

Does the Value Premium Persist After Controlling for Profitability? *Evidence From US and European Equity Markets*

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Abstract

This study asks whether the value premium survives once profitability is broadened into a full measure of firm quality. Replacing the narrow profitability control of Fama and French (2015) with the Quality Minus Junk composite, I estimate nested factor models on size–book-to-market portfolios across the United States and Europe, assessing survival through portfolio intercepts and the GRS test in lieu of loadings. The U.S. premium is not subsumed: pricing errors persist under the full specification, QMJ loads negatively, and the quality-value relationship proves exclusively post-crisis.

In Europe it survives differently, with investment conservatism instead of quality pricing value, and a UK extension weighs against an ‘ownership-structure’ explanation. The mechanism absorbing value in the U.S. is, ultimately, found not to be a universal property of equity markets.

AI Statement

I acknowledge use of generative AI when correcting development of code for this paper. However, the work reported remains my own.

Acknowledgments

I thank all my friends at Kent for making me come back to finish this degree !

1. Introduction

Stocks trading at high book-to-market ratios have historically generated returns exceeding what might be attributed to market risk only. This *value premium* is among the most replicated findings in empirical asset pricing, holding across countries, time periods, and model specifications. Its underlying source, however, remains contested, with implications extending well beyond academic factor modelling.

The stakes are simultaneously economic and institutional – at firm level, a misunderstood premium can distort the cost of capital: if cheap stocks are cheap due to genuine risk, their equity is correctly priced and capital allocation proves efficient. If they are cheap as investors systematically neglect them, value firms face artificially inflated discount rates; suppressing investment and directing savings toward growth firms whose valuations may not reflect productive capacity. The composition of real investment across an economy is therefore, in part, a function of whether equity markets price value correctly.

At institutional levels, defined benefit pension funds, sovereign wealth funds and a rapidly expanding universe of systematic factor strategies have allocated capital to value equities assuming the premium to be persistent. Such assumption was stress-tested during the value drawdown of 2007 to 2020, when growth stocks dominated and prominent voices declared the premium *effectively dead*.¹ For institutional investors operating across jurisdictions, whether a premium documented in U.S. data translates to European markets carries important consequence for how global factor portfolios are constructed, and what return assumptions underpin long horizon liability matching.

Fama and French (2015) sharpened the question considerably: the value factor was largely redundant in U.S. data once profitability and investment controls entered, implying three decades of factor investing built around HML may have measured a confounding factor. That result, however, rests on a narrow profitability measure, U.S. data alone, and a framework to omit momentum. Whether it generalises or rather reflects the accounting regimes and market structures from which it was estimated, remains unresolved.

This study tests whether the value premium persists after controlling for profitability, extending *Fama and French (2015)* in three directions: replacing narrow profitability definitions with a broad quality composite (QMJ), testing temporal stability across the 2008 crisis, and replicating across European equity markets where financial system structure and accounting conventions differ materially. The European replication is then further decomposed by country to test whether the institutional explanation holds within Europe.

¹ The “death of value” became a prominent theme in practitioner commentary over this period; *Israel, Laursen and Richardson (2021)* and *Blitz and Hanauer (2021)* survey and reject the thesis, the latter titled in direct response.

The value premium survives quality controls in both markets; yet through structurally different channels. In the U.S., QMJ absorbs profitability entirely, loading negatively on value: cheap firms are systematically low quality, and the quality-value relationship is concentrated in the post-crisis period, with quality and value orthogonal before 2008. In Europe, QMJ is insignificant throughout and its sign reverses relative to the U.S., with investment conservatism instead of quality pricing the value premium. Substituting a UK-specific quality factor for pooled European measure fails to produce the U.S.-like pattern that comparative governance literature would predict, suggesting the quality-value disconnect a broader European phenomenon rather than a product of a UK-continental ownership divide only.

These findings carry critical implication for whether the 2007-2020 value drawdown reflected genuine premium decay, whether institutional value allocations were rational, and additionally, whether factor models calibrated on U.S. data can reliably be exerted across markets.

2. Literature Review

2.1 Economic Foundations of the Value Premium

Findings corroborated by three-factor model of *Fama and French (1993)* claim the *Capital Asset Pricing Model* to be empirically inadequate: cheap stocks earn far more than their market betas predict, and their value factor HML (that constructed as the return spread between high and low book-to-market portfolios) captures dimension of risk which single-factor models consistently miss. *Fama and French (1993)* leave economic source of this risk open, deferring questions of whether it reflects macroeconomic sensitivity, financial distress or some other recurring exposure.

Dimson, Marsh and Staunton (2002) provide temporal grounding across sixteen countries and more than a century of data, showing the premium to survive the likes of depressions and financial crises. That durability is itself diagnostic: that generating the premium recurs across different economic regimes, making cross-market differences in how it is priced particularly informative of its source. If the premium were purely a financial phenomenon (so a function of investor behaviour at a given moment); it shouldn't appear to outlast the cohorts of investors whose errors generated it. This persistence favours a mechanism rooted in production economics over one grounded in investor error (one which should fade as market participants learn); the two interpretations, however, are difficult to assert on just this evidence.

2.2 Theoretical Divides

There exist two distinct accounts of how financial markets approach processing firm 'value' information – *Zhang (2005)* grounds the premium in 'physical' economics of capital adjustment. Value stocks disproportionately hold productive capital with asymmetric adjustment costs (those characterised by cheap installation during expansions, yet high liquidation expenses in contractions). In downturns, when investors need liquidity, and marginal utility of consumption surge most, value stocks are often those unable to restructure quickly. On this account, the premium is a correct functioning of an efficient market, which prices real economic risk.

Conversely, *De Bondt and Thaler (1985)* attribute the premium to an entirely different force of investor *psychology*: finding long-run 'losers' to repeatedly outperform long-run 'winners', exposing inconsistencies within efficient pricing theory, and establishing overreaction an empirical regularity subject for 'cognitive' explanation. *Lakonishok, Shleifer and Vishny (1994)* later make an *extrapolation* hypothesis, whereby investors project past earning trajectories too far into the future – overpricing 'glamour' stocks with strong recent growth, and underpricing value stocks with weak recent performance. They argue the value premium to be a *return to correctness* in a market where others are wrong. This results in serious economic implication – 'glamour' firms receive cheap equity, while value firms face excessive discount rates, with significant downstream effects on corporate investment, which arbitrage struggles to fully correct, for the arbitrage itself is risky and capital constrained.

Both accounts generate differing empirical predictions, *Zhang (2005)* implying temporal stability: adjustment costs being a permanent feature of physical capital opposed to a cyclical phenomenon, seeing the value premium neither weaken during sentiment downturns nor face disruption in financial crises. The extrapolation hypothesis of *De Bondt and Thaler (1985)* and later *Lakonishok, Shleifer and Vishny (1994)* predicts much opposite: a premium driven by systematic belief errors should be sensitive to investor sentiment, and consequently vulnerable to major shocks to force expectation revision.

The *Global Financial Crisis of 2008* may be used as an exogenous ‘reset’ of investor expectations on an unprecedented scale, providing feasible grounds for testing structural stability: a Chow test at that breakpoint aiming to distinguish a premium whose mechanism is ‘permanent’ - and one whose mechanism is influenced by investor psychology.

2.3 Introducing Profitability

Novy-Marx (2013) posits complication neither risk-based nor behavioural accounts fully anticipate; gross profitability predicts equity returns with force comparable to book-to-market, while the two are negatively correlated in cross-sectional analysis. The empirical question hereby shifts from whether value earns a premium to whether book-to-market contains information distinct from profitability. A negative association raises an alternate possibility: value premium is not independent and speculates book-to-market has merely served a ‘noisy’ proxy for underlying profitability. This further implies investors have always priced weaker earnings power of value firms; not their cheapness *per se*. From a neoclassical standpoint, this aligns with rational pricing, as markets correctly discount less profitable firms at higher rates, causing the value premium to emerge with returns driven by profitability characteristics.

Later motivated by the ‘dividend discount model identity’; an identity relating a firm’s value to expected profitability and investment, *Fama and French (2015)* formalise this challenge. The result is their ‘five-factor’ model, adding profitability (RMW, Robust Minus Weak) and investment (CMA, Conservative Minus Aggressive) to the original three factors. Their central finding is critical: HML becomes largely redundant in U.S. data once RMW and CMA are included.

Over three decades of value investing and academic ‘edifice’ circling the value premium could have been capturing profitability and investment risk in some flawed way. Consider *Fama and French (2015)* are correct: an appropriate pricing model should not use book-to-market logic. Yet we note the subsumption result to not simply settle, *Fama and French 2015* later using narrow operating profitability (a single income statement line) as their control for quality, omitting whether a broader conception (incorporating financial safety and payout policy) would similarly absorb HML. Their framework also omits momentum, meaning apparent value independence in some specifications could reflect momentum contamination.

Evidence here is confined to U.S. data, from a period in which the U.S. economy shifted toward ‘knowledge’ intensive production. Under U.S. GAAP, firms must expense instead of capitalising investments in organisational capital, causing reported book values to exclude assets to generate substantial economic value. The noisiness of book-to-market as a signal of genuine cheapness is arguably consequence of accounting regulation: a policy choice with direct implications for which economic relationships empirical asset pricing can detect. *Fama*

and French's profitability measure is hence narrow, with evidence drawn only from a U.S. market by which book equity sees increased distortion by the accounting treatment of intangible investment.

Apparent subsumption of HML by profitability and investment could here reflect a market specific measurement problem rather than a universal relationship between value and profitability, motivating two extensions: first, whether broader quality controls absorb HML more fully than narrow profitability; and second, whether the same relationship holds in European markets where sector composition and accounting structures potentially make book values considerably more informative.

2.4 Introducing Quality

Profitability is one dimension of a broader *construct* subsequent literature has come to call *quality*. One may argue the distinction between the two is not semantic but economic: *Asness, Frazzini and Pedersen (2019)* construct Quality Minus Junk as a composite of profitability, growth, safety and payout - each dimension capturing what rational investors assess holistically when determining whether cheapness represents opportunity or risk. Economic logic of a quality premium in such sense is simple: firms scoring well across dimensions (profitable, growing, safe and generous in their payouts) face lower bankruptcy risk, generate more stable cash flows, and ultimately signal better corporate governance than those deemed low quality.

