t} \left[\kappa(\bar{x} - x_t) dt - \nu(x_t - \underline{x}) (\omega dZ_t^C + \sqrt{1 - \omega^2} dZ_t^P) \right],$$

and from (1), since $d(C^{-1})/C^{-1} = -dC/C + (dC/C)^2$,

$$\frac{d(C_t^{-1})}{C_t^{-1}} = -\bar{\mu} dt + \sigma_C^2 dt - \sigma_C dZ_t^C.$$

Step 2: the product. For a product of three processes, dM_t/M_t is the sum of the three relative increments plus the cross terms, and $e^{-\rho t}$ has no diffusion:

$$\frac{dM_t}{M_t} = -\rho dt + \frac{dg_t}{g_t} + \frac{d(C_t^{-1})}{C_t^{-1}} + \frac{dg_t}{g_t} \frac{d(C_t^{-1})}{C_t^{-1}}.$$

The only nonzero cross term multiplies the dZ_t^C parts of the two factors, $-(a/g_t)\nu(x_t - \underline{x})\omega$ and $-\sigma_C$, so it equals $a\nu\omega\sigma_C(x_t - \underline{x})/g_t dt$.

Step 3: matching coefficients. Writing the result as $-r_t dt - \Lambda_{C,t} dZ_t^C - \Lambda_{p,t} dZ_t^P$: the dt terms give $r_t = \rho + \bar{\mu} - \sigma_C^2 + a\kappa(x_t - \bar{x})/g_t - a\nu\omega\sigma_C(x_t - \underline{x})/g_t$, which is (6); the dZ_t^C terms give $\Lambda_{C,t} = \sigma_C + a\nu\omega(x_t - \underline{x})/g_t$; and the dZ_t^P terms give $\Lambda_{p,t} = a\nu\sqrt{1 - \omega^2}(x_t - \underline{x})/g_t$, as in (5).

Step 4: monotonicity. Both prices of risk depend on x_t only through $h(x) = (x - \underline{x})/g$. Its derivative is

$$h'(x) = \frac{g - a(x - \underline{x})}{g^2} = \frac{1 - a(\bar{x} - \underline{x})}{g^2},$$

because $g - a(x - \underline{x}) = 1 + a(x - \bar{x}) - a(x - \underline{x}) = 1 - a(\bar{x} - \underline{x})$. The assumption $a(\bar{x} - \underline{x}) < 1$ makes $h' > 0$. Hence $\Lambda_{C,t} = \sigma_C + a\nu\omega h(x_t)$ increases with x_t if and only if $\omega > 0$, and $\Lambda_{p,t} = a\nu\sqrt{1 - \omega^2} h(x_t)$ increases with x_t whenever $\sqrt{1 - \omega^2} > 0$, that is, whenever $\omega < 1$. $\square$

Proof of Proposition 2. The proof has three parts: the price is a discounted expectation of $g_t s_t^j$; that expectation is linear in the state because the state has an affine drift; and the return loadings follow from the price by Itô's lemma.

Step 1: the price as an expectation. The price of the dividend stream $D_\tau^j = s_\tau^j C_\tau$ is $P_t^j = E_t \int_t^\infty (M_\tau/M_t) D_\tau^j d\tau$. With $M_\tau = e^{-\rho\tau} g_\tau/C_\tau$, consumption cancels in $M_\tau D_\tau^j$, and

$$P_t^j = \frac{C_t}{g_t} \int_0^\infty e^{-\rho u} E_t[q_{t+u}^j] du, \quad q_t^j \equiv g_t s_t^j.$$

Step 2: the drift of q_t^j . By Itô's lemma, $dq_t^j = s_t^j dg_t + g_t ds_t^j + dg_t ds_t^j$. The first two terms contribute the drifts $a\kappa(\bar{x} - x_t)s_t^j$ and $g_t\phi^j(\bar{s}^j - s_t^j)$. The cross term multiplies the diffusion of g_t , $-a\nu(x_t - \underline{x})(\omega dZ_t^C + \sqrt{1 - \omega^2} dZ_t^p)$, by that of s_t^j in (7), which gives $-a\nu(x_t - \underline{x})s_t^j c^j dt$ with $c^j = \omega\sigma_{sC}^j + \sqrt{1 - \omega^2}\sigma_{sp}^j$: the instantaneous covariance between the share's growth and the news that lowers fear. So the drift of q_t^j is

$$a\kappa(\bar{x} - x_t)s_t^j + g_t\phi^j(\bar{s}^j - s_t^j) - a\nu(x_t - \underline{x})s_t^j c^j.$$

This drift is linear in (x_t, q_t^j, s_t^j) . To see it, replace $g_t s_t^j$ by q_t^j and $x_t s_t^j$ by $[q_t^j - (1 - a\bar{x})s_t^j]/a$, which follows from $g_t = 1 + a(x_t - \bar{x})$, and collect terms:

$$(1 - a\bar{x})\phi^j \bar{s}^j + a\phi^j \bar{s}^j x_t - K^j q_t^j + S^j s_t^j,$$

where the coefficient on q_t^j is $-(\kappa + \phi^j + \nu c^j) = -K^j$ and the coefficient on s_t^j is $\kappa + \nu c^j(1 - a(\bar{x} - \underline{x})) = S^j$.

Step 3: the discounted expectation. Let $X_t = (x_t, q_t^j, s_t^j)'$. Its drift is $A_0 + A_1 X_t$ with

$$A_0 = \begin{pmatrix} \kappa\bar{x} \\ (1 - a\bar{x})\phi^j \bar{s}^j \\ \phi^j \bar{s}^j \end{pmatrix}, \quad A_1 = \begin{pmatrix} -\kappa & 0 & 0 \\ a\phi^j \bar{s}^j & -K^j & S^j \\ 0 & 0 & -\phi^j \end{pmatrix},$$

so $m(u) \equiv E_t[X_{t+u}]$ solves the linear equation $m'(u) = A_0 + A_1 m(u)$ with $m(0) = X_t$. Multiplying by $e^{-\rho u}$, integrating over $u \geq 0$ and integrating the left side by parts gives $\rho L - X_t = A_0/\rho + A_1 L$

for $L = \int_0^\infty e^{-\rho u} m(u) du$, that is,

$$L = (\rho I - A_1)^{-1} \left(X_t + \frac{A_0}{\rho} \right),$$

provided that $e^{-\rho u} m(u) \rightarrow 0$, which holds when $\rho + \kappa$, $\rho + K^j$ and $\rho + \phi^j$ are positive. The price is C_t/g_t times the second element of L . Because $\rho I - A_1$ is lower triangular, its second row is easy to invert: with $c_q^j = 1/(\rho + K^j)$, $c_x^j = a\phi^j \bar{s}^j / [(\rho + \kappa)(\rho + K^j)]$ and $c_s^j = S^j / [(\rho + \phi^j)(\rho + K^j)]$, the second element of L is $c_x^j x_t + c_q^j q_t^j + c_s^j s_t^j + c_0^j$, where $c_0^j = [c_x^j \kappa \bar{x} + c_q^j (1 - a\bar{x}) \phi^j \bar{s}^j + c_s^j \phi^j \bar{s}^j] / \rho$ collects the constant A_0/ρ . Substituting $q_t^j = g_t s_t^j$ gives (9).

Step 4: loadings. Write $P_t^j = C_t F_t^j / g_t$ with F_t^j the bracket in (9). The diffusion of $d \log P_t^j$ is the diffusion of $d \log C_t$, which is $\sigma_C dZ_t^C$, plus $(\partial \log F_t^j / \partial x_t - a/g_t)$ times the diffusion of x_t , plus $\partial \log F_t^j / \partial s_t^j$ times the diffusion of s_t^j ; the term $-a/g_t$ is $-\partial \log g_t / \partial x_t$, and $\partial F_t^j / \partial x_t = c_x^j + c_q^j a s_t^j$ because F_t^j depends on x_t also through g_t . Collecting the dZ_t^C and dZ_t^p terms, and using $\sigma_{SC}^j = \theta^j / \sigma_C$, gives $L_{C,t}^j$ and $L_{p,t}^j$. The loading on the firm's own shock Z_t^j does not enter M_t and is not priced. Finally, the expected excess return of any asset equals $-\text{Cov}_t(dM_t/M_t, dR_t^j)/dt$, and with the kernel of Proposition 1 this is $\Lambda_{C,t} L_{C,t}^j + \Lambda_{p,t} L_{p,t}^j$, which is (10). $\square$

Proof of Proposition 3. With $\omega = 1$, the recession-news shock drops out of (2), and with $v = \alpha \sigma_C$ the fear process becomes

$$dx_t = \kappa(\bar{x} - x_t) dt - \alpha(x_t - \underline{x}) \sigma_C dZ_t^C, \quad \sigma_C dZ_t^C = \frac{dC_t}{C_t} - \bar{\mu} dt,$$

where the second equality is (1). The shift $y_t = x_t - x^*$ leaves increments unchanged, $dy_t = dx_t$, and turns $\bar{x} - x_t$ into $\bar{y} - y_t$ with $\bar{y} = \bar{x} - x^* = 1/a$, and $x_t - \underline{x}$ into $y_t - \underline{y}$ with $\underline{y} = \underline{x} - x^*$. This gives the process for y_t in the proposition. For the kernel, $g_t = 1 + a(x_t - \bar{x}) = 1 + a(y_t - 1/a) = a y_t$, so $M_t = a e^{-\rho t} y_t / C_t$. In Menzly et al. (2004), the investor has utility $\log(C_t - X_t)$ over consumption in excess of an external habit X_t . Marginal utility is $1/(C_t - X_t) = Y_t/C_t$ with $Y_t = C_t/(C_t - X_t)$, the inverse surplus consumption ratio, and Y_t is specified to follow $dY_t = k(\bar{Y} - Y_t) dt - \alpha(Y_t - \underline{Y})(dC_t/C_t - E_t[dC_t/C_t])$ with lower bound $\underline{Y}$. With $(k, \bar{Y}, \underline{Y}) = (\kappa, \bar{y}, \underline{y})$, their Y_t and this paper's y_t follow the same equation driven by the same consumption, so the two kernels differ only by the constant a . Prices are expectations of ratios of the kernel at two dates, in which a constant cancels, so every asset price coincides. $\square$

Internet Appendix for “Recession Fear and the Price of Cash-flow Risk”

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This Internet Appendix reports the estimates and details behind the paper. It has four parts. The first gives the complete estimates of the main regressions and their inference in finite samples: block bootstraps that re-estimate the fear residual on every draw, and a correction for the bias of a persistent predictor, confirm the significance of the payout spread and the firm-level price; the firm-level regressions are also reported with equal weights and within industries. The second shows where in the cross-section the premium is earned: the fear effect is concentrated in firms with persistent payout shares and present among the stocks that are cheapest to arbitrage. The third reports the tests that rule out alternative explanations: the exact habit state of the model at 25 calibrations, single episodes of high fear, fourteen measures of financial conditions, risk appetite, uncertainty and intermediary capital, alternative payout measures and point-in-time inputs, and measures of cyclicity built from sales, operating income and the text of annual reports. It also gives the valuation controls and double sorts behind the duration test and the analyst forecasts and announcement returns behind the tests of risk against mispricing. The fourth covers the model and the data: the estimation of the fear-dependent pricing kernel and the construction of the data. Every table reports results with both the current-vintage fear residual v_t and the real-time residual v_t^{rt} . Equation, table and section numbers without the prefix IA refer to the paper.

