Discussion of "Equity Valuation Without DCF"

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The discounted alpha

- Two classical ways of valuing firms (NPV approach)
  - DCF valuation

$$V_t = \sum_{\tau=t}^{\infty} E_t[\frac{CF_\tau}{(1+R)^\tau}]$$

    $\rightarrow$ extremely noisy for high duration cash flows

  - Use price multiples (such as P/B or P/E).

- This paper proposes an alternative valuation method, called *discounted alpha*, using the identity:

$$V_t = P_t + \sum_{\tau=t}^{\infty} E_t[X_\tau \alpha_\tau]$$

- X_τ is the discount rate

Reinterpretation of the main idea

Discounted cash flows

$$V_t = \underbrace{\sum_{\tau=t}^{\infty} E_t\left[\frac{CF_\tau}{(1+R)^\tau}\right]}_{\text{Subject to error}}$$

Discounted alpha

$$V_t = \underbrace{P_t}_{\text{Observable}} + \underbrace{\sum_{\tau=t}^{\infty} E_t[X_\tau \alpha_\tau]}_{\text{Subject to error}}$$

- Discounting α has a smaller effect on valuation than cash flows, because they are less persistent, thus having a shorter duration
- Cash flows are close to random walk, alphas are decaying
- Pricing based on alpha (and firm characteristic) rather than using the entire cash flow projection

Back to the example

- Cash flow of \$1 each period, and let the true discount rate be 4%.
- Then, the firm value is \$25 from $P = 1/0.04$.
- Suppose that the market price is \$20.

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- Cash flow of \$1 each period, and let the true discount rate be 4%.
- Then, the firm value is \$25 from $P = 1/0.04$.
- Suppose that the market price is \$20.
- Then the alpha of this firm is 1% (because 1/20= 5%). Discounted alpha uses $\$20 + \$20 \times 1\%/R$

	$\hat{R} = 3\%$	$\hat{R} = 4\%$	$\hat{R} = 5\%$
DCF V_0^{DCF}	33.3	25.0	20.0
Error vs true	+8.3	0.0	-5.0
Discounted alpha V_0^{DA}	26.7	25.0	24.0
Error vs true	+1.7	0.0	-1.0

What I like about this paper

Smart idea:

- Lowers duration by using alpha instead of discount rates
- No risk adjustment needed
    - Alphas already remove factor risk, thus no need for firm-level discount-rate estimation.

Interesting empirical findings:

- PE fund returns captured by CAPM misvaluation
- Alpha consistent with fundamental investing
- Biased analyst forecast and underpricing

Main theoretical equation

$$\underbrace{\frac{\alpha_{i,t}}{1+R_{f,t}}}_{\text{Alpha}} = \gamma_V \overbrace{\left[I - \underbrace{\rho_{i,t}\,\phi_{z,i,t}}_{\text{Persistence}} - \underbrace{\frac{\Gamma_{G,z,i,t}}{1+R_{f,t}}}_{\text{Cov(Pers, capital gain)}} \right]}^{\text{Payout rate}} \underbrace{z_{i,t}}_{\text{Char. Vector}} + u^*_{i,t}$$

Key Intuition:

- Solve for γ_V to find total underpricing $(V/P - 1)$.
- The Payout Rate
  - Measures how fast underpricing $(\gamma_V \cdot z_{i,t})$ is paid out as alpha.
  - Depends on the persistence (ϕ) of the characteristics.
  - Γ: the degree to which persistence shocks are related to capital gains (?)

Empirical Procedure

$$\frac{\alpha_{i,t}}{1+R_{f,t}} = \gamma_V \left[I - \rho_{i,t}\, \phi_{z,i,t} - \frac{\Gamma_{G,z,i,t}}{1+R_{f,t}} \right] z_{i,t} \; + \; u^{*}_{i,t},$$

First-stage panel regression (4 regressions)

$$R_{i,t+1} - R_{f,t} = \gamma_R z_{i,t} + \Gamma_R z_{i,t} f_{t+1} + \varepsilon^{R}_{i,t+1}$$

$$\frac{P_{i,t+1}}{P_{i,t}} = (1+R_{f,t})\, \rho_{i,t} + \Gamma_G z_{i,t} f_{t+1} + \varepsilon^{G}_{i,t+1}$$

$$z_{i,t+1} = \phi_z z_{i,t} + \Gamma_z z_{i,t} f_{t+1} + \varepsilon^{z}_{i,t+1}$$

$$\hat{\varepsilon}^{G}_{i,t+1} \hat{\varepsilon}^{z}_{i,t+1} = \Gamma_{G,z} z_{i,t} + \varepsilon^{G,z}_{i,t}$$