Rational investors require higher expected returns from low-quality firms to compensate for the added risks these characteristics imply, in a manner again consistent with efficient market pricing. Considerable implication for this is that RMW, by capturing only the profitability dimension of this broader assessment, is an incomplete control for quality. If QMJ absorbs RMW entirely when in the same regression (revealing operating profitability was acting a proxy for the fuller quality composite) then failure of RMW to subsume value in some specifications might reflect inadequacy of the control, instead of independence of the value premium. Conversely, if HML retains significance even after QMJ is controlled for, the residual could represent true independent economic dimensions: most plausibly, the 'asset-in-place adjustment cost' risk *Zhang (2005)* describes (cost dependent on future economic conditions).

2.5 Europe as an International Dimension

Including an international dimension does not act just a 'robustness' check, for if profitability absorbs value only where book-to-market is a noisy measure of economic value, then cross market variation in accounting regimes, sector composition, as well as financial structure becomes central to identifying the relationship. Existing evidence remains disproportionately U.S. based, yet *Griffin (2002)* proves domestic Fama-French factors explain international

returns substantially better than global factors, implying *factor premia* are shaped by local economic structures. *Fama and French (2017)* further highlight HML to be more consistently priced internationally than profitability and investment factors, though do not examine whether broader quality controls absorb value across markets.

Henceforth, Europe can provide theoretically informative comparison grounds, as mechanisms which might weaken book-to-market in the U.S. need not operate with that same force. European large-cap markets historically have had greater exposure to banks and industrial firms, where ‘tangible’ assets and regulated balance sheets play a larger role in reported book equity.

If book-to-market is a less noisy valuation signal in this environment, QMJ should add less incremental explanatory power over HML than in the U.S. Likewise, if QMJ absorbs HML in both markets, the profitability-quality explanation of value is more likely to represent a general asset-pricing relationship, not a U.S.-specific accounting outcome.

2.6 Contribution and Hypotheses

Preceding literature leaves empirical gap of whether the value premium retains independent explanatory power once profitability is broadened into fuller measures of firm quality. This study addresses that gap in testing HML after controlling for QMJ. Opposed to re-testing whether value exists, it asks whether HML captures an economic dimension distinct from quality, how that dimension differs between U.S. and European equity markets, and whether full-sample estimates of subsumption hold across the 2008 crisis or perhaps mask a shift between regimes.

Three hypotheses follow. First, the coefficient on HML, β_3 , remains positive and statistically significant after controlling for QMJ in both markets – indicating the value premium is not fully subsumed by broad quality characteristics. Second, no statistically significant structural break is detected around the Global Financial Crisis, implying the value-quality relationship to be more consistent with a persistent economic mechanism than with crisis-sensitive expectation revision. Third, testing QMJ for weaker incremental explanatory power in European regressions than in U.S. regressions, which would be consistent with institutional differences outlined above.

3. Methodology

3.1 Data and Sample

Monthly U.S. and European Fama-French five-factor data are obtained from *Kenneth R. French Data Library*, covering January 1990 to present. The U.S. and European 25 portfolios sorted on size and book-to-market serve as ‘test’ assets throughout. Momentum factor (UMD) is sourced from the same library for both markets. Quality Minus Junk factor of *Asness, Frazzini and Pedersen (2019)* is from the *AQR Capital Management Data Library*, with European series beginning in mid-1993.

I further lag the *Baker-Wurgler (2006)* orthogonalised sentiment index by one period in all specifications; a standard practice in the literature, addressing identification problems whereby contemporaneous sentiment and returns are jointly determined within a month.

The sample yields 435 monthly U.S. observations, 429 European, and 408 for the sentiment specification owing to index coverage limitations.

A high R^2 value reported throughout each specification (typically above 0.85) reflect shared construction of the dependent portfolios and the right-hand-side factors, both being derived from size and book-to-market sorts of the same underlying stock universe. It does not indicate explanatory power of any single added factor; inference is drawn from the magnitude and significance of individual coefficients, particularly β_3 , rather than from changes in R^2 across specifications.

3.2 Sequential Model Specifications

Five nested OLS regressions are estimated on excess returns of the SMALL HiBM portfolio.

This portfolio is used a representative test asset on two grounds: *small capitalisation, high book-to-market stocks carry the strongest theoretical value loading*², providing greatest power to detect subsumption; and restricting the representative analysis to one portfolio allows clean identification of how each successive control affects β_3 .

Results for all 25 portfolios are presented in Tables 2 through 6. Each model adds one control while holding the dependent variable and sample constant. Standard errors follow *Newey and West (1987)* with a lag of twelve months, capturing one full annual cycle of the seasonal autocorrelation structure in monthly factor returns.

² *Fama and French, 1993*

I. Model 1: Fama-French Three-Factor Baseline (Fama and French, 1993)

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(MKT - RF)_t + \beta_2(SMB)_t + \beta_3(HML)_t + \varepsilon_{i,t}$$

Establishes the baseline β_3 before any profitability controls enter.

MKT-RF is the excess market return, SMB is Small Minus Big, HML is High Minus Low

II. Model 2: Five-Factor Extension

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(MKT - RF)_t + \beta_2(SMB)_t + \beta_3(HML)_t + \beta_4(RMW)_t + \beta_5(CMA)_t + \varepsilon_{i,t}$$

Where RMW is Robust Minus Weak, CMA is Conservative Minus Aggressive

III. Model 3: Five-Factor Model with Momentum

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(MKT - RF)_t + \beta_2(SMB)_t + \beta_3(HML)_t \\ + \beta_4(RMW)_t + \beta_5(CMA)_t + \beta_6(UMD)_t + \varepsilon_{i,t}$$

UMD being Up Minus Down

IV. Model 4: Five-Factor Model with Quality

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(MKT - RF)_t + \beta_2(SMB)_t + \beta_3(HML)_t \\ + \beta_4(RMW)_t + \beta_5(CMA)_t + \beta_6(UMD)_t + \beta_7(QMJ)_t + \varepsilon_{i,t}$$

QMJ is Quality Minus Junk, a composite of profitability, growth, safety and payout.

As Section 2.4 argues, RMW may be an incomplete control for quality; M4 tests whether the broader composite similarly affects β_3 ; and whether it absorbs the contribution of RMW. M1 and M4 are used in all subsample and structural break analyses, as they represent the baseline and richest pre-sentiment specification respectively.

V. Model 5: Full Specification with Sentiment

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_1(MKT - RF)_t + \beta_2(SMB)_t + \beta_3(HML)_t + \beta_4(RMW)_t \\ + \beta_5(CMA)_t + \beta_6(UMD)_t + \beta_7(QMJ)_t + \beta_8(SENT)_{t-1} + \varepsilon_{i,t}$$

$SENT_{t-1}$ is the lagged sentiment index

VI. Cross-Sectional Analysis

M1 and M4 are estimated separately for *each of the 25 portfolios* $i = 1, \dots, 25$, and each portfolio receives its own intercept and loadings. Alpha grids (Tables 2 and 3) present α_i for all 25 under each specification. HML grids (Tables 4 and 5) present $\beta_{3,i}$, revealing whether quality controls affect value loadings heterogeneously across the size-value spectrum. Table 6 presents the percentage change in $\beta_{3,i}$ from M1 to M4:

$$\Delta_i = \left[(\beta_{3,i}^{M4} - \beta_{3,i}^{M1}) / |\beta_{3,i}^{M1}| \right] \times 100$$

VII. GRS Test

Evaluating 25 portfolio intercepts individually inflates the probability of spurious rejection. I implement Gibbons, Ross and Shanken (1989) F-statistic to test joint null $H_0 : \alpha_1 = \dots = \alpha_{25} = 0$, accounting for correlations between portfolio residuals:

$$GRS = \left(\frac{T}{N} \right) \times \left[\frac{T - N - K}{T \quad K \quad 1} \right] \times [\alpha' S^{-1} \alpha] / [1 + \mu' Q^{-1} \mu]$$

Where T is months, α the intercept vector, S the residual covariance matrix, μ is mean factor returns and Q is factor covariance.

A monotonically falling GRS statistic across M1 through M4 can be interpreted evidence that each model reduces unexplained cross-sectional pricing errors. Table 7 reports statistics and p-values for all four specifications.

VIII. Temporal Stability

M1 and M4 are re-estimated on pre-crisis (January 1990 to December 2007) and post-crisis (January 2009 to present) subsamples. Calendar year 2008 is excluded from both as factor loadings and cross-sectional correlations are documented to break down during acute crisis periods³ including 2008 in either subsample risks ‘contaminating’ coefficient estimates with dynamics unrepresentative of either regime. Table 8 presents the four resulting specifications. The formal structural break test uses full sample:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_3(HML)_t + [factors] + \beta_8(D)_t + \beta_9(HML_t \times D_t) + \varepsilon_{i,t}$$

Where $D_t = 1$ from January 2009 onwards. β_9 our key coefficient, measuring whether β_3 changed after the crisis. $H_0 : \beta_9 = 0$ corresponds to no structural break. The sign and significance of β_9 directly address competing theoretical accounts outlined in Section 2.2.

IX. European Replication

The full model sequence is then replicated using European factors and portfolios, with EU_QMJ from AQR and EU_MOM from the French library substituted throughout:

$$REU_{i,t} - REU_{f,t} = \alpha_i + \beta_1(EU_MKT - RF)_t + \beta_2(EU_SMB)_t + \beta_3(EU_HML)_t + \dots + \varepsilon_{i,t}$$

Where $REU_{f,t}$ is the European risk-free rate from the French factor file. Tables EU1 through EU9 mirror the U.S. structure.

³ (Fama and French, 2015)

4. Results

4.1 U.S. Value Premium

Our FF3 baseline yields $\beta_3 = 0.529^{***}$ (SE = 0.036), establishing the benchmark against which successive attenuation is measured. M2 reduces β_3 to 0.428^{***} while RMW loads at -0.105^{**} , replicating partial subsumption of *Fama and French (2015)*.