IA.A Full estimates of Tables 3 and 8

Tables [IA.1](#) and [IA.2](#) report all coefficients of the regressions summarized in Tables 3 and 8, and the model’s value premium at two more values of ω .

IA.B Finite-sample inference and persistence

Table [IA.3](#) reports the finite-sample inference summarized in Section [VIII](#) for the payout spread and price of Table 3 and the value-weighted firm-level price with characteristics of Table 6, column

Table IA.1. Fear, habit and the price of payout cash-flow risk: all coefficients

Dependent variable	(1) λ_{t+1}	(2) λ_{t+1}	(3) R_{t+1}^{HL}	(4) R_{t+1}^{HL}	(5) λ_{t+1}	(6) λ_{t+1}	(7) R_{t+1}^{HL}	(8) R_{t+1}^{HL}
Panel A: Fear and habit measured from current-vintage data								
Fear residual v_t	0.0116 (1.59)		0.0695 (2.54)		0.0164 (2.64)		0.0854 (3.38)	
One-step-ahead residual v_t^{oos}		0.0010 (0.14)		0.0395 (1.64)		0.0044 (0.72)		0.0508 (2.43)
Habit state h_t	0.028 (0.09)	-0.027 (-0.09)	-0.769 (-0.66)	-0.504 (-0.41)	0.089 (0.38)	0.055 (0.23)	-0.558 (-0.63)	-0.229 (-0.24)
Sahm indicator $Sahm_t$	0.026 (0.78)	0.023 (0.57)	0.370 (2.60)	0.466 (2.79)	-0.012 (-0.47)	-0.007 (-0.19)	0.199 (1.35)	0.324 (1.95)
Effect of 1 sd of fear	0.09	0.01	0.51	0.42	0.12	0.05	0.63	0.54
Panel B: Fear and habit measured from real-time data								
Real-time residual v_t^{rt}	0.0107 (1.46)		0.0614 (2.02)		0.0154 (2.62)		0.0772 (3.04)	
One-step-ahead $v_t^{rt,oos}$		0.0013 (0.21)		0.0334 (1.29)		0.0044 (0.78)		0.0429 (1.95)
Real-time habit h_t^{rt}	-0.021 (-0.06)	0.006 (0.02)	-1.051 (-0.79)	-0.646 (-0.46)	-0.083 (-0.33)	-0.017 (-0.07)	-1.308 (-1.29)	-0.789 (-0.75)
Sahm indicator $Sahm_t$	0.023 (0.69)	0.023 (0.58)	0.346 (2.19)	0.438 (2.42)	-0.014 (-0.51)	-0.005 (-0.14)	0.185 (1.11)	0.302 (1.68)
Effect of 1 sd of fear	0.08	0.01	0.45	0.35	0.11	0.05	0.57	0.46
Factor controls in $t + 1$	No	No	No	No	Yes	Yes	Yes	Yes
Months	366	366	428	428	366	366	428	428

All coefficients of the regressions of Table 3. λ_{t+1} is the monthly slope from (18) on payout cash-flow risk, in percent a month per standard deviation of $\hat{\theta}^P$; R_{t+1}^{HL} is the payout decile 10 minus decile 1 return in percent a month. In Panel A, v_t and v_t^{oos} are the expanding-window and one-step-ahead fear residuals in percentage points and h_t the habit state in percent a quarter, all from current-vintage consumption data; in Panel B, v_t^{rt} , $v_t^{rt,oos}$ and h_t^{rt} are the same variables built from the real-time consumption data available at each survey. $Sahm_t$ is the real-time Sahm indicator in percentage points. Columns (5) to (8) add the month $t + 1$ returns on the market, SMB, HML, RMW, CMA and momentum factors as controls, so that the fear coefficient measures the part of the variation in the price of cash-flow risk that these factor spreads do not span. Formation months t run from June 1995 (columns with λ , which need 20 quarters of portfolio cash flows) or April 1990 (columns with R^{HL}) to November 2025. Constants are not reported. The effect of 1 sd of fear is the effect of a one-standard-deviation increase in the fear variable, in percent a month, using the standard deviation of the quarterly series from 1978Q3 to 2025Q4: 7.394 percentage points for v_t , 10.56 for v_t^{oos} , 7.374 for v_t^{rt} and 10.63 for $v_t^{rt,oos}$. Newey and West (1987) t -statistics with 12 lags in parentheses.

Table IA.2. Fear and the value premium: all coefficients

Panel A: Model, expected return of value minus growth (% a year), by percentile of the fear state x						
	10th	25th	50th	75th	90th	99th
$\omega = 1$ (habit)	0.06	0.03	-0.05	-0.17	-0.29	-0.10
$\omega = 0.6$	-0.01	-0.06	-0.16	-0.32	-0.48	-0.37
$\omega = 0.3$	-0.06	-0.12	-0.25	-0.43	-0.62	-0.58
$\omega = 0.21$ (benchmark)	-0.07	-0.14	-0.27	-0.46	-0.66	-0.64
$\omega = 0$	-0.11	-0.19	-0.33	-0.54	-0.76	-0.79
Panel B: Data, coefficients of (24), 1978Q3 to 2025Q3 (189 quarters)						
	Top 30 minus bottom 30			Top 10 minus bottom 10		
	Fear	Habit	Sahm _{<i>t</i>}	Fear	Habit	Sahm _{<i>t</i>}
Fear measured by v_t	-1.15	-0.69	0.83	-1.53	-1.16	1.64
	(-2.51)	(-1.34)	(1.79)	(-2.21)	(-1.30)	(2.61)
Fear measured by v_t^{oos}	-1.58	-0.78	0.33	-2.12	-1.29	0.97
	(-2.92)	(-1.52)	(0.83)	(-2.95)	(-1.44)	(1.47)
without the surveys of 2020Q2 to 2021Q4	-1.17	-0.82	0.22	-1.50	-1.27	0.88
	(-2.94)	(-1.60)	(0.59)	(-2.30)	(-1.46)	(1.65)
Fear measured by v_t^{rt}	-1.39	-0.56	0.81	-1.87	-1.03	1.60
	(-3.26)	(-1.12)	(1.87)	(-3.03)	(-1.34)	(2.86)
Fear measured by $v_t^{rt,oos}$	-1.87	-0.79	0.20	-2.54	-1.34	0.77
	(-3.72)	(-1.54)	(0.52)	(-3.91)	(-1.72)	(1.25)
without the surveys of 2020Q2 to 2021Q4	-1.39	-0.80	0.26	-1.84	-1.25	0.91
	(-3.45)	(-1.62)	(0.71)	(-3.01)	(-1.61)	(1.77)
Panel C: Top 30 minus bottom 30, subsamples, regressions on fear, habit and Sahm _{<i>t</i>}						
	Quarters	v_t and h_t		v_t^{rt} and h_t^{rt}		
		Fear	Habit	Fear	Habit	
Full sample	189	-1.15	-0.69	-1.39	-0.56	
		(-2.51)	(-1.34)	(-3.26)	(-1.12)	
Without 2008 and 2009	181	-1.04	-0.66	-1.30	-0.52	
		(-2.25)	(-1.29)	(-3.07)	(-1.04)	
Without 2020 to 2024	169	-1.18	-0.79	-1.46	-0.84	
		(-2.26)	(-1.49)	(-2.90)	(-1.55)	
1978Q3 to 2007Q4	118	-1.07	-0.86	-1.69	-1.18	
		(-2.20)	(-0.48)	(-3.32)	(-1.37)	
1990Q1 to 2025Q3	143	-1.21	-0.69	-1.40	-0.37	
		(-2.19)	(-1.09)	(-2.82)	(-0.55)	

All coefficients of the regressions of Table 8. Panel A uses Proposition 2 at the calibration of Section VII, with dividend shares relative to their means of 0.98 (growth) and 2.44 (value), cash-flow risk of -0.22×10^{-3} and 0.65×10^{-3} in the model's units, and no exposure to recession news ($\sigma_{sp}^j = 0$); with $\underline{x} = 0$ and $\bar{x} = 1$ (Section VII), the percentiles of x are 0.26, 0.37, 0.60, 1.04, 1.88 and 6.73. Panel B reports b_v (column Fear), b_h (column Habit) and b_s from (24), in percent a quarter per standard deviation of each regressor, standardized over the regression sample; the rows use v_t or v_t^{oos} with h_t , from current-vintage data, and v_t^{rt} or $v_t^{rt,oos}$ with the real-time habit state h_t^{rt} . Panel C reports b_v and b_h in subsamples, with regressors standardized over the full sample. Newey and West (1987) t -statistics with 4 lags in parentheses.

(2).

Bootstraps. Panel A reports two bootstraps under the null $c_1 = 0$, each with 5,000 draws. The residual bootstrap keeps the states in their order and rebuilds the dependent variable from its fitted values on the habit state and the Sahm indicator plus residuals resampled in circular blocks of 24 months. The two-stage bootstrap also accounts for the estimation of the fear residual: it resamples the surveys in circular blocks of eight quarters, together with their regressors in (12) and their formation months, re-estimates the expanding-window residual on every draw (with each survey's real-time regressors for v_t^{rt}), and rebuilds the dependent variable under the null as before. The p -value is the share of draws whose t -statistic is at least as large as the actual one. Holding each drawn survey's residual at its estimated value changes the p -values by at most 0.002, so the estimation of the residual does not change the size of the test. Panel B reports the standard deviation of c_1 across the same resampled samples with their actual returns. These standard errors exceed the Newey-West ones by 8 to 30 percent, mainly because they also resample the episodes of fear; the first stage raises only that of the spread, from 0.030 to 0.034.

Persistent predictor. Panel C checks for the small-sample bias of predictive regressions with persistent predictors (Stambaugh, 1999). It works at the survey frequency, with

$$y_q = c_0 + c_1 v_q + c_2 h_q + c_3 \text{Sahm}_q + e_q, \quad (\text{IA.1})$$

where y_q is the average of the spread, the price or the firm-level price over the three formation months that use survey q , in percent a month, so that its returns are realized after the survey; v_q is the fear residual of survey q , in percentage points; h_q is the habit state of survey q , in percent a quarter; Sahm_q is the Sahm indicator known at the survey date, the value for the first month of the survey quarter, in percentage points, so that every state is measured before the returns in y_q ; c_0 is a constant and e_q the error, both in percent a month; and c_1 to c_3 are slopes in percent a month per unit of each state. The states follow

$$X_{q+1} = a + \Phi X_q + u_{q+1}, \quad X_q = (v_q, h_q, \text{Sahm}_q)', \quad (\text{IA.2})$$

where a is a vector of constants and u_{q+1} a vector of innovations, both in the units of X_q , and Φ is a matrix of slopes, which I correct for its small-sample bias by bootstrap. Under the null $c_1 = 0$, I

resample pairs (e_q, u_{q+1}) of residuals in blocks of four quarters, rebuild the states from (IA.2) with the corrected Φ and y_q from (IA.1) with $c_1 = 0$ and the estimated c_0 , c_2 and c_3 , and estimate (IA.1) again, 5,000 times. The mean of the estimates of c_1 is its bias under the null, between a twentieth and an eighth of each coefficient, and the share of t -statistics at least as large as the actual one is a one-sided p -value. The reduced-bias estimate adds the innovations u_{q+1} of the corrected VAR to (IA.1) as regressors (Amihud and Hurvich, 2004). With the real-time residual, v_q^{rt} and h_q^{rt} replace v_q and h_q in both equations. With the Sahm indicator averaged over the three formation months in place of its survey-date value, the estimates of c_1 change by at most 0.003.

