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KEY TOPICS COVERED Page

• Valuation vs. Cheapness: Excess Intrinsic Value Motivation	2
• Stewardship: Financing Yield Motivation	3
• Valuation Driven Factor Model: Residual Alpha Traits	4
• 2x3 Factor Portfolio Performance	5
• Factor Performance in Russell 1000 & Russell 2000	6

In October 2020, Applied Finance published a research paper ([Valuation Beta](#)) that studied the attributes of a comprehensive intrinsic value framework in the context of asset pricing studies popularized by Fama French’s expansion from the CAPM to 3-, 5-, and 6-factor models. This study not only indicated that the Intrinsic Value Factor has delivered significant alpha against asset pricing frameworks reliant on valuation proxies (Book to Price and Dividend Discount Model), but it also provided compelling evidence that factors aligned with intrinsic value and securities analysis principles better explain cross-sectional returns over the past 20+ years compared to academic models that have been subject to recent revision.

“Value” proxies in Fama French’s asset pricing motivations ignore the [Wealth Creation Effect](#) of shareholder value created through profitable reinvestment.

- Book to Price, originally posited as the “value” factor in three factor research, only incorporates historical data into its numerator and often conflates high leverage and low profits.
- The later expansion to five factors relied on a Dividend Discount Model proxy for value, which motivated an unconditional preference towards low growth stocks. This implied that high asset growth is a predictor of cross-sectional underperformance regardless of whether incremental investment can generate cash flows in excess of a firm’s cost of capital.
- Applied Finance’s comprehensive intrinsic value framework corrects for these shortcomings by capturing shareholder value created as profits and investment persist over the finite life of the firm. By rewarding profitable investment instead of blindly punishing firms for growing, Valuation Driven portfolios deliver “all weather” attributes that perform well independent of the value/growth cycle observed in traditional style methodologies.

We are excited to share updated results from this asset pricing research study. Our original publication studied US market returns between October 1998 and June 2020. In 2021, we published an update in our [October 2021 Quarterly Market Review](#) to highlight performance from July 2020 to June 2021. This update now extends our study’s time horizon with an additional year of returns through June 2022.

We believe our ongoing research is an important contribution to asset pricing literature, not only due to the unique alpha characteristics and the improved ability to explain cross-sectional returns derived from systematic intrinsic value estimates, but also due to the implications that call for a [reconciliation between the divergent perspectives in quantitative finance and securities analysis](#).

In this write-up, we recap the motivations for the Excess Intrinsic Value and Financing Yield factors and their unique residual alpha traits in asset pricing. We then review the cross-sectional explanatory benefits of the Valuation Driven Applied Finance 5-Factor Model. We also review recent factor performance (and each underlying 2x3 portfolio) on the incremental year of new data added to our study horizon. We also introduce a new visual tool to quickly review the annual performance of Applied Finance and popular asset pricing factors in the context of Russell 1000 and Russell 2000 constituents that better align to practitioner needs in real-world portfolio construction.

Please contact your AFG representative if we can lend a hand with any questions or training needs. We are thankful for our research partnership, and we look forward to continuing to provide valuation-based insight to assist in your portfolio construction and asset allocation decisions!

Excess Intrinsic Value Motivation

In the charts and tables over the next several pages, we have updated the performance characteristics of studies that provide the motivation for Valuation Driven factors in asset pricing.

In aggregate, these motivations capture insight derived from securities analysis & NPV principles: firm value is a function of the present value of future cash flows and shareholder value is created through profitable reinvestment. By studying factors that align with these principles with asset pricing techniques popularized by Fama French, we can reconcile the best practice of quantitative finance with securities analysis.

Table 1 highlights that the Applied Finance Intrinsic Value Factor™ provides 3.40% of statistically significant annualized alpha when regressed against the Fama French 5 Factor model. In this same test for factor redundancy, Book to Price provides -5.27% of statistically significant negative alpha, and each of these “value” factors share a high degree of multicollinearity.

Table 2 (and it’s accompanying line chart) explores the contrast between Intrinsic Value and Book to Price. We form portfolios on the competing cheap/expensive and undervalued/overvalued portfolio assignments. This provides compelling evidence that undervalued stocks that are not cheap significantly outperform stocks that are cheap, but not undervalued.

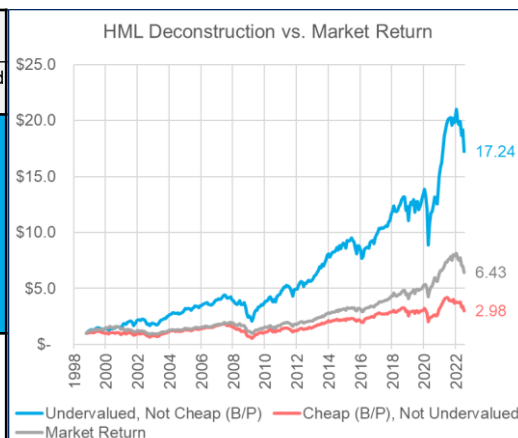
The formulas below table 2 highlight how the common “book value” term can be rearranged to calculate Excess Intrinsic Value to diminish the multicollinearity observed between Book to Price and the Intrinsic Value Factor™.