Table 1: Value Premium and Factor Controls (SMALL HiBM Portfolio)

	Dependent variable:				
	Excess Return: SMALL HiBM				
	M1: FF3 (1)	M2: FF5 (2)	M3: FF5+UMD (3)	M4: +QMJ (4)	M5: +SENT (5)
MKT-RF	0.911 ^{***} (0.023)	0.938 ^{***} (0.034)	0.938 ^{***} (0.033)	0.857 ^{***} (0.028)	0.858 ^{***} (0.030)
SMB	1.040 ^{***} (0.051)	1.001 ^{***} (0.056)	1.002 ^{***} (0.053)	0.979 ^{***} (0.043)	0.989 ^{***} (0.048)
HML (B3)	0.529 ^{***} (0.036)	0.428 ^{***} (0.077)	0.428 ^{***} (0.078)	0.384^{***} (0.079)	0.384 ^{***} (0.089)
RMW		-0.105 ^{**} (0.050)	-0.105 ^{**} (0.051)	0.099 (0.063)	0.096 (0.069)
CMA		0.304 (0.193)	0.304 (0.193)	0.316 [*] (0.185)	0.317 (0.200)
UMD			0.003 (0.029)	0.009 (0.027)	0.009 (0.026)
QMJ				-0.335 ^{***} (0.091)	-0.336 ^{***} (0.101)
SENT (lag)					0.112 (0.084)
Constant	0.275 ^{**} (0.120)	0.259 ^{***} (0.095)	0.257^{**} (0.101)	0.382^{***} (0.115)	0.355 ^{***} (0.110)
Newey-West SEs	Yes	Yes	Yes	Yes	Yes
NW Lag	12	12	12	12	12
Observations	435	435	435	435	408
R ²	0.859	0.867	0.867	0.873	0.870

Note: *, **, *** denote significance at the 10%, 5%, and 1% level respectively. Newey-West standard errors in parentheses (lag = 12). HML (β_3) is the variable of interest.

β_3 falls to 0.384*** once QMJ enters, though this attenuation is a re-attribution of shared comovement, and arguably not evidence on the premium itself; HML and QMJ overlap, and the regression reassigns common variation from the value loading to quality.

As SMALL HiBM is by construction a high book-to-market portfolio, β_3 remains large under any specification and therefore cannot alone speak to subsumption. The question is properly addressed by the intercept, isolating the average excess return left unexplained once every factor (full quality composite included) has been ‘partialled’ out.

That intercept does not vanish - our SMALLHiBM alpha is positive, and significant, across all five specifications and, instead of collapsing as quality enters, the figure rises from 0.257 (M3) to 0.382*** (M4, SE = 0.115). An increase which is largely mechanical: QMJ carries a positive return and loads negatively on the portfolio (−0.335***), so the intercept rises to offset it (a mirror image of the fall in β_3). However, directional point is what matters; broadening profitability control into the full quality composite leaves more return unexplained, which shows opposite of the absorption *Fama and French (2015)* document for U.S. data. A single-portfolio intercept is an *imprecise* object however, and the claim does not rest on its point estimate.

Table 7: GRS Test (Model Comparison across 25 U.S. Portfolios)

Model	Factors Included	GRS Statistic	p-value
M1: FF3	MKT-RF, SMB, HML	3.7472***	0
M2: FF5	MKT-RF, SMB, HML, RMW, CMA	3.2148***	0
M3: FF5+UMD	MKT-RF, SMB, HML, RMW, CMA, UMD	3.1251***	0
M4: FF5+UMD+QMJ	MKT-RF, SMB, HML, RMW, CMA, UMD, QMJ	2.5915***	1e-04

*, **, *** = 10%, 5%, 1%. GRS statistic is *F*-distributed under the null that all 25 intercepts are jointly zero. A monotonically falling GRS statistic is consistent with each successive model reducing unexplained cross-sectional pricing error.

GRS statistics (per Table 7) fall monotonically from 3.747 under M1 to 2.592 under M4 and remain rejected at the one percent level ($p \approx 0.0001$). Persistent rejection under M4 tells us the seven-factor space does not span the cross-section, and residual pricing errors concentrate in the small-cap, high book-to-market corner. These are not eliminated by any combination of quality, profitability or investment controls, and thus the GRS further establishes *that* priced lies outside the factor space; we cannot attribute that residual specifically to value.

H1 is largely supported. β_3 remains positive and significant at the one percent level across all five specifications.

4.2 Cross-Sectional Heterogeneity

Where quality controls attenuate β_3 across the 25 portfolios is as informative as how much; and when restricting attention to cells significant under both M1 and M4, the largest reductions concentrate at intermediate book-to-market: ME4_BM2 falls 48.7% (0.219*** $\rightarrow$ 0.112**) and ME5_BM2 falls 52.4% (0.170*** $\rightarrow$ 0.081**), both retaining significance, and so it is interpretable as genuine attenuation, rather than movement between statistically-zero estimates.

Table 6: HML Factor Loadings (B3) across 25 U.S. Portfolios

Portfolio	B3 M1: FF3	t-stat	B3 M4: +QMJ	t-stat	Change (%)
SMALL_LoBM	-0.525***	(-9.09)	-0.419***	(-8.54)	20.2%
ME1_BM2	-0.269***	(-3.86)	-0.165***	(-3.57)	38.5%
ME1_BM3	0.088***	(3.22)	0.097***	(3.18)	11%
ME1_BM4	0.312***	(7.54)	0.337***	(8.9)	8.1%
SMALL_HiBM	0.529***	(14.89)	0.384***	(4.83)	-27.5%
ME2_BM1	-0.489***	(-15.58)	-0.354***	(-7.48)	27.6%
ME2_BM2	-0.038	(-0.7)	-0.007	(-0.19)	80.5%
ME2_BM3	0.285***	(3.48)	0.228***	(5.21)	-20%
ME2_BM4	0.467***	(12.29)	0.45***	(14.76)	-3.7%
ME2_BM5	0.675***	(30.75)	0.647***	(17.94)	-4.1%
ME3_BM1	-0.493***	(-13.88)	-0.337***	(-9.13)	31.6%
ME3_BM2	0.077	(1.26)	0.023	(0.68)	-69.8%
ME3_BM3	0.377***	(4.44)	0.283***	(5.02)	-25.1%
ME3_BM4	0.579***	(7.31)	0.497***	(7.63)	-14.1%
ME3_BM5	0.8***	(10.28)	0.745***	(9.5)	-6.8%
ME4_BM1	-0.409***	(-10.53)	-0.308***	(-9.09)	24.7%
ME4_BM2	0.219***	(2.8)	0.112**	(2.11)	-48.7%
ME4_BM3	0.451***	(4.66)	0.31***	(3.83)	-31.3%
ME4_BM4	0.525***	(6.88)	0.441***	(5.2)	-16%
ME4_BM5	0.832***	(16.04)	0.803***	(10.55)	-3.5%
BIG_LoBM	-0.28***	(-10.07)	-0.308***	(-13.89)	-10%
ME5_BM2	0.17***	(2.88)	0.081**	(2.02)	-52.4%
ME5_BM3	0.403***	(8.63)	0.338***	(7.05)	-16.2%
ME5_BM4	0.744***	(11.62)	0.751***	(12.5)	0.8%
BIG_HiBM	0.86***	(20.88)	1.111***	(14.25)	29.2%

*Comparison of value factor loadings: M1 (FF3 baseline) vs M4 (FF5+UMD+QMJ). Sample: January 1990 to present. *, **, *** = 10%, 5%, 1%. Newey-West t-statistics (lag=12) in parentheses. Change (%) = percentage change in B3 from M1 to M4.*

Under U.S. GAAP, mandatory expensing of organisational capital compresses reported book equity, making book-to-market a noisier valuation signal at intermediate cheapness

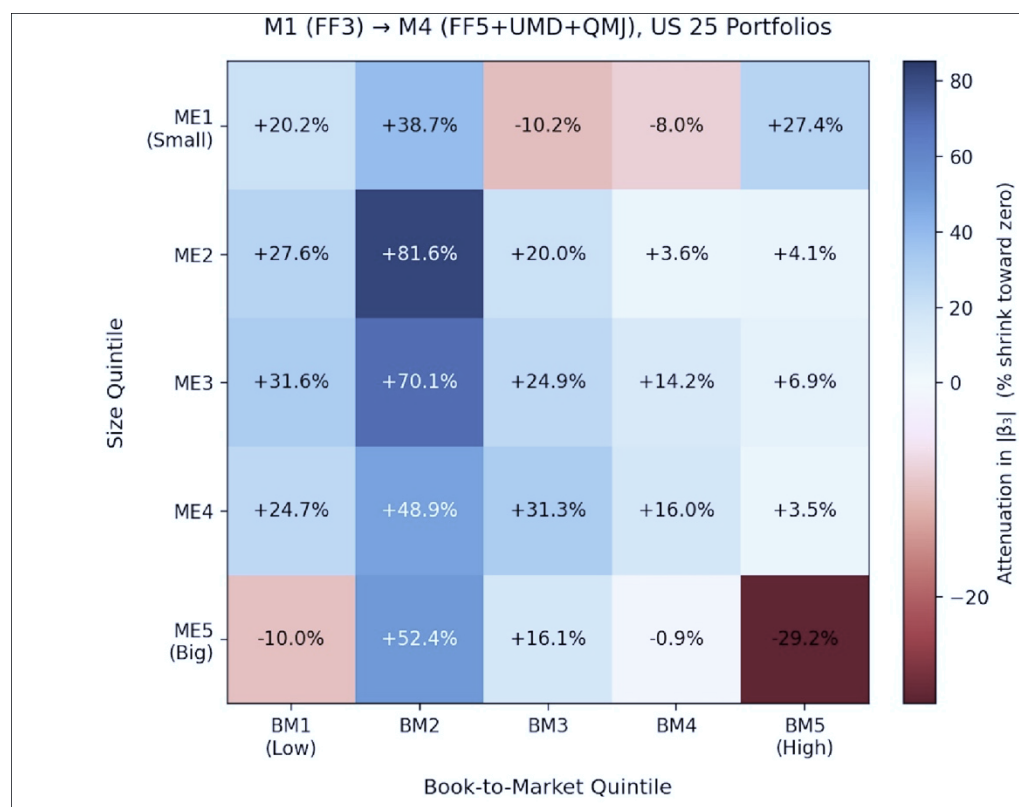
levels. Quality controls absorb value loading most where book-to-market is least informative as a signal of genuine cheapness.

Henceforth, premium absorbed in these cells is not compensation for holding genuinely distressed firms but rather acts a measurement effect in which intermediate book-to-market ratios conflate cheapness with quality impairment. This bears directly on the *FF2015* debate: the subsumption result is concentrated in cells where book-to-market proxies poorly for economic value, and is not reflective of a universal ‘quality-value’ relationship.

