The Disconnect Between Market Capital Gains and the Dividend Yield in Asset Pricing

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The Dividend Disconnect

- Financial theory is based on the idea that investors care about returns but are indifferent about whether they receive them through capital gains or dividends

- **Dividend disconnect:** Investors pay a lot of attention to capital gains but ignore dividends (Hartzmark and Solomon, 2019, 2022)

- The variance of cap gains is up to **1000 times higher** than the dividend yield
  - The dividend yield makes a substantial contribution to the mean return
  - But essentially contributes nothing to the variance

- Implication for asset pricing: *the dividend yield is silent*
  - The dividend yield has no effect on CAPM betas
  - CAPM betas are practically identical whether we use the full market portfolio or just the capital gains to the market portfolio

A Two-Factor CAPM

- We propose a **two-factor CAPM** that includes a **<u>separate</u> market dividend yield factor**

- We motivate our empirical analysis by proposing a **theoretical model**:
  - Under certain assumptions, the predictive power of the dividend yield can be substantially higher than the predictive power of capital gains

- **Main empirical finding:** exposure (beta) to the dividend yield factor can predict the cross-section of expected stock returns
  - *This establishes a significant beta-return relation missing from the CAPM*
  - *without invalidating any of the popular extensions to the CAPM*

- This finding holds for both dividend-paying and non-dividend paying firms
  - and is unrelated to individual dividend yields

Theoretical Foundation

- Suppose that capital gains (cg) and the dividend yield (dy) contain distinct information about returns.

- Then, the true model is a two-factor model with separate betas: β_{cg}, β_{dy}

- Suppose an econometrician estimates the single-factor CAPM:
  - If $\beta_{cg} = \beta_{dy}$ the CAPM holds

  - If $\beta_{cg} \neq \beta_{dy}$ the CAPM is misspecified

  - If additionally: Var(cg) $\gg Var(dy)$, then estimating the CAPM completely ignores the information in dy and $\beta_{capm} = \beta_{cg}$

- In short, the CAPM completely ignores the dividend yield due to the high volatility of capital gains

Theoretical Model - Assumptions

- Two-factor model with separate betas: β_{cg}, β_{dy} and Var(cg) $\gg Var(dy)$

- Investors regularly receive signals about **cg** and **dy**:
  - **Main cg signal**: changes in stock prices
  - **Main dy signal:** changes in the dividend yield

- **Dividend disconnect:** investors pay attention to signals about cg but ignore signals about dy

- Investors also observe **additional** signals about cg (e.g., macro news)

- Although investors regularly ignore changes in dy, they may occasionally pay attention to *some* signals about dy (e.g., when dy determines the sign of returns)

Theoretical Model - Results

- Under these assumptions, our model shows:
  - *a signal about the dividend yield factor has higher return predictive power than an additional signal about the capital gains factor*

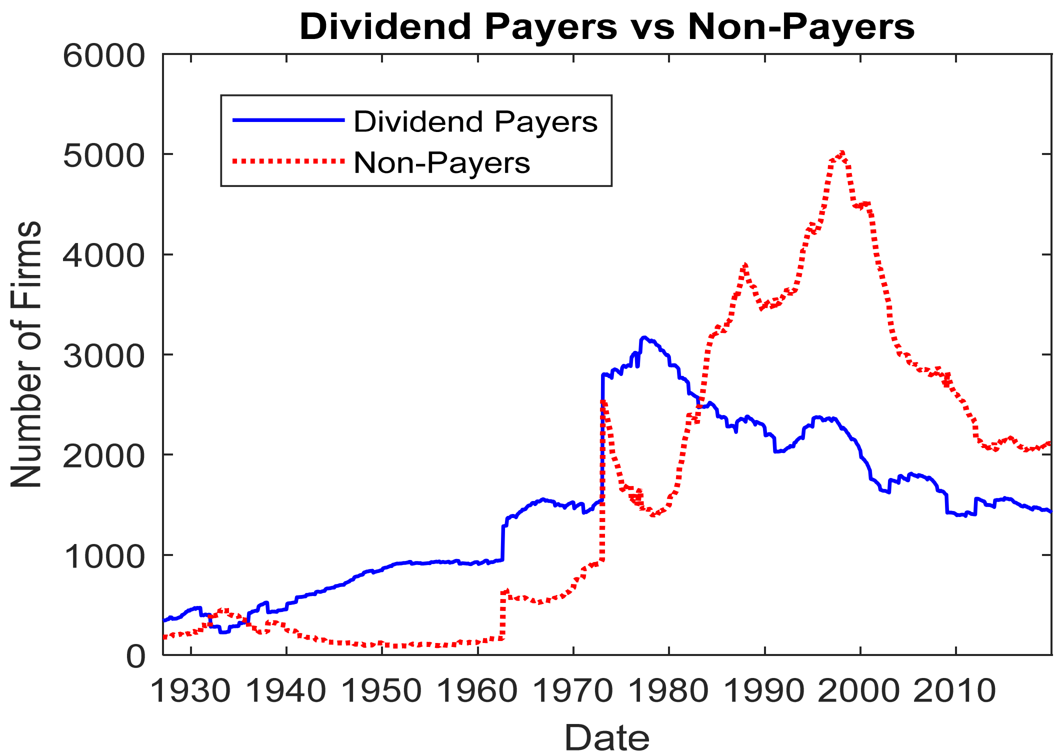
- Intuitively, this implies that investors spend substantial resources to learn about capital gains because they are by far the most uncertain (i.e., volatile) component of returns

