Critical Finance Review

Internet Appendix To "Catering Through Nominal Share Prices Revisited"

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A Appendix To "Catering Through Nominal Share Prices Revisited"

This appendix contains descriptions of the estimation methods and additional details on the econometric arguments used in the main manuscript. For tractability, all equations and tables in this appendix are prefixed with an A.

A.1 *Autocorrelations and partial autocorrelations*

In Figure 2 of the main manuscript, we report autocorrelation and partial autocorrelation functions for the variables in eq. 1. The autocorrelation function is the set of all sample autocorrelation coefficients (ACs) up to a given number of lags, where the ACs measure correlation of a time series with its own past values. The k^{th} sample AC (AC_k) can be computed as the correlation coefficient between a time series y_t with its own k^{th} lagged value y_{t-k} , as follows:

$$AC_k = \frac{\sum_{t=k+1}^{T}(y_t - \overline{y})(y_{t-k} - \overline{y})}{\sum_{t=1}^{T}(y_t - \overline{y})^2}. \tag{A1}$$

where $\overline{y}$ is the sample mean of y_t. We also estimate the partial autocorrelation function – a set of all sample partial autocorrelation coefficients (PACs) up to a given lag. The PAC is a measure of conditional autocorrelation; it estimates the correlation of a time series with its own k^{th} lagged value after controlling for all previous lags. Thus, the PAC captures the "pure" correlation between the current value of the series and a period k in the past. The PAC for lag k, $\emptyset_k$, can be computed as follows:

$$y_t = \alpha + \emptyset_1 y_{t-1} + \emptyset_2 y_{t-2} + \cdots + \emptyset_k y_{t-k} + \varepsilon_t. \tag{A2}$$

The AC and PAC functions are commonly used for identification of time series patterns. For example, highly persistent or non-stationary (unit root) series are characterized by slowly decreasing AC functions and by the first ACs and PACs equal to 1. Since in our setting ACs and PACs are sample estimates, large first ACs and PACs should be considered noteworthy as they may imply that the population ACs and PACs are equal to 1.

A.2 *Non-stationarity tests*

With high levels of persistence in some of the eq. 1 variables, it may be of interest to test if these variables are non-stationary. To formally test for non-stationarity, we use the Augmented Dickey-Fuller (ADF) test. Our null hypothesis is that the variables in eq. 1 have a unit root and thus are non-stationary, and we report the p-values associated with this null hypothesis in Table A1. The results suggest that one cannot reject existence of a unit root for P^{CME} and P^{SMB} using

	ADF p-val.	PP p-val.	ERS statistic	KPSS statistic
VW P^{CME}	0.60	0.56	-1.99^{***}	1.79^{***}
EW P^{CME}	0.62	0.57	-2.00^{***}	1.29^{***}
VW P^{SMB}	0.64	0.48	-1.84^{***}	1.80^{***}
EW P^{SMB}	0.59	0.45	-2.00^{***}	1.29^{***}
s	0.44	0.01	-2.19^{***}	0.41^{***}
m	0.66	0.30	-1.83^{***}	1.50^{***}
pIPO (*first-day closing price*)	0.14	0.16	-2.97^{**}	0.18^{*}
pIPO (*offering price*)	0.04	0.04	-2.11^{***}	0.43^{***}
pIPO (*filing range midpoint*)	0.30	0.34	-2.51^{***}	0.61^{***}
p (*postsplit price*)	0.73	0.58	-1.51^{***}	3.22^{***}
split factor	0.35	0.00	-2.51^{***}	0.25^{***}
A	0.02	0.00	-2.02^{***}	0.60^{***}
p^{EW}	0.57	0.58	-2.13^{***}	1.45^{***}
r^{EW}	0.00	0.00	-6.71	0.09

Table A1: Non-stationarity tests.

Description: The table reports p-values from the Augmented Dickey-Fuller (ADF) test and the Phillips and Perron (1988) PP test as well as the statistics from the Elliot *et al.* (1996) ERS test and the Kwiatkowski *et al.* (1992) KPSS test. The ADF, PP and ERS test the null hypothesis that the series have a unit root. The KPSS tests the null that the series are stationary. The table reports test results for all dependent variables and for each independent variable in eq. 1. Most variables are the same as those used in the main manuscript. The variables unique to the appendix include the IPO offering price, the midpoint of the pre-IPO filing range (both defined as in Baker *et al.*, 2009), and the split factor, which indicates by how much the firm adjusts the price through a split. For the ERS test, the asterisks ***, **, * denote the inability to reject the null hypothesis of non-stationarity at the 1%, 5%, and 10% levels. For the KPSS test, the asterisks indicate rejection of the null hypothesis of stationarity at the respective levels.

Interpretation: Four different tests suggest that non-stationarity is likely a concern in the regression setting used in the paper.

both equal- and value-weighted variants of these variables. In fact, one may reject non-stationarity only for the split announcement premium A, the return variable r^{EW}, and the IPO offering price.

Although the Augmented Dickey Fuller test is the most popular method to test for a unit root, there are alternatives that are worth considering. We use three such alternatives proposed by Phillips and Perron (1988) (the PP test); Kwiatkowski *et al.* (1992) (the KPSS test); and Elliot *et al.* (1996) (the ERS test).

The PP test differs from the ADF test in how it deals with serial correlation and heteroskedasticity in the errors. While the ADF test uses a parametric autoregression to approximate the ARMA structure of the errors, the PP test corrects for serial correlation and heteroskedasticity by directly modifying the test statistics. The test requires estimation of the sample variance of the residuals and the bandwidth to determine the persistence of the variance. We use the Newey-West procedure with automatic bandwidth selection and the Bartlett kernel for this estimation. The interpretation of the PP test is similar to that of the ADF test.

In general, the ADF and PP tests have low power and cannot definitively distinguish between highly persistent stationary processes and non-stationary processes. We note however that the spurious regression bias is a concern for both persistent and non-stationary processes. As such, the low power of the ADF and PP tests is acceptable in our setting. Still, to obtain maximum power against very persistent alternatives, we use the test proposed by Elliot *et al.* (1996) (the ERS test). This test is a modification of the ADF test in that it detrends the data prior to running the test regression. Elliot et al.'s Monte Carlo simulations show that the ERS test has the best overall performance in terms of small-sample size and power. As in the previous tests, we select the number of lags using the Modified Akaike Information Criterion. The ERS statistic is compared with the simulated critical values, and the null hypothesis of non-stationarity is rejected for large negative values of the statistic.[1]

The ADF, PP, and ERS tests are designed to examine the null hypothesis that a time-series are non-stationary. Kwiatkowski *et al.* (1992) propose an alternative KPSS test that examines the null hypothesis that the series are stationary. Critical values from the asymptotic distributions of the test must be obtained by simulation. The test requires specification of the spectral estimation and lags selection methods. We use the GLS-detrended estimation and select lags using the Modified Akaike Information Criterion. The KPPS statistic is compared with the simulated critical values, and the null hypothesis of stationarity is rejected for large values of the statistic.[2]

In Table A1, we test all variables of interest using the three abovementioned alternatives to the ADF test. The results confirm that we cannot reject non-stationarity for P^{CME} and P^{SMB}, equal-weighted and value-weighted, no matter which test we use. Similarly, we cannot reject non-stationarity for the control variable p^{EW} and the dependent variables m and p. For the dependent variables s, *pIPO* (offering), and *split factor* (discussed shortly), non-stationarity generally cannot be rejected, with the exception of the PP test. We note that conflicting results between the PP test and the ERS and KPSS tests are not surprising in this case, since the PP test may have low power distinguishing

[1] In the ERS column of Table A1, we use asterisks to denote inability to reject the null hypothesis of non-stationarity.

[2] In the KPSS column of Table A1, we use asterisks to indicate rejection of the null hypothesis of stationarity.

non-stationary and highly persistent series. Overall, the results confirm that many of the variables in eq. 1 may lead to the spurious regression bias.

A.3 Additional IPO price variables

In Table A2, we report two additional time series specifications for the p_{IPO} dependent variable: the IPO offering prices and the midpoint of the pre-IPO filing range. In first differences, only two of the catering proxies, $VW\Delta P^{CME}$ and A, show relation to the IPO offering prices, respectively at the 5% and 10% significance levels. The midpoint of the pre-IPO filing range is not significantly related to any of the catering proxies.