Table 3 reflects a test for factor redundancy between Excess Intrinsic Value and Fama French’s 5 Factors. Excess Intrinsic Value provides unexplained annualized alpha of 1.99% while Operating Profitability becomes insignificant, indicating that the discounted value of persistent Economic Profits is more useful than a single year ROE-based measure. Swapping Excess Intrinsic Value for Operating Profits in an adjusted 5 factor model in Table 4, Excess Intrinsic Value provides 7.97% of alpha unexplained by the remaining factors.

Table 1: 2x3 Factors	199810 - 202206	Intercept	MKT-RF	SMB	HML	RMW	CMA	IV	R-sq	VIF
Book to Price (HML)	Coefficient	-5.27%	0.08	0.09	-0.41	0.34	0.99	0.87	7.71	
	t-Stat	-4.52	3.56	2.54	-8.75	7.79	29.76			
	Significance	***	***	*	***	***	***			
Intrinsic Value Factor™ (IV)	Coefficient	3.40%	-0.02	-0.03	0.77	0.51	-0.11	0.88	8.33	
	t-Stat	3.24	-0.97	-0.91	29.76	14.29	-2.61			
	Significance	**			***	***	**			

Applied Finance Research: US Market (ex-ADRs/REITS), Using remaining Fama French 5 factors and Applied Financing Intrinsic Value in regressions to explain average returns on Book to Price (HML) and Applied Finance Intrinsic Value Factor (IV): October 1998 to June 2022.

Table 2: Annual Return		Intrinsic Value Factor™		
		Overvalued 30%	Middle 40%	Undervalued 30%
Book to Price (HML)	Expensive 30%			12.74%
	Middle 40%			
	Cheap 30%	4.71%		



Applied Finance Research: US Market (ex-ADRs/REITS), 6 Portfolios formed on Size and Book to Price and Size and Applied Finance Intrinsic Value Factor. Point-in-time factor construction with monthly rebalancing from October 1998 to June 2022. Cap-weighted returns.

Book to Price “Value” Framework

$$\frac{B_t}{M_t} = \frac{\sum_{t=-\infty}^0 (\text{Paid in Capital}_{t+\tau} + \text{Retained Earnings}_{t+\tau} - \text{Share Repurchases}_{t+\tau})}{M_t}$$

Applied Finance Intrinsic Value Factor Valuation Framework

$$\frac{IV_t}{M_t} = \frac{BV_t + \sum_{t=1}^n E(\text{Economic Profit}_{t+\tau}) / (1+r)^\tau}{M_t}$$

Excess Intrinsic Value Factor Valuation Framework

$$\frac{IV_t - BV_t}{M_t} = \frac{\sum_{t=1}^n E(\text{Economic Profit}_{t+\tau}) / (1+r)^\tau}{M_t}$$

2x3 Factor Construction – Applied Finance Factors

$$\text{Excess Intrinsic Value} = (\text{Intrinsic Value}_{LFY} - \text{Common Stock}_{LFY}) / \text{Market Cap}_{Current}$$

$$\text{VMC} = 1/2 (\text{Small Valuation Preference} + \text{Big Valuation Preference}) - 1/2 (\text{Small Cheapness Preference} + \text{Big Cheapness Preference})$$

Table 3: 2x3 Factors	199810 - 202206	Intercept	MKT-RF	SMB	HML	RMW	CMA	VMC	R-sq	VIF
Operating Profitability (RMW)	Coefficient	0.60%	-0.03	-0.02	-0.22		0.06	0.80	0.78	4.53
	t-Stat	0.60	-1.43	-0.70	-7.70		1.59	24.68		
	Significance				***			***		
Excess Intrinsic Value (VMC)	Coefficient	1.99%	-0.03	-0.09	0.36	0.86	-0.08		0.84	6.36
	t-Stat	1.94	-1.50	-3.01	14.22	24.68	-1.85			
	Significance			**	***	***				