That said, our deepest value portfolios tell a different story: ME2_BM5 falls 4.1%, ME3_BM5 falls 6.8%, ME4_BM5 falls 3.5%. Where cheapness is unambiguous, quality and value are empirically separable. Here, residual premium at extreme discounts to book seems more consistent with compensation for adjustment cost risk (*Zhang, 2005*), whilst strategies targeting the extreme cheapness decile retain exposure to a dimension which quality screens cannot eliminate.

BIG_HiBM increases from 0.860 to 1.111 when QMJ enters, all while the t-statistic falls from 20.88 to 14.25; consistent with a suppression effect in which conditioning on QMJ reveals underlying value exposure the baseline partially masks. A loss of precision here prevents strong inference, though results indicate the quality-value relationship to vary within the high book-to-market column in ways aggregated analysis would.

Figure I: Attenuation in HML Loading (β_3) When QMJ is Added



4.3 Temporal Stability

In the pre-crisis subsample (January 1990 to December 2007), $\beta_3 = 0.516^{***}$ under M1 and 0.515^{***} under M4. Quality controls add no explanatory power to value pricing before 2008. Notably, this is not a small-sample artefact, for over the same subsample QMJ loads at -0.379^{***} (SE = 0.118), indicating the quality factor is not inert in this period – only failing to overlap with the value premium. Quality and value appear independently priced before the crisis, and the partial subsumption visible in the full sample is most plausibly considered a post-crisis phenomenon.

Table 8: Subsample Analysis (Pre vs Post Global Financial Crisis)

	<i>Dependent variable:</i>			
	Excess Return: SMALL HiBM			
	Pre-crisis		Post-crisis	
	(1)	(2)	(3)	(4)
MKT-RF	0.923 ^{***} (0.025)	0.853 ^{***} (0.034)	0.833 ^{***} (0.046)	0.801 ^{***} (0.043)
SMB	0.994 ^{***} (0.046)	1.147 ^{***} (0.120)	0.943 ^{***} (0.040)	1.097 ^{***} (0.098)
HML (B3)	0.516^{***} (0.078)	0.515^{***} (0.039)	0.415 ^{***} (0.068)	0.294^{**} (0.145)
RMW			0.146 ^{**} (0.070)	0.111 (0.087)
CMA			0.096 (0.065)	0.598 (0.364)
UMD			0.038 (0.030)	-0.023 (0.042)
QMJ			-0.379^{***} (0.118)	-0.354^{***} (0.101)
Constant	0.278 ^{**} (0.120)	0.438 ^{**} (0.211)	0.445 ^{***} (0.138)	0.501 ^{**} (0.204)
Model	FF3	FF3	FF5+UMD+QMJ	FF5+UMD+QMJ
Sample	1990-2007	2009-present	1990-2007	2009-present
Newey-West SEs	Yes	Yes	Yes	Yes
NW Lag	12	12	12	12
Observations	216	207	216	207
R ²	0.895	0.832	0.906	0.857

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Newey-West standard errors in parentheses (lag=12). Pre-crisis: January 1990 to December 2007. Post-crisis: January 2009 to present. Crisis period (2008) excluded.

This finding exists as much a methodological observation on *FF2015* as it does a robustness check, *FF2015* estimates over a sample extending through the post-crisis period, so its full sample QMJ = -0.335^{***} appears merely an average across a pre-crisis regime in which quality and value are orthogonal and a post-crisis regime in which they are not, driven by the latter where β_3 falls to 0.294^{**} (SE = 0.145) under M4.

Full-sample OLS estimates a single coefficient as though the relationship were time-invariant, obscuring a distinction material for claims of subsumption. A conclusion pointing to quality absorbing value not being a general feature of U.S. equity pricing; only a post-crisis feature whose source remains unclear.

We consider two reasonings; Federal Reserve balance sheet expansion from 2009 compressed credit spreads broadly, raising the relative valuation of stable-cashflow firms and generating a mechanically negative quality-value correlation without structural change in value stock risk.⁴ Alternatively, the crisis may have accelerated a shift toward ‘intangible’ production, narrowing portfolio-level gaps between low price-to-book and high quality.⁵ That said, these are two mechanisms time-series cannot reliably distinguish between.

The Chow (Table 9) test returns interaction coefficients of 0.006 under M1 and 0.101 under M4, both indistinguishable from zero. The null of no structural break is not rejected, consistent with H2, *though a pre-specified breakpoint inflates the probability of null retention*⁶ and the subsample evidence is more consistent with gradual regime shift than a discrete break that the Chow framework is not designed to detect.

Any institutional value allocation predicated on quality controls absorbing the premium should account for the possibility this relationship was absent before 2008.

⁴ (Krishnamurthy and Vissing-Jorgensen, 2011)

⁵ (Corrado and Hulten, 2010)

⁶ (Andrews, 1993)

Table 9: Chow Test (Structural Break in Value Premium at 2008)

<i>Dependent variable:</i>		
	Excess Return: SMALL HiBM	
	M1: FF3 (1)	M4: FF5+UMD+QMJ (2)
MKT-RF	0.909*** (0.022)	0.843*** (0.033)
SMB	1.041*** (0.055)	0.971*** (0.041)
HML (B3)	0.528*** (0.069)	0.321*** (0.119)
	RMW	0.130 (0.080)
	CMA	0.323* (0.188)
	UMD	0.008 (0.026)
	QMJ	-0.362*** (0.106)
D post2008	0.184 (0.243)	0.114 (0.211)
HML x D post2008	0.006 (0.079)	0.101 (0.089)
Constant	0.189 (0.140)	0.351*** (0.132)
Newey-West SEs	Yes	Yes
NW Lag	12	12
Observations	435	435
R ²	0.860	0.874

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Newey-West standard errors in parentheses (lag=12). D post2008 = 1 from January 2009 onwards. HML x D post2008 = interaction term.

H2 is not rejected. The pre-crisis orthogonality of quality and value indicates the full-sample quality-value relationship is post-crisis specific.

4.4 European Value Premium

For Europe, FF3 yields EU $\beta_3 = 0.356^{***}$, somewhat smaller than the U.S. baseline of 0.529^{***} , consistent with prior evidence the value premium is lower in European markets.⁷ β_3 falls to 0.282^{***} across M1 to M4, a 20.7% reduction compared with 27.5% in the U.S.

Table EU1: Value Premium and Factor Controls (SMALL HiBM Portfolio)

	<i>Dependent variable:</i>			
	Excess Return: EU SMALL HiBM			
	M1: FF3 (1)	M2: FF5 (2)	M3: FF5+UMD (3)	M4: +QMJ (4)
MKT-RF	0.876*** (0.014)	0.899*** (0.017)	0.900*** (0.017)	0.900*** (0.020)
SMB	0.950*** (0.032)	0.959*** (0.032)	0.957*** (0.032)	0.939*** (0.032)
HML (B3)	0.356*** (0.022)	0.270*** (0.029)	0.275*** (0.032)	0.282*** (0.035)
RMW		-0.023 (0.031)	-0.042 (0.033)	-0.073* (0.041)
CMA		0.170*** (0.043)	0.166*** (0.047)	0.148*** (0.052)
UMD			0.024 (0.017)	0.014 (0.017)
QMJ				0.045 (0.041)
Constant	0.157*** (0.056)	0.157** (0.064)	0.150** (0.065)	0.170** (0.072)
Newey-West SEs	Yes	Yes	Yes	Yes
NW Lag	12	12	12	12
Observations	429	429	425	393
R ²	0.961	0.963	0.963	0.965

*Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Newey-West SE (lag=12). European factors. Dependent: EU SMALL HiBM excess return.*

⁷ (Fama and French, 2017)

QMJ loads at +0.045 (SE=0.041) in M4 (statistically zero), with this null holding across both subsamples: pre-crisis QMJ = 0.064, post-crisis QMJ = 0.082, each insignificant. The post-crisis quality-value correlation driving the U.S. result is not apparent in Europe at any point. Quality carries little statistically detectable effect on European value returns, and the value premium survives quality controls not by a residual, but considerably - as quality adds nothing.

Here, factor structures perhaps rule out *data quality* explanations: CMA loads at 0.170*** throughout all European specifications. Say poor factor construction were the source of null profitability; CMA likely fails too. That investment conservatism prices strongly while profitability controls consistently fail strongly indicates the result to be economic in origin. Whilst in the U.S., QMJ = -0.335***, (*reflecting negative quality-value correlation in which cheap firms are systematically low quality*⁸), in Europe, QMJ = +0.045: positive and essentially zero. Institutional mechanisms which might generate a correlation like this in the U.S. appear weaker or absent in European markets, implying the sign QMJ reveals a deeper structural divergence.

European financial intermediation is predominantly bank-based, with distress resolved through *renegotiated credit instead of market repricing*⁹. A low price-to-book in this environment may hereby reflect regulatory capital requirements, conservative accounting under IFRS, or relationship specific assets in which equity markets discount, whilst banks continue to finance. *Blockholder ownership across continental European legal systems sustains firms through extended periods of low valuation*¹⁰; without the quality deterioration that QMJ penalises. Cheapness does not reliably signal quality impairment in Europe, so QMJ has little negative premium to capture. CMA pricing European value strongly where QMJ does not aligns considerably with *Zhang's (2005)* adjustment cost mechanism operating through physical capital in lieu of the quality value channel; with *Griffin's (2002)* finding factor premia to be locally determined.

European evidence thus serves a triangulating function: the mechanism through which quality partially absorbs value in the U.S. proves not a general property of equity markets, instead proving perhaps specific to financial systems in which cheapness reliably signals quality impairment. Hence, European results contest U.S. results may not measure what they might initially appear to.