A.4 An alternative post-split price choice variable

Researchers often use alternative dependent variables to clarify the effects of the spurious regression bias in time series models. We use a similar technique in an attempt to better understand the effect of catering proxies on the firms' choice of the post-split price p. As an alternative dependent variable, we use the split factor – a factor that the splitting firm chooses to adjust its price. Not only is the split factor a choice variable for the splitting firms, but also the p variable may be expressed as a function of the split factor and the pre-split price:

$$p_{i,t} = \frac{\textit{pre-split price}_{i,\ t-1}}{\textit{split factor}_{i,\ t-1}} \tag{A3}$$

If the firm's choice of the post-split price is driven by catering considerations, it follows that its choice of the split factor should also depend on the catering variables. As such, controlling for the pre-split price level, we expect the firms to choose larger split factors when the market prefers cheap stocks. To examine this expectation, in Table A3 we report the results of the following time series regression:

$$\Delta \textit{split factor}_t = a + b \cdot \Delta P^{CME}_{t-1} + c \cdot \Delta P^{SMB}_{t-1} + d \cdot A_{t-1} + e \cdot \Delta p^{EW}_{t-1} + f \cdot r^{EW}_t + u_t. \tag{A4}$$

We difference the split factor variable because the tests in Table A1 point to it being persistent and likely non-stationary.[3] When we examine the AC and PAC functions, we confirm split factor persistence. Table A3 shows that the catering variables are insignificant when used to explain firms' split factor choices. As such, the data indicate that the time series of p depend on the catering proxies, whereas an alternative metric of the firms' post-split price choice, the split factor, does not respond to catering. What may cause this discrepancy?

[3]In the subsequent sections, we report the *split factor* results using the HP filter and multi-period differences. The results are similar.

Panel A: IPO offering prices					
$VW\Delta P^{CME}_{t-1}$	−0.04**				
	(−2.45)				
$EW\Delta P^{CME}_{t-1}$		−0.03			
		(−1.24)			
$VW\Delta P^{SMB}_{t-1}$			−0.02		
			(−1.10)		
$EW\Delta P^{SMB}_{t-1}$				−0.01	
				(−0.59)	
A_{t-1}					−0.03*
					(−1.85)
Δp_{t-1}	−0.04**	−0.03**	−0.04**	−0.04**	−0.04**
	(−2.80)	(−2.42)	(−2.60)	(−2.47)	(−2.33)
r_t	0.04	0.05	0.07	0.06	0.09
	(0.39)	(0.42)	(0.47)	(0.46)	(0.66)
N	26	26	26	26	26
Adj. R^2	0.30	0.19	0.15	0.12	0.16
Panel B: Midpoint of the pre-IPO filing range					
$VW\ \Delta P^{CME}_{t-1}$	−0.01				
	(−0.66)				
$EW\ \Delta P^{CME}_{t-1}$		−0.01			
		(−0.66)			
$VW\ \Delta P^{SMB}_{t-1}$			0.00		
			(0.11)		
$EW\ \Delta P^{SMB}_{t-1}$				−0.01	
				(−0.28)	
A_{t-1}					−0.01
					(−0.84)
Δp_{t-1}	−0.00	0.00	−0.00	−0.00	0.00
	(−0.13)	(0.17)	(−0.28)	(−0.01)	(0.02)
r_t	−0.04	−0.04	−0.04	−0.04	−0.03
	(−0.35)	(−0.33)	(−0.28)	(−0.27)	(−0.21)
N	26	26	26	26	26
Adj. R^2	−0.07	−0.08	−0.12	−0.12	−0.09

Table A2: Catering proxies and additional IPO price variables

Description: The table reports results for the following differenced model:

$$\Delta p_{IPO\ t} = a + b \cdot \Delta P^{CME}_{t-1} + c \cdot \Delta P^{SMB}_{t-1} + d \cdot A_{t-1} + e \cdot \Delta p^{EW}_{t-1} + f \cdot r^{EW}_{t} + u_t.$$

In Panel A, the dependent variable is the IPO offering price. In Panel B, the dependent variable is the midpoint of the pre-IPO filing range. Estimation techniques and independent variables are the same as in Table 1 of the main manuscript. Asterisks $***$, $**$, and $*$ denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

Interpretation: When first differences are used to account for data persistence, support for the catering incentives affecting the firms' aggregate IPO prices considerably weakens.

$VW\ \Delta P^{CME}_{t-1}$	−0.00				
	(−0.53)				
$EW\ \Delta P^{CME}_{t-1}$		−0.00			
		(−0.03)			
$VW\ \Delta P^{SMB}_{t-1}$			0.00		
			(0.08)		
$EW\ \Delta P^{SMB}_{t-1}$				0.00	
				(0.27)	
A_{t-1}					0.00
					(0.11)
Δp_{t-1}	0.02***	0.02***	0.02***	0.02**	0.02***
	(3.02)	(2.79)	(2.90)	(2.43)	(3.24)
r_t	0.03	0.03	0.03	0.03	0.03
	(1.51)	(1.43)	(1.35)	(1.20)	(1.46)
N	43	43	43	43	43
Adj. R^2	0.30	0.29	0.27	0.28	0.31

Table A3: Catering proxies and split factors

Description: The table reports regression results from the following model:

$$\Delta split\ factor_t = a + b \cdot \Delta P^{CME}_{t-1} + c \cdot \Delta P^{SMB}_{t-1} + d \cdot A_{t-1} + e \cdot \Delta p^{EW}_{t-1} + f \cdot r^{EW}_t + u_t,$$

where $split\ factor_t$ is the average split factor chosen by the splitting firms in year t. Estimation techniques and independent variables are the same as in Table 1 of the main manuscript. Asterisks *** and ** denote statistical significance at the 0.01 and 0.05 levels.

Interpretation: When a split factor is used as an alternative to the post-split price variable, there is no relation between the aggregate split factor choice and the catering variables.

One possible reason is that p and the four catering proxies that are significant in Panel D of Table 1 of the main manuscript (namely, $VW\,\Delta P^{CME}_{t-1}$, $EW\,\Delta P^{CME}_{t-1}$, $VW\,\Delta P^{SMB}_{t-1}$, and $EW\,\Delta P^{SMB}_{t-1}$) are functions of the pre-split prices. Specifically, eq. A3 shows that the post-split price is a function of the pre-split price and the firm's choice of the split factor. From the literature (e.g., Lakonishok and Lev, 1987; Baker *et al.*, 2009), we know that the splitters have relatively high pre-split prices. As such, the numerator of eq. A3 is dominated by firms that are expensive in the context of catering, and their pre-split price may be denoted as $p_{\sim expen.}$. In the time series form:

$$p_t = \frac{1}{N}\sum_{i=1}^{N} \frac{pre\text{-}split\ price_{t-1}}{split\ factor_{t-1}} = \frac{1}{N}\sum_{i=1}^{N} \frac{p_{\sim expen.,\ t-1}}{split\ factor_{\sim expen.,\ t-1}} \qquad \text{(A5)}$$

In turn, the catering proxies are derived from the market-to-book ratios of cheap vs. expensive firms and therefore are also functions of $p_{\sim expen.}$. As such, in the p specifications of eq. 1 both the dependent and independent variables have similar components (highlighted in **boldface** in eq. A6), potentially resulting in a spurious relation. Put differently, the p specifications possibly regress prices on the reciprocals of prices, inducing a negative relation by construction.

$$\frac{1}{N}\sum_{i=1}^{N}\frac{\mathbf{p}_{\sim expen.,\ t-1}}{split\ factor_{\sim expen.,\ t-1}} = \alpha + \beta log\frac{\sum_{c=1}^{C}\frac{p_{cheap,\ t-1}}{bvps_{cheap,\ t-1}}}{\sum_{e=1}^{E}\frac{\mathbf{p}_{expen.,\ t-1}}{bvps_{expen.,\ t-1}}} + u_t \tag{A6}$$

We note that as long as the correlation between prices of large and expensive stocks is non-trivial, P^{SMB} may also contain a price component correlated with p by construction. Perhaps most tellingly, the only catering proxy that does not contain an unadjusted price component, A, is insignificant in all p specifications (Tables 1, 2, and 4 of the main manuscript).

A.5 Full Hodrick-Prescott results

In the main text, Table 2 contains an abridged version of the levels regressions that use the HP-filtered variables. In Table A4, we report the full version of these regressions, with the addition of a regression that uses the split factor as dependent variable.

A.6 Economically unrelated explanatory variables

Novy-Marx (2013, 2014) confirms the results of prior research in that expected returns may be explained by variables that do not appear to have clear economic links to firm performance. Among these are the El Niño phenomenon, the conjunctions of the planets, sunspots, etc. He argues that these surprising results are due to the fact that the variables are highly persistent. To examine his empirical setup in our setting, we study the relation between firms' price management activities and the time series variables in Novy-Marx (2014). These variables include the El Niño phenomenon (*El Niño*), the political party of the US President (*US Pres.*), the global land-ocean temperature index anomaly (*Global Warm*), the temperature in New York (*Temp NY*), the number of sunspots (*Sunspots*), the conjunction of Mars and Saturn (*Mars Sat.*), and the conjunction of Jupiter and Saturn (*Jup. Sat.*):

$$\begin{aligned} depvar_t =& a + b \cdot El\ Niño_{t-1} + c \cdot US\ Pres_{t-1} + \ d \cdot Global\ Warm + e \cdot Temp\ NY_{t-1} \\ &+ f \ \cdot Sunspots_{t-1} + g \cdot Mars\ Sat_{t-1} + h \cdot Jup\ Sat_{t-1} + \ i \cdot p_{t-1}^{EW} \\ &+ j \cdot r_t^{EW} + u_t, \end{aligned} \tag{A7}$$

where *depvar*, p^{EW}, and r^{EW} are defined in the main manuscript.[4]

[4]We thank Robert Novy-Marx for sharing his data and code.