Table 4: 2x3 Factors	199810 - 202206	Intercept	MKT-RF	SMB	HML	VMC	CMA	R-sq	VIF
Excess Mkt Return (MKT-Rf)	Coefficient	11.76%		0.26	0.54	-0.46	-0.73	0.31	1.44
	t-Stat	4.13		2.94	6.77	-5.01	-6.66		
	Significance	***		**	***	***	***		
Size (SMB)	Coefficient	4.66%	0.11		0.30	-0.40	-0.01	0.27	1.37
	t-Stat	2.45	2.94		5.65	-6.85	-0.07		
	Significance	*	**		***	***			
Book to Price (HML)	Coefficient	-9.01%	0.26	0.34		0.66	0.74	0.62	2.63
	t-Stat	-4.57	6.77	5.65		12.29	10.56		
	Significance	***	***	***		***	***		
Excess Intrinsic Value (VMC)	Coefficient	7.97%	-0.18	-0.36	0.53		-0.07	0.50	2.00
	t-Stat	4.49	-5.01	-6.85	12.29		-0.96		
	Significance	***	***	***	***				
Investment Rate (CMA)	Coefficient	5.66%	-0.19	0.00	0.39	-0.05		0.43	1.76
	t-Stat	3.94	-6.66	-0.07	10.56	-0.96			
	Significance	***	***		***				

Applied Finance Research: US Market (ex-ADRs/REITS), Using remaining Fama French 5 factors and Applied Finance Excess Intrinsic Value in regressions to explain average returns on each individual factor: October 1998 to June 2022.

Financing Yield Motivation

Applied Finance Intrinsic Value Factor Valuation Framework

$$IV_t = \frac{BV_t + \sum_{\tau=1}^n E(\text{Economic Profit}_{t+\tau}) / (1+r)^\tau}{M_t}$$

$$IV_t = \frac{BV_t + \sum_{\tau=1}^n E(\text{Economic Margin}_{t+\tau} * \text{Invested Capital}_{t+\tau-1} * \{1 + \text{Capital Growth}_{t+\tau}\}) / (1+r)^\tau}{M_t}$$

Dividend Discount Model Valuation Framework

$$M_t = \sum_{\tau=1}^{\infty} E(d_{t+\tau}) / (1+r)^\tau$$

$$M_t = \sum_{\tau=1}^{\infty} E(Y_{t+\tau} - dB_{t+\tau}) / (1+r)^\tau$$

$$\frac{M_t}{B_t} = \frac{\sum_{\tau=1}^{\infty} E(Y_{t+\tau} - dB_{t+\tau}) / (1+r)^\tau}{B_t}$$

Financing Yield Tautology (in DDM Model)

$$d_{t+\tau} = Y_{t+\tau} - dB_{t+\tau}$$

2x3 Factor Construction – Applied Finance Factors

Financing Yield = Cash Flow from Financing Activity_{LFY} / Enterprise Value_{Current}
RMD = 1/2 (Small_{Returning Capital} + Big_{Returning Capital}) – 1/2 (Small_{Diluting Ownership} + Big_{Diluting Ownership})

18

In our asset pricing research, we noted a material inconsistency between the role of asset growth in quantitative finance and securities analysis. Incremental investment in projects that earn more than a firm’s cost of capital should increase a firm’s intrinsic value, while investment in projects that earn less than a firm’s cost of capital will destroy shareholder value. This concept is captured in Applied Finance’s Wealth Creation Matrix, and it is a perspective that is common in corporate finance and capital budgeting decisions.

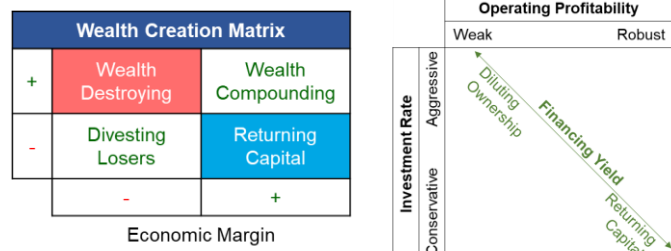
In the expansion to 5 factors, however, Fama French provided motivation to independently prefer stocks with high profitability and low growth characteristics. This claim that high levels of asset growth predict underperformance is inconsistent with the conditional role of investment in our valuation framework. We agree that high asset growth is problematic for unprofitable firms, but profitable

reinvestment offers a [Wealth Creation Effect](#) that unlocks shareholder value.

Studying [Fama French’s 5 Factor paper](#), we observed that their interpretation that led to two distinct factors could be reinterpreted as a single factor focused on yield derived from firm-wide financing cash flow. This single factor interpretation eliminates the problematic claim that asset growth is unconditionally a predictor of underperformance. Instead, high growth fueled by external financing due to weak profitability can be captured by the “diluting ownership” portfolio.

Table 5 highlights that a single-factor Financing Yield interpretation contains additional unexplained alpha when regressed against Fama French’s 5 Factors, while Operating Profits and Investment Rate become redundant when regressed against Financing Yield. Table 6 then replaces the RMW & CMA factors with Financing Yield, which provides significant annualized alpha of 8.85%.