Post-crisis decline in EU β_3 from 0.375*** to 0.206*** under M1, without corresponding Chow interaction significance, is consistent with gradual contamination of European HML through banking sector concentration on the long side of the factor, as *Eurozone sovereign crisis dynamics raised distress risk for financial-sector value firms without a discrete break*.¹¹

⁸ (Asness, Frazzini and Pedersen, 2019)

⁹ (Demirgüç-Kunt and Levine, 2001)

¹⁰ (La Porta et al., 1998)

¹¹ (Acharya, Drechsler and Schnabl, 2014)

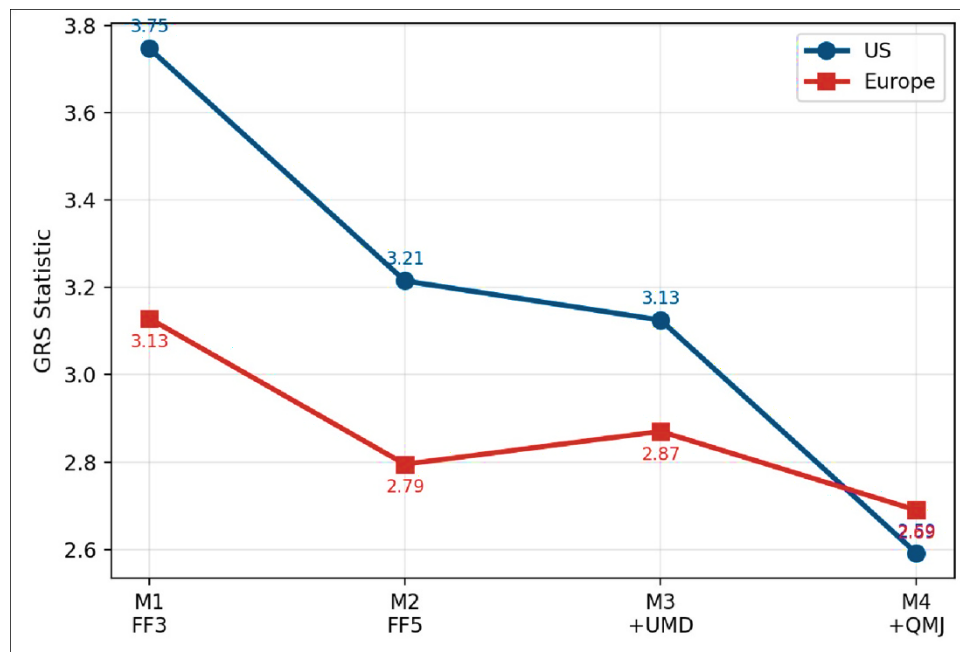
Table EU7: GRS Test (Model Comparison across 25 European Portfolios)

Model	Factors	GRS Statistic	p-value
M1: FF3	MKT-RF, SMB, HML	3.1288***	0
M2: FF5	MKT-RF, SMB, HML, RMW, CMA	2.7949***	0
M3: FF5+UMD	MKT-RF, SMB, HML, RMW, CMA, UMD	2.8701***	0
M4: FF5+UMD+QMJ	MKT-RF, SMB, HML, RMW, CMA, UMD, QMJ	2.6897***	0

*Gibbons, Ross and Shanken (1989) joint test. European factors throughout. *, **, *** = 10%, 5%, 1%.*

The European GRS path is non-monotonic: falling from 3.129 at M1 to 2.795 at M2, rising to 2.870 at M3, then falling to 2.690 at M4. The U.S. path declines noticeably smoothly across all specifications. This rise from M2 to M3 in Europe indicates momentum adds noise over signal, consistent with lower institutional rebalancing frequency bank-based intermediation and blockholder ownership produce. Divergence between the two GRS paths reflects a structural difference in which economic mechanisms price the cross-section across the two markets, opposed to a difference in model estimation quality.

Figure II: GRS Test Across Model Specifications US vs European 25-Portfolio Sets



H3 is supported. QMJ is insignificant across all European specifications and both subsamples and its sign reverses relative to the U.S.

4.5 Considering Country Composition

It is also important to raise questions of whether pooled results conceal a UK-specific pattern which continental weighting dilutes. The UK, in particular, is characterised alongside the U.S. as an outsider model characterised by dispersed ownership and market-based finance¹² in contrast to the insider model of continental Europe. If blockholder structures account for the European QMJ null, UK quality pricing should viably approximate the U.S. pattern.

Table 11: EU QMJ versus UK QMJ

	M4: QMJ (EU)	M4: QMJ (UK)
	0.900***	0.892***
MKT-RF	(0.020)	(0.017)
SMB	0.939***	0.932***
	(0.032)	(0.031)
HML	0.282***	0.255***
	(0.035)	(0.039)
RMW	-0.073	-0.050
	(0.041)	(0.036)
CMA	0.148**	0.157**
	(0.052)	(0.048)
UMD	0.014	0.031
	(0.017)	(0.021)
QMJ	0.045	0.023
	(0.041)	(0.020)
Constant	0.170*	0.174**
	(0.072)	(0.065)
R ²	0.965	0.965
N	393	393

*M4 specification, excess returns on the EU Small/High-BM portfolio. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*

Substituting AQR's UK-specific QMJ produces a coefficient of +0.023, statistically indistinguishable from zero; modestly smaller than the pooled European estimate of +0.045, yet of the same sign. An absence of quality-value correlation extends across both ownership structures, which is difficult to reconcile with a pooling artefact. Governance divides between the UK and continental Europe does not explain the European divergence from U.S. quality-value dynamics, suggesting structural features of European equity markets cut across ownership models.

¹² (Faccio and Lang, 2002)

4.6 Limitations

Sequential OLS specification assumes constant factor loadings - an assumption the subsample evidence directly contradicts. The quality-value relationship is concentrated post-2008 and full-sample estimates are averages across potentially distinct regimes rather than structural parameters. Time-varying coefficient models of the kind proposed by Ferson and Harvey (1991) would better characterise this dynamic.

Additionally, QMJ is an estimated factor and its *use as a second-stage regressor produces downward-biased standard errors*¹³. T-statistics on QMJ are upper bounds on precision; inference reliant on direction and consistency across specifications rather than pointing significance, with force for the European estimates where the coefficient is already small sized.

Finally, a *Chow test at a pre-specified breakpoint inflates the probability of null retention*¹⁴. Temporal stability findings should hence be read as consistent with no discrete structural break at 2008 instead of *positive* evidence of time-invariant factor structure; with the subsample comparison in Table 8 carrying more information on this point.

5. Concluding Points

Ultimately, it is clear the value premium persists after controlling for profitability. Widening the narrow operating-profitability measure of *Fama and French (2015)* into the full *Quality-Minus-Junk* composite does not subsume HML in either the United States or Europe: β_3 remains positive and significant throughout, and the GRS test continues to reject joint pricing under our seven-factor specification.

A more consequential finding, however, is *reasoning* the premium survivorship differs across the two markets, and that this divergence reframes what the original subsumption result was potentially measuring.

In the United States, quality and value are not orthogonal: but only after 2008. Pre-crisis, QMJ prices independently of value; the negative quality loading that appears to absorb HML is a post-crisis phenomenon, concentrated in intermediate book-to-market cells where US GAAP's mandatory expensing of organisational capital renders book equity least informative. What appears a structural relationship between profitability and value in full-sample US data is, by this evidence, a regime-specific measurement: the joint product of an accounting convention that suppresses reported book equity and a monetary environment that compressed credit spreads in favour of stable-cashflow firms.

¹³ Per (Shanken, 1992)

¹⁴ (Andrews, 1993)

In Europe, where likes of bank-based intermediation and blockholder ownership keep book equity a cleaner valuation signal, quality carries no detectable effect at all and its sign reverses; investment conservatism, not quality, prices the surviving premium. The UK replication advises against an ownership-structure explanation, locating the divergence in financial architecture broadly rather than ‘insider–outsider’ governance divide.

Our contribution is thus not another verdict on whether value is ‘real’; rather demonstration that factor-redundancy results are conditional on the measurement regime to produce them. Subsumption is best described a property of markets in which cheapness reliably signals quality impairment - and whether it does is a function of accounting policy and financial-system structure, not asset pricing alone.

This carries multiple implications: for standard-setters, treatment of intangible investment is not a *neutral* disclosure choice – when determining how noisily book equity proxies for economic value, it governs which cross-sectional relationships empirical pricing can even detect.

5.1 Broader Implications

For institutional allocators constructing global factor portfolios, and when serving clients through investment product labels, this finding cautions against exporting US-calibrated models - a strategy assuming quality absorbs value will be misspecified across European markets where the channel is investment.

As for broader “*death of value*” debates, the post-crisis confinement of the US quality–value link implies that reallocation away from value during the 2007–2020 drawdown, if predicated on a permanent profitability subsumption, was acting on a relationship that did not exist before 2008 and may not be structural.

The premium, then, survives profitability. What does not is assumptions those circumstances absorbing it in US data generalise.

Bibliography

Acharya, V.V., Drechsler, I. and Schnabl, P. (2014) 'A pyrrhic victory? Bank bailouts and sovereign credit risk', *Journal of Finance*, 69(6), pp. 2689–2739.

Andrews, D.W.K. (1993) 'Tests for parameter instability and structural change with unknown change point', *Econometrica*, 61(4), pp. 821–856.

Asness, C.S., Frazzini, A. and Pedersen, L.H. (2019) 'Quality minus junk', *Review of Accounting Studies*, 24(1), pp. 34–112.

Baker, M. and Wurgler, J. (2006) 'Investor sentiment and the cross-section of stock returns', *Journal of Finance*, 61(4), pp. 1645–1680.

Blitz, D. and Hanauer, M.X. (2021) 'Resurrecting the value premium', *The Journal of Portfolio Management*

Corrado, C.A. and Hulten, C.R. (2010) 'How do you measure a "technological revolution"?', *American Economic Review*, 100(2), pp. 99–104.

De Bondt, W.F.M. and Thaler, R. (1985) 'Does the stock market overreact?', *Journal of Finance*, 40(3), pp. 793–805.

Demirgüç-Kunt, A. and Levine, R. (eds.) (2001) *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*. Cambridge, MA: MIT Press.

Dimson, E., Marsh, P. and Staunton, M. (2002) *Triumph of the Optimists: 101 Years of Global Investment Returns*. Princeton, NJ: Princeton University Press.

Faccio, M. and Lang, L.H.P. (2002) 'The ultimate ownership of Western European corporations', *Journal of Financial Economics*, 65(3), pp. 365–395.

Fama, E.F. and French, K.R. (1993) 'Common risk factors in the returns on stocks and bonds', *Journal of Financial Economics*, 33(1), pp. 3–56.

Fama, E.F. and French, K.R. (2015) 'A five-factor asset pricing model', *Journal of Financial Economics*, 116(1), pp. 1–22.

Fama, E.F. and French, K.R. (2017) 'International tests of a five-factor asset pricing model', *Journal of Financial Economics*, 123(3), pp. 441–463.