IA.C Firm-level prices with equal weights and within industries

Table IA.4 complements Table 6 with the equal-weighted regressions, for stocks above the 20th percentile of NYSE market equity, and the regressions within two-digit SIC industries, in which cash-flow risk and the characteristics are demeaned within each industry and month. Section IV.E discusses both.

IA.D All persistence terciles

Table IA.5 extends Table 7 with the middle persistence tercile, the estimates for all stocks, all coefficients of the pooled regression (23) except the slopes on the characteristics, and the average value-minus-growth return within each tercile. Section IV.F discusses the results.

IA.E Idiosyncratic volatility

Section IV.G tests Prediction 6. Idiosyncratic volatility is the standard deviation of the residual of a regression of the stock's monthly excess return on the value-weighted market excess return over the previous 36 months, with at least 24, in percent a month; its 10th, 50th and 90th percentiles across stock-months are 4.8, 8.5 and 16.8 percent. Stocks are sorted into terciles of idiosyncratic volatility each formation month, and within each tercile into quintiles of cash-flow risk. Table IA.6 reports the value-weighted top minus bottom quintile spread and its coefficient on the fear residual in (19)

Table IA.3. Finite-sample inference for the fear coefficient

	Current vintage, v_t			Real time, v_t^{rt}		
	Spread	Price	Firm level	Spread	Price	Firm level
Panel A: Bootstrap p -values under $c_1 = 0$						
Newey-West t -statistic	2.54	1.59	3.71	2.02	1.46	4.90
Residual bootstrap, states fixed	0.009	0.079	0.000	0.029	0.095	0.000
95th percentile of t	1.72	1.89	1.62	1.75	1.87	1.65
Two-stage bootstrap, first stage re-estimated	0.011	0.070	0.000	0.027	0.088	0.000
95th percentile of t	1.79	1.76	1.63	1.69	1.82	1.63
Same draws, residual held fixed	0.011	0.071	0.000	0.025	0.090	0.000
Panel B: Standard error of c_1						
Newey-West	0.0274	0.0073	0.0037	0.0304	0.0073	0.0033
Pairs bootstrap, first stage re-estimated	0.0341	0.0095	0.0040	0.0363	0.0093	0.0039
Pairs bootstrap, residual held fixed	0.0299	0.0094	0.0041	0.0352	0.0096	0.0038
Panel C: Persistent predictor, survey frequency, Sahm indicator at the survey date						
OLS c_1	0.0748 (2.69)	0.0130 (1.77)	0.0135 (3.71)	0.0655 (2.13)	0.0116 (1.55)	0.0160 (5.01)
Persistence of fear, bias-corrected	0.81	0.83	0.81	0.83	0.86	0.83
Correlation of return and fear shocks	-0.24	-0.12	-0.21	-0.27	-0.21	-0.22
Bias of c_1 under the null	0.0038	0.0013	0.0012	0.0054	0.0009	0.0020
Bootstrap p -value	0.014	0.080	0.002	0.044	0.100	0.000
Reduced-bias c_1	0.0696 (2.56)	0.0113 (1.78)	0.0115 (3.30)	0.0597 (1.97)	0.0096 (1.50)	0.0142 (4.75)

Spread and price are the payout decile 10 minus decile 1 return and the price λ_{t+1} of Table 3; firm level is the value-weighted firm-level price with characteristics of Table 6, column (2). Panel A: the Newey-West t -statistic on fear in (19) (12 lags) and the one-sided p -values and 95th percentiles of the t -statistic of two bootstraps under $c_1 = 0$ with 5,000 draws: the residual bootstrap with the states in their actual order, and the two-stage bootstrap that resamples surveys and formation months in blocks of eight quarters and re-estimates the expanding-window fear residual on every draw, also on the same draws with the residual of each drawn survey held at its estimated value. Panel B: the Newey-West standard error of c_1 and its standard deviation across the same resampled samples with their actual returns. Panel C: estimates of (IA.1) over 142 survey quarters from 1990Q2 to 2025Q3 (121 from 1995Q3 for the price), in percent a month per percentage point of fear, with Newey-West t -statistics (4 lags); the bias-corrected own persistence of fear in (IA.2); the correlation between e_q and the innovation to fear in u_{q+1} ; the mean of c_1 across bootstrap draws under the null and the one-sided bootstrap p -value; and the reduced-bias estimate of c_1 with its t -statistic. With the real-time residual, v_t^{rt} and h_t^{rt} replace v_t and h_t .

Table IA.4. Firm-level prices of cash-flow risk with equal weights and within industries

	Equal weights, no microcaps			Market-equity weights
	None	Chars.	Within industry	Within industry
Mean price $\bar{\lambda}^F$	0.059 (1.53)	0.039 (1.26)	0.005 (0.12)	0.077 (1.56)
Panel A: Current-vintage fear and habit				
Fear residual v_t	0.0077 (1.32)	0.0070 (1.42)	-0.0031 (-0.74)	0.0112 (1.36)
Habit state h_t	0.254 (1.13)	0.192 (1.10)	0.276 (1.28)	0.567 (1.52)
v_t , factor returns as controls	0.0080 (1.63)	0.0063 (1.48)	-0.0065 (-1.44)	0.0118 (1.34)
v_t , without 2022Q2 to 2024Q1	0.0017 (0.21)	0.0057 (0.80)	-0.0083 (-1.38)	-0.0018 (-0.25)
v_t^{oos} instead of v_t	0.0019 (0.38)	0.0045 (1.29)	0.0018 (0.47)	0.0014 (0.16)
Panel B: Real-time fear and habit				
Real-time residual v_t^{rt}	0.0086 (1.47)	0.0084 (1.69)	-0.0001 (-0.02)	0.0093 (1.10)
Real-time habit h_t^{rt}	0.436 (1.61)	0.326 (1.59)	0.268 (1.14)	0.423 (0.96)
v_t^{rt} , factor returns as controls	0.0089 (1.89)	0.0077 (1.84)	-0.0037 (-1.01)	0.0103 (1.13)
v_t^{rt} , without 2022Q2 to 2024Q1	0.0027 (0.32)	0.0077 (1.04)	-0.0032 (-0.48)	-0.0046 (-0.59)
$v_t^{rt,oos}$ instead of v_t^{rt}	0.0029 (0.58)	0.0059 (1.71)	0.0037 (0.84)	-0.0016 (-0.19)

As Table 6. Equal weights use stocks above the 20th percentile of NYSE market equity. Within industry: firm cash-flow risk and the characteristics are demeaned within two-digit SIC industry and month. [Newey and West \(1987\)](#) t -statistics with 12 lags in parentheses.

(Panel A), the firm-level price of cash-flow risk with characteristics within each tercile and its fear coefficient (Panel B), the pooled regression (23) with standardized idiosyncratic volatility in place of persistence (Panel C), and the Fama-MacBeth slope on standardized idiosyncratic volatility with the characteristics, which is the premium on idiosyncratic volatility itself, and its fear coefficient (Panel D).

Table IA.5. Cash-flow risk, fear and the persistence of payout shares: all terciles

	Persistence tercile			All
	1 (transitory) 0.26 (0.5)	2 3 (persistent) 0.45 (0.9) 0.65 (1.6)		
Median persistence ρ^j (half-life, years)				
Panel A: Firm-level price of cash-flow risk, (21) with characteristics, and its rise with fear				
Average price $\tilde{\lambda}^F$	0.017	0.007	0.090	0.055
Coefficient on v_t	0.0120 (2.86)	0.0036 (0.44)	0.0195 (3.68)	0.0152 (4.02)
Coefficient on v_t^{rt}	0.0124 (2.57)	0.0037 (0.43)	0.0241 (4.13)	0.0171 (4.84)
Model: premium per unit of θ^j at median fear	0.036	0.059	0.110	
Panel B: Pooled regression (23), market-equity weights, month fixed effects				
	v_t, h_t	v_t^{rt}, h_t^{rt}		
b_0 , price of cash-flow risk at average states	0.043 (0.99)	0.044 (1.08)		
b_1 , its change per pp of fear	0.0125 (2.25)	0.0144 (2.83)		
d_0 , change in the price per sd of persistence	0.090 (2.96)	0.095 (3.15)		
d_1 , change in its fear sensitivity per sd of persistence	0.0091 (1.87)	0.0069 (1.40)		
e_1 , change in the premium on persistence per pp of fear	0.0052 (0.76)	0.0044 (0.61)		
Panel C: Top minus bottom quintile of cash-flow risk within the tercile (% a month)				
Average spread	0.126	0.171	0.495	
Coefficient on v_t	0.0235 (1.23)	0.0072 (0.25)	0.0795 (2.46)	
Coefficient on v_t^{rt}	0.0261 (1.21)	0.0050 (0.17)	0.0787 (2.31)	
Panel D: Next quarter's value minus growth within the tercile (% a quarter per sd of each regressor)				
Average value minus growth	1.30	-0.31	-0.31	
Fear residual v_t	0.00 (-0.01)	-0.75 (-1.38)	-1.22 (-1.75)	
Real-time residual v_t^{rt}	-0.18 (-0.26)	-0.58 (-1.18)	-1.22 (-1.81)	

As Table 7, with all three terciles. Persistence is ρ^j of (16), the annual autocorrelation of the firm's log payout share, estimated on an expanding window of at least 20 quarters, shrunk toward its two-digit SIC industry with weight $n/(n+40)$, and known one quarter after the share's quarter; stocks are sorted into terciles each formation month, from April 1990 to November 2025 (602,452 stock-months, 4,755 firms). Panel A: the average of the monthly price λ_{t+1}^F of (21) with market-equity weights and the eight characteristics, in percent a month per standard deviation of cash-flow risk, and the coefficient on the fear residual in (19) with λ_{t+1}^F as the dependent variable, in the same units per percentage point of fear; the model row is the premium per unit of θ^j at the median of fear, from Proposition 2 at the calibration of Section VII and the terciles' median half-lives. Panel B: (23) with market-equity weights that sum to one in each month and Driscoll and Kraay (1998) standard errors with 12 lags. Panel C: the value-weighted return of the top minus the bottom quintile of cash-flow risk within the tercile, in percent a month, and its coefficient on the fear residual in (19). Panel D: the next quarter's value-weighted return of the top minus the bottom book-to-market tercile within the persistence tercile, in percent, on the standardized fear residual, habit state and Sahm indicator of the survey quarter, 1990Q3 to 2025Q3 (141 quarters), with 4 lags. t -statistics in parentheses.