Panel A: s					
$VW\ P_{t-1}^{CME}$	−0.23				
	(−0.82)				
$EW\ P_{t-1}^{CME}$		−0.13			
		(−0.45)			
$VW\ P_{t-1}^{SMB}$			−0.02		
			(−0.13)		
$EW\ P_{t-1}^{SMB}$				−0.07	
				(−0.24)	
A_{t-1}					0.25*
					(1.63)
p_{t-1}	1.42***	1.44***	1.41***	1.43***	1.27***
	(5.10)	(4.48)	(4.78)	(3.93)	(4.97)
r_t	2.93**	2.94**	2.93**	2.95**	2.47**
	(2.44)	(2.30)	(2.16)	(2.13)	(1.90)
N	44	44	44	44	44
Adj. R^2	0.43	0.42	0.41	0.42	0.43
Panel B: m					
$VW\ P_{t-1}^{CME}$	0.06				
	(0.49)				
$EW\ P_{t-1}^{CME}$		−0.08			
		(−0.73)			
$VW\ P_{t-1}^{SMB}$			0.00		
			(0.04)		
$EW\ P_{t-1}^{SMB}$				−0.11	
				(−1.10)	
A_{t-1}					−0.07
					(−0.84)
p_{t-1}	−0.52***	−0.49***	−0.51***	−0.45***	−0.48***
	(−3.84)	(−3.37)	(−3.71)	(−2.91)	(−4.18)
r_t	−1.50**	−1.48**	−1.50**	−1.43**	−1.37**
	(−2.43)	(−2.09)	(−2.34)	(−2.03)	(−2.25)
N	44	44	44	44	44
Adj. R^2	0.24	0.25	0.24	0.25	0.24

Table A4: Time series regressions with the Hodrick-Prescott filter.

Panel C: p_{IPO}, IPO closing price					
$VW\ P^{CME}_{t-1}$	-1.23^{**}				
	(-2.65)				
$EW\ P^{CME}_{t-1}$		-0.81			
		(-1.69)			
$VW\ P^{SMB}_{t-1}$			-1.16^{**}		
			(-2.52)		
$EW\ P^{SMB}_{t-1}$				-0.88	
				(-1.58)	
A_{t-1}					-1.32
					(-1.41)
p_{t-1}	0.25	0.90	0.95^{*}	1.24	1.55
	(0.44)	(1.27)	(1.77)	(1.70)	(1.65)
r_t	1.77	2.73^{*}	3.41^{**}	3.74^{**}	6.35^{**}
	(1.25)	(1.73)	(2.38)	(2.30)	(2.21)
N	27	27	27	27	27
Adj. R^2	0.35	0.15	0.34	0.15	0.19

Panel D: p_{IPO}, IPO offering price					
$VW\ P^{CME}_{t-1}$	-0.25^{***}				
	(-3.57)				
$EW\ P^{CME}_{t-1}$		-0.20^{**}			
		(-2.08)			
$VW\ P^{SMB}_{t-1}$			-0.17^{*}		
			(-1.83)		
$EW\ P^{SMB}_{t-1}$				-0.15	
				(-1.48)	
A_{t-1}					-0.01
					(-0.06)
p_{t-1}	-0.13	-0.00	0.01	0.06	0.03
	(-0.76)	(-0.02)	(0.07)	(0.28)	(0.10)
r_t	0.68	0.82	1.07	1.10	1.20
	(0.67)	(0.83)	(0.94)	(1.00)	(0.91)
N	27	27	27	27	27
Adj. R^2	0.23	0.15	0.11	0.08	0.01

Table A4: *Continued*.

Panel E: p_{IPO}, midpoint of the pre-IPO filing range					
$VW\ P^{CME}_{t-1}$	−0.06				
	(−0.59)				
$EW\ P^{CME}_{t-1}$		−0.10			
		(−0.99)			
$VW\ P^{SMB}_{t-1}$			0.03		
			(0.38)		
$EW\ P^{SMB}_{t-1}$				−0.05	
				(−0.49)	
A_{t-1}					0.20***
					(3.33)
p_{t-1}	−0.18	−0.16	−0.14	−0.13	−0.23
	(−0.68)	(−0.54)	(−0.47)	(−0.40)	(−0.84)
r_t	−0.61	−0.67	−0.47	−0.52	−0.80
	(−0.46)	(−0.53)	(−0.33)	(−0.37)	(−0.56)
N	27	27	27	27	27
Adj. R^2	−0.08	−0.05	−0.09	−0.08	−0.01
Panel F: p					
$VW\ P^{CME}_{t-1}$	−0.06***				
	(−4.68)				
$EW\ P^{CME}_{t-1}$		−0.05***			
		(−3.74)			
$VW\ P^{SMB}_{t-1}$			−0.06***		
			(−5.09)		
$EW\ P^{SMB}_{t-1}$				−0.05***	
				(−3.12)	
A_{t-1}					−0.02
					(−1.04)
p_{t-1}	0.05***	0.06***	0.07***	0.08***	0.06**
	(4.27)	(3.92)	(5.20)	(4.08)	(2.28)
r_t	0.07	0.07	0.09**	0.09*	0.10
	(1.50)	(1.61)	(2.02)	(1.73)	(1.13)
N	44	44	44	44	44
Adj. R^2	0.54	0.40	0.49	0.33	0.14

Table A4: *Continued*.

Panel G: *split factor*					
$VW\ P^{CME}_{t-1}$	−0.00				
	(−1.01)				
$EW\ P^{CME}_{t-1}$		−0.00			
		(−0.53)			
$VW\ P^{SMB}_{t-1}$			−0.00		
			(−0.53)		
$EW\ P^{SMB}_{t-1}$				−0.00	
				(−0.43)	
A_{t-1}					0.00**
					(2.45)
p_{t-1}	0.01***	0.01***	0.01***	0.01***	0.01***
	(5.02)	(4.36)	(4.67)	(3.92)	(4.61)
r_t	0.02**	0.02**	0.02**	0.02*	0.02
	(2.34)	(2.15)	(2.07)	(2.01)	(1.55)
N	44	44	44	44	44
Adj. R^2	0.45	0.42	0.42	0.42	0.45

Table A4: *Continued*.

Description: The table contains estimation results from the following levels model:

$$depvar_t = a + b \cdot P^{CME}_{t-1} + c \cdot P^{SMB}_{t-1} + d \cdot A_{t-1} + e \cdot p^{EW}_{t-1} + f \cdot r^{EW}_t + u_t,$$

where most variables have been defined in Table 1 of the main manuscript, and several additional variables have been defined in Table A1. Before running the regression, we apply the Hodrick and Prescott (1997) filter to s, m, p_{IPO} (all variants), p, P^{CME}, P^{SMB} (both equal- and value-weighted), p^{EW}, and the split factor to address persistence. t-Statistics in parenthesis are computed from standard errors robust to heteroskedasticity and autocorrelation up to three lags. Asterisks $***$, $**$, and $*$ denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

Interpretation: Using the Hodrick-Prescott filter to adjust for data persistence eliminates or substantially weakens the link between the catering variables and the firms' aggregate price management activities, with the exception of the post-split prices.

Novy-Marx (2013) points out that it is difficult to find a logical economic link between these variables and expected returns. Similarly, we are hard-pressed to offer a link between these variables and firms' price management activities. As such, since price management activities and the explanatory variables in equation A7 are most likely independent, we expect to reject the independence hypothesis 1%, 5%, and 10% of the time, depending on the desired significance level. In Panel A of Table A5, the rejection rates are higher than expected: 7%, 24%, and 38% at the 1%, 5%, and 10% significance levels, respectively. These results corroborate the notion that finding significant relations between unrelated variables is quite easy when the variables are persistent. The results are also in line with the simulations in Granger *et al.* (2001), who obtain similar

	El Niño$_{t-1}$	*US Pres*$_{t-1}$	*Global Warm.*$_{t-1}$	*Temp NY*$_{t-1}$	*Sunspots*$_{t-1}$	*Mars Sat.*$_{t-1}$	*Jup. Sat.*$_{t-1}$
Panel A: Levels							
s_t	0.71**	1.31	−0.39	0.14	0.00	−0.43	−0.88*
	(2.19)	(1.25)	(−0.17)	(0.61)	(0.14)	(−1.49)	(−1.78)
m_t	−0.28	−0.72	5.29***	0.47***	0.00	0.53*	0.81
	(−1.00)	(−0.63)	(4.58)	(3.97)	(0.07)	(1.72)	(1.26)
$p_{IPO\ closing_t}$	−0.05	0.16*	0.61**	0.06*	0.00	0.08**	−0.04
	(−1.09)	(1.83)	(2.71)	(1.91)	(0.98)	(2.07)	(−0.59)
$p_{IPO\ offering_t}$	−0.01	0.03	0.40**	0.05**	0.00	0.05*	−0.02
	(−0.61)	(0.80)	(2.63)	(2.24)	(1.19)	(2.07)	(−0.39)
$p_{IPO\ mid_t}$	0.00	−0.04	0.41**	0.05**	0.00	0.03	−0.00
	(0.26)	(−1.35)	(2.63)	(2.79)	(0.72)	(1.52)	(−0.14)
p_t	−0.05	0.07	0.27*	0.02	−0.00	0.05***	−0.02
	(−1.42)	(0.94)	(1.69)	(1.21)	(−0.57)	(2.89)	(−0.42)