Ferson, W.E. and Harvey, C.R. (1991) 'The variation of economic risk premiums', *Journal of Political Economy*, 99(2), pp. 385–415.

Gibbons, M.R., Ross, S.A. and Shanken, J. (1989) 'A test of the efficiency of a given portfolio', *Econometrica*, 57(5), pp. 1121–1152.

Griffin, J.M. (2002) 'Are the Fama and French factors global or country specific?', *Review of Financial Studies*, 15(3), pp. 783–803.

- Israel, R., Laursen, K. and Richardson, S.A. (2021) 'Is (systematic) value investing dead?', *The Journal of Portfolio Management*, 47(2), pp. 38–62
- Krishnamurthy, A. and Vissing-Jorgensen, A. (2011) 'The effects of quantitative easing on interest rates: channels and implications for policy', *Brookings Papers on Economic Activity*, 42(2), pp. 215–287.
- Lakonishok, J., Shleifer, A. and Vishny, R.W. (1994) 'Contrarian investment, extrapolation, and risk', *Journal of Finance*, 49(5), pp. 1541–1578.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (1998) 'Law and finance', *Journal of Political Economy*, 106(6), pp. 1113–1155.
- Newey, W.K. and West, K.D. (1987) 'A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix', *Econometrica*, 55(3), pp. 703–708.
- Novy-Marx, R. (2013) 'The other side of value: the gross profitability premium', *Journal of Financial Economics*, 108(1), pp. 1–28.
- Shanken, J. (1992) 'On the estimation of beta-pricing models', *Review of Financial Studies*, 5(1), pp. 1–33.
- Zhang, L. (2005) 'The value premium', *Journal of Finance*, 60(1), pp. 67–103.

Appendix

This appendix reports the complete set of estimated specifications. Tables 1–10 cover the U.S. models and Tables EU1–EU9 the European replication, each European table mirroring the structure of its U.S. counterpart; Table 11 reports the UK-specific QMJ specification. The tables most central to the argument are reproduced in the main text; the remainder are included here so that full results are available. Beginning with Descriptive Statistic measures.

Table S1: Descriptive Statistics (U.S. Factors and Representative Portfolios)

Sample: January 1990 to present. Monthly observations in percentage decimal form.

Variable	Mean	Std Dev	Min	Max	Skewness	N
MKT-RF	0.7073	4.4481	-17.2	13.58	-0.5558	408
SMB	0.1171	3.0463	-15.54	18.46	0.3816	408
HML	0.1512	3.2481	-13.83	12.86	0.1943	408
RMW	0.3741	2.6267	-18.95	13.05	-0.4165	408
CMA	0.199	2.1778	-7.08	9.01	0.456	408
RF	0.2137	0.188	0	0.69	0.3679	408
UMD	0.4422	4.713	-34.34	18.02	-1.4655	408
QMJ	0.4677	2.655	-8.71	12.01	0.0712	408
SENT	0.1864	2.1475	-5.34	5.63	8e-04	408
SMALL HiBM	1.0994	6.3021	-27.8123	41.2114	0.2169	408
BIG HiBM	0.744	6.2575	-28.5796	21.9876	-0.4093	408

Monthly values in percentage decimal form (e.g. 0.01 = 1%). Excess portfolio returns computed as raw return minus risk-free rate. Skewness computed using the method of moments estimator.

Table S2: Descriptive Statistics (European Factors and Representative Portfolios)

Sample: January 1990 to present. Monthly observations in percentage decimal form.

Variable	Mean	Std Dev	Min	Max	Skewness	N
MKT-RF (EU)	0.5886	4.9465	-22.02	16.62	-0.5099	393
SMB (EU)	0.0568	2.0835	-7.33	8.83	-0.0192	393
HML (EU)	0.3805	2.6908	-11.3	12.09	0.2555	393
RMW (EU)	0.2685	1.6234	-5.4	6.4	-0.2648	393
CMA (EU)	0.1314	1.8436	-7.3	8.77	0.3318	393
RF (EU)	0.2023	0.1766	0	0.56	0.2218	393
UMD (EU)	0.8602	3.8838	-26.09	13.65	-1.3499	393
QMJ (EU)	0.4438	2.3249	-11.79	11.46	-0.1472	393
SMALL HiBM (EU)	0.8915	4.865	-26.81	18.55	-0.7707	393
BIG HiBM (EU)	0.6842	6.5813	-31.36	26.6	-0.4213	393

Monthly values in percentage decimal form (e.g. 0.01 = 1%). Excess portfolio returns computed as raw return minus risk-free rate. Skewness computed using the method of moments estimator.

US Table 1: Value Premium and Factor Controls (SMALL HiBM Portfolio)

	Dependent variable: Excess Return: SMALL HiBM				
	M1: FF3	M2: FF5	M3: FF5+UM D	M4: +QMJ	M5: +SENT
	(1)	(2)	(3)	(4)	(5)
MKT-RF	0.911*** (0.023)	0.938*** (0.034)	0.938*** (0.033)	0.857*** (0.028)	0.858*** (0.030)
SMB	1.040*** (0.051)	1.001*** (0.056)	1.002*** (0.053)	0.979*** (0.043)	0.989*** (0.048)
HML (B3)	0.529*** (0.036)	0.428*** (0.077)	0.428*** (0.078)	0.384*** (0.079)	0.384*** (0.089)
RMW		-0.105** (0.050)	-0.105** (0.051)	0.099 (0.063)	0.096 (0.069)
CMA		0.304 (0.193)	0.304 (0.193)	0.316* (0.185)	0.317 (0.200)
UMD			0.003 (0.029)	0.009 (0.027)	0.009 (0.026)
QMJ				-0.335*** (0.091)	-0.336*** (0.101)
SENT (lag)					0.112 (0.084)
Constant	0.275** (0.120)	0.259*** (0.095)	0.257** (0.101)	0.382*** (0.115)	0.355*** (0.110)
Newey-West SEs	Yes	Yes	Yes	Yes	Yes
NW Lag	12	12	12	12	12
Observations	435	435	435	435	408
R2	0.859	0.867	0.867	0.873	0.870

*Note: Coefficients are from time-series regressions of monthly excess returns on the indicated factors. Newey-West heteroskedasticity- and autocorrelation-consistent standard errors (lag = 12) are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively.*

US Table 2: Intercepts (α), Model 1: FF3

25 U.S. portfolios sorted on size x book-to-market. Sample: January 1990 to present.

	Low B/M	2	3	4	High B/M
Small	-0.547*** (-3.84)	0.075 (0.54)	0.016 (0.21)	0.219*** (2.77)	0.275** (2.29)
2	-0.167* (-1.94)	0.076 (1.01)	0.058 (0.67)	0.042 (0.66)	-0.039 (-0.7)
3	-0.137** (-2.03)	0.08 (0.98)	-0.032 (-0.34)	0.009 (0.11)	0.02 (0.18)
4	0.068 (0.78)	0.06 (0.69)	-0.038 (-0.42)	0.057 (0.71)	-0.168* (-1.82)
Big	0.181*** (3.2)	0.056 (0.87)	0.031 (0.37)	-0.291** (-2.54)	-0.167 (-0.96)

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (lag=12) in parentheses. Monthly values in %. Rows = size quintiles (Small to Big). Columns = book-to-market quintiles (Low B/M to High B/M).

US Table 3: Intercepts (α), Model 4: FF5+UMD+QMJ

25 U.S. portfolios sorted on size x book-to-market. Sample: January 1990 to present.

	Low B/M	2	3	4	High B/M
Small	-0.115 (-1)	0.277** (2.5)	0.124 (1.49)	0.226*** (3.04)	0.382*** (3.33)
2	-0.017 (-0.24)	0.097 (1.41)	0.002 (0.02)	-0.053 (-0.84)	-0.037 (-0.61)
3	-0.019 (-0.27)	0.008 (0.09)	-0.099 (-1.37)	-0.062 (-0.85)	-0.04 (-0.44)
4	0.117 (1.25)	0.02 (0.29)	-0.062 (-0.76)	0.033 (0.38)	-0.089 (-0.88)
Big	0.113** (1.96)	-0.016 (-0.27)	0.049 (0.54)	-0.276*** (-2.72)	0.115 (0.87)

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (lag=12) in parentheses. Monthly values in %. Rows = size quintiles (Small to Big). Columns = book-to-market quintiles (Low B/M to High B/M).

US Table 4: HML Factor Loadings (β_3), Model 1: FF3 Baseline

Baseline value premium before profitability, momentum or quality controls. Sample: January 1990 to present.

	Low B/M	2	3	4	High B/M
Small	-0.525*** (-9.09)	-0.269*** (-3.86)	0.088*** (3.22)	0.312*** (7.54)	0.529*** (14.89)
2	-0.489*** (-15.58)	-0.038 (-0.7)	0.285*** (3.48)	0.467*** (12.29)	0.675*** (30.75)
3	-0.493*** (-13.88)	0.077 (1.26)	0.377*** (4.44)	0.579*** (7.31)	0.8*** (10.28)
4	-0.409*** (-10.53)	0.219*** (2.8)	0.451*** (4.66)	0.525*** (6.88)	0.832*** (16.04)
Big	-0.28*** (-10.07)	0.17*** (2.88)	0.403*** (8.63)	0.744*** (11.62)	0.86*** (20.88)

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (*lag*=12) in parentheses. Monthly values in %. Rows = size quintiles (Small to Big). Columns = book-to-market quintiles (Low B/M to High B/M).

US Table 5: HML Factor Loadings (β_3), Model 4: FF5+UMD+QMJ

Value premium after controlling for profitability, investment, momentum and quality. Sample: January 1990 to present.

	Low B/M	2	3	4	High B/M
Small	-0.419*** (-8.54)	-0.165*** (-3.57)	0.097*** (3.18)	0.337*** (8.9)	0.384*** (4.83)
2	-0.354*** (-7.48)	-0.007 (-0.19)	0.228*** (5.21)	0.45*** (14.76)	0.647*** (17.94)
3	-0.337*** (-9.13)	0.023 (0.68)	0.283*** (5.02)	0.497*** (7.63)	0.745*** (9.5)
4	-0.308*** (-9.09)	0.112** (2.11)	0.31*** (3.83)	0.441*** (5.2)	0.803*** (10.55)
Big	-0.308*** (-13.89)	0.081** (2.02)	0.338*** (7.05)	0.751*** (12.5)	1.111*** (14.25)

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (*lag*=12) in parentheses. Monthly values in %. Rows = size quintiles (Small to Big). Columns = book-to-market quintiles (Low B/M to High B/M).