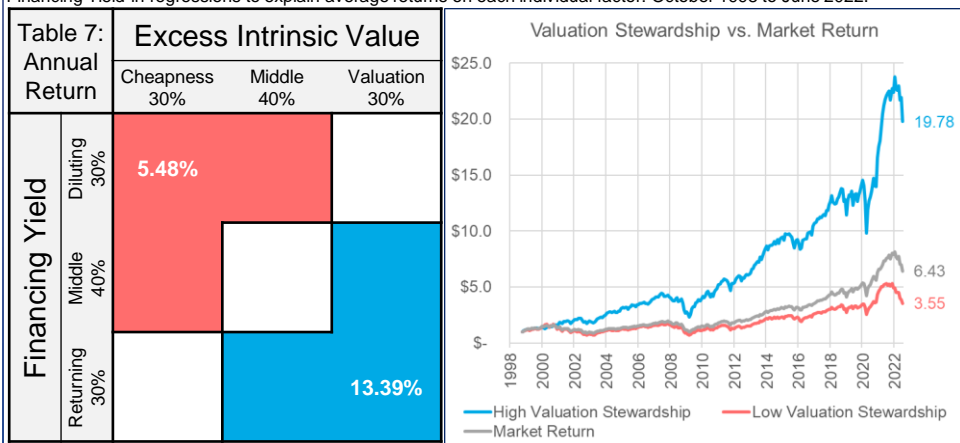
Table 7 highlights the performance of portfolios formed on Applied Finance’s Excess Intrinsic Value and Financing Yield factors, a combination we refer to as “Valuation Stewardship”. On a cap-weighted basis, high Valuation Stewardship stocks have returned 13.39% per year, while low Valuation Stewardship stocks have returned 5.48% per year.



	199810 - 202206	Intercept	MKT-RF	SMB	HML	RMW	CMA	RMD	R-sq	VIF
Operating Profitability (RMW)	Coefficient	0.32%	-0.03	-0.13	0.23		-0.62	1.13	0.70	3.30
	t-Stat	0.27	-1.10	-3.67	8.18		-10.79	19.20		
	Significance			***	***		***	***		
Investment Rate (CMA)	Coefficient	0.26%	-0.04	0.01	0.29	-0.48		0.95	0.73	3.68
	t-Stat	0.25	-2.12	0.39	14.03	-10.79		17.48		
	Significance		*		***	***		***		
Financing Yield (RMD)	Coefficient	2.38%	-0.04	-0.01	-0.12	0.50	0.55		0.81	5.28
	t-Stat	3.07	-2.68	-0.23	-6.42	19.20	17.48			
	Significance	**	**		***	***	***			

	199810 - 202206	Intercept	MKT-RF	SMB	HML	RMD	R-sq	VIF
Excess Mkt Return (MKT-Rf)	Coefficient	12.64%		0.27	0.21	-0.94	0.31	1.45
	t-Stat	4.44		3.21	3.68	-8.77		
	Significance	***		**	***	***		
Size (SMB)	Coefficient	4.52%	0.13		0.16	-0.31	0.19	1.24
	t-Stat	2.23	3.21		4.21	-3.75		
	Significance	*	**		***	***		
Book to Price (HML)	Coefficient	-7.06%	0.22	0.36		0.78	0.18	1.22
	t-Stat	-2.36	3.68	4.21		6.75		
	Significance	*	***	***		***		
Financing Yield (RMD)	Coefficient	8.85%	-0.23	-0.16	0.18		0.35	1.54
	t-Stat	6.52	-8.77	-3.75	6.75			
	Significance	***	***	***	***			

Applied Finance Research: US Market (ex-ADRs/REITS), Using remaining Fama French 5 factors and Applied Finance Financing Yield in regressions to explain average returns on each individual factor: October 1998 to June 2022.



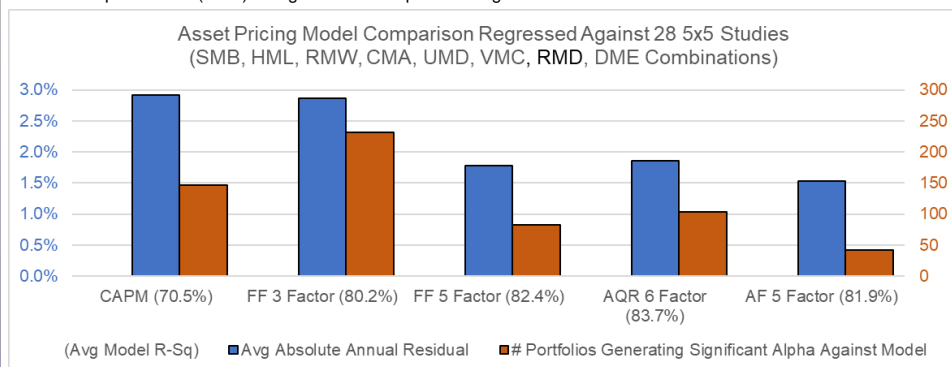
Applied Finance Research: US Market (ex-ADRs/REITS), 6 Portfolios formed on Size and Excess Intrinsic Value and Size and Financing Yield. Point-in-time factor construction with monthly rebalancing from October 1998 to June 2022. Cap-weighted returns.