Panel B: First differences

	Δ*El Niño*$_{t-1}$	Δ*US Pres*$_{t-1}$	Δ*Global Warm*$_{t-1}$	Δ*Temp NY*$_{t-1}$	Δ*Sunspots*$_{t-1}$	Δ*Mars Sat.*$_{t-1}$	Δ*Jup. Sat.*$_{t-1}$
Δs_t	0.80	1.30	−5.25	−0.29	−0.00	0.66	−0.25
	(1.52)	(1.10)	(−1.17)	(−0.34)	(−0.37)	(1.27)	(−0.96)
Δm_t	−0.18	−0.81	1.37	0.05	0.00	−0.40	0.31
	(−1.05)	(−1.20)	(0.96)	(0.12)	(0.88)	(−1.41)	(1.25)
$\Delta p_{IPO\ closing_t}$	−0.02	−0.07	0.02	0.14	0.00	0.03	−0.00
	(−0.39)	(−1.48)	(0.04)	(1.49)	(1.30)	(1.15)	(−0.05)

Table A5: Effects of the spurious regression bias in time series regressions.

Panel B: First differences

	$\Delta El\ Niño_{t-1}$	$\Delta US\ Pres_{t-1}$	$\Delta Global\ Warm_{t-1}$	$\Delta Temp\ NY_{t-1}$	$\Delta Sunspots_{t-1}$	$\Delta Mars\ Sat._{t-1}$	$\Delta Jup.\ Sat._{t-1}$
$\Delta p_{IPO\ offering_t}$	0.01	−0.04	−0.20	0.03	0.00*	0.04**	−0.00
	(0.53)	(−0.84)	(−0.92)	(0.92)	(1.85)	(2.17)	(−0.34)
$\Delta p_{IPO\ mid_t}$	0.02	−0.04	−0.06	−0.01	0.00	0.01	−0.01
	(1.20)	(−0.97)	(−0.54)	(−0.36)	(0.82)	(0.93)	(−1.32)
Δp_t	−0.03	0.01	0.05	0.06	0.00	0.02	−0.01
	(−0.93)	(0.60)	(0.38)	(1.30)	(0.89)	(1.34)	(−0.32)

Table A5: *Continued.*

Description: Panel A contains estimation results for the following regression model, in levels:

$$depvar_t = a + b \cdot El\ Niño_{t-1} + c \cdot US\ Pres_{t-1} + d \cdot Global\ Warm + e \cdot Temp\ NY_{t-1} + f \cdot Sunspots_{t-1} + g \cdot Mars\ Sat._{t-1} + h \cdot Jup.\ Sat._{t-1} + i \cdot p^{EW}_{t-1} + j \cdot r^{EW}_t + u_t$$

where *El Niño* is the Pacific ocean temperature anomaly, *US Pres* is a dummy variable equal to one if the U.S. President is a Democrat, *Global Warm* is the Global Land-Ocean Temperature Index Anomaly, *Temp NY* is the highest monthly temperature registered by the Central Park weather station in the current year, *Sunspots* is the number of sunspots, *Mars Sat.* is the conjunction of Mars and Saturn, and *Jup. Sat.* is the conjunction of Jupiter and Saturn. These variables are defined as in Novy-Marx (2014). The remaining variables are defined in Table 1 of the main manuscript. Panel B contains results from the following differenced model:

$$\Delta depvar_t = a + b \cdot \Delta El\ Niño_{t-1} + c \cdot \Delta US\ Pres_{t-1} + d \cdot \Delta Global\ Warm + e \cdot \Delta Temp\ NY_{t-1} + f \cdot \Delta Sunspots_{t-1} + g \cdot \Delta Mars\ Sat_{t-1} + h \cdot \Delta Jup.\ Sat_{t-1} + i \cdot \Delta p^{EW}_{t-1} + j \cdot r^{EW}_t + u_t.$$

The independent variables are standardized to unit variance, t-statistics in parentheses are computed from standard errors robust to heteroskedasticity and autocorrelation up to three lags. Asterisks ***, **, and * represent statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

Interpretation: When economically unrelated variables are used in place of catering incentives (in levels), the likelihood of rejecting the true null hypothesis of independence is high. When first differences are used to adjust for data persistence, the likelihood of rejecting the true null declines to acceptable levels.

rejection rates for the sample size and the persistence level similar to ours.

Notably, when we difference the persistent variables in Panel B the rejection rates become quite reasonable: 0%, 2%, and 5% at the 1%, 5% and 10% significance levels. This result is consistent with the notion that high rejection rates in Panel A are caused by high persistence that leads to increased occurrence of Type I errors.

A.7 Full multi-period differencing results

In the main text, Table 4 contains an abridged version of regressions that use multi-period differencing. In Table A6, we report the full version of these regressions, with the addition of the regression that uses the split factor as dependent variable.

Panel A: Dependent variable is $\Delta_2 s_t$					
$VW\ \Delta_2 P^{CME}_{t-1}$	0.05				
	(0.12)				
$EW\ \Delta_2 P^{CME}_{t-1}$		0.19			
		(0.42)			
$VW\ \Delta_2 P^{SMB}_{t-1}$			0.23		
			(0.70)		
$EW\ \Delta_2 P^{SMB}_{t-1}$				0.33	
				(0.71)	
${}_2A_{t-1}$					0.31
					(0.70)
$\Delta_2 p_{t-1}$	1.66**	1.64**	1.63**	1.55**	1.55**
	(2.70)	(2.67)	(2.64)	(2.41)	(2.34)
${}_2r_t$	6.27**	6.08*	5.88*	5.63	5.93**
	(2.10)	(1.94)	(1.91)	(1.65)	(2.11)
N	42	42	42	42	42
Adj. R^2	0.42	0.42	0.42	0.42	0.42

Table A6: Time series regressions with multi-year differencing

Panel B: Dependent variable is $\Delta_3 s_t$					
$VW\ \Delta_3 P^{CME}_{t-1}$	0.06				
	(0.13)				
$EW\ \Delta_3 P^{CME}_{t-1}$		0.27			
		(0.54)			
$VW\ \Delta_3 P^{SMB}_{t-1}$			0.27		
			(0.60)		
$EW\ \Delta_3 P^{SMB}_{t-1}$				0.41	
				(0.72)	
${}_3A_{t-1}$					0.40
					(0.73)
$\Delta_3 p_{t-1}$	1.08*	1.08*	1.06*	1.01*	0.95
	(1.87)	(1.94)	(1.79)	(1.70)	(1.50)
${}_3r_t$	11.55**	10.78**	10.68**	9.87*	10.62**
	(2.38)	(2.24)	(2.29)	(1.83)	(2.67)
N	41	41	41	41	41
Adj. R^2	0.37	0.37	0.37	0.38	0.38
Panel C: Dependent variable is $\Delta_4 s_t$					
$VW\ \Delta_4 P^{CME}_{t-1}$	−0.10				
	(−0.23)				
$EW\ \Delta_4 P^{CME}_{t-1}$		0.27			
		(0.50)			
$VW\ \Delta_4 P^{SMB}_{t-1}$			0.05		
			(0.14)		
$EW\ \Delta_4 P^{SMB}_{t-1}$				0.25	
				(0.47)	
${}_4A_{t-1}$					0.50
					(1.05)
$\Delta_4 p_{t-1}$	0.69	0.79	0.73	0.73	0.56
	(0.84)	(0.99)	(0.87)	(0.88)	(0.65)
${}_4r_t$	22.28***	19.83***	21.26***	19.76***	19.98***
	(3.57)	(3.18)	(3.81)	(3.04)	(3.34)
	40	40	40	40	40
Adj. R^2	0.40	0.40	0.40	0.40	0.41

Table A6: *Continued*

Panel D: Dependent variable is $\Delta_5 s_t$					
$VW\ \Delta_5 P^{CME}_{t-1}$	0.05				
	(0.10)				
$EW\ \Delta_5 P^{CME}_{t-1}$		0.34			
		(0.57)			
$VW\ \Delta_5 P^{SMB}_{t-1}$			0.10		
			(0.21)		
$EW\ \Delta_5 P^{SMB}_{t-1}$				0.34	
				(0.54)	
${}_5A_{t-1}$					0.11
					(0.18)
$\Delta_5 p_{t-1}$	0.86	0.90	0.85	0.83	0.81
	(0.94)	(1.03)	(0.92)	(0.91)	(0.90)
${}_5r_t$	27.16***	25.17***	26.83***	24.87***	27.07***
	(4.90)	(4.42)	(4.96)	(4.22)	(4.04)
N	39	39	39	39	39
Adj. R^2	0.50	0.50	0.50	0.50	0.50
Panel E: Dependent variable is $\Delta_2 m_t$					
$VW\ \Delta_2 P^{CME}_{t-1}$	−0.12				
	(−0.85)				
$EW\ \Delta_2 P^{CME}_{t-1}$		−0.39**			
		(−2.46)			
$VW\ \Delta_2 P^{SMB}_{t-1}$			−0.18		
			(−1.45)		
$EW\ \Delta_2 P^{SMB}_{t-1}$				−0.49***	
				(−2.77)	
${}_2A_{t-1}$					−0.17
					(−0.72)
$\Delta_2 p_{t-1}$	−0.45	−0.40	−0.42	−0.29	−0.39
	(−1.58)	(−1.60)	(−1.45)	(−1.12)	(−1.22)
${}_2r_t$	−4.03*	−3.64*	−3.81*	−3.13	−3.94*
	(−1.90)	(−1.72)	(−1.81)	(−1.46)	(−1.92)
N	42	42	42	42	42
Adj. R^2	0.30	0.34	0.30	0.35	0.30

Table A6: *Continued*.