Table IA.6. Cash-flow risk, fear and idiosyncratic volatility

	Idiosyncratic volatility tercile			All
	1 (low)	2	3 (high)	
Panel A: Top minus bottom quintile of cash-flow risk within the tercile (% a month)				
Average spread	0.248	0.268	0.582	
Coefficient on v_t	0.0441	0.0119	0.1116	
	(2.57)	(0.37)	(2.51)	
Effect of the 10th to 90th percentiles of v_t	0.709	0.191	1.794	
Coefficient on v_t^{rt}	0.0397	0.0278	0.1137	
	(2.12)	(0.91)	(2.60)	
Panel B: Firm-level price of cash-flow risk, (21) with characteristics				
Average price $\bar{\lambda}^F$	0.039	-0.033	0.179	
Coefficient on v_t	0.0103	0.0066	0.0344	
	(2.57)	(0.98)	(2.48)	
Coefficient on v_t^{rt}	0.0098	0.0136	0.0360	
	(2.22)	(2.37)	(2.71)	
Panel C: Pooled regression (23) with idiosyncratic volatility in place of persistence				
	v_t, h_t		v_t^{rt}, h_t^{rt}	
b_1 , change in the price per pp of fear	0.0125	(2.09)	0.0114	(1.72)
d_0 , change in the price per sd of the volatility	0.061	(0.86)	0.050	(0.72)
d_1 , change in its fear sensitivity per sd of the volatility	-0.0075	(-1.20)	-0.0103	(-1.34)
e_1 , fear sensitivity of the premium on the volatility	0.0221	(1.07)	0.0317	(1.29)
Panel D: Premium on idiosyncratic volatility, Fama-MacBeth slope with characteristics				
	Market-equity weights		Equal weights, no microcaps	
Average slope	0.055		0.050	
Coefficient on v_t	0.0175	(1.43)	0.0145	(1.56)
Coefficient on v_t^{rt}	0.0168	(1.30)	0.0143	(1.48)

Formation months April 1990 to November 2025; 716,053 stock-months with an idiosyncratic volatility estimate. Spreads and prices are in percent a month (per standard deviation of cash-flow risk for the prices), fear coefficients in the same units per percentage point of the residual; the effect of the 10th to 90th percentiles multiplies the coefficient by 16.08 percentage points. Panel C uses market-equity weights that sum to one in each month and [Driscoll and Kraay \(1998\)](#) standard errors with 12 lags; the other panels use [Newey and West \(1987\)](#) standard errors with 12 lags. t -statistics in parentheses.

IA.F Fear and the exact habit state

Section IV.B replaces the habit state h_t of (12) by the exact state of Proposition 3. For each of the 25 combinations of the persistence κ , equal to 0.04, 0.08, 0.16, 0.32 or 0.64, and the sensitivity α , equal to 5, 15, 30, 60 or 120, I filter $z_t = y_t/\bar{y}$ from quarterly consumption growth with the discretization $z'_t = z_{t-1} \exp\{-\alpha(\Delta c_t - m_t) - \alpha^2 w_t/2\}$ and $z_t = 1 + (z'_t - 1)e^{-\kappa/4}$, where m_t is the mean of consumption growth over the previous 40 quarters and w_t its variance, computed without the quarters of 2020 and 2021, so that the state is a function of consumption history alone; the habit term of the preference shock is $q(z_t) = z_t/(1 + b(z_t - 1))$ with $b = 0.804$, the value of $a(\bar{x} - \underline{x})$ in the calibration of Section VII, and the regressions of Table IA.7 replace h_t in (12) by $q(z_t)$ (exact state) or by $q(z_t)$, $\log z_t$ and $(\log z_t)^2$ (flexible), and add to (19) and (24) the expected return that the habit economy implies for the test asset at z_t (model controls). The real-time versions rebuild the state from the consumption vintage of each survey. At every combination, the state explains at most 7 percent of the variance of fear, and with the exact state the fear coefficients of the firm-level price, the pooled regression and the duration test are significant at all 25 combinations.

IA.G Leaving out episodes of high fear

Table IA.8 leaves out one episode of high fear at a time. Each row drops the formation months whose survey quarter falls in the listed quarters and reports the coefficient on fear in (19) relative to its full-sample value. Panel A drops, one at a time, the runs of consecutive quarters from 1990 to 2025 in which v_t was in its top quartile; Panels B and C drop fixed windows around the pandemic and the fear of 2022 and 2023. Before 2020, no run moves the spread or the firm-level coefficient by more than about a fourth. The fear of 2022 and 2023 is the most informative episode for the portfolio tests; without the surveys of 2022Q2 to 2024Q1, the firm-level coefficient keeps more than four fifths of its full-sample value ($t = 1.9$ with v_t and 3.0 with v_t^{TT}).

IA.H Financial conditions, risk appetite and uncertainty

Table IA.9 reports the fear coefficients of (19) with each control of Section VIII added, one at a time, with the eleven measures of financial conditions and risk appetite at once, and with these and the three measures of uncertainty and intermediary capital at once. Each control is measured at the

Table IA.7. Fear coefficients with the exact habit state, across 25 habit calibrations

Dependent variable	Fear	Exact state			Exact state, model controls			Flexible		
		Min t	Max t	Sig.	Min t	Max t	Sig.	Min t	Max t	Sig.
Spread R_{t+1}^{HL}	v_t	1.71	3.44	14	1.63	3.56	13	0.66	2.64	6
	v_t^{IT}	1.55	3.25	10	1.80	3.43	17	1.27	2.47	8
Price λ_{t+1}	v_t	1.15	2.22	1	1.14	2.87	4	0.44	2.22	2
	v_t^{IT}	1.16	2.46	4	1.49	2.98	10	0.89	2.09	2
Firm-level price, column (5)	v_t	3.45	4.20	25	3.43	4.08	25	2.07	4.00	25
	v_t^{IT}	4.04	5.11	25	4.16	5.40	25	4.37	5.73	25
Firm-level price, column (7)	v_t	3.69	4.56	25	3.66	4.23	25	2.35	4.38	25
	v_t^{IT}	4.30	5.31	25	4.37	5.58	25	4.55	5.66	25
Pooled regression, b_1	v_t	2.40	3.46	25	2.26	3.66	25	0.93	3.09	12
	v_t^{IT}	2.70	3.77	25	2.91	4.00	25	2.07	3.59	25
Duration, top 30 minus bottom 30	v_t	-2.77	-2.07	25	-2.99	-2.01	25	-2.78	-1.66	21
	v_t^{IT}	-3.37	-2.10	25	-3.57	-2.12	25	-2.97	-2.00	25

For each dependent variable and fear measure, the smallest and largest Newey and West (1987) t -statistic on the fear residual across the 25 combinations of κ and α , and the number of combinations at which it exceeds 1.96 in absolute value (Sig.). The fear residual is the residual of (12) with the habit state replaced by the exact state $q(z_t)$ at that combination (Exact state), with the expected returns of the habit economy added to (19) or (24) as controls (model controls), or with $q(z_t)$, $\log z_t$ and $(\log z_t)^2$ in place of the habit state (Flexible); the same terms replace h_t in (19) and (24). Spread, price and the firm-level prices are those of Tables 3 and 6; the pooled regression is (22) with market-equity weights and Driscoll and Kraay (1998) standard errors; duration is (24) for the top 30 minus bottom 30 book-to-market portfolios, with 4 lags. Formation months April 1990 to November 2025; quarters 1978Q3 to 2026Q1 for duration.

end of the formation month, or taken from the survey in force in that month for forecaster disagreement, and standardized to unit standard deviation over the regression sample (Section IA.N). The variance risk premium ends in December 2024, which sets the end of the sample with all controls, and the intermediary capital ratio ends in June 2025.

IA.I Alternative payout measures, point-in-time inputs and industries

Table IA.10 reports the fear coefficient for the payout spread and for the value-weighted firm-level price with characteristics, column (2) of Table 6, when the cash-flow risk estimates are built from alternative payout measures, from alternative point-in-time inputs, or without one Fama-French industry, as summarized in Sections IV.E and VIII. Payout to common stock removes dividends

Table IA.8. Leaving out one episode of high fear at a time

Quarters left out	Spread	Price	Firm level
Panel A: Runs of quarters in the top quartile of v_t , 1990 to 2025			
1990Q3 to 1990Q4	0.99 (2.32)	1.00 (1.59)	1.01 (3.59)
1998Q3 to 1998Q4	1.01 (2.55)	1.02 (1.64)	1.02 (3.85)
2001Q1	1.02 (2.61)	1.01 (1.62)	1.02 (3.78)
2008Q1 to 2009Q1	1.25 (3.27)	1.32 (2.08)	0.99 (3.39)
2012Q3	1.00 (2.53)	1.00 (1.60)	1.01 (3.74)
2015Q1	1.00 (2.54)	1.00 (1.59)	1.00 (3.72)
2016Q2 to 2016Q3	0.98 (2.48)	0.96 (1.51)	0.99 (3.67)
2019Q3 to 2020Q1	1.01 (2.50)	1.07 (1.71)	1.06 (3.97)
2021Q2 to 2025Q4	0.51 (1.27)	-0.28 (-0.43)	0.56 (1.38)
Panel B: Fixed windows, v_t			
2022Q2 to 2024Q1	0.43 (1.24)	-0.25 (-0.47)	0.82 (1.94)
2025Q1 to 2025Q4	1.01 (2.46)	0.96 (1.45)	0.88 (3.27)
2020Q1 to 2024Q4	0.66 (1.89)	0.41 (0.71)	0.96 (2.13)
2021Q2 to 2025Q4	0.51 (1.27)	-0.28 (-0.43)	0.56 (1.38)
Panel C: Fixed windows, v_t^{rt}			
2022Q2 to 2024Q1	0.22 (0.52)	-0.38 (-0.70)	0.97 (2.97)
2025Q1 to 2025Q4	1.00 (1.97)	0.95 (1.32)	0.91 (4.56)
2020Q1 to 2024Q4	0.51 (1.25)	0.04 (0.07)	1.09 (3.09)
2021Q2 to 2025Q4	0.21 (0.45)	-0.54 (-0.88)	0.81 (2.67)

Coefficient on the fear residual in (19) when the formation months whose survey quarter falls in the listed quarters are left out, divided by its full-sample value, with Newey and West (1987) t -statistics (12 lags) in parentheses. The full-sample coefficients, in percent a month per percentage point of fear, are 0.0695 ($t = 2.54$), 0.0116 (1.59) and 0.0137 (3.71) with v_t , and 0.0614 (2.02), 0.0107 (1.46) and 0.0162 (4.90) with v_t^{rt} , for the spread, the price and the firm-level price. Spread and price are the payout decile 10 minus decile 1 return and the price λ_{t+1} of Table 3; firm level is the value-weighted firm-level price with characteristics of Table 6, column (2). Panels A and B use v_t and h_t ; Panel C uses v_t^{rt} and h_t^{rt} . Runs are consecutive survey quarters from 1990Q1 to 2025Q4 in which the residual was at or above its 75th percentile over those quarters.

on and repurchases of preferred stock; payout per share divides it by shares outstanding, so that issuance dilutes it; net payout subtracts sales of stock. The sample without preferred stock drops the firm-quarters in which preferred stock exceeds 5 percent of book equity, and the sample without issuers drops those in which common issuance over the previous four quarters exceeds 5 percent of market equity. Historical SIC codes replace the current codes of the company file; the two report-date variants drop the firm-quarters whose report date is imputed, or impute 180 instead of 90 days; and the variant without starts and stops leaves out the four-quarter growth observations in which payout starts from or falls to zero. The industry rows drop all stocks of one of the twelve Fama-French industries from the firm-level sample.