US Table 6: HML Factor Loadings (β_3) across 25 U.S. Portfolios (Model 1 vs Model 4)

Comparison of value factor loadings: M1 (FF3 baseline) vs M4 (FF5+UMD+QMJ). Sample: January 1990 to present.

Portfolio	B3 M1: FF3	t-stat	B3 M4: +QMJ	t-stat	Change (%)
SMALL_LoBM	-0.525***	(-9.09)	-0.419***	(-8.54)	20.2%
ME1_BM2	-0.269***	(-3.86)	-0.165***	(-3.57)	38.5%
ME1_BM3	0.088***	(3.22)	0.097***	(3.18)	11%
ME1_BM4	0.312***	(7.54)	0.337***	(8.9)	8.1%
SMALL_HiBM	0.529***	(14.89)	0.384***	(4.83)	-27.5%
ME2_BM1	-0.489***	(-15.58)	-0.354***	(-7.48)	27.6%
ME2_BM2	-0.038	(-0.7)	-0.007	(-0.19)	80.5%
ME2_BM3	0.285***	(3.48)	0.228***	(5.21)	-20%
ME2_BM4	0.467***	(12.29)	0.45***	(14.76)	-3.7%
ME2_BM5	0.675***	(30.75)	0.647***	(17.94)	-4.1%
ME3_BM1	-0.493***	(-13.88)	-0.337***	(-9.13)	31.6%
ME3_BM2	0.077	(1.26)	0.023	(0.68)	-69.8%
ME3_BM3	0.377***	(4.44)	0.283***	(5.02)	-25.1%
ME3_BM4	0.579***	(7.31)	0.497***	(7.63)	-14.1%
ME3_BM5	0.8***	(10.28)	0.745***	(9.5)	-6.8%
ME4_BM1	-0.409***	(-10.53)	-0.308***	(-9.09)	24.7%
ME4_BM2	0.219***	(2.8)	0.112**	(2.11)	-48.7%
ME4_BM3	0.451***	(4.66)	0.31***	(3.83)	-31.3%
ME4_BM4	0.525***	(6.88)	0.441***	(5.2)	-16%
ME4_BM5	0.832***	(16.04)	0.803***	(10.55)	-3.5%
BIG_LoBM	-0.28***	(-10.07)	-0.308***	(-13.89)	-10%
ME5_BM2	0.17***	(2.88)	0.081**	(2.02)	-52.4%
ME5_BM3	0.403***	(8.63)	0.338***	(7.05)	-16.2%
ME5_BM4	0.744***	(11.62)	0.751***	(12.5)	0.8%
BIG_HiBM	0.86***	(20.88)	1.111***	(14.25)	29.2%

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (lag=12) in parentheses. Change (%) = percentage change in B3 from M1 to M4.

US Table 7: GRS Test (Model Comparison across 25 U.S. Portfolios)

Gibbons, Ross and Shanken (1989) joint test of whether all 25 intercepts are simultaneously zero.

Model	Factors Included	GRS Statistic	p-value
M1: FF3	MKT-RF, SMB, HML	3.7472***	0
M2: FF5	MKT-RF, SMB, HML, RMW, CMA	3.2148***	0
M3: FF5+UMD	MKT-RF, SMB, HML, RMW, CMA, UMD	3.1251***	0
M4: FF5+UMD+QMJ	MKT-RF, SMB, HML, RMW, CMA, UMD, QMJ	2.5915***	1e-04

*, **, *** = 10%, 5%, 1%.

US Table 8: Subsample Analysis (Pre vs Post Global Financial Crisis)

	Dependent variable: Excess Return: SMALL HiBM			
	Pre-crisis (1)	Post-crisis (2)	Pre-crisis (3)	Post-crisis (4)
MKT-RF	0.923*** (0.025)	0.853*** (0.034)	0.833*** (0.046)	0.801*** (0.043)
SMB	0.994*** (0.046)	1.147*** (0.120)	0.943*** (0.040)	1.097*** (0.098)
HML (B3)	0.516*** (0.078)	0.515*** (0.039)	0.415*** (0.068)	0.294** (0.145)
RMW			0.146** (0.070)	0.111 (0.087)
CMA			0.096 (0.065)	0.598 (0.364)
UMD			0.038 (0.030)	-0.023 (0.042)
QMJ			-0.379*** (0.118)	-0.354*** (0.101)
Constant	0.278** (0.120)	0.438** (0.211)	0.445*** (0.138)	0.501** (0.204)
Model	FF3	FF3	FF5+UMD +QMJ	FF5+UMD+QMJ
Sample	1990-2007	2009- present	1990-2007	2009-present
Newey-West SEs	Yes	Yes	Yes	Yes
NW Lag	12	12	12	12
Observations	216	207	216	207
R2	0.895	0.832	0.906	0.857

*Note: Coefficients are from time-series regressions of monthly excess returns on the indicated factors. Newey-West heteroskedasticity- and autocorrelation-consistent standard errors (lag = 12) are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. Pre-crisis: January 1990 to December 2007. Post-crisis: January 2009 to present (crisis year excluded).*

US Table 9: Chow Test (Structural Break in Value Premium at 2008)

Regression of excess returns including a post-2008 dummy and its interaction with HML.

	Dependent variable:	
	Excess Return: SMALL HiBM	
	M1: FF3	M4: FF5+UMD+QMJ
	(1)	(2)
MKT-RF	0.909*** (0.022)	0.843*** (0.033)
SMB	1.041*** (0.055)	0.971*** (0.041)
HML (B3)	0.528*** (0.069)	0.321*** (0.119)
RMW		0.130 (0.080)
CMA		0.323* (0.188)
UMD		0.008 (0.026)
QMJ		-0.362*** (0.106)
D post2008	0.184 (0.243)	0.114 (0.211)
HML x D post2008	0.006 (0.079)	0.101 (0.089)
Constant	0.189 (0.140)	0.351*** (0.132)
Newey-West SEs	Yes	Yes
NW Lag	12	12
Observations	435	435
R2	0.860	0.874

*Note: Coefficients are from time-series regressions of monthly excess returns on the indicated factors. Newey-West heteroskedasticity- and autocorrelation-consistent standard errors (lag = 12) are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. D_post2008 is a dummy equal to 1 from January 2009 onward; HML × D_post2008 is its interaction with the HML factor loading.*

US Table 10: HML Factor Loadings (β_3), Pre vs Post 2008, across 25 U.S. Portfolios

Pre-crisis: January 1990 to December 2007. Post-crisis: January 2009 to present. Crisis year excluded.

Portfolio	M1: FF3	M4: FF5+UMD+QMJ		
	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
SMALL_LoBM	-0.595*** (-5.5)	-0.489*** (-9.87)	-0.48*** (-4.6)	-0.444*** (-8.2)
ME1_BM2	-0.223* (-1.94)	-0.267*** (-7.09)	0.148 (1.48)	-0.247*** (-6.09)
ME1_BM3	0.127*** (4.66)	0.003 (0.1)	0.069 (1.22)	0.05 (1.42)
ME1_BM4	0.227*** (3.98)	0.342*** (9.06)	0.232*** (3.15)	0.384*** (9.05)
SMALL_HiBM	0.516*** (6.62)	0.515*** (13.05)	0.415*** (6.09)	0.294** (2.02)
ME2_BM1	-0.5*** (-10.64)	-0.502*** (-11.93)	-0.277** (-2.43)	-0.455*** (-10.24)
ME2_BM2	0.114 (1.62)	-0.16*** (-5.01)	0.187*** (2.75)	-0.098*** (-2.82)
ME2_BM3	0.453*** (4.54)	0.091** (2.41)	0.335*** (6.31)	0.099*** (3.46)
ME2_BM4	0.53*** (10.99)	0.4*** (12.11)	0.456*** (7.62)	0.42*** (13.68)
ME2_BM5	0.718*** (20.83)	0.671*** (18.54)	0.681*** (19.8)	0.658*** (14.31)
ME3_BM1	-0.623*** (-21.25)	-0.406*** (-9.01)	-0.446*** (-7.19)	-0.326*** (-6.25)
ME3_BM2	0.207** (2.02)	-0.02 (-0.88)	0.108 (1.57)	-0.024 (-0.66)
ME3_BM3	0.556*** (5.27)	0.203*** (6.32)	0.371*** (6.35)	0.162*** (3.08)
ME3_BM4	0.738*** (7.89)	0.416*** (8.53)	0.645*** (10.19)	0.383*** (5.65)
ME3_BM5	0.865*** (8.52)	0.734*** (17.65)	0.676*** (6.98)	0.75*** (12.07)
ME4_BM1	-0.484*** (-9.49)	-0.318*** (-9.04)	-0.308*** (-4.39)	-0.266*** (-6.81)
ME4_BM2	0.434*** (4.5)	0.055* (1.76)	0.246*** (3.06)	0.052 (1.13)
ME4_BM3	0.686*** (5.66)	0.294*** (5.38)	0.4*** (4.91)	0.271*** (3.72)
ME4_BM4	0.659*** (6.96)	0.417*** (6.4)	0.649*** (7.1)	0.443*** (4.53)
ME4_BM5	0.882*** (10.04)	0.825*** (23.16)	0.657*** (5.81)	0.864*** (12.9)
BIG_LoBM	-0.298*** (-5.93)	-0.328*** (-12.55)	-0.363*** (-6.13)	-0.301*** (-10.86)
ME5_BM2	0.36*** (4)	0.085** (2.15)	0.159** (2.19)	0.028 (0.58)
ME5_BM3	0.491*** (7.97)	0.333*** (7.69)	0.337*** (5.38)	0.288*** (5.01)
ME5_BM4	0.815*** (7.58)	0.692*** (14.77)	0.863*** (7.7)	0.66*** (9.11)
BIG_HiBM	0.797*** (10.5)	0.81*** (14.41)	1.059*** (6.43)	1.014*** (10.19)

*, **, *** = 10%, 5%, 1%. Newey-West t -statistics (lag=12) in parentheses. A decline in $B3$ from pre to postcrisis indicates the value premium weakened after the GFC. An increase suggests value became more distinct from profitability post-crisis.