Panel F: Dependent variable is $\Delta_3 m_t$					
$VW\ \Delta_3 P^{CME}_{t-1}$	−0.23				
	(−1.11)				
$EW\ \Delta_3 P^{CME}_{t-1}$		−0.57***			
		(−2.79)			
$VW\ \Delta_3 P^{SMB}_{t-1}$			−0.30		
			(−1.34)		
$EW\ \Delta_3 P^{SMB}_{t-1}$				−0.69**	
				(−2.47)	
${}_3A_{t-1}$					−0.11
					(−0.32)
$\Delta_3 p_{t-1}$	−0.01	−0.00	0.04	0.13	0.06
	(−0.05)	(−0.00)	(0.13)	(0.42)	(0.19)
${}_3r_t$	−8.13**	−6.85**	−7.78**	−5.79*	−8.67***
	(−2.38)	(−2.17)	(−2.41)	(−1.80)	(−2.80)
N	41	41	41	41	41
Adj. R^2	0.29	0.35	0.30	0.35	0.28
Panel G: Dependent variable is $\Delta_4 m_t$					
$VW\ \Delta_4 P^{CME}_{t-1}$	−0.09				
	(−0.34)				
$EW\ \Delta_4 P^{CME}_{t-1}$		−0.57*			
		(−1.87)			
$VW\ \Delta_4 P^{SMB}_{t-1}$			−0.18		
			(−0.83)		
$EW\ \Delta_4 P^{SMB}_{t-1}$				−0.61	
				(−1.67)	
${}_4A_{t-1}$					−0.27
					(−0.52)
$\Delta_4 p_{t-1}$	0.40	0.29	0.41	0.42	0.52
	(0.72)	(0.57)	(0.73)	(0.76)	(0.91)
${}_4r_t$	−16.18**	−12.93**	−15.50***	−12.19*	−15.86**
	(−2.51)	(−2.12)	(−2.73)	(−1.93)	(−2.58)
	40	40	40	40	40
Adj. R^2	0.34	0.37	0.34	0.36	0.34

Table A6: *Continued.*

Panel H: Dependent variable is $\Delta_5 m_t$					
$VW\ \Delta_5 P^{CME}_{t-1}$	-0.27				
	(-0.83)				
$EW\ \Delta_5 P^{CME}_{t-1}$		-0.75			
		(-1.63)			
$VW\ \Delta_5 P^{SMB}_{t-1}$			-0.28		
			(-0.80)		
$EW\ \Delta_5 P^{SMB}_{t-1}$				-0.84	
				(-1.46)	
${}_5A_{t-1}$					0.02
					(0.03)
$\Delta_5 p_{t-1}$	0.37	0.33	0.44	0.49	0.45
	(0.62)	(0.59)	(0.71)	(0.80)	(0.75)
${}_5r_t$	-19.18^{***}	-15.92^{***}	-19.09^{***}	-14.39^{**}	-21.00^{***}
	(-3.32)	(-2.84)	(-3.65)	(-2.57)	(-3.33)
N	39	39	39	39	39
Adj. R^2	0.41	0.45	0.41	0.44	0.40
Panel I: Dependent variable is $\Delta_2\ p_{IPO\ closing_t}$					
$VW\ \Delta_2 P^{CME}_{t-1}$	-0.16^{***}				
	(-4.70)				
$EW\ \Delta_2 P^{CME}_{t-1}$		-0.14^{***}			
		(-3.03)			
$VW\ \Delta_2 P^{SMB}_{t-1}$			-0.16^{***}		
			(-4.70)		
$EW\ \Delta_2 P^{SMB}_{t-1}$				-0.16^{***}	
				(-2.90)	
${}_2A_{t-1}$					-0.15
					(-1.54)
$\Delta_2 p_{t-1}$	0.02	0.06^{*}	0.06^{*}	0.09^{*}	0.06
	(0.47)	(1.95)	(1.85)	(2.05)	(0.90)
${}_2r_t$	0.37	0.40	0.66^{*}	0.56	0.55
	(1.02)	(0.98)	(1.83)	(1.36)	(1.22)
N	25	25	25	25	25
Adj. R^2	0.58	0.41	0.55	0.39	0.17

Table A6: *Continued.*

Panel J: Dependent variable is $\Delta_3\ p_{IPO\ closing_t}$

$VW\ \Delta_3 P^{CME}_{t-1}$	-0.18^{***}				
	(-5.68)				
$EW\ \Delta_3 P^{CME}_{t-1}$		-0.17^{***}			
		(-3.56)			
$VW\ \Delta_3 P^{SMB}_{t-1}$			-0.20^{***}		
			(-8.38)		
$EW\ \Delta_3 P^{SMB}_{t-1}$				-0.20^{***}	
				(-3.77)	
${}_3A_{t-1}$					-0.17^{*}
					(-1.96)
$\Delta_3 p_{t-1}$	0.04	0.09	0.09^{*}	0.11	0.07
	(0.74)	(1.51)	(1.93)	(1.65)	(0.89)
${}_3r_t$	0.38	0.33	0.85^{***}	0.60^{*}	0.11
	(0.91)	(0.90)	(3.39)	(1.89)	(0.17)
N	24	24	24	24	24
Adj. R^2	0.70	0.53	0.74	0.52	0.22

Panel K: Dependent variable is $\Delta_4\ p_{IPO\ closing_t}$

$VW\ \Delta_4 P^{CME}_{t-1}$	-0.20^{***}				
	(-6.28)				
$EW\ \Delta_4 P^{CME}_{t-1}$		-0.20^{***}			
		(-4.47)			
$VW\ \Delta_4 P^{SMB}_{t-1}$			-0.22^{***}		
			(-6.06)		
$EW\ \Delta_4 P^{SMB}_{t-1}$				-0.25^{***}	
				(-5.05)	
${}_4A_{t-1}$					-0.20^{***}
					(-3.04)
$\Delta_4 p_{t-1}$	0.08	0.15	0.13	0.19^{**}	0.18
	(0.86)	(1.66)	(1.59)	(2.64)	(1.36)
${}_4r_t$	-0.01	-0.08	0.64	0.27	-1.24
	(-0.02)	(-0.12)	(0.85)	(0.36)	(-1.02)
	23	23	23	23	23
Adj. R^2	0.74	0.68	0.75	0.70	0.39

Table A6: *Continued*.

Panel L: Dependent variable is $\Delta_5\ p_{IPO\ closing_t}$					
$VW\ \Delta_5 P^{CME}_{t-1}$	-0.23^{***}				
	(-8.00)				
$EW\ \Delta_5 P^{CME}_{t-1}$		-0.24^{***}			
		(-5.54)			
$VW\ \Delta_5 P^{SMB}_{t-1}$			-0.25^{***}		
			(-8.16)		
$EW\ \Delta_5 P^{SMB}_{t-1}$				-0.31^{***}	
				(-7.48)	
${}_5A_{t-1}$					-0.25^{**}
					(-2.80)
$\Delta_5 p_{t-1}$	0.01	0.08^{*}	0.09^{**}	0.13^{**}	0.06
	(0.21)	(1.74)	(2.15)	(2.86)	(1.05)
${}_5r_t$	0.88	0.90	1.57^{**}	1.75^{**}	-0.64
	(1.58)	(1.59)	(2.69)	(2.47)	(-0.62)
N	22	22	22	22	22
Adj. R^2	0.75	0.69	0.74	0.70	0.27
Panel M: Dependent variable is $\Delta_2\ p_{IPO\ offering_t}$					
$VW\ \Delta_2 P^{CME}_{t-1}$	-0.05^{***}				
	(-3.04)				
$EW\ \Delta_2 P^{CME}_{t-1}$		-0.05^{**}			
		(-2.39)			
$VW\ \Delta_2 P^{SMB}_{t-1}$			-0.05^{**}		
			(-2.37)		
$EW\ \Delta_2 P^{SMB}_{t-1}$				-0.05^{**}	
				(-2.11)	
${}_2A_{t-1}$					-0.07^{*}
					(-1.83)
$\Delta_2 p_{t-1}$	-0.03	-0.01	-0.01	-0.00	-0.01
	(-1.16)	(-0.37)	(-0.48)	(-0.11)	(-0.45)
${}_2r_t$	0.02	0.04	0.10	0.08	0.12
	(0.16)	(0.34)	(0.60)	(0.63)	(0.58)
N	25	25	25	25	25
Adj. R^2	0.37	0.32	0.29	0.24	0.20

Table A6: *Continued*.