Valuation Beta – 2022 Asset Pricing Study Update

Applied Finance 5 Factor Model & Residual Alpha Comparison

	199810 - 202206	Intercept	MKT-RF	SMB	VMC	RMD	DME	R-sq	VIF
Excess Mkt Return (MKT-Rf)	Coefficient	13.06%		0.27	-0.12	-0.93	0.30	0.33	1.48
	t-Stat	4.58		3.05	-1.10	-7.45	3.57		
	Significance	***		**		***	***		
Size (SMB on AFCM Factors)	Coefficient	5.44%	0.12		-0.39	-0.16	0.37	0.29	1.42
	t-Stat	2.79	3.05		-5.73	-1.73	7.02		
	Significance	**	**		***		***		
Excess Intrinsic Value (VMC)	Coefficient	3.12%	-0.04	-0.27		0.44	0.49	0.63	2.68
	t-Stat	1.94	-1.10	-5.73		6.21	13.26		
	Significance			***		***	***		
Financing Yield (RMD)	Coefficient	6.65%	-0.18	-0.07	0.28		0.10	0.50	2.02
	t-Stat	5.43	-7.45	-1.73	6.21		2.61		
	Significance	***	***		***		**		
Debt/Enterprise Value (DME)	Coefficient	-7.14%	0.15	0.41	0.79	0.25		0.55	2.24
	t-Stat	-3.53	3.57	7.02	13.26	2.61			
	Significance	***	***	***	***	**			

Applied Finance Research: US Market (ex-ADRs/REITS), Using Excess Intrinsic Value (VMC), Financing Yield (RMD) & Debt / Enterprise Value (DME) in regressions to explain average returns on each individual factor: October 98 to June 22.