Table IA.9. Fear and the price of cash-flow risk with controls for financial conditions and uncertainty

Control	Current vintage, v_t			Real time, v_t^{rt}		
	Spread	Price	Firm level	Spread	Price	Firm level
Log dividend-price ratio	0.0639 (2.39)	0.0123 (1.80)	0.0132 (3.47)	0.0611 (2.18)	0.0118 (1.77)	0.0161 (4.70)
cay	0.0667 (2.35)	0.0117 (1.53)	0.0130 (3.36)	0.0594 (2.01)	0.0106 (1.47)	0.0157 (4.69)
Realized variance	0.0824 (3.25)	0.0148 (2.25)	0.0155 (4.25)	0.0741 (2.62)	0.0139 (2.08)	0.0179 (5.30)
Variance risk premium	0.0719 (2.54)	0.0121 (1.60)	0.0122 (3.25)	0.0615 (1.97)	0.0104 (1.36)	0.0146 (4.52)
VIX	0.0828 (3.12)	0.0142 (2.11)	0.0160 (4.54)	0.0762 (2.46)	0.0143 (2.04)	0.0190 (5.39)
Excess bond premium	0.0735 (2.42)	0.0123 (1.51)	0.0145 (3.63)	0.0675 (1.92)	0.0118 (1.37)	0.0174 (4.32)
Risk aversion (BEX)	0.0763 (2.59)	0.0128 (1.60)	0.0145 (3.77)	0.0683 (2.03)	0.0120 (1.47)	0.0171 (4.91)
Uncertainty (BEX)	0.0772 (2.47)	0.0127 (1.58)	0.0160 (3.80)	0.0662 (1.99)	0.0114 (1.43)	0.0173 (4.43)
Price of volatile stocks	0.0776 (2.58)	0.0107 (1.41)	0.0185 (3.70)	0.0668 (2.19)	0.0095 (1.28)	0.0203 (4.83)
Term spread	0.0485 (1.60)	0.0090 (1.16)	0.0139 (3.29)	0.0385 (1.23)	0.0080 (1.07)	0.0162 (4.02)
Credit spread	0.0748 (2.69)	0.0112 (1.47)	0.0143 (3.46)	0.0678 (2.18)	0.0103 (1.32)	0.0168 (4.31)
All eleven above at once, 1990 to 2024	0.0721 (1.90)	0.0074 (0.73)	0.0182 (2.77)	0.0684 (1.63)	0.0078 (0.81)	0.0255 (4.28)
Forecaster disagreement	0.0956 (2.65)	0.0071 (0.89)	0.0177 (2.54)	0.0878 (1.90)	0.0053 (0.62)	0.0278 (4.58)
Macroeconomic uncertainty (JLN)	0.0893 (2.65)	0.0198 (2.50)	0.0191 (3.86)	0.0707 (2.01)	0.0161 (2.01)	0.0196 (4.32)
Intermediary capital ratio (HKM)	0.0845 (3.04)	0.0148 (1.82)	0.0131 (3.15)	0.0732 (2.38)	0.0119 (1.57)	0.0159 (4.28)
All fourteen at once, 1990 to 2024	0.1225 (2.20)	0.0096 (0.72)	0.0259 (2.52)	0.1028 (1.56)	0.0106 (0.78)	0.0418 (4.89)

Coefficient on the fear residual in (19), in percent a month per percentage point of fear, with the listed control added; Newey and West (1987) t -statistics (12 lags) in parentheses. Spread and price are the payout decile 10 minus decile 1 return and the price λ_{t+1} of Table 3; firm level is the value-weighted firm-level price with characteristics of Table 6, column (2). The first three columns use v_t and h_t , the last three v_t^{rt} and h_t^{rt} . Controls are defined in Section IA.N; the term and credit spreads are those of the first month of the survey quarter, and forecaster disagreement is that of the survey in force in the formation month. Formation months run from April 1990 (June 1995 for the price) to November 2025, except with the variance risk premium and with the controls at once, which end in December 2024, and with the intermediary capital ratio, which ends in June 2025.

Table IA.10. Fear coefficients with alternative payout measures, point-in-time inputs and samples

Estimates	Mean spread (% a year)	Spread, fear coefficient		Firm level, fear coefficient	
		v_t	v_t^{rt}	v_t	v_t^{rt}
Paper (total payout, point in time)	7.39 (3.2)	0.070 (2.5)	0.061 (2.0)	0.0137 (3.7)	0.0162 (4.9)
Payout to common stock	7.32 (3.0)	0.096 (3.2)	0.094 (3.0)	0.0137 (3.6)	0.0161 (5.1)
Payout to common stock per share	6.78 (2.8)	0.104 (3.1)	0.101 (2.8)	0.0133 (3.5)	0.0158 (5.0)
Payout net of issuance	3.55 (1.6)	-0.011 (-0.7)	-0.019 (-1.1)	0.0024 (0.7)	0.0013 (0.3)
Without firms with preferred stock	7.15 (2.8)	0.075 (2.7)	0.064 (2.0)	0.0145 (4.0)	0.0161 (4.5)
Without issuers	7.43 (2.9)	0.069 (2.6)	0.059 (1.9)	0.0141 (4.0)	0.0164 (5.0)
Without payout starts and stops	4.93 (2.0)	0.081 (2.0)	0.086 (2.0)	0.0146 (3.7)	0.0161 (4.1)
Historical SIC codes	5.06 (2.5)	0.052 (2.1)	0.048 (1.8)	0.0127 (3.1)	0.0152 (4.3)
Without imputed report dates	8.29 (3.4)	0.064 (2.4)	0.056 (1.9)	0.0131 (3.5)	0.0150 (4.5)
Report dates imputed at 180 days	7.84 (3.4)	0.069 (2.6)	0.062 (2.1)	0.0130 (3.4)	0.0153 (4.7)
Without consumer nondurables	7.09 (2.9)	0.067 (2.7)	0.059 (2.1)	0.0137 (3.6)	0.0161 (4.7)
Without consumer durables	6.85 (3.0)	0.074 (2.6)	0.067 (2.1)	0.0140 (3.8)	0.0164 (4.9)
Without manufacturing	7.88 (2.7)	0.119 (3.3)	0.113 (2.8)	0.0163 (3.9)	0.0192 (5.2)
Without energy	7.17 (2.9)	0.056 (1.9)	0.050 (1.5)	0.0126 (3.3)	0.0147 (4.1)
Without chemicals	6.94 (3.0)	0.063 (2.3)	0.055 (1.8)	0.0141 (3.7)	0.0166 (5.1)
Without business equipment	3.47 (2.0)	0.029 (1.7)	0.025 (1.3)	0.0079 (2.2)	0.0093 (2.6)
Without telecommunications	5.57 (2.5)	0.056 (2.4)	0.045 (1.7)	0.0124 (3.3)	0.0142 (4.5)
Without utilities	6.66 (3.1)	0.053 (2.1)	0.049 (1.7)	0.0138 (3.8)	0.0164 (4.9)
Without shops	6.38 (2.1)	0.091 (2.1)	0.074 (1.6)	0.0148 (3.7)	0.0169 (4.4)
Without health	7.80 (3.3)	0.061 (2.3)	0.056 (1.8)	0.0131 (3.4)	0.0166 (4.5)
Without finance	7.16 (3.4)	0.064 (3.3)	0.052 (2.3)	0.0157 (3.7)	0.0181 (4.7)
Without other industries	7.08 (3.0)	0.065 (2.2)	0.059 (1.9)	0.0142 (3.3)	0.0173 (4.5)

Mean spread is the average decile 10 minus decile 1 return with the deciles re-formed on the listed estimates, in percent a year. The fear coefficients are c_1 of (19) for the spread, in percent a month per percentage point of fear, and for the value-weighted firm-level price with characteristics of column (2) of Table 6, in percent a month per standard deviation of cash-flow risk per percentage point of fear; each real-time column uses v_t^{rt} and h_t^{rt} . Formation months April 1990 to November 2025. Newey and West (1987) t -statistics with 12 lags in parentheses.

IA.J Payout cash-flow risk and cyclicity in general

Section VIII shows that the fear premium belongs to payout cash-flow risk rather than to exposure to the economy in general. This section reports the two tests behind that conclusion.

The cash-flow risk of sales and operating income carries no fear premium. Table IA.11 replaces payout by sales or by operating income before depreciation: the covariance of the four-quarter log growth of each with consumption growth is estimated, winsorized, shrunk and attached

point in time exactly as for payout (Section III.D), and value-weighted deciles are formed on NYSE breakpoints from January 1975. Neither sort earns a premium (0.4 and 1.2 percent a year for decile 10 minus decile 1, t below 0.6), and neither the price of the deciles' own cash-flow risk nor the spread moves with fear, with either residual, over the payout sample or over the full sample of these sorts.

Table IA.11. Fear and the price of the cash-flow risk of sales and operating income

Cash flow	Dependent variable	April 1990 to November 2025		August 1978 to November 2025	
		v_t	v_t^{rt}	v_t	v_t^{rt}
Sales	Price λ_{t+1}	0.0048 (0.49)	0.0032 (0.33)	0.0012 (0.14)	0.0010 (0.12)
Sales	Spread R_{t+1}^{HL}	0.0049 (0.14)	-0.0060 (-0.17)	-0.0033 (-0.11)	-0.0110 (-0.38)
Operating income	Price λ_{t+1}	0.0018 (0.24)	0.0013 (0.16)	-0.0034 (-0.42)	-0.0044 (-0.57)
Operating income	Spread R_{t+1}^{HL}	0.0040 (0.14)	-0.0137 (-0.45)	-0.0144 (-0.49)	-0.0347 (-1.22)

Coefficient on the fear residual in (19), with the habit state and the Sahm indicator as controls, for value-weighted deciles sorted each month on the cash-flow risk of sales or of operating income before depreciation, estimated as the payout cash-flow risk of Section III.D with the four-quarter log growth of the cash flow in place of that of the payout share. The dependent variable is the price λ_{t+1} of the deciles' own cash-flow risk, in percent a month per standard deviation, or the decile 10 minus decile 1 return, in percent a month; the coefficient is per percentage point of fear. Current vintage uses v_t and h_t , real time v_t^{rt} and h_t^{rt} . Newey and West (1987) t -statistics with 12 lags in parentheses.

Stated cyclicity. For each original 10-K, 10-K405 and 10-KT filed on EDGAR from 2006 to 2025, stated cyclicity is the share of the sentences of Item 1A, Risk Factors, that mention the economy or the business cycle. For 10-Ks filed from 2006 to 2020, Item 1A comes from EDGAR-CORPUS (Loukas et al., 2021), matched to the filing of the same CIK whose period of report falls in the labeled year (96 percent are matched), with the latest filing date when there are several; otherwise it is taken from the primary document on EDGAR as the longest span from a line that begins with Item 1A to the next line that begins with Item 1B, Item 1C or Item 2. The two sources give the same shares on 300 randomly chosen 10-Ks for fiscal 2019. Sentences end at a period, question mark or exclamation mark followed by a space and a capital letter, an opening parenthesis or a quotation mark; sentences shorter than 25 characters, and Item 1A sections shorter than 2,000 characters, are dropped. A sentence mentions the economy or the business cycle if it contains recession or recessionary; economic followed by downturn, slowdown, conditions, weakness, uncertainty, cycle, crisis, activity, environment, recovery or decline; downturn in the economy; macroeconomic; business cycle; cyclical or cyclicity; consumer spending, confidence, demand

or sentiment; discretionary spending, income or purchases; unemployment; gross domestic product or GDP; general economic; state of the economy; or weak, weakening, weakness, slowdown or deterioration in or of the economy. I fixed this list before looking at any returns. Each score is dated at its filing date and linked to stocks through the CIK in the Compustat company file.