Panel N: Dependent variable is $\Delta_3\ p_{IPO\ offering_t}$					
$VW\ \Delta_3 P^{CME}_{t-1}$	-0.07^{***}				
	(-3.59)				
$EW\ \Delta_3 P^{CME}_{t-1}$		-0.06^{**}			
		(-2.65)			
$VW\ \Delta_3 P^{SMB}_{t-1}$			-0.07^{***}		
			(-3.08)		
$EW\ \Delta_3 P^{SMB}_{t-1}$				-0.06^{**}	
				(-2.56)	
${}_3A_{t-1}$					-0.09^{**}
					(-2.44)
$\Delta_3 p_{t-1}$	-0.05^{***}	-0.03	-0.03	-0.03	-0.03
	(-3.27)	(-1.36)	(-1.64)	(-1.14)	(-1.25)
${}_3r_t$	0.02	0.00	0.15	0.05	0.01
	(0.15)	(0.01)	(0.68)	(0.23)	(0.05)
N	24	24	24	24	24
Adj. R^2	0.57	0.45	0.52	0.37	0.39
Panel O: Dependent variable is $\Delta_4\ p_{IPO\ offering_t}$					
$VW\ \Delta_4 P^{CME}_{t-1}$	-0.08^{***}				
	(-3.00)				
$EW\ \Delta_4 P^{CME}_{t-1}$		-0.08^{**}			
		(-2.31)			
$VW\ \Delta_4 P^{SMB}_{t-1}$			-0.08^{**}		
			(-2.78)		
$EW\ \Delta_4 P^{SMB}_{t-1}$				-0.08^{**}	
				(-2.30)	
${}_4A_{t-1}$					-0.14^{***}
					(-3.44)
$\Delta_4 p_{t-1}$	-0.04	-0.01	-0.02	0.00	0.00
	(-1.41)	(-0.44)	(-0.60)	(0.09)	(0.06)
${}_4r_t$	0.17	0.11	0.39	0.15	-0.17
	(0.50)	(0.28)	(0.90)	(0.34)	(-0.47)
	23	23	23	23	23
Adj. R^2	0.47	0.41	0.44	0.34	0.48

Table A6: *Continued*.

Panel P: Dependent variable is $\Delta_5\ p_{IPO\ offering_t}$					
$VW\ \Delta_5 P^{CME}_{t-1}$	-0.08^{***}				
	(-4.66)				
$EW\ \Delta_5 P^{CME}_{t-1}$		-0.08^{***}			
		(-3.62)			
$VW\ \Delta_5 P^{SMB}_{t-1}$			-0.09^{***}		
			(-5.35)		
$EW\ \Delta_5 P^{SMB}_{t-1}$				-0.10^{***}	
				(-4.80)	
${}_5A_{t-1}$					-0.16^{***}
					(-6.19)
$\Delta_5 p_{t-1}$	-0.04	-0.01	-0.01	0.00	-0.01
	(-1.28)	(-0.31)	(-0.24)	(0.11)	(-0.58)
${}_5r_t$	0.40	0.38	0.64^{**}	0.61	-0.10
	(1.55)	(1.17)	(2.15)	(1.72)	(-0.37)
N	22	22	22	22	22
Adj. R^2	0.49	0.41	0.48	0.37	0.57

Panel Q: Dependent variable is $\Delta_2 p_{IPO\ mid_t}$					
$VW\ \Delta_2 P^{CME}_{t-1}$	-0.01				
	(-0.61)				
$EW\ \Delta_2 P^{CME}_{t-1}$		-0.02			
		(-0.96)			
$VW\ \Delta_2 P^{SMB}_{t-1}$			-0.00		
			(-0.23)		
$EW\ \Delta_2 P^{SMB}_{t-1}$				-0.02	
				(-0.72)	
${}_2A_{t-1}$					-0.03^{*}
					(-1.76)
$\Delta_2 p_{t-1}$	-0.02	-0.02	-0.02	-0.02	-0.02
	(-0.89)	(-0.56)	(-0.73)	(-0.47)	(-0.71)
${}_2r_t$	-0.11	-0.09	-0.10	-0.08	-0.06
	(-0.45)	(-0.43)	(-0.39)	(-0.34)	(-0.25)
N	25	25	25	25	25
Adj. R^2	0.09	0.14	0.07	0.11	0.12

Table A6: *Continued.*

Panel R: Dependent variable is $\Delta_3 p_{IPO\ mid_t}$					
$VW\ \Delta_3 P^{CME}_{t-1}$	−0.02				
	(−0.90)				
$EW\ \Delta_3 P^{CME}_{t-1}$		−0.02			
		(−0.73)			
$VW\ \Delta_3 P^{SMB}_{t-1}$			−0.01		
			(−0.53)		
$EW\ \Delta_3 P^{SMB}_{t-1}$				−0.01	
				(−0.48)	
${}_3A_{t-1}$					-0.05^{**}
					(−2.50)
$\Delta_3 p_{t-1}$	−0.03	−0.02	−0.03	−0.02	−0.02
	(−1.49)	(−0.97)	(−1.05)	(−0.91)	(−1.25)
${}_3r_t$	−0.18	−0.18	−0.18	−0.19	−0.10
	(−0.53)	(−0.51)	(−0.47)	(−0.47)	(−0.42)
N	24	24	24	24	24
Adj. R^2	0.19	0.18	0.15	0.15	0.27
Panel S: Dependent variable is $\Delta_4 p_{IPO\ mid_t}$					
$VW\ \Delta_4 P^{CME}_{t-1}$	-0.03^{*}				
	(−1.77)				
$EW\ \Delta_4 P^{CME}_{t-1}$		−0.03			
		(−1.18)			
$VW\ \Delta_4 P^{SMB}_{t-1}$			−0.03		
			(−1.57)		
$EW\ \Delta_4 P^{SMB}_{t-1}$				−0.02	
				(−0.87)	
${}_4A_{t-1}$					-0.10^{***}
					(−3.63)
$\Delta_4 p_{t-1}$	−0.04	−0.03	−0.03	−0.02	−0.02
	(−1.09)	(−0.75)	(−0.79)	(−0.59)	(−0.78)
${}_4r_t$	0.18	0.11	0.24	0.08	0.17
	(0.74)	(0.39)	(0.82)	(0.22)	(0.73)
	23	23	23	23	23
Adj. R^2	0.18	0.12	0.15	0.09	0.49

Table A6: *Continued*.

Panel T: Dependent variable is $\Delta_5 p_{IPO\ mid_t}$					
$VW\ \Delta_5 P^{CME}_{t-1}$	−0.02				
	(−1.03)				
$EW\ \Delta_5 P^{CME}_{t-1}$		−0.01			
		(−0.61)			
$VW\ \Delta_5 P^{SMB}_{t-1}$			−0.02		
			(−1.11)		
$EW\ \Delta_5 P^{SMB}_{t-1}$				−0.01	
				(−0.54)	
${}_5A_{t-1}$					−0.12***
					(−3.94)
$\Delta_5 p_{t-1}$	0.00	0.01	0.01	0.01	0.01
	(0.02)	(0.18)	(0.24)	(0.22)	(0.51)
${}_5r_t$	0.07	0.02	0.12	0.04	−0.02
	(0.18)	(0.04)	(0.31)	(0.08)	(−0.10)
N	22	22	22	22	22
Adj. R^2	0.06	0.02	0.05	0.01	0.61

Panel U: Dependent variable is $\Delta_2 p_t$					
$VW\ \Delta_2 P^{CME}_{t-1}$	−0.14***				
	(−5.61)				
$EW\ \Delta_2 P^{CME}_{t-1}$		−0.12***			
		(−4.12)			
$VW\ \Delta_2 P^{SMB}_{t-1}$			−0.14***		
			(−6.87)		
$EW\ \Delta_2 P^{SMB}_{t-1}$				−0.15***	
				(−4.81)	
${}_2A_{t-1}$					−0.07
					(−1.35)
$\Delta_2 p_{t-1}$	0.10***	0.12***	0.12***	0.15***	0.12***
	(5.02)	(5.59)	(6.08)	(6.48)	(3.44)
${}_2r_t$	0.26*	0.28*	0.38**	0.42**	0.19
	(1.80)	(1.78)	(2.44)	(2.34)	(1.06)
N	42	42	42	42	42
Adj. R^2	0.70	0.60	0.67	0.61	0.33

Table A6: *Continued*.