- After all the information about capital gains is taken into account, the factor that can resolve more uncertainty and hence have higher predictive power is the dividend yield factor

- This motivates using the dividend yield as a separate factor and is tested by our empirical analysis

The Post-1978 Sample Period

- The empirical analysis focuses on the post-1978 sample period.
- This marks the peak in the number of US dividend-paying firms (Fama and French, 2001).
- Consistent with our theory: the less important are dividends, the more likely are investors to ignore them, and the higher their predictive power



The Dividend Yield Factor

- Firms pay dividends:
  - At different frequencies: monthly (2%), quarterly (82%), semi-annually (7%) and annually (9%)
  - In different months: e.g., Jan-Apr-July-Oct vs. Feb-May-Aug-Nov vs. Mar-June-Sept-Dec

- We account for seasonality by using the 12-month trailing dividend yield:

$$\mathrm{dy}12_t = \frac{\sum_{i=0}^{11} D_{t-i}}{P_{t-1}}$$

- To ensure stationarity, we use the proportional change in dy12 (Δdy12):

$$\Delta\,\mathrm{dy}12_t = \frac{\mathrm{dy}12_t - \mathrm{dy}12_{t-1}}{\mathrm{dy}12_{t-1}}$$

- **$\boldsymbol{\Delta}\,\mathbf{dy12}_{\boldsymbol{t}}$ is the dividend yield factor**

Portfolio Sorts on Δdy12

Panel A: Value-Weighted Portfolios

Rank	Returns: Mean	Returns: St Dev	Size	B/M	FF6 Alpha	Factor Loadings: Pre-Formation $\beta_{\Delta\, dy12}$	Factor Loadings: Post-Formation $\beta_{F\Delta\, dy12}$
High	0.66	4.48	17.34	0.49	0.01	0.33	-0.01
4	0.63	3.95	17.56	0.51	-0.16***	0.09	0.02*
3	0.79	4.22	17.50	0.52	0.05	-0.06	0.03**
2	0.75	4.60	17.42	0.54	0.01	-0.21	0.01
Low	0.94	5.77	16.28	0.60	0.26***	-0.57	-0.06***
H-L	-0.28**	2.74			-0.27**		0.05
(*t*-stat)	(-2.04)				(-2.38)		(1.40)

Panel B: Equally-Weighted Portfolios

Rank	Returns: Mean	Returns: St Dev	Size	B/M	FF6 Alpha	Factor Loadings: Pre-Formation $\beta_{\Delta\, dy12}$	Factor Loadings: Post-Formation $\beta_{F\Delta\, dy12}$
High	0.70	5.39	14.57	0.73	0.22**	0.47	-0.16***
4	0.89	4.51	15.00	0.74	0.27***	0.06	-0.13***
3	0.91	4.69	14.82	0.78	0.34***	-0.13	-0.15***
2	0.99	5.42	14.04	0.85	0.50***	-0.36	-0.23***
Low	1.06	7.50	12.79	0.91	0.93***	-0.99	-0.35***
H-L	-0.36**	3.36			-0.71***		0.19***
(*t*-stat)	(-2.16)				(-5.62)		(4.17)

Why is the Δdy12 premium negative?