Second-stage panel regression:

$$\frac{\widehat{\gamma}_R z_{i,t}}{1+R_{f,t}} = \gamma_V \left[I - \widehat{\rho}_{i,t} \widehat{\phi}_{z,i,t} - \frac{\widehat{\Gamma}_{G,z,i,t}}{1+R_{f,t}} \right] z_{i,t} + \widehat{u}^{e}_{i,t}$$

▷ Then, underpricing can be determined

$$\widehat{V}_{i,t}/P_{i,t} - 1 = \widehat{\gamma}_V z_{i,t}.$$

Comment 1: Stability in estimation?

- The empirical strategy relies on four regression equations as the first-stage
- The slope estimates are then entered as an explanatory variable in the second-stage regressions.
- γ_V is thus systematically underestimated. The bias increases for firms with high idiosyncratic volatility and highly volatile firm chracteristic $SD(\varepsilon^z)$.
- These estimation error are likely to weaken your results, but they may generate "inaccurate" estimates

Covariance Term $\hat{\Gamma}_{G,z}$

$$\hat{\varepsilon}^{G}_{i,t+1}\hat{\varepsilon}^{z}_{i,t+1} = \Gamma_{G,z} z_{i,t} + \varepsilon^{G,z}_{i,t}$$

- $\Gamma_{G,z} = Cov\left(G_{t+1}, \frac{z_{i,t+1}}{z_{i,t}}\right)$ is estimated from the product of two noisy variables. It is then regressed on firm characteristics. *Gamma* is critical, and I am concerned that signal-to-noise is low.

- Assumes covariance risk is static and linear in $z_{i,t}$.

Suggestion:

- Study if the variation in the covariance is driven by cross-sectional vs time-series variation (may be driven by one-time surprise in accounting variables).

- Is projecting the covariance on firm-characteristic reliable? Even then, why should you use the slope on the characteristic?

Duration $\hat{\rho}_{i,t}$

$$\frac{P_{i,t+1}}{P_{i,t}} = (1 + R_{f,t})\,\rho_{i,t} + \Gamma_G z_{i,t} f_{t+1} + \varepsilon^G_{i,t+1}$$

- ▷ Argues that sensitivity to $R_{f,t}$ captures Cash Flow Duration.
- ▷ Does this coefficient actually correlate with fundamental duration.
- ▷ If so, should you use the changes in the risk-free rate?

⇒ Validate against equity duration (e.g., Dechow, Sloan, and Soliman 2004).

Comment 2: Performance of the measure

One of the point made in this paper is related to the precision of valuation.

- ▷ I do not see much analysis on accuracy:
  - PE funds buy stocks that are 10–13% cheaper but make up to 30%. What does the model imply about the additional 17–20%?

⇒ How does it perform compared to taking the simple strategy of sorting based on characteristics?

Additional suggestions:

- ▷ Form portfolios on duration and test whether there is greater improvement in high duration assets as implied by the model
- ▷ How accurately does your alpha measure future out-performance?
  - Evaluate increments of out-of-sample R^2 of your alpha compared to a simple regression approach (such as in the equity predictability literature).

Comment 3: Risk vs mispricing?

Panel A. Ex-Post Five-year Cumulative Abnormal Returns (*CAR*)

Ex-ante Sorting Variable	CAPM *CAR*	FF3 *CAR*	FF5 *CAR*
CAPM Underpricing	**27.39 (4.43)**	22.31 (3.51)	9.56 (1.41)
FF3 Underpricing	20.76 (3.68)	**26.84 (4.82)**	17.53 (2.97)
FF5 Underpricing	4.35 (0.49)	13.15 (2.52)	**16.13 (3.07)**

- ▷ Table 3 shows that CAR decreased moving from CAPM → FF5
- ▷ Table 2 implies similar pattern.
- ▷ This seems to suggests that much of what this paper captures may be risk factors and not mispricing.
- ▷ These alphas may be persistent risk premium
  - Alphas may not be as fast decaying in this case

Minor comments

- Some of the analysis comes from without careful motivation (e.g., Russell Index)
- Renumber equations (18-9-19)
- Typo in Eqn 17? the second γ_v is γ_G?

Conclusion

- ▷ Overall, the paper relies on a clever idea and makes contribution to the literature
- ▷ I recommend that you all read the paper!
  - Some polishing may be necessary
  - Robustness (both estimation and empirics)
  - Magnitude
- ▷ I wish all the best for the publication!