Stated cyclical ranks realized cyclical. Across 4,738 firms, the rank correlation of a firm's average stated cyclical with the slope of its four-quarter log sales growth on four-quarter real GDP growth, estimated over 2006Q1 to 2025Q4 from at least 24 quarters, is 0.10 ($p < 0.001$), and this slope rises from 0.9 in decile 1 of stated cyclical to 2.6 in decile 10 ($t = 3.5$ for the difference). The rank correlation of stated cyclical with payout cash-flow risk averages 0.07 in the monthly cross-sections of stocks.

Stated cyclical carries no fear premium. Table [IA.12](#) reports the tests. From March 2007 to November 2025, the value-weighted difference between decile 10 and decile 1 of stated cyclical averages -0.44 percent a year ($t = -0.2$), and its six-factor alpha is -1.46 percent a year ($t = -0.8$). This difference rises with the habit state and the Sahm indicator, and with the real-time fear residual ($t = 2.0$) but not with v_t . The firm-level price of stated cyclical does not rise with fear. With both measures in the firm-level regressions, fear raises the price of payout cash-flow risk and, if anything, lowers that of stated cyclical.

IA.K The duration test

This section supports Section [V](#) with two sets of results.

Valuation controls do not explain the fall of the value premium with fear. Table [IA.13](#) adds to [\(24\)](#), one at a time and then all together, the term spread (the 10-year Treasury yield minus the 3-month bill rate), the default spread (the Baa minus the Aaa corporate yield), the log dividend-price ratio and the book-to-market ratio of the market, from Amit Goyal's predictor file, and the value spread, the log book-to-market of the top 30 percent of book-to-market minus that of the bottom 30 percent, from the annual series of Kenneth French's data library, formed each June. Each control is measured at the end of the survey quarter and standardized over the regression sample, so its coefficient is in percent a quarter per standard deviation, like those of the fear residual, the habit

Table IA.12. Stated cyclicality and fear

	Current vintage			Real time		
	Fear	Habit	Sahm _{<i>t</i>}	Fear	Habit	Sahm _{<i>t</i>}
Panel A: Deciles sorted on stated cyclicality, value weights						
Decile 10 minus decile 1	0.0197 (0.77)	3.47 (2.78)	0.287 (3.00)	0.0366 (2.00)	4.78 (5.09)	0.267 (2.85)
without 2022Q2 to 2024Q1	−0.0037 (−0.09)	3.02 (2.10)	0.275 (2.72)	0.0455 (1.14)	4.74 (4.69)	0.263 (2.89)
Slope on decile stated cyclicality	−0.0022 (−0.31)	0.40 (0.86)	0.090 (4.26)	0.0052 (0.79)	0.87 (2.88)	0.086 (3.92)
Payout spread, same months	0.1440 (3.81)	3.74 (2.51)	0.357 (2.51)	0.1200 (3.19)	2.91 (2.25)	0.295 (1.86)
Panel B: Firm-level prices, market-equity weights, with the eight characteristics						
Stated cyclicality alone	−0.0027 (−0.43)	0.35 (1.10)	0.096 (3.73)	0.0000 (0.00)	0.50 (2.26)	0.096 (3.88)
Payout cash-flow risk, stocks with both measures	0.0237 (4.33)	0.70 (2.13)	−0.004 (−0.20)	0.0226 (4.01)	0.59 (2.03)	−0.012 (−0.62)
Both measures: payout cash-flow risk	0.0257 (4.40)	0.73 (2.14)	−0.007 (−0.38)	0.0237 (3.90)	0.57 (1.86)	−0.016 (−0.76)
without 2022Q2 to 2024Q1	0.0304 (3.89)	0.74 (2.08)	−0.006 (−0.32)	0.0345 (4.79)	0.71 (2.28)	−0.018 (−0.80)
Both measures: stated cyclicality	−0.0102 (−2.14)	−0.01 (−0.04)	0.088 (3.10)	−0.0068 (−1.44)	0.13 (0.53)	0.093 (3.40)
without 2022Q2 to 2024Q1	−0.0170 (−2.93)	−0.01 (−0.04)	0.085 (3.16)	−0.0128 (−1.65)	0.07 (0.26)	0.093 (3.69)

Coefficients of (19) on the fear residual, the habit state and Sahm_{*t*}, with Newey and West (1987) *t*-statistics (12 lags) in parentheses; current vintage uses v_t and h_t and real time v_t^{rt} and h_t^{rt} . Panel A: the dependent variable is the value-weighted return of decile 10 minus decile 1 of stocks sorted each month on stated cyclicality with NYSE breakpoints, in percent a month (formation months March 2007 to November 2025, the first months having too few NYSE stocks with a 10-K in the lowest decile); the slope of the decile returns on the deciles' standardized average stated cyclicality, in percent a month per standard deviation (December 2006 to November 2025); and the payout decile 10 minus decile 1 return over December 2006 to November 2025. Panel B: the dependent variables are slopes of (21) with market-equity weights and the eight characteristics, estimated from December 2006 to November 2025, on stated cyclicality alone, on payout cash-flow risk for the stocks that have both measures, and on both measures together, in percent a month per standard deviation.

state and the Sahm indicator, which remain in the regression. With one control, the fear coefficient is between -1.08 and -1.52 for the 30 percent portfolios and between -1.53 and -1.88 for the deciles, and with all five it is -2.19 and -2.60 . The value spread is the only control that predicts the value premium on its own, with the sign documented by [Cohen et al. \(2003\)](#).

The fall of the value premium is not the cash-flow risk premium in another form. Table [IA.14](#) sorts the stocks of the panel of Section [IV.E](#) each month, independently, into terciles of payout cash-flow risk $\hat{\theta}_j$ and of log book-to-market, with breakpoints from the stocks above the 20th percentile of NYSE market equity, sums the value-weighted monthly returns of the nine cells within calendar quarters and regresses them as in [\(24\)](#), from the survey of 1990Q4 to that of 2025Q3. Value and growth stocks have nearly the same cash-flow risk, unconditionally and within each risk tercile (differences between -0.10×10^{-3} and 0.09×10^{-3}). Fear lowers the return of value minus growth within every cash-flow-risk tercile and raises the return of high minus low cash-flow risk within the growth and value terciles, while the habit state has no consistent effect on either. The cash-flow risk premium is earned among growth stocks, 4.52 percent a year, and not among value stocks (0.08 percent).

IA.L Risk or mispricing: expectations, announcements and releases

Tables [IA.15](#) and [IA.16](#) report the estimates behind Section [VI](#). Each row regresses a monthly cross-sectional slope on standardized payout cash-flow risk, from [\(25\)](#), [\(26\)](#) or [\(21\)](#) with the eight characteristics, on the fear residual, the habit state and the Sahm indicator as in [\(19\)](#), with market-equity weights over all stocks and with equal weights over stocks above the 20th percentile of NYSE market equity.

Analysts' expectations beyond the survey's horizon. Panel A of Table [IA.15](#) uses the current-year forecast error of Section [VI](#) and four measures at longer horizons: the next-year forecast error, actual earnings per share for the fiscal year after the current one minus the consensus of month t , in percent of the price, for actuals announced after the consensus date; the revision of the next-year forecast over the following twelve months, in percent of the price of month t ; the consensus

Table IA.13. Valuation controls in the duration test

	Top 30 minus bottom 30				Top 10 minus bottom 10			
	v_t		v_t^{rt}		v_t		v_t^{rt}	
	Fear	Control	Fear	Control	Fear	Control	Fear	Control
Control								
None	−1.15 (−2.51)		−1.39 (−3.26)		−1.53 (−2.21)		−1.87 (−3.03)	
Term spread	−1.43 (−2.75)	−0.66 (−1.22)	−1.66 (−3.25)	−0.71 (−1.28)	−1.63 (−2.24)	−0.22 (−0.30)	−1.97 (−2.80)	−0.26 (−0.33)
Default spread	−1.08 (−2.26)	−0.23 (−0.40)	−1.33 (−3.13)	−0.21 (−0.36)	−1.55 (−2.14)	0.04 (0.05)	−1.88 (−3.03)	0.02 (0.03)
Log dividend-price ratio	−1.12 (−2.40)	−0.29 (−0.46)	−1.37 (−3.20)	−0.15 (−0.24)	−1.53 (−2.18)	−0.03 (−0.04)	−1.90 (−3.05)	0.14 (0.19)
Market book-to-market	−1.18 (−2.49)	0.19 (0.37)	−1.45 (−3.35)	0.29 (0.48)	−1.65 (−2.34)	0.61 (0.91)	−2.02 (−3.28)	0.72 (0.93)
Value spread	−1.52 (−2.78)	1.20 (1.77)	−1.62 (−3.38)	1.07 (1.53)	−1.88 (−2.41)	1.12 (1.31)	−2.08 (−3.05)	0.99 (1.12)
All five	−2.19 (−3.78)		−2.22 (−3.83)		−2.60 (−3.43)		−2.68 (−3.57)	

Coefficients on the fear residual and on the control in (24) with one control added at a time, or all five, each measured at the end of the survey quarter and standardized to unit standard deviation over the regression sample; the habit state and the Sahm indicator are in every regression. The dependent variable is the next-quarter return, in percent, of the top 30 percent minus the bottom 30 percent, or the top decile minus the bottom decile, of book-to-market. The row None is the first or fourth row of Panel B of Table 8; the other rows cover the same 189 quarters. Newey and West (1987) t -statistics with 4 lags in parentheses.

forecast of long-term earnings growth, in percent a year; and its revision over twelve months, in percentage points. Each measure is winsorized at the 1st and 99th percentiles each month. The standard errors use 24 lags for the current-year error and the revisions, 36 for the next-year error and 12 for long-term growth. The samples run from April 1990 to between December 2024 and November 2025, with a median of 740 to 1,290 stocks a month.

