A Matter of Principle:
Accounting Reports Convey Both Cash-Flow News and Discount-Rate News

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APPENDIX B

Contrasting the Identification of Expected-Return News with that in Voulteenaho (2002)

This appendix provides a contrast to the variance decomposition approach for identifying the two types of news in accounting data.[1] This approach, explained in Callen (2009), assumes the Vuolteenaho (2002) model, implemented in a vector autoregressive (VAR) scheme to capture the linear dependencies among multiple time series of indicator variables. Book-to-price and (book) return of equity (ROE), along with past stock returns, are the conditioning information for the determination of the expected-return news and cash-flow news components of stock returns, although subsequent papers expand the information set. This section compares this approach with ours.

Our paper differs from the variance decomposition approach in a critical respect. Intriguingly, the Vuolteenaho (2002) model applies the same clean-surplus equation as we do to introduce book-to-price and ROE. However, a further assumption is added: The premium of price over book value is expected to decline to zero in the long run, and that promotes the autoregressive modeling. Declining premiums imply no expected earnings growth. In contrast, our model admits expected earnings growth (and the corresponding

[1] Papers that employ the approach using accounting data include Callen and Segal (2004), Callen, Hope, and Segal (2005), Callen, Livnat, and Segal (2006), and Hecht and Vuolteenaho (2006).

increase in premiums) that is expected under the realization principle in GAAP, and it is the realization principle that is a response to risk.

Other differences in the approaches mean that they are not directly comparable. First, our expected-return news is about expected returns one year ahead while the expected-return news in the variance decomposition approach pertains to the changes in the sum of all expected future discount rates.[2] Second, our approach extracts expected-return news from financial statements, and then investigates whether it explains returns in conjunction with cash flow news; the variance decomposition approach decomposes returns into components due to the two types of news, and then investigates what variables explain each component.[3] The VAR approach does not suit our purpose. We are interested in how accounting information (alone) indicates changes in the expected return whereas, in a VAR system, the expected return is modeled as a function of past returns as well as other information, and past returns reflect both accounting information and other information. Further, in the VAR papers, all estimates are in-sample with fixed parameters estimated using information both before and after points in time when information is observed. Our estimates of changes in expected returns are applied out of sample so that the effect of financial reports on returns is observed without look-ahead bias; accordingly, the practicality of the design is demonstrated.

Nevertheless, it is instructive to draw a comparison between the two sets of results and to document their properties. So we replicated the analysis in Vuolteenaho (2002) and Hecht and Vuolteenaho (2006), guided by the primer in Callen and Segal (2010). The resulting expected-return news, N_{rt}, and cash-flow news, N_{et}, are components of the (total) return on the left-hand side of equation (6), the regression estimated

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[2] Our expected-return news measure, $\Delta E_t(R_{t+1}) = E_t(R_{t+1}) - E_{t\text{-}1}(R_t)$, is the change in the expected return for holding the stock for one period ahead, updated with information during the current period. In contrast, in the Campbell return decomposition, the measure is $E_t\,(R_{t+1}) - E_{t\text{-}1}(R_{t+1})$ which is equal to $\Delta E_t(R_{t+1}) - E_{t\text{-}1}(R_{t+1} - R_t)$. (We thank a reviewer for pointing this out.) While our focus is relevant for an investor, we repeated the analysis with $E_t\,(R_{t+1}) - E_{t\text{-}1}(R_{t+1})$ as the target by estimating the expected return as in equation (4) with the dependent variable being returns two year ahead and comparing that expectation with that with returns one year ahead. While the ability of accounting variables to predict returns two years ahead in regression (4) is diminished, the results are similar to those in Table 4. Our approach can be adapted to forecasting expected returns many periods ahead, subject to dealing with survivorship issues.