Panel V: Dependent variable is $\Delta_3 p_t$					
$VW\ \Delta_3 P_{t-1}^{CME}$	-0.15^{***}				
	(-5.47)				
$EW\ \Delta_3 P_{t-1}^{CME}$		-0.13^{***}			
		(-4.01)			
$VW\ \Delta_3 P_{t-1}^{SMB}$			-0.17^{***}		
			(-9.26)		
$EW\ \Delta_3 P_{t-1}^{SMB}$				-0.17^{***}	
				(-5.44)	
${}_3A_{t-1}$					-0.06
					(-1.25)
$\Delta_3 p_{t-1}$	0.11^{***}	0.13^{***}	0.15^{***}	0.17^{***}	0.16^{***}
	(4.61)	(4.62)	(6.31)	(5.88)	(4.36)
${}_3r_t$	0.27	0.21	0.41	0.53^{**}	-0.09
	(1.24)	(1.17)	(1.66)	(2.20)	(-0.32)
N	41	41	41	41	41
Adj. R^2	0.68	0.59	0.72	0.66	0.36
Panel W: Dependent variable is $\Delta_4 p_t$					
$VW\ \Delta_4 P_{t-1}^{CME}$	-0.15^{***}				
	(-8.55)				
$EW\ \Delta_4 P_{t-1}^{CME}$		-0.13^{***}			
		(-5.72)			
$VW\ \Delta_4 P_{t-1}^{SMB}$			-0.16^{***}		
			(-9.42)		
$EW\ \Delta_4 P_{t-1}^{SMB}$				-0.18^{***}	
				(-8.61)	
${}_4A_{t-1}$					-0.04
					(-1.07)
$\Delta_4 p_{t-1}$	0.17^{***}	0.19^{***}	0.20^{***}	0.22^{***}	0.24^{***}
	(6.60)	(5.43)	(7.32)	(6.93)	(4.56)
${}_4r_t$	-0.24	-0.36	-0.11	0.15	-1.07^{***}
	(-1.19)	(-1.52)	(-0.35)	(0.56)	(-2.90)
	40	40	40	40	40
Adj. R^2	0.77	0.70	0.79	0.77	0.52

Table A6: *Continued*.

Panel X: Dependent variable is $\Delta_5 p_t$					
$VW\ \Delta_5 P^{CME}_{t-1}$	-0.19^{***}				
	(-7.44)				
$EW\ \Delta_5 P^{CME}_{t-1}$		-0.17^{***}			
		(-4.36)			
$VW\ \Delta_5 P^{SMB}_{t-1}$			-0.20^{***}		
			(-9.34)		
$EW\ \Delta_5 P^{SMB}_{t-1}$				-0.25^{***}	
				(-8.82)	
${}_5A_{t-1}$					-0.02
					(-0.40)
$\Delta_5 p_{t-1}$	0.13^{***}	0.16^{***}	0.18^{***}	0.20^{***}	0.19^{***}
	(6.49)	(6.27)	(7.28)	(9.04)	(3.35)
${}_5r_t$	0.48	0.38	0.58^{**}	1.21^{***}	-0.66^{*}
	(1.69)	(1.30)	(2.11)	(4.74)	(-1.99)
N	39	39	39	39	39
Adj. R^2	0.77	0.68	0.80	0.81	0.37
Panel Y: Dependent variable is Δ_2 *split factor*$_t$					
$VW\ \Delta_2 P^{CME}_{t-1}$	0.00				
	(0.01)				
$EW\ \Delta_2 P^{CME}_{t-1}$		0.00			
		(0.53)			
$VW\ \Delta_2 P^{SMB}_{t-1}$			0.00		
			(0.49)		
$EW\ \Delta_2 P^{SMB}_{t-1}$				0.00	
				(0.82)	
${}_2A_{t-1}$					0.00
					(0.54)
$\Delta_2 p_{t-1}$	0.02^{**}	0.02^{**}	0.02^{**}	0.01^{**}	0.01^{**}
	(2.61)	(2.61)	(2.55)	(2.35)	(2.35)
${}_2r_t$	0.05^{*}	0.04	0.04	0.04	0.04^{*}
	(1.84)	(1.66)	(1.68)	(1.39)	(1.81)
N	42	42	42	42	42
Adj. R^2	0.44	0.44	0.44	0.45	0.44

Table A6: *Continued*.

Panel Z: Dependent variable is Δ_3 *split factor*$_t$					
$VW\ \Delta_3 P^{CME}_{t-1}$	0.00				
	(0.13)				
$EW\ \Delta_3 P^{CME}_{t-1}$		0.00			
		(0.74)			
$VW\ \Delta_3 P^{SMB}_{t-1}$			0.00		
			(0.55)		
$EW\ \Delta_3 P^{SMB}_{t-1}$				0.00	
				(0.89)	
${}_3A_{t-1}$					0.00
					(0.73)
$\Delta_3 p_{t-1}$	0.01*	0.01**	0.01*	0.01*	0.01
	(2.03)	(2.12)	(1.93)	(1.84)	(1.65)
${}_3r_t$	0.08*	0.07*	0.07*	0.06	0.07**
	(1.92)	(1.74)	(1.82)	(1.36)	(2.14)
N	41	41	41	41	41
Adj. R^2	0.38	0.39	0.39	0.39	0.39
Panel AA: Dependent variable is Δ_4 *split factor*$_t$					
$VW\ \Delta_4 P^{CME}_{t-1}$	−0.00				
	(−0.23)				
$EW\ \Delta_4 P^{CME}_{t-1}$		0.00			
		(0.67)			
$VW\ \Delta_4 P^{SMB}_{t-1}$			0.00		
			(0.02)		
$EW\ \Delta_4 P^{SMB}_{t-1}$				0.00	
				(0.59)	
${}_4A_{t-1}$					0.01
					(1.25)
$\Delta_4 p_{t-1}$	0.01	0.01	0.01	0.01	0.01
	(1.04)	(1.22)	(1.05)	(1.06)	(0.80)
${}_4r_t$	0.17***	0.15***	0.17***	0.15***	0.15***
	(3.40)	(2.84)	(3.77)	(2.84)	(3.01)
N	40	40	40	40	40
Adj. R^2	0.42	0.43	0.42	0.43	0.43

Table A6: *Continued*.

Panel AB: Dependent variable is Δ_5 *split factor*$_t$					
$VW\ \Delta_5 P^{CME}_{t-1}$	0.00				
	(0.26)				
$EW\ \Delta_5 P^{CME}_{t-1}$		0.00			
		(0.81)			
$VW\ \Delta_5 P^{SMB}_{t-1}$			0.00		
			(0.23)		
$EW\ \Delta_5 P^{SMB}_{t-1}$				0.00	
				(0.74)	
${}_5A_{t-1}$					0.00
					(0.37)
$\Delta_5 p_{t-1}$	0.01	0.01	0.01	0.01	0.01
	(1.26)	(1.37)	(1.21)	(1.20)	(1.17)
${}_5r_t$	0.20***	0.18***	0.20***	0.18***	0.20***
	(4.35)	(3.71)	(4.49)	(3.74)	(3.48)
N	39	39	39	39	39
Adj. R^2	0.52	0.53	0.52	0.52	0.52

Table A6: *Continued*.

Description: The table reports coefficients from multi-year differenced regressions of the following form:

$$\Delta_k depvar_t = a + b \cdot \Delta_k P^{CME}_{t-1} + c \cdot \Delta_k P^{SMB}_{t-1} + d \cdot \bar{A}_{t-1} + e \cdot \Delta_k p^{EW}_{t-1} + f \cdot \bar{r}^{EW}_t + u_t,$$

where most variables are defined as in Table 1 of the main text and additional variables are defined in Table A1; *depvar*, P^{CME}, P^{SMB}, and p^{EW} are differenced, and k stands for the number of years used to compute the differences. Variables with low persistence levels, $\bar{A}$ and $\bar{r}^{EW}$, are averaged over k years. t-Statistics in parentheses are computed from standard errors robust to heteroskedasticity and autocorrelation up to three lags. Asterisks $***$, $**$, and $*$ denote statistical significance at 0.01, 0.05, and 0.10 levels, respectively.

Interpretation: Multi-year differencing offers support for the relation between catering and (i) the aggregate splitting activity in 0% of cases; (ii) price management in 25% cases; (iii) IPO price management in 95% of cases, and (iv) post-split price management in 80% of cases.

A.8 HP-filtered series

In Figure A1, we report the AC and PAC results for the HP-filtered variables identified in Figure 1 of the main text as persistent.