Announcements and macroeconomic releases. Panel B of Table IA.15 reports the price of payout cash-flow risk outside announcement months, λ_{t+1}^F in (26), inside them, $\lambda_{t+1}^F + \lambda_{t+1}^{EA}$, and their difference λ_{t+1}^{EA} . Table IA.16 splits the monthly price into the part earned on given days and the part earned on the other days of the month: in Panel A, the three-day windows around the firms' report dates (4.6 percent of trading days); in Panel B, the days of the Employment Situation and GDP releases from August 1996 to November 2025 (9.5 percent of trading days), alone or with the next trading day (18.9 percent). The rows Per-day difference test whether the fear effect

Table IA.14. Double sorts on book-to-market and payout cash-flow risk

Portfolio	Mean (% a year)	v_t, h_t and $Sahm_t$			v_t^{rt}, h_t^{rt} and $Sahm_t$		
		Fear	Habit	$Sahm_t$	Fear	Habit	$Sahm_t$
Value minus growth, all stocks	-0.02	-1.08	-0.37	1.22	-1.01	-0.04	1.18
		(-2.11)	(-0.70)	(2.66)	(-2.29)	(-0.08)	(2.68)
within the low-risk tercile	3.33	-1.13	-0.91	0.91	-1.28	-0.65	0.85
		(-1.89)	(-1.57)	(1.54)	(-2.58)	(-0.97)	(1.54)
within the middle tercile	-1.61	-0.77	-0.36	1.87	-0.76	-0.02	1.80
		(-1.21)	(-0.54)	(3.50)	(-1.21)	(-0.03)	(3.41)
within the high-risk tercile	-1.10	-0.93	0.19	1.78	-0.68	0.49	1.78
		(-1.65)	(0.27)	(3.08)	(-1.42)	(0.67)	(3.36)
High minus low cash-flow risk, all stocks	2.99	0.82	-0.35	0.14	0.80	-0.32	0.08
		(2.62)	(-1.44)	(0.86)	(2.59)	(-1.07)	(0.43)
within the growth tercile	4.52	0.81	-0.59	0.38	0.66	-0.52	0.29
		(2.06)	(-2.01)	(1.29)	(1.70)	(-1.45)	(0.90)
within the middle tercile	1.63	0.21	0.30	0.19	0.15	0.39	0.16
		(0.71)	(0.97)	(0.57)	(0.59)	(1.12)	(0.50)
within the value tercile	0.08	1.00	0.52	1.25	1.26	0.62	1.21
		(2.19)	(1.15)	(3.95)	(3.07)	(1.38)	(3.87)

Mean next-quarter return, in percent a year, and the coefficients b_v , b_h and b_s of (24), in percent a quarter per standard deviation of each regressor, for value-weighted portfolios from the stock-month panel of Section IV.E: the top minus the bottom tercile of book-to-market, unconditionally and within each tercile of payout cash-flow risk, and the top minus the bottom tercile of payout cash-flow risk, unconditionally and within each tercile of book-to-market, with monthly returns summed within calendar quarters, from the survey of 1990Q4 to that of 2025Q3. Newey and West (1987) t -statistics with 4 lags in parentheses.

per trading day is the same on the named days as on the others.

IA.M The estimated fear-dependent kernel

Section VII.C summarizes the estimation of the kernel (27), with $\Gamma(x_t) = \gamma_0 + \gamma_1 q(x_t)$ and $H(x_t) = \eta q(x_t)$, where $q(x_t) = (x_t - \underline{x})/[g_t(\bar{x} - \underline{x})]$ is the fear term of the preference shock in (5), which equals one at $x_t = \bar{x}$ and is bounded; γ_0 and γ_1 are dimensionless and $\eta \geq 0$ is the price of recession news at $q = 1$. The economy of Section II is the special case $\gamma_0 = 1$, $\gamma_1 = \alpha v \omega (\bar{x} - \underline{x})/\sigma_C$ and $\eta = \alpha v \sqrt{1 - \omega^2}(\bar{x} - \underline{x})$, with its own interest rate. I keep the fear process, σ_C , $\bar{\mu}$ and ω of the benchmark calibration of Section VII, set the real interest rate to 1 percent, and model the market as a claim to C_t^λ , with the leverage λ of its dividends estimated. The cash-flow risk of the payout deciles and of the value and growth claims are the estimates of Tables 2 and 8 mapped to the model's units, and

Table IA.15. Risk or mispricing: analysts' expectations and announcement months

	VW		EW	
	v_t	v_t^{rt}	v_t	v_t^{rt}
Panel A: Analysts' expectations, slopes on payout cash-flow risk				
Current-year forecast error	0.0020 (0.77)	0.0029 (0.85)	-0.0029 (-0.77)	-0.0027 (-0.74)
Next-year forecast error	0.0089 (1.61)	0.0085 (1.50)	0.0016 (0.38)	-0.0004 (-0.09)
Revision of the next-year forecast over 12 months	0.0030 (0.81)	0.0039 (0.85)	0.0004 (0.10)	-0.0012 (-0.40)
Long-term growth forecast	-0.0136 (-0.80)	-0.0120 (-0.70)	-0.0252 (-1.79)	-0.0240 (-1.53)
Revision of long-term growth over 12 months	0.0285 (1.10)	0.0244 (0.85)	0.0088 (0.55)	0.0019 (0.10)
Panel B: Price of payout cash-flow risk in announcement months, (26)				
Outside announcement months, λ_{t+1}^F	0.0100 (2.08)	0.0135 (3.20)	0.0049 (1.01)	0.0065 (1.40)
In announcement months, $\lambda_{t+1}^F + \lambda_{t+1}^{EA}$	0.0162 (2.28)	0.0172 (2.56)	0.0106 (1.31)	0.0125 (1.43)
Difference, λ_{t+1}^{EA}	0.0062 (0.89)	0.0037 (0.53)	0.0057 (0.84)	0.0060 (0.80)

Coefficients on the fear residual in (19), per percentage point of the residual, with Newey and West (1987) t -statistics in parentheses, for the monthly cross-sectional slopes on standardized payout cash-flow risk described in Section IA.L; the habit state and the Sahm indicator are in every regression. VW: market-equity weights, all stocks; EW: equal weights, stocks above the 20th percentile of NYSE market equity. In Panel A the slopes are in percent of the price (forecast errors and revisions), in percent a year (long-term growth) or in percentage points (its revision) per standard deviation of payout cash-flow risk; in Panel B they are in percent a month per standard deviation.

the dividend shares of value and growth match the dividend yields of the book-to-market deciles. The price of each claim solves its Feynman-Kac equation, which I solve numerically; for the kernel of Proposition 1, the solver reproduces the closed-form values of Table 8 to within 0.01 percentage points. The targets are the average and the change between the 10th and 90th percentiles of fear of three excess returns over the formation months of the payout tests: the market, the payout decile 10 minus decile 1 spread, and the book-to-market decile 10 minus decile 1 spread. In the model, averages are over the stationary distribution of x_t and changes are between its 10th and 90th percentiles; in the data, changes are c_1 from (19) times the 16.1 percentage points between the 10th and 90th percentiles of v_t .

I choose the parameters to minimize the sum of squared differences between model and data moments, each divided by its Newey and West (1987) standard error, subject to $\gamma_1 \geq 0$, $\eta \geq 0$,

Table IA.16. Risk or mispricing: announcement days and macroeconomic releases

	VW		EW	
	v_t	v_t^{rt}	v_t	v_t^{rt}
Panel A: Three-day windows around the firms' report dates (0.046 of the trading days)				
In the windows	0.0020	0.0023	0.0006	0.0006
	(1.39)	(1.68)	(0.36)	(0.34)
Other days	0.0117	0.0138	0.0064	0.0078
	(3.33)	(4.58)	(1.41)	(1.83)
Per-day difference, windows minus other days	0.0308	0.0361	0.0058	0.0041
	(0.98)	(1.19)	(0.17)	(0.12)
Panel B: Employment Situation and GDP releases, August 1996 to November 2025				
Release days (0.095 of the trading days)	0.0024	0.0027	0.0015	0.0013
	(1.67)	(2.01)	(1.38)	(1.20)
Other days	0.0143	0.0127	0.0082	0.0074
	(3.72)	(3.45)	(1.59)	(1.46)
Per-day difference, release days minus other days	0.0093	0.0145	0.0069	0.0054
	(0.56)	(0.92)	(0.68)	(0.57)
Release day and next trading day (0.189 of the days)	0.0088	0.0082	0.0056	0.0060
	(4.73)	(4.76)	(2.54)	(3.00)
Other days	0.0079	0.0072	0.0041	0.0027
	(2.05)	(1.94)	(0.92)	(0.60)
Per-day difference, two-day windows minus other days	0.0366	0.0345	0.0245	0.0284
	(3.01)	(3.03)	(2.30)	(3.07)
Next trading day alone	0.0064	0.0055	0.0041	0.0047
	(3.92)	(3.64)	(2.28)	(3.28)
Employment release day	0.0006	0.0006		
	(0.37)	(0.43)		
Day after the employment release	0.0032	0.0027		
	(2.49)	(2.19)		
GDP release day	0.0018	0.0021		
	(1.30)	(1.59)		
Day after the GDP release	0.0031	0.0028		
	(2.11)	(2.01)		
Two-day windows, without the pandemic surveys	0.0086	0.0079	0.0050	0.0055
	(4.63)	(4.14)	(2.37)	(2.92)
Two-day windows, 1996 to 2019	0.0070	0.0056	0.0076	0.0064
	(2.51)	(1.80)	(1.69)	(1.47)

As Table IA.15, for the parts of the price of payout cash-flow risk, in percent a month per standard deviation, earned on the days named in each row and on the other days of the month; the rows Per-day difference regress the slope for the named days divided by their share of the trading days minus the slope for the other days divided by the rest on the states, so that their t -statistics test equal fear effects per trading day. Panel B covers formation months from July 1996 to November 2025 (353 months), with the release days from the archives of the Bureau of Labor Statistics and the Bureau of Economic Analysis (Section IA.N).

$1 \leq \lambda \leq 8$ and γ_0 above the smallest value at which the market has a finite price, $\gamma_0 \geq [\lambda \bar{\mu} + \lambda(\lambda - 1)\sigma_C^2/2 - r]/(\lambda\sigma_C^2) + 1$, a bound that binds in every specification. Because the six moments come from the same months and are correlated, and two parameters sit at bounds, the minimized objective is not chi-square. I therefore use a parametric bootstrap: I estimate the covariance of the data moments by a moving-block bootstrap of the formation months (12-month blocks, 2,000 draws), draw 500 moment vectors from the normal distribution with the model's moments at the estimates and that covariance, and re-estimate the parameters on each draw. The p -value of the fit is the share of draws whose minimized objective exceeds the actual one, and the standard errors are the standard deviations of the re-estimated parameters.

Table IA.17 reports the estimates. Column (0) is the economy of Section II at the benchmark, in which the whole fall of the value premium with fear comes from the recession-news term. With constant exposures, column (1) matches the average market premium with leverage $\lambda = 3.4$ and the average payout spread with an effective risk aversion that rises from 56 at the 10th percentile of fear to 69 at the 90th, and reproduces 1.4 of the 13.4 percentage points by which the payout spread rises with fear: a larger γ_1 would raise the fear sensitivity of the market premium together with that of the payout spread, and in the data the first is small. Targeting only the market and payout moments, in column (2), changes little. In column (3), the exposures rise with fear while their average stays at the measured values. With $\psi = 5.9$ (standard error 4.2), they are zero at the 10th percentile of fear, half their average at the median and 2.8 times it at the 90th percentile, and the kernel fits 9.8 of the 13.4 points with a constant effective risk aversion of 41 and a market premium that does not move with fear, as in the data (a change of 1.2 percentage points with a standard error of 6.5). Applied to dividends simulated with these exposures, the estimator (15) returns 2.34×10^{-3} for decile 10, against 2.47×10^{-3} in the data, so the scaled exposures are consistent with the measured covariances. In no column does the value premium fall with fear: η is estimated at zero, with a bootstrap interval from 0 to 26, so these moments do not identify the price of recession news. The bootstrap p -values of the fit are 0.09, 0.08 and 0.11.