Aggregate	Study	Tests	Single Factor CAPM			Fama French 3 Factor			Fama French 5 Factor			AQR 6 Factor			Applied Finance 5 Factor		
			Avg	R-sq	Sig	Avg	R-sq	Sig	Avg	R-sq	Sig	Avg	R-sq	Sig	Avg	R-sq	Sig
All		700	2.92%	0.705	146	2.87%	0.802	232	1.78%	0.824	83	1.86%	0.837	103	1.53%	0.819	42
Applied Finance		75	2.98%	0.702	20	3.09%	0.779	25	2.32%	0.803	16	2.47%	0.806	20	1.63%	0.816	4
Fama French/AQR		250	2.95%	0.707	48	2.82%	0.820	86	1.38%	0.842	14	1.39%	0.860	16	1.45%	0.827	9
Blended		375	2.88%	0.704	78	2.86%	0.796	121	1.94%	0.817	53	2.05%	0.828	67	1.56%	0.814	29
App Fin	5x5: VMC x RMD	25	3.16%	0.722	8	3.41%	0.770	8	2.33%	0.795	6	2.46%	0.799	9	1.71%	0.807	1
	5x5: VMC x DME	25	2.88%	0.688	6	3.01%	0.776	8	2.62%	0.798	7	2.84%	0.803	8	1.65%	0.815	1
	5x5: RMD x DME	25	2.91%	0.696	6	2.85%	0.791	9	2.02%	0.815	3	2.12%	0.817	3	1.54%	0.827	2
Fama French/AQR	5x5: SMB x HML	25	1.79%	0.735	0	1.46%	0.918	3	1.22%	0.927	2	1.31%	0.928	2	1.24%	0.912	1
	5x5: SMB x RMW	25	3.30%	0.776	9	2.84%	0.904	13	1.11%	0.929	2	1.16%	0.930	1	0.83%	0.921	1
	5x5: SMB x CMA	25	3.08%	0.777	4	2.44%	0.909	7	1.18%	0.930	2	1.17%	0.932	2	1.29%	0.919	2
	5x5: HML x RMW	25	3.24%	0.671	6	3.30%	0.785	10	2.01%	0.807	2	1.98%	0.810	4	1.78%	0.793	1
	5x5: HML x CMA	25	2.23%	0.698	2	2.26%	0.804	6	1.35%	0.828	1	1.33%	0.830	1	1.03%	0.806	0
	5x5: RMW x CMA	25	3.06%	0.726	6	3.23%	0.767	11	1.28%	0.807	1	1.27%	0.811	1	1.42%	0.792	1
	5x5: SMB x UMD	25	3.76%	0.717	6	3.27%	0.873	11	1.35%	0.885	2	1.08%	0.920	2	1.88%	0.871	2
	5x5: HML x UMD	25	2.88%	0.643	4	2.88%	0.746	8	1.42%	0.764	1	1.75%	0.815	2	1.53%	0.752	1
	5x5: RMW x UMD	25	3.13%	0.670	6	3.39%	0.749	11	1.32%	0.771	1	1.36%	0.817	0	1.61%	0.755	0
5x5: CMA x UMD	25	3.00%	0.660	5	3.09%	0.743	6	1.61%	0.769	0	1.49%	0.811	1	1.85%	0.751	0	
Blended (AF & Fama French/AQR)	5x5: VMC x SMB	25	3.49%	0.760	8	3.18%	0.892	14	1.46%	0.912	4	1.59%	0.914	3	1.11%	0.916	3
	5x5: VMC x HML	25	2.95%	0.685	7	2.96%	0.793	8	2.67%	0.807	7	2.88%	0.812	10	2.10%	0.801	4
	5x5: VMC x RMW	25	2.45%	0.698	5	2.65%	0.740	6	2.11%	0.758	2	2.23%	0.765	3	1.55%	0.760	1
	5x5: VMC x CMA	25	3.29%	0.716	8	3.51%	0.758	10	2.34%	0.789	5	2.52%	0.796	7	1.77%	0.789	3
	5x5: VMC x UMD	25	3.92%	0.671	10	4.18%	0.742	12	2.66%	0.761	5	2.81%	0.802	6	2.33%	0.753	2
	5x5: RMD x SMB	25	3.47%	0.776	8	3.01%	0.908	16	1.41%	0.925	4	1.38%	0.926	4	1.31%	0.925	5
	5x5: RMD x HML	25	2.96%	0.699	6	2.98%	0.807	10	1.54%	0.824	2	1.59%	0.825	2	1.07%	0.815	1
	5x5: RMD x RMW	25	3.05%	0.727	7	3.16%	0.780	9	1.87%	0.811	3	1.91%	0.814	4	1.51%	0.806	2
	5x5: RMD x CMA	25	2.77%	0.680	6	2.93%	0.732	8	1.72%	0.762	2	1.76%	0.766	3	1.51%	0.751	0
	5x5: RMD x UMD	25	3.43%	0.666	5	3.55%	0.743	7	1.73%	0.764	2	1.86%	0.807	2	1.74%	0.754	2
	5x5: DME x SMB	25	1.73%	0.738	0	1.11%	0.902	3	1.74%	0.917	5	1.83%	0.918	8	1.08%	0.922	1
	5x5: DME x HML	25	1.43%	0.701	1	1.34%	0.806	1	1.69%	0.821	1	1.78%	0.822	1	0.95%	0.815	0
5x5: DME x RMW	25	3.11%	0.697	4	3.17%	0.795	9	2.31%	0.825	4	2.39%	0.827	6	1.75%	0.828	2	
5x5: DME x CMA	25	2.12%	0.703	1	2.09%	0.792	4	2.08%	0.817	4	2.13%	0.819	4	1.53%	0.817	1	
5x5: DME x UMD	25	3.03%	0.645	2	3.09%	0.745	4	1.80%	0.764	3	2.15%	0.812	4	2.11%	0.764	2	

Applied Finance Research: Annualized alphas, adjusted r-squared and significance counts (p-value <= 0.05) on 28 pairings of 25 portfolios formed on 5x5 intersection of independent sorts of common asset pricing factors (SMB, HML, RMW, CMA, UMD, VMC, RMD, DME). Quintile breakpoints formed on NYSE constituents. Cap-weighted portfolios, October 1998 to June 2022.

While the motivations for each factor indicate that they provide unexplained alpha characteristics against the Fama French 5 factor model, we can also develop a Valuation Driven asset pricing model based on these factors. In addition to Excess Intrinsic Value & Financing Yield, we can include Debt/Enterprise Value as a direct measure of leverage that subsumes the use of Book to Price as a proxy for leverage. Table 8 displays that each factor is a source of unique alpha characteristics unexplained by the remaining factors and do not suffer from concerns related to multicollinearity.

In total, this leads to 8 distinct asset pricing factors that we can compare. (Size, Book to Price, Operating Profits, Investment Rate, Momentum, Excess Intrinsic Value, Financing Yield & Debt/Enterprise Value) Within 28 "pick 2" combinations, we can create 25 5x5 portfolios based on independent quintile sorts. This leads to 700 monthly return arrays that we can regress against each

asset pricing model to determine which set of factors best explain cross-sectional stock returns.

In table 9, we display aggregate alpha comparisons. Against the CAPM, the average portfolio alpha is 2.92% and the alpha for 146 of the 700 study portfolios is statistically significant. Expanding to three factors, the average alpha falls to 2.87%, but the number of significant return arrays increases to 232. We observe a substantial improvement for Fama French's expansion to 5 factors, with average alpha of 1.78% and 83 significant return arrays, and these levels are similar in the expansion to 6 factors (1.86%/103).