[3] In applying VAR, most studies model expected-return news and back out the cash-flow news as the residual. Thus cash-flow news is not specifically identified. As pointed out by Chen and Zhao (2009), expected-return news cannot be precisely measured with VAR, so cash-flow news could very well be a catchall for modeling noise, a concern when one recognizes that the findings are quite dependent on the specification of state variables.

in Table 4. Table B1 thus estimates equation (6), but now with the right-hand-side variable as N_{rt}, and (alternatively) N_{et} instead of R_t. Like Table 4, Panel A is based on levered accounting variables while Panel B has unlevered variables.

If the expected-return news measured under the alternative approaches were capturing the same information, one would expect a positive correlation between them.[4] In contrast (and in contrast to the negative correlation with total returns in Table 4), our estimate of the expected-return news, $\Delta E_t(R_{t+1})$, is negatively related to the identified expected-return news component of returns, N_{rt}, in Panel A of Table B1 (for $Y_t = N_{rt}$).[5] Moreover, while we have confirmed the observation in earlier papers that N_{rt} and N_{et} are positively correlated, our expected-return news is also negatively correlated with the cash-flow news component of return, N_{et}. Thus, N_{rt} and N_{et}, while purportedly capturing directionally opposite effects of returns, have the same relationship with $\Delta E_t(R_{t+1})$; N_{rt} and N_{et} do not differentiate the news in $\Delta E_t(R_{t+1})$. These same observations apply in the unlevered regressions in Panel B. While $\Delta E_t(R_{t+1})$ explains returns in Table 4, it is not the N_{rt} component of those returns that it is predicting. So, if $\Delta E_t(R_{t+1})$ is capturing expected-return news (as the association with betas in Table 3 and forward returns in Table 6 suggest), then the question as to what N_{rt} and N_{et} are actually capturing is open.

These findings show that N_{rt} and $\Delta E_t(R_{t+1})$ convey different information. However, without a validating benchmark, the comparisons do not indicate which measure in appropriate (and, as indicated, they measure different dimensions of the change in the expected return). However, in both panels in Table B1, the expected return at the beginning of the period, $E_{t-1}(R_t)$ predicts the cash-flow news component of the return, N_{et}, (positively), as does beginning-of-period book-to-price. That is inconsistent with the requirement that a cash-flow news variable be unpredictable, questioning whether N_{et} is cash-flow news.

[4] To be clear, a positive N_{rt} means increasing expected returns (implying lower returns), *ceteris paribus*, as does $\Delta E_t(R_{t-1})$.

[5] The coefficient on $\Delta E_t(R_{t-1})$ is conditional upon the other variables in the regression, of course, but even if earnings and the change in earnings indicate higher expected returns (as their coefficients suggest), it is difficult to see that, given these variables, $\Delta E_t(R_{t-1})$ would imply lower expected returns, especially given the validation of the measure earlier. The mean unconditional correlation between the estimate of $\Delta E_t(R_{t-1})$ and N_{rt} is 0.022. Book-to-price is in the regressions and a conditioning variable in the VAR system, but results are similar without book-to-price.

Further, in the unlevered regressions in Panel B, the contemporaneous change in leverage, ΔNFO_t, is negatively related to N_{rt}. This is inconsistent with N_{rt} capturing changes in financing risk and inconsistent with ΔNFO loading appropriately in Table 4. And (in contrast to Table 4), NFE_t (net-interest-to-price), another leverage measure, is also negatively related to N_{rt}. Indeed, the negative coefficients on ΔNFO_t and NFE_t in the N_{rt} regressions are similar to those in the N_{et} regressions. In short, consistency requirements for N_{rt} and N_{et} are violated. In contrast, the return prediction results in Table 6 show that these requirements are satisfied for our identification of news.

Our emphasis on the realization principle contrasts our paper with Hecht and Vuolteenaho (2006) in particular. They report that N_{rt} and N_{et} are positively correlated in the cross-section, a correlation that we also observe.[6] The Table B1 analysis produces reservations about these measures, and recognition of the realization principle deepens these reservations: Why would more realized earnings imply higher expected returns, particularly in light of the realization principle?[7] Do firms become more risky as they (successfully) realize more earnings and build up balance sheets? An investor sees a reduction of risk when realizing cash from selling risky stocks and investing that cash in the risk-free asset. Stocks are just claims on risky expected earnings in firms, so one would expect the same reduction in risk when firms' realized earnings yield assets close to cash.