- Δdy12 is ***countercyclical***:
  - An asset with high beta on Δdy12 performs well when Δdy12 is high
  - *Δdy12 is high in recessions*, hence this asset performs well in recessions
  - According to asset pricing theory, this asset is valuable because it performs well when we need it the most (in the bad states of the world)
  - Hence investors do not require a high expected return to hold it
  - As a result: *high-beta assets on the Δdy12 factor have low expected returns*, and vice versa

Components of the Dividend Yield

- The dividend yield itself has two components:
  - dividends (in the numerator), and
  - lagged prices (in the denominator)
- Similarly, the dividend yield factor, **Δdy12**, has two components:
  - **the dividend growth rate: Δd12**, and
  - ***lagged* capital gains: Δp**

$$\Delta dy12 \approx \Delta d12 - \Delta p$$

The Price of Dividend Yield Risk

- A formal analysis of the relation between risk (beta) and expected stock returns
  - Based on two-stage Fama-MacBeth (1973) regressions

- **First stage:**
  - estimate the time-series of betas using a 5-year rolling window:

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,1}(mktx_t - r_{f,t}) + \boldsymbol{\beta_{i,2}\Delta dy12_t}$$
$$+\beta_{i,3}SMB_t + \beta_{i,4}HML_t + \beta_{i,5}RMW_t + \beta_{i,6}CMA_t + \beta_{i,7}MOM_t + \varepsilon_{i,t}$$

- **Second stage:** condition on lagged betas:

$$r_{i,t} - r_{f,t} = a_i + \gamma_1\hat{\beta}_{i,1,t-1} + \boldsymbol{\gamma_2\hat{\beta}_{i,2,t-1}}$$
$$+\gamma_3\hat{\beta}_{i,3,t-1} + \gamma_4\hat{\beta}_{i,4,t-1} + \gamma_5\hat{\beta}_{i,5,t-1} + \gamma_6\hat{\beta}_{i,6,t-1} + \gamma_7\hat{\beta}_{i,7,t-1} + \epsilon_{i,t}$$

Fama-MacBeth Regressions

Panel A: Dividend Yield Factor

	Original		FMP	
	Mean	*t*-stat	Mean	*t*-stat
mkt-rf	0.02	0.13	0.01	0.11
Δdy12	-0.26	-2.18	-0.28	-1.84
SMB	-0.03	-0.37	-0.03	-0.49
HML	0.09	1.13	0.09	1.13
RMW	-0.01	-0.17	-0.01	-0.18
CMA	0.02	0.52	0.03	0.58
MOM	-0.11	-1.53	-0.10	-1.37

Panel B: Components of the Dividend Yield Factor

	Original		FMP	
	Mean	*t*-stat	Mean	*t*-stat
mkt-rf	0.01	0.10	0.02	0.17
Δd12	0.03	1.69	0.03	1.41
Δp	0.26	2.26	0.26	1.89
SMB	-0.03	-0.41	-0.03	-0.48
HML	0.08	1.10	0.08	1.07
RMW	-0.01	-0.11	-0.01	-0.10
CMA	0.02	0.48	0.02	0.50
MOM	-0.11	-1.49	-0.09	-1.31

Dividend Payers vs Non-Dividend Payers

Panel A: Dividend Payers

	Original		FMP	
	Mean	*t*-stat	Mean	*t*-stat
mkt-rf	0.12	0.82	0.12	0.79
Δdy12	-0.41	-2.92	-0.45	-2.57
SMB	0.06	0.77	0.05	0.62
HML	0.12	1.57	0.13	1.59
RMW	-0.07	-1.26	-0.07	-1.32
CMA	0.03	0.60	0.03	0.70
MOM	-0.02	-0.26	-0.02	-0.22

Panel B: Non-Dividend Payers

	Original		FMP	
	Mean	*t*-stat	Mean	*t*-stat
mkt-rf	0.00	-0.04	-0.01	-0.06
Δdy12	-0.25	-2.41	-0.27	-2.09
SMB	-0.02	-0.39	-0.03	-0.52
HML	0.06	0.85	0.06	0.83
RMW	0.00	-0.06	0.00	-0.07
CMA	0.02	0.47	0.02	0.50
MOM	-0.10	-1.51	-0.09	-1.34

Sorting on Individual Dividend Yields

Panel A: Value-Weighted Portfolios

Rank	Mean (Returns)	St Dev (Returns)	Size	B/M	FF6 Alpha	Dividend Yield
High	0.74	4.03	17.39	0.77	-0.07	5.67
4	0.80	3.94	17.61	0.57	-0.05	3.29
3	0.76	4.20	17.80	0.45	-0.18***	2.29
2	0.74	4.63	17.31	0.44	-0.15**	1.50
Low	0.62	5.08	17.06	0.43	-0.19***	0.63
H-L	0.12	4.04			0.12	
(*t*-stat)	(0.61)				(0.90)	