A further notable improvement is observed when using Valuation Driven factors, where average alpha falls to 1.53% and only 42 of the 700 portfolio return arrays are statistically significant. While Fama French factors do not explain Applied Finance factors well, Applied Finance factors can explain Fama French factors as well as they explain themselves!

2022 Factor Performance Update

Equipped with our expanded set of monthly returns through the end of June 2022, we can review updated performance of asset pricing factors and their underlying 2x3 portfolios derived by NYSE-based size and factor breakpoints. The annualized return reflects cap-weighted returns between October 1998 and June 2022, while rolling 12M returns reflect the new data appended to our study from July 2021 to June 2022.

- Intrinsic Value Factor™ (IV):** Since 1998, top 30% has outperformed bottom 30% by 6.0% per year in large cap stocks and 6.8% in small cap stocks. Over the previous 12 months, top 30% outperformed bottom 30% by 21.7% in large cap stocks and 29.7% in small cap stocks.
- Excess Intrinsic Value (VMC):** Since 1998, top 30% has outperformed bottom 30% by 7.2% per year in large cap stocks and 6.0% in small cap stocks. Over the previous 12 months, top 30% outperformed bottom 30% by 26.7% in large cap stocks and 20.4% in small cap stocks.
- Financing Yield (RMD):** Since 1998, top 30% has outperformed bottom 30% by 8.2% per year in large cap stocks and 7.8% in small cap stocks. Over the previous 12 months, top 30% outperformed bottom 30% by 30.7% in large cap stocks and 21.6% in small cap stocks.
- Debt / Enterprise Value (DME):** Since 1998, top 30% has underperformed bottom 30% by -0.1% per year in large cap stocks and outperformed by 2.4% in small cap stocks. Over the previous 12 months, top 30% outperformed bottom 30% by 15.0% in large cap stocks and 17.8% in small cap stocks.
- Book to Price (HML):** Since 1998, top 30% has underperformed bottom 30% by -1.9% per year in large cap stocks and outperformed by 2.8% in small cap stocks. Over the previous 12 months, top 30% outperformed bottom 30% by 12.5% in large cap stocks and 26.9% in small cap stocks.