As N_{rt} and N_{et} are positively correlated, Hecht and Vuolteenaho (2006) argue that the standard returns-earnings regression understates the degree to which earnings explain returns because the return-increasing cash-flow news is partially cancelled by the lower return implied by higher earnings realizations. To demonstrate, they regress N_{rt} and N_{et} on earnings levels and earnings changes and report that the

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[6] A positive correlation between N_{rt} and N_{et} is also reported in Voulteenaho (2002) and Cohen, Gompers, and Voulteenaho (2003).

[7] We note that the correlation between the two types of news in aggregate returns in Hecht and Vouteenaho (2006), using different state variables, is -0.288. That is (reasonably) explained by good economic times being associated with lower investor risk aversion. We find no corresponding explanation in the paper for the positive correlation in the cross-section. Li (2014) predicts that, while losses may convey value-decreasing cash-flow news, they may also indicate decreasing expected-return news because of the increasing value of an abandonment option that limits downside risk. His tests indicate that these two offsetting effects may explain the low R-squares observed in returns-earnings regressions for loss firms.

regressions produce considerably higher R^2 than when total returns are regressed on the same variables. However, N_{rt} and N_{et} are estimated as a linear combination of the time-t residuals in the VAR system and those residuals include time-t earnings realizations (in the residual for the ROE auto-regression). Thus, time-t earnings realizations appear on both sides of the regression equation. We attribute their high R^2 values (and those in Table B1 relative to Table 4) to this mechanical correlation.[8]

Callen and Segal (2004) is a paper close to ours, for it also compares how accruals and cash flows convey cash-flow and expected-return news. It has some of the same flavor, with their recognition that the timeliness of accruals provides information akin to the realization principle. This is a VAR variance decomposition paper, embracing the Vuolteenaho model, with earnings divided into cash and accrual components. Callen and Segal conclude that both accruals and cash flows provide both cash-flow news and discount-rate news. In contrast, our empirical analysis indicates that cash flows primarily provide expected-return news.

[8] The VAR analysis also has a look-ahead bias, with parameter estimates based on observations in the sample period after a given year, t. The Hecht and Voulteenaho (2006) return period was from May – April whereas ours is from April-March (for December 31 fiscal-year firms in both cases). The May – April period includes first quarter earnings realizations for the year after year t. Hecht and Voulteenaho report higher R^2 for the N_{rt} regression than we do, which we find is due to the VAR estimation with pooled data rather than within industries.

Table B1

Mean Coefficient Estimates for Regressions of the Estimated Expected-Return News Component, N_{rt}, and Cash-Flow New Component, N_{et}, of Returns on Cash-Flow News and Expected-Return News from Financial Statements

This table estimates cross-sectional regression equation (6), as in Table 4, but replacing the left-had-side return, R_t, with the expected-return news component, N_{rt}, and the cash-flow news component, N_{et}, of the return. These return components are estimated with the variance decomposition procedures in Voulteenaho (2002). The coefficients are means of estimated cross-section coefficients for each year, 1973-2012, and t-statistics (in parentheses) are these means divided by their standard errors estimated from the time series of coefficient estimates. In Panel A, the financial statement news variables are levered, and in Panel B they are unlevered.

N_{rt} and N_{et} are estimated by following the primer and SAS code in Callen and Segal (2010). The VAR system is estimated by industry using weighted least squares, using the Fama-French 49 industry classification. This differs from Vuolteenaho (2002) that applies the same coefficients to all firms. However, results are robust to restricting the VAR parameters to be constant over time and across industries. Following the prior research, the capitalization factor is set to ρ = 0.967. The analysis is carried out only for firms with December fiscal-year end at t-1, in order to align accounting variables across firms. Firms in financial industries (SIC 6000-6999) are excluded, as are firms with t-1 market equity less than $10 million and book-to-price more than 100 or less than 1/100. Finally, in the VAR estimation, the top and bottom 1% of each variable was rejected to mitigate the impact of outliers.