Panel B: Equally-Weighted Portfolios

Rank	Mean (Returns)	St Dev (Returns)	Size	B/M	FF6 Alpha	Dividend Yield
High	0.87	3.84	15.00	0.95	0.16**	7.45
4	0.96	4.04	15.24	0.80	0.12*	3.28
3	0.91	4.45	15.25	0.74	-0.02	2.30
2	0.93	4.58	15.08	0.69	-0.02	1.49
Low	0.79	5.02	15.03	0.63	-0.14**	0.65
H-L	0.08	2.62			0.30***	
(*t*-stat)	(0.60)				(3.22)	

The Predictive CAPM

- We augment the standard CAPM to include the lagged excess return to the market:

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,1}(mkt_t - r_{f,t}) + \beta_{i,2}(mkt_{t-1} - r_{f,t-1}) + \varepsilon_{i,t}$$

Panel A: Value-Weighted Portfolios

	Standard CAPM beta		Dimson (1979) CAPM beta		Predictive CAPM beta		
Rank	Return	FF6 Alpha	Return	FF6 Alpha	Return	FF6 Alpha	Post-Formation $\beta_{FMKT_{t-1}}$
High	0.70	0.06	0.78	0.12	0.92	0.29***	0.11***
4	0.85	-0.05	0.79	-0.04	0.75	0.03	0.01
3	0.85	-0.07	0.85	-0.02	0.81	0.05	-0.02
2	0.76	-0.13**	0.75	-0.11***	0.66	-0.11**	-0.03***
Low	0.64	-0.07	0.66	-0.08	0.64	-0.05	-0.03***
H-L	0.06	0.13	0.12	0.21	0.28*	0.33***	0.14***
(*t*-stat)	(0.19)	(0.81)	(0.39)	(1.32)	(1.79)	(2.75)	(4.29)

The Predictive CAPM

- Fama-MacBeth regressions:

Panel D: Fama-MacBeth Regressions				
	Original		FMP	
	Mean	*t*-stat	Mean	*t*-stat
$(mkt\text{-}rf)_t$	0.01	0.11	0.01	0.12
$(mkt\text{-}rf)_{t-1}$	0.25	2.25	0.25	1.85
SMB	-0.03	-0.39	-0.03	-0.48
HML	0.09	1.15	0.09	1.13
RMW	-0.01	-0.16	-0.01	-0.17
CMA	0.02	0.52	0.03	0.58
MOM	-0.11	-1.53	-0.10	-1.34

Panel E: Fama-MacBeth Regressions				
	Original		FMP	
	Mean	*t*-stat	Mean	*t*-stat
$(mkt\text{-}rf)_t$	0.01	0.10	0.02	0.17
$(mkt\text{-}rf)_{t-1}$	0.25	2.24	0.26	1.86
$\Delta d12$	0.03	1.69	0.03	1.41
SMB	-0.03	-0.41	-0.03	-0.48
HML	0.08	1.10	0.08	1.07
RMW	-0.01	-0.11	-0.01	-0.10
CMA	0.02	0.48	0.02	0.50
MOM	-0.11	-1.49	-0.09	-1.30

Robustness

- Good-beta, bad-beta model of Campbell and Vuolteenaho (2004)
  - Based on the Campbell and Shiller (1988) decomposition
  - Good beta is the discount rate beta, bad beta is the cashflow beta
  - *We find that good-beta and bad-beta does not affect the predictive power of the dividend yield factor*

- Are the results driven by the different tax treatment of capital gains and dividends?
  - *We find that the answer is no*
  - Based on the *implied tax rate of* Poterba (1986, 1989) defined as the (tax-exempt) municipal yield over the treasury yield

- Same results using an *orthogonalized dividend yield factor* to the short rate, the term spread and the default spread (see Petkova, 2006)

Conclusion

- **The standard CAPM ignores the market dividend yield** because of the vastly higher variance of capital gains

- **The two-factor CAPM establishes a relation between the market dividend yield and expected stock returns**

- The results are remarkable:
  - **The beta to the dividend yield factor provides strong cross-sectional predictability**
  - This predictability is robust to other risk factors
  - The strongest component of the market dividend yield is the lagged capital gains leading to a predictive CAPM model

- The results are consistent with a theoretical model based on the dividend disconnect