Table 10: 2x3 Factor Portfolio Returns	Annualized Return	Spread vs Mkt	July 2021 to June 2022	Spread vs. Mkt
US Market Return	8.2%		-14.8%	
Size (SMB)	3.1%		-12.0%	
Size (SMB on AFCM Factors)	3.1%		-10.2%	
Intrinsic Value Factor: Small Cap, Bottom 30%	6.7%	-1.4%	-42.7%	-27.9%
Intrinsic Value Factor: Small Cap, Middle 40%	11.3%	3.2%	-11.0%	3.9%
Intrinsic Value Factor: Small Cap, Top 30%	13.5%	5.4%	-13.1%	1.8%
Intrinsic Value Factor: Large Cap, Bottom 30%	5.1%	-3.1%	-28.8%	-14.0%
Intrinsic Value Factor: Large Cap, Middle 40%	8.6%	0.4%	-10.4%	4.4%
Intrinsic Value Factor: Large Cap, Top 30%	11.1%	2.9%	-7.2%	7.7%
Intrinsic Value Factor (IV)	5.2%		36.2%	
Excess Intrinsic Value: Small Cap, Bottom 30%	6.9%	-1.2%	-37.4%	-22.5%
Excess Intrinsic Value: Small Cap, Middle 40%	11.5%	3.3%	-17.6%	-2.8%
Excess Intrinsic Value: Small Cap, Top 30%	13.0%	4.8%	-17.0%	-2.1%
Excess Intrinsic Value: Large Cap, Bottom 30%	3.7%	-4.5%	-35.9%	-21.1%
Excess Intrinsic Value: Large Cap, Middle 40%	6.9%	-1.3%	-13.8%	1.0%
Excess Intrinsic Value: Large Cap, Top 30%	10.8%	2.7%	-9.3%	5.6%
Excess Intrinsic Value (VMC)	5.0%		34.6%	
Financing Yield: Small Cap, Bottom 30%	5.9%	-2.3%	-34.6%	-19.7%
Financing Yield: Small Cap, Middle 40%	12.1%	4.0%	-22.8%	-7.9%
Financing Yield: Small Cap, Top 30%	13.7%	5.5%	-13.0%	1.9%
Financing Yield: Large Cap, Bottom 30%	3.7%	-4.5%	-30.5%	-15.6%
Financing Yield: Large Cap, Middle 40%	8.1%	-0.1%	-14.7%	0.1%
Financing Yield: Large Cap, Top 30%	11.9%	3.8%	0.3%	15.1%
Financing Yield (RMD)	6.7%		36.2%	
Debt / Enterprise Value: Small Cap, Bottom 30%	8.8%	0.7%	-33.6%	-18.8%
Debt / Enterprise Value: Small Cap, Middle 40%	10.6%	2.5%	-21.8%	-6.9%
Debt / Enterprise Value: Small Cap, Top 30%	11.2%	3.1%	-15.8%	-0.9%
Debt / Enterprise Value: Large Cap, Bottom 30%	8.2%	0.0%	-20.1%	-5.3%
Debt / Enterprise Value: Large Cap, Middle 40%	8.3%	0.1%	-5.8%	9.0%
Debt / Enterprise Value: Large Cap, Top 30%	8.1%	-0.1%	-5.1%	9.8%
Debt/Enterprise Value (DME)	0.6%		20.6%	
Book to Price: Small Cap, Bottom 30%	8.6%	0.5%	-38.2%	-23.3%
Book to Price: Small Cap, Middle 40%	10.6%	2.4%	-19.6%	-4.8%
Book to Price: Small Cap, Top 30%	11.4%	3.3%	-11.3%	3.5%
Book to Price: Large Cap, Bottom 30%	8.4%	0.2%	-17.3%	-2.5%
Book to Price: Large Cap, Middle 40%	8.2%	0.0%	-8.9%	5.9%
Book to Price: Large Cap, Top 30%	6.5%	-1.7%	-4.8%	10.1%
Book to Price (HML)	0.0%		25.6%	
Operating Profitability: Small Cap, Bottom 30%	7.6%	-0.5%	-35.2%	-20.3%
Operating Profitability: Small Cap, Middle 40%	12.4%	4.2%	-11.6%	3.2%
Operating Profitability: Small Cap, Top 30%	12.1%	3.9%	-19.2%	-4.3%
Operating Profitability: Large Cap, Bottom 30%	2.1%	-6.0%	-28.1%	-13.2%
Operating Profitability: Large Cap, Middle 40%	8.9%	0.7%	-12.0%	2.8%
Operating Profitability: Large Cap, Top 30%	9.5%	1.3%	-10.9%	3.9%
Operating Profitability (RMW)	4.5%		22.8%	
Investment Rate: Small Cap, Bottom 30%	13.4%	5.2%	-18.8%	-3.9%
Investment Rate: Small Cap, Middle 40%	11.9%	3.7%	-14.6%	0.3%
Investment Rate: Small Cap, Top 30%	6.3%	-1.9%	-37.2%	-22.3%
Investment Rate: Large Cap, Bottom 30%	10.1%	1.9%	4.4%	19.3%
Investment Rate: Large Cap, Middle 40%	8.7%	0.5%	-8.7%	6.2%
Investment Rate: Large Cap, Top 30%	7.0%	-1.2%	-29.0%	-14.2%
Investment Rate (CMA)*	4.1%		34.6%	
Price Momentum: Small Cap, Bottom 30%	7.1%	-1.0%	-32.3%	-17.4%
Price Momentum: Small Cap, Middle 40%	11.4%	3.2%	-13.4%	1.5%
Price Momentum: Small Cap, Top 30%	13.9%	5.7%	-19.4%	-4.5%
Price Momentum: Large Cap, Bottom 30%	4.9%	-3.3%	-21.0%	-6.1%
Price Momentum: Large Cap, Middle 40%	8.5%	0.3%	-8.6%	6.3%
Price Momentum: Large Cap, Top 30%	9.6%	1.4%	-16.3%	-1.5%
Price Momentum (1Yx1M) (UMD)	2.2%		11.4%	

Applied Finance Research: US Market (ex-ADRs/REITS), 2x3 Factor Portfolios formed on Size and Top 30%/Middle 40%/Bottom 30% of study factor. Point-in-time factor construction with monthly rebalancing. Annualized returns reflect performance from October 1998 to June 2022. Rolling 12 Month Returns reflect performance from July 2021 to June 2022. Cap-weighted returns.

- Operating Profitability (RMW):** Since 1998, top 30% has outperformed bottom 30% by 7.4% per year in large cap stocks and 4.4% in small cap stocks. Over the previous 12 months, top 30% outperformed bottom 30% by 17.2% in large cap stocks and 16.0% in small cap stocks.
- Investment Rate (CMA)*:** Since 1998, bottom 30% (conservative growth) has outperformed top 30% (aggressive growth) by 3.1% per year in large cap stocks and 7.1% in small cap stocks. Over previous 12 months, bottom 30% outperformed top 30% by 33.5% in large cap and 18.4% in small cap stocks. (*CMA factor is bottom 30%-top 30%)
- Price Momentum (1 Year ex 1 Month) (UMD):** Since 1998, top 30% has outperformed bottom 30% by 4.7% per year in large cap stocks and 6.8% in small cap stocks. Over the previous 12 months, top 30% outperformed bottom 30% by 4.7% in large cap stocks and 12.9% in small cap stocks.

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