Panel A: Levered News Variables

$$Y_t = a + b_1\frac{Earn_t}{P_{t-1}} + b_2\frac{\Delta Earn_t}{P_{t-1}} + b_3\frac{B_{t-1}}{P_{t-1}} + b_4E_{t-1}\left(R_t\right) + b_5\Delta E_t\left(R_{t+1}\right) + \varepsilon_t$$

Intercept	$Earn_t$	$\Delta Earn_t$	B_{t-1}	$E_{t-1}(R_t)$	$\Delta E_t(R_{t+1})$	ADJRSQ
$Y_t = N_{rt}$:						
0.00	0.33	0.21		-0.09		0.05
(-0.05)	(6.21)	(3.99)		(-1.76)		
-0.03	0.38	0.36	0.01		-0.15	0.06
(-2.17)	(5.70)	(6.54)	(1.06)		(-2.57)	
0.01	0.49	0.32	0.03	-0.39	-0.35	0.06
(0.80)	(7.58)	(5.76)	(2.68)	(-5.34)	(-5.47)	
$Y_t = N_{et}$:						
-0.07	1.04	1.58		0.23		0.29
(-2.76)	(9.03)	(16.46)		(2.84)		
-0.03	1.30	1.86	-0.04		-0.51	0.30
(-0.99)	(9.67)	(16.46)	(-2.92)		(-9.27)	
-0.03	1.32	1.87	-0.04	-0.03	-0.56	0.30
(-0.87)	(9.62)	(16.61)	(-2.79)	(-0.30)	(-6.71)	

Panel B: Unlevered News Variables

$$Y_t = a + b_1 \frac{OI_t}{P_{t-1}^{NOA}} + b_2 \frac{\Delta OI_t}{P_{t-1}^{NOA}} + b_3 \frac{NFE_t}{P_{t-1}} + b_4 \frac{NOA_{t-1}}{P_{t-1}^{NOA}} + b_5 \frac{NFO_{t-1}}{P_{t-1}} + b_6 \frac{\Delta NFO_t}{P_{t-1}} + b_7 E_{t-1}\left(R_t\right) + b_8 \Delta E_t\left(R_{t+1}\right) + \varepsilon_t$$

Intercept	OI_t	ΔOI_t	NFE_t	NOA_{t-1}	NFO_{t-1}	ΔNFO_t	$E_{t-1}(R_t)$	$\Delta E_t(R_{t+1})$	ADJRSQ
$Y_t = N_{rt}$:									
0.00	0.25	0.25	-0.34	0.01	0.00	-0.01	-0.05		0.05
(-0.13)	(4.41)	(5.04)	(-2.07)	(1.29)	(0.52)	(-0.73)	(-1.14)		
-0.02	0.27	0.36	-0.52	0.01	0.01	-0.04		-0.19	0.05
(-1.34)	(4.46)	(6.65)	(-2.36)	(0.93)	(1.27)	(-2.59)		(-2.54)	
0.02	0.35	0.31	-0.57	0.02	0.01	-0.07	-0.35	-0.42	0.06
(1.01)	(6.23)	(6.12)	(-2.59)	(2.22)	(1.35)	(-3.97)	(-4.59)	(-4.68)	
$Y_t = N_{et}$:									
-0.07	0.91	2.03	-0.70	-0.05	0.02	-0.17	0.49		0.29
(-2.61)	(8.50)	(19.97)	(-3.57)	(-4.46)	(1.70)	(-9.00)	(6.15)		
-0.02	1.23	1.98	-1.10	-0.06	0.04	-0.30		-0.71	0.29
(-0.58)	(9.64)	(13.94)	(-4.69)	(-4.40)	(2.21)	(-8.85)		(-7.91)	
-0.01	1.11	2.02	-0.96	-0.05	0.03	-0.33	-0.11	-0.77	0.29
(-0.32)	(9.22)	(13.90)	(-4.29)	(-3.53)	(1.58)	(-7.21)	(-0.77)	(-4.62)	