Panel A: $VW\ P^{CME}$

Autocorrelation	Partial Correlatio...	LAG	AC	PAC	p-value
		1	0.14	0.14	0.33
		2	-0.14	-0.17	0.38
		3	-0.30	-0.27	0.09
		4	-0.34	-0.32	0.02
		5	-0.25	-0.34	0.01
		6	0.03	-0.21	0.02
		7	0.20	-0.17	0.01
		8	0.17	-0.23	0.01
		9	0.18	-0.11	0.01
		10	-0.01	-0.21	0.02

Panel B: $VW\ P^{SMB}$

Autocorrelation	Partial Correlatio...	LAG	AC	PAC	p-value
		1	0.28	0.28	0.06
		2	-0.23	-0.34	0.04
		3	-0.25	-0.09	0.03
		4	-0.30	-0.32	0.01
		5	-0.27	-0.24	0.00
		6	-0.03	-0.14	0.01
		7	0.06	-0.25	0.01
		8	0.07	-0.20	0.02
		9	0.20	-0.06	0.02
		10	0.08	-0.25	0.02

Panel C: $EW\ P^{CME}$

Autocorrelation	Partial Correlatio...	LAG	AC	PAC	p-value
		1	0.10	0.10	0.49
		2	-0.25	-0.26	0.17
		3	-0.28	-0.24	0.06
		4	-0.11	-0.14	0.09
		5	-0.15	-0.31	0.11
		6	-0.06	-0.24	0.16
		7	-0.00	-0.29	0.24
		8	0.10	-0.28	0.28
		9	0.33	0.07	0.06
		10	0.03	-0.23	0.09

Panel D: $EW\ P^{SMB}$

Autocorrelation	Partial Correlatio...	LAG	AC	PAC	p-value
		1	0.16	0.16	0.27
		2	-0.15	-0.18	0.32
		3	-0.19	-0.14	0.25
		4	-0.26	-0.25	0.11
		5	-0.24	-0.26	0.06
		6	-0.11	-0.21	0.08
		7	0.03	-0.18	0.13
		8	0.07	-0.21	0.17
		9	0.25	0.02	0.08
		10	0.01	-0.28	0.12

Panel E: p^{EW}

Autocorrelation	Partial Correlatio...	LAG	AC	PAC	p-value
		1	-0.08	-0.08	0.57
		2	-0.43	-0.44	0.01
		3	0.00	-0.11	0.02
		4	0.22	0.02	0.02
		5	-0.18	-0.23	0.02
		6	-0.15	-0.14	0.02
		7	-0.05	-0.32	0.04
		8	0.19	-0.04	0.03
		9	-0.01	-0.18	0.05
		10	-0.08	-0.14	0.07

Panel F: s

Autocorrelation	Partial Correlatio...	LAG	AC	PAC	p-value
		1	-0.32	-0.32	0.03
		2	-0.20	-0.34	0.03
		3	0.16	-0.05	0.04
		4	-0.19	-0.26	0.04
		5	-0.03	-0.23	0.07
		6	0.11	-0.15	0.10
		7	0.05	-0.01	0.15
		8	-0.10	-0.14	0.18
		9	-0.00	-0.15	0.25
		10	-0.03	-0.22	0.33

Panel G: m

Autocorrelation	Partial Correlation	LAG	AC	PAC	p-value
		1	-0.30	-0.30	0.04
		2	-0.13	-0.24	0.08
		3	0.07	-0.06	0.15
		4	-0.25	-0.32	0.08
		5	0.21	0.02	0.06
		6	-0.14	-0.21	0.07
		7	0.04	-0.03	0.11
		8	0.02	-0.13	0.16
		9	-0.22	-0.27	0.10
		10	0.20	-0.12	0.08

Panel H: p^{IPO}

Autocorrelation	Partial Correlation	LAG	AC	PAC	p-value
		1	0.06	0.06	0.76
		2	-0.53	-0.53	0.01
		3	-0.12	-0.06	0.03
		4	0.06	-0.29	0.05
		5	-0.11	-0.30	0.08
		6	0.03	-0.16	0.13
		7	0.10	-0.27	0.17
		8	0.02	-0.18	0.25
		9	-0.00	-0.20	0.33
		10	0.03	-0.16	0.41

Figure A1: Autocorrelation functions for the HP de-trended variables.

Panel I: p

Autocorrelation	Partial Correlation	LAG	AC	PAC	p-valu...
		1	0.09	0.09	0.52
		2	-0.48	-0.49	0.00
		3	-0.24	-0.18	0.00
		4	-0.05	-0.34	0.01
		5	0.08	-0.17	0.01
		6	0.05	-0.30	0.02
		7	0.08	-0.12	0.03
		8	-0.00	-0.29	0.05
		9	0.04	-0.03	0.08
		10	0.04	-0.12	0.12

Figure A1: *Continued*.

Description: The figure displays, the autocorrelogram and partial autocorrelogram for all variables in eq. 1 up to 10 lags (LAG) after de-trending using the HP filter. We report autocorrelation coefficients (AC), partial autocorrelation coefficients (PACs), and p-values for the null hypothesis that all ACs up to the given lag are equal to zero. The two vertical lines in the autocorrelation graphics represent critical bounds for the null hypotheses that the ACs or PACs are equal to zero at the 5% significance level.

Interpretation: Adjusting the variables using the Hodrick-Prescott filter substantially reduces (and in most cases eliminates) data persistence.

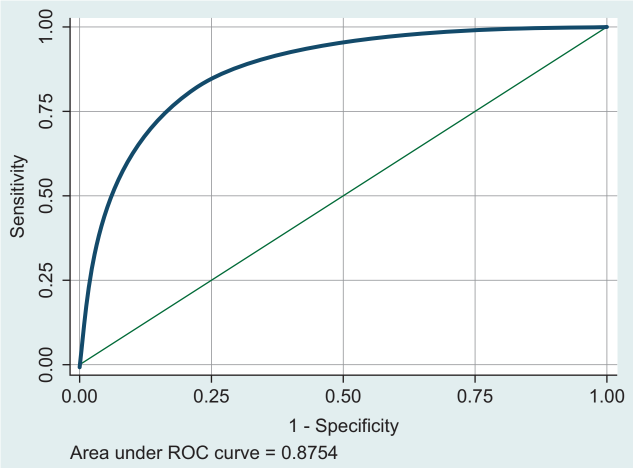
A.9 ROC curves

A shortcoming of the *percent correctly predicted* measure used in the main text is that its results may change depending on the selected threshold value L. In the manuscript, we focus on the two most commonly used thresholds, the sample proportion of ones L =0.06 as suggested by Cramer (1999), and L =0.50 as suggested by Wooldridge (2002).

We note that the choice between different threshold values involves a trade-off between Type I and Type II errors. A ROC (Receiver Operating Characteristic) curve allows to gauge how this trade-off changes for all possible values of L. On the vertical axis, the curve contains the probability of correctly predicting a split event, and on the horizontal axis – the one minus the probability of correctly predicting a no-split event. Thus, the further the ROC curve is away from a 45 degree line (from above), the better the model predicts both split and non-split events. A single statistic that conveys this information is the area under the ROC curve. When this area is equal to 1, there is no trade-off; the model correctly predicts both event types. On the contrary, if the area is small, the model is largely incorrect.

In Figure A2, we report the ROC curves and the areas under the curves for the firm-level models in specifications 1 and 5 of Panel A, Table 5 in the main text (the base case models with and without P^{CME}). Both ROC curves

Panel A: Model with P^{CME}



Panel B: Model without P^{CME}

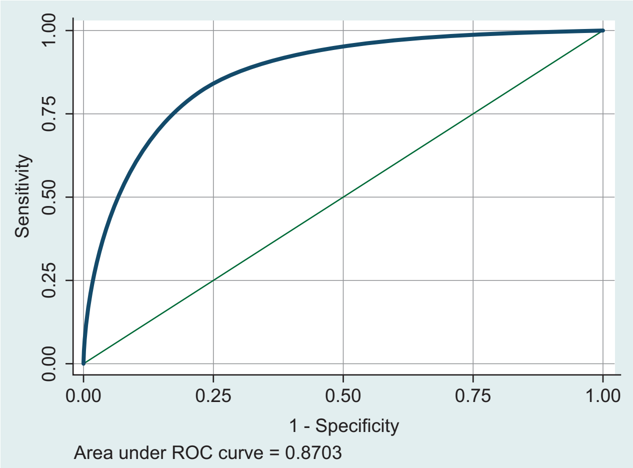


Figure A2: ROC curves.

Description: Panel A plots the ROC (Receiver Operating Characteristic) curve for the firm-level regression model with P^{CME}:

$$\Pr\left(s_{i,t}=1\right)=a+b\cdot P^{CME}_{t-1}+e\cdot p_{i,t-1}+f\cdot r_{i,t}+g\cdot NYSED_{i,t}+h\cdot\sigma_{i,t-1}+j\cdot p^{Industry}_{i,t-1}+k\cdot p^{LastSplit}_{i,t-1}+u_{i,t}.$$

Panel B plots the ROC curve for the model without P^{CME}:

$$\Pr\left(s_{i,t}=1\right)=a+e\cdot p_{i,t-1}+f\cdot r_{i,t}+g\cdot NYSED_{i,t}+h\cdot\sigma_{i,t-1}+j\cdot p^{Industry}_{i,t-1}+k\cdot p^{LastSplit}_{i,t-1}+u_{i,t}.$$

On the vertical axis, the curve contains the probability of correctly predicting a split event, and on the horizontal axis – one minus the probability of correctly predicting a no-split event.

Interpretation: The increase in explanatory power from adding P^{CME} to the panel regression of a firm's decision to split its shares is rather trivial.

are almost identical; the area under the curve is 0.8703 for the model without P^{CME} and 0.8754 for the model with P^{CME}. As such, the ROC analysis suggests that our results are not driven by the threshold choice, and that the increase in the explanatory power from adding a catering variable is rather trivial.