With the changes in the data measured with the real-time residual (1.94 percent a year for the market, 10.86 for the payout spread and -16.05 for the value spread), the estimates are similar: with constant exposures, the effective risk aversion is 55 at the 10th percentile of fear and 68 at the 90th; with exposures that scale with fear, $\psi = 2.8$ (standard error 3.8), and the model fits 6.4 of the 10.9 points of the payout spread's rise with a constant effective risk aversion of 45. The bootstrap p -values are 0.04, 0.17 and 0.04.

Table IA.17. An estimated fear-dependent pricing kernel

	Data	(0)	(1)	(2)	(3)
Panel A: Moments, percent a year					
Market, mean	9.18 (2.61)	4.09	9.05	9.01	9.15
Market, 90th minus 10th	1.24 (6.48)	2.81	1.91	1.95	0.00
Payout spread, mean	7.39 (2.32)	0.36	7.86	8.12	7.54
Payout spread, 90th minus 10th	13.41 (5.29)	0.34	1.35	1.43	9.79
Value minus growth, mean	1.00 (3.65)	−0.31	2.09	2.15*	2.19
Value minus growth, 90th minus 10th	−14.41 (7.03)	−0.58	0.44	0.46*	3.06
Panel B: Estimates					
γ_0			37.3 (15.4)	37.2 (14.9)	41.3 (5.8)
γ_1			28.6 (16.4)	29.8 (17.1)	0.0 (9.1)
η			0.00 (7.42)	0.00 (8.05)	0.26 (7.90)
λ			3.39 (1.12)	3.33 (1.10)	5.55 (1.29)
ψ					5.89 (4.17)
Γ at 10th, 50th, 90th pct.	2.7/3.4/4.0	56/63/69	56/63/70	41/41/41	
Exposure scale at the same pct.	1.0/1.0/1.0	1.0/1.0/1.0	1.0/1.0/1.0	0.0/0.5/2.8	
Value minus growth change, recession-news term	−0.62	0.00	0.00	0.52	
J statistic (degrees of freedom)		9.8 (2)	5.2 (0)	6.8 (1)	
Bootstrap p -value		0.088	0.080	0.110	
Share of draws with $\eta = 0$		0.51	0.50	0.49	
Market volatility (% , not targeted)	15.2	17.7	7.6	7.5	11.1

Panel A: data moments are in percent a year over formation months April 1990 to November 2025, with [Newey and West \(1987\)](#) standard errors (12 lags) in parentheses: the means of the market excess return, the payout decile 10 minus decile 1 spread and the book-to-market decile 10 minus decile 1 spread, and the changes in their expected values between the 10th and 90th percentiles of the fear residual v_t , from (19). Model moments are averages over the stationary distribution of x_t and differences between its 90th and 10th percentiles. Column (0) is the economy of Section II at the benchmark calibration, with the market the claim to consumption and the model's own interest rate, and has no free parameters. Columns (1) and (2) have constant cash-flow exposures; column (2) targets only the market and payout moments, and its value-minus-growth moments, marked *, are not targeted. Column (3) lets every exposure scale with fear, $\theta^j(x_t) = \theta^j s(x_t)$ with $s(x_t) = \max\{0, 1 + \psi(q(x_t) - 1)\}$ divided by its mean under the stationary distribution, so that the average exposure equals the measured one. Panel B: estimates, with bootstrap standard errors in parentheses; Γ and the exposure scale $s(x)$ at the 10th, 50th and 90th percentiles of fear; the recession-news term $H\Delta L_p$ of the change of the value premium between those percentiles; the minimized objective with the number of moments minus parameters, the bootstrap p -value of the fit and the share of bootstrap draws in which η is at its bound of zero; and the model's average market return volatility, which is not targeted.

IA.N Data construction

Survey fear. Mean and individual responses to the SPF question on the probability of a decline in real GDP come from the Federal Reserve Bank of Philadelphia. $p_t^{(h)}$ for $h = 1, \dots, 4$ are the variables RECESS2 to RECESS5 of the mean-response file. Realized declines use current-vintage real GDP. The objective probability averages, over the four horizons, expanding-window probits of a decline in quarter $t + h$ on the term spread (ten-year Treasury yield minus three-month bill rate), the Baa minus Aaa yield spread, Sahm_t and Δc_{t-1} .

Consumption. Real per-capita consumption growth is

$$\Delta c_t = 100 [\bar{w}_t \Delta \log Q_t^N + (1 - \bar{w}_t) \Delta \log Q_t^S - \Delta \log N_t],$$

in percent a quarter, where Q_t^N and Q_t^S are the BEA quantity indexes of nondurables and services, N_t is the BEA population series, and $\bar{w}_t$ is the average of the nominal share of nondurables in quarters $t - 1$ and t . Nominal consumption C_t^{nom} is the sum of nominal spending on nondurables and services, in dollars. All series are from FRED (series DNDGRA3Q086SBEA, DSERRA3Q086SBEA, PCND, PCESV and B230RC0Q173SBEA).

Real-time consumption. The real-time residual v_t^{rt} uses the quarterly vintages of real personal consumption expenditures on nondurable goods (RCONND) and on services (RCONS) from the Real-Time Data Set for Macroeconomists of the Federal Reserve Bank of Philadelphia ([Croushore and Stark, 2001](#)). The vintage dated quarter t contains the data available in the middle of quarter t , through quarter $t - 1$, and is used for the survey of quarter t . In each vintage, real per-capita consumption growth is the Törnqvist aggregate above, computed from the two real series, with the nominal shares of nondurables and services and the population series from the current vintage, which are revised little. When a vintage does not yet contain quarter $t - 1$, as for four vintages in 1968 and 1969 and after the government shutdowns of 1995 and 1996 and of 2025, the latest available quarters are used. The regressors of survey t , Δc_{t-1} to Δc_{t-5} and the real-time habit state h_t^{rt} , built as h_t from the last 40 growth rates in the vintage, come from vintage t , and the expanding-window regression for v_t^{rt} uses, for each earlier survey s , the regressors of vintage s . Applied with the latest vintage in place of every vintage, the same code reproduces v_t to within 0.45 percentage points. The nominal shares and population remain current vintage, because the real-time data set

does not carry nominal nondurables and its population vintages begin in 1998. Replacing them with crude alternatives, the share of nondurables fixed at its sample mean of 0.30 or lagged twelve quarters, or population growth fixed at its mean of 0.23 percent a quarter, changes the residual by 0.46, 0.11 and 0.81 percentage points (standard deviations of the difference; correlations of 0.998, 1.000 and 0.995 with v_t^{rt}) and leaves the fear coefficients of the spread, the price and the firm-level price between 0.061 and 0.066, at 0.011, and between 0.014 and 0.016, with t -statistics of 2.0 to 2.2, 1.4 to 1.5 and 4.5 to 4.9.

Compustat. Quarterly fundamentals use industrial format, standard data, domestic population, consolidated statements and U.S. dollars. When a firm has two records for a calendar quarter, I keep the one with the latest fiscal period. Payout is the quarterly flow of `dvy` plus `prstkcy`. The report date `rdq` is used when it falls after the end of the quarter and within a year of it. Industries are two-digit SIC codes from the Compustat company file.

CRSP. Monthly returns, prices and shares come from the CRSP monthly stock file in the new format, merged with its security information history over the dates for which each record is valid. Common stocks are securities with share type NS, security type EQTY, subtype COM, U.S. incorporation, issuer type ACOR or CORP, primary exchange NYSE, NYSE American or Nasdaq, regular-way trading and active trading status. Market capitalization is the absolute price times shares outstanding. Links to Compustat use link types LU and LC and primary links P and C, within the link's valid dates. The market return in Tables 2 and 5 is the value-weighted return of all common stocks in this sample.

Firm characteristics. The characteristics in (21) are measured at the end of month t . Market equity is the absolute price times shares outstanding, in millions of dollars. Book equity is stockholders' equity (`seq`, else `ceq` plus `pstk`, else at minus 1t) minus preferred stock (`pstkrv`, else `pstk1`, else `pstk`) plus deferred taxes and investment tax credit (`txditc`), from the latest fiscal year that ended at least 6 and at most 18 months earlier; book-to-market is its ratio to current market equity, for positive book equity. Operating profitability is revenue minus cost of goods sold, selling, general and administrative expenses and interest expense, over book equity, from the same fiscal year, and asset growth is the growth of total assets over that fiscal year. Momentum is the compounded return over months $t - 11$ to $t - 1$, with at least 8 returns. CAPM beta is the slope of

the stock's excess return on the value-weighted market excess return over the last 60 months, with at least 24. Dividend yield is the sum, over the last 12 months with at least 10 available, of the differences between the CRSP returns with and without dividends. Total payout yield is the trailing four-quarter payout of Section III.D, from the latest statement whose report date has passed, over market equity. Market equity and book-to-market enter in logs and the other characteristics in levels.

Macroeconomic releases. The release days of Section VI are the dates of the Employment Situation news releases in the archive of the Bureau of Labor Statistics, from February 1994, and of the advance, second and third (formerly preliminary and final) estimates of GDP in the news release archive of the Bureau of Economic Analysis, from August 1996; the daily returns on each release day and the three calendar days after it come from the CRSP daily stock file in the new format, with the same common-stock filters as the monthly file, and the next trading day is the first of those days after the release.

Factors and book-to-market portfolios. The market, size, value, profitability, investment and momentum factors and the value-weighted book-to-market portfolios are from Kenneth French's data library. Dividend yields of the book-to-market deciles are the annualized average difference between returns with and without dividends.

Controls and the Michigan survey. The log dividend-price ratio of the S&P 500 (twelve-month dividends over the price), realized stock market variance and the variance risk premium are monthly series, and cay is the quarterly series of the previous quarter, all from the predictor data of Goyal et al. (2024), which take cay from Lettau and Ludvigson (2001). The VIX is the CBOE closing value on the last trading day of the month. The excess bond premium is the monthly series of Gilchrist and Zakrajšek (2012) published by the Federal Reserve. The risk-aversion and uncertainty indices are the monthly indices of Bekaert et al. (2022), which start in 1986. The price of volatile stocks is, each month, the average log book-to-market of the fifth of CRSP-Compustat common stocks with the lowest standard deviation of their last 12 monthly returns (at least 10) minus that of the fifth with the highest, a monthly-return version of the measure of Pflueger et al. (2020), who use daily returns; book-to-market is defined as for the firm characteristics. Forecaster disagreement is the cross-forecaster standard deviation, in percentage points, of each forecaster's

average probability of a decline in real GDP over the next four quarters (RECESS2 to RECESS5 of the individual-response file), from the survey in force in the formation month. Macroeconomic uncertainty is the twelve-month-horizon index of [Jurado et al. \(2015\)](#), in the update of August 2026 posted by Sydney Ludvigson. The intermediary capital ratio is the end-of-month series of [He et al. \(2017\)](#), in the update of June 2025 posted by the authors. Each control is standardized to unit standard deviation over the regression sample. The Michigan fear measure is minus the Index of Consumer Expectations of the University of Michigan Surveys of Consumers, averaged over the first two months of each quarter, so that it is known at the end of the second month, when the formation months that use the SPF survey of that quarter begin. Its residual is computed exactly as v_t in (12), with the same regressors and expanding windows of at least 40 quarters; applied to the SPF probability, the same code reproduces v_t to within 10^{-4} percentage points. Its real-time version is computed as v_t^{rt} , with the regressors of each survey from the vintage of that quarter. The Michigan residual starts in 1978Q3.