Table EU1: Value Premium and Factor Controls (European SMALL HiBM Portfolio)

	Dependent variable: Excess Return: EU SMALL HiBM			
	M1: FF3	M2: FF5	M3: FF5+UMD	M4: +QMJ
	(1)	(2)	(3)	(4)
MKT-RF	0.876*** (0.014)	0.899*** (0.017)	0.900*** (0.017)	0.900*** (0.020)
SMB	0.950*** (0.032)	0.959*** (0.032)	0.957*** (0.032)	0.939*** (0.032)
HML (B3)	0.356*** (0.022)	0.270*** (0.029)	0.275*** (0.032)	0.282*** (0.035)
RMW		-0.023 (0.031)	-0.042 (0.033)	-0.073* (0.041)
CMA		0.170*** (0.043)	0.166*** (0.047)	0.148*** (0.052)
UMD			0.024 (0.017)	0.014 (0.017)
QMJ				0.045 (0.041)
Constant	0.157*** (0.056)	0.157** (0.064)	0.150** (0.065)	0.170** (0.072)
Newey-West SEs	Yes	Yes	Yes	Yes
NW Lag	12	12	12	12
Observation s	429	429	425	393
R2	0.961	0.963	0.963	0.965

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (lag=12) in parentheses. Monthly values in %. European factors throughout.

Table EU2: Intercepts (α), Model 1: FF3, European Portfolios

25 European portfolios sorted on size x book-to-market.

	Low B/M	2	3	4	High B/M
Small	-0.442*** (-4.01)	-0.143* (-1.69)	-0.069 (-1.11)	0.001 (0.03)	0.157*** (2.84)
2	-0.173** (-2.43)	-0.009 (-0.17)	-0.017 (-0.29)	0.023 (0.43)	0.069 (1.31)
3	-0.042 (-0.54)	0.067 (1.12)	-0.079 (-1.03)	-0.081 (-1.02)	0.037 (0.53)
4	0.136* (1.89)	0.051 (0.55)	-0.041 (-0.55)	-0.086 (-1.09)	-0.102 (-1.6)
Big	0.114** (1.99)	0.148*** (2.61)	-0.003 (-0.06)	0.031 (0.58)	-0.213** (-2.52)

*, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. Newey-West heteroskedasticity- and autocorrelation-consistent t-statistics (lag = 12) are reported in parentheses. All values are monthly and expressed in percentage form. Rows denote size quintiles (Small to Big); columns denote book-to-market quintiles (Low B/M to High B/M). European factors throughout.

Table EU3: Intercepts (α), Model 4: FF5+UMD+QMJ, European Portfolios

25 European portfolios sorted on size x book-to-market.

	Low B/M	2	3	4	High B/M
Small	-0.176* (-1.68)	0.003 (0.04)	0.065 (0.84)	0.027 (0.39)	0.17** (2.37)
2	0.021 (0.24)	0.1 (1.6)	-0.021 (-0.36)	-0.086 (-1.62)	0.006 (0.09)
3	0.185** (2.03)	0.074 (1.02)	-0.144* (-1.9)	-0.191** (-2.41)	-0.017 (-0.21)
4	0.3*** (3.15)	-0.001 (-0.01)	-0.105 (-1.32)	-0.031 (-0.38)	-0.062 (-0.64)
Big	0.124* (1.87)	-0.047 (-0.68)	0.022 (0.29)	0.06 (0.79)	0.084 (0.88)

*, **, *** = 10%, 5%, 1%. Newey-West t-statistics (lag=12) in parentheses. Monthly values in %. European factors throughout.

Table EU4: HML Factor Loadings (β_3), Model 1: FF3 Baseline, European Portfolios

Baseline value premium, European portfolios.

	Low B/M	2	3	4	High B/M
Small	-0.434*** (-4.27)	-0.238*** (-3.78)	-0.097** (-2.38)	0.094*** (3.41)	0.356*** (16.25)
2	-0.572*** (-10.79)	-0.257*** (-6.16)	0.044 (1.64)	0.268*** (6.81)	0.508*** (20.18)
3	-0.62*** (-8.5)	-0.202*** (-6.48)	0.123** (2.12)	0.264*** (4.03)	0.558*** (22.61)
4	-0.554*** (-14.58)	-0.119 (-1.31)	0.103** (2.23)	0.333*** (5.14)	0.619*** (16.45)
Big	-0.599*** (-11.72)	-0.209*** (-4.18)	0.043 (1.23)	0.33*** (10.42)	0.774*** (12.17)

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (lag=12) in parentheses**Table EU5: HML Factor Loadings (β_3), Model 4: FF5+UMD+QMJ, European Portfolios**

Value premium after profitability, momentum and quality controls.

	Low B/M	2	3	4	High B/M
Small	-0.526*** (-8.37)	-0.276*** (-6.26)	-0.145** (-2.57)	0.051 (1.17)	0.282*** (8.18)
2	-0.598*** (-15.69)	-0.293*** (-8.1)	0.012 (0.31)	0.312*** (8.87)	0.441*** (16.12)
3	-0.591*** (-10.14)	-0.215*** (-4.51)	0.163*** (3.32)	0.343*** (6.36)	0.555*** (13.54)
4	-0.499*** (-11.14)	-0.156** (-2.33)	0.098* (1.91)	0.291*** (5.28)	0.617*** (10.09)
Big	-0.577*** (-9.56)	-0.239*** (-6.15)	-0.053 (-0.95)	0.33*** (5.54)	0.779*** (15.18)

*, **, *** = 10%, 5%, 1%. Newey-West *t*-statistics (lag=12) in parentheses. Monthly values in %. European factors throughout.

Table EU6: HML Factor Loadings (β_3) across 25 European Portfolios (Model 1 vs Model 4)

Comparison: M1 (FF3 baseline) vs M4 (FF5+UMD+QMJ). European factors throughout.

Portfolio	B3 M1	t-stat	B3 M4	t-stat	Change (%)
EU_SMALL_Lo BM	-0.434***	(-4.27)	-0.526***	(-8.37)	-21.2%
EU_ME1_BM2	-0.238***	(-3.78)	-0.276***	(-6.26)	-16.1%
EU_ME1_BM3	-0.097**	(-2.38)	-0.145**	(-2.57)	-50.4%
EU_ME1_BM4	0.094***	(3.41)	0.051	(1.17)	-46%
EU_SMALL_Hi BM	0.356***	(16.25)	0.282***	(8.18)	-20.7%
EU_ME2_BM1	-0.572***	(-10.79)	-0.598***	(-15.69)	-4.5%
EU_ME2_BM2	-0.257***	(-6.16)	-0.293***	(-8.1)	-14.3%
EU_ME2_BM3	0.044	(1.64)	0.012	(0.31)	-72.7%
EU_ME2_BM4	0.268***	(6.81)	0.312***	(8.87)	16.5%
EU_ME2_BM5	0.508***	(20.18)	0.441***	(16.12)	-13.2%
EU_ME3_BM1	-0.62***	(-8.5)	-0.591***	(-10.14)	4.7%
EU_ME3_BM2	-0.202***	(-6.48)	-0.215***	(-4.51)	-6.7%
EU_ME3_BM3	0.123**	(2.12)	0.163***	(3.32)	32.5%
EU_ME3_BM4	0.264***	(4.03)	0.343***	(6.36)	29.7%
EU_ME3_BM5	0.558***	(22.61)	0.555***	(13.54)	-0.5%
EU_ME4_BM1	-0.554***	(-14.58)	-0.499***	(-11.14)	10%
EU_ME4_BM2	-0.119	(-1.31)	-0.156**	(-2.33)	-31.3%
EU_ME4_BM3	0.103**	(2.23)	0.098*	(1.91)	-4.7%
EU_ME4_BM4	0.333***	(5.14)	0.291***	(5.28)	-12.5%
EU_ME4_BM5	0.619***	(16.45)	0.617***	(10.09)	-0.3%
EU_BIG_LoBM	-0.599***	(-11.72)	-0.577***	(-9.56)	3.8%
EU_ME5_BM2	-0.209***	(-4.18)	-0.239***	(-6.15)	-14.2%
EU_ME5_BM3	0.043	(1.23)	-0.053	(-0.95)	-223.5%
EU_ME5_BM4	0.33***	(10.42)	0.33***	(5.54)	0.2%
EU_BIG_HiBM	0.774***	(12.17)	0.779***	(15.18)	0.7%

*, **, *** = 10%, 5%, 1%. Newey-West t-statistics (lag=12).

Table EU7: GRS Test (Model Comparison across 25 European Portfolios)

Gibbons, Ross and Shanken (1989) joint test. European factors throughout.

Model	Factors	GRS Statistic	p-value
M1: FF3	MKT-RF, SMB, HML	3.1288***	0
M2: FF5	MKT-RF, SMB, HML, RMW, CMA	2.7949***	0
M3: FF5+UMD	MKT-RF, SMB, HML, RMW, CMA, UMD	2.8701***	0
M4: FF5+UMD+QMJ	MKT-RF, SMB, HML, RMW, CMA, UMD, QMJ	2.6897***	0

*, **, *** = 10%, 5%, 1%.

Table EU8: European Subsample Analysis (Pre vs Post Global Financial Crisis)

	Dependent variable: Excess Return: EU SMALL HiBM			
	Pre-crisis (1)	Post-crisis (2)	Pre-crisis (3)	Post-crisis (4)
MKT-RF	0.903*** (0.030)	0.849*** (0.015)	0.922*** (0.031)	0.882*** (0.026)
SMB	0.963*** (0.050)	0.920*** (0.040)	0.912*** (0.040)	0.942*** (0.048)
HML (B3)	0.375*** (0.040)	0.358*** (0.028)	0.206*** (0.034)	0.303*** (0.040)
RMW			-0.032 (0.048)	-0.155** (0.076)
CMA			0.261*** (0.032)	0.083 (0.073)
UMD			-0.002 (0.019)	0.017 (0.030)
QMJ			0.064 (0.050)	0.082 (0.072)
Constant	0.179** (0.084)	0.165** (0.074)	0.292*** (0.073)	0.141* (0.078)
Model	FF3	FF3	FF5+UMD+QMJ	FF5+UMD+QMJ
Sample	1990-2007	2009- present	1990-2007	2009-present
Newey-West SEs	Yes	Yes	Yes	Yes
NW Lag	12	12	12	12
Observations	210	207	174	207
R2	0.945	0.967	0.954	0.968

*Note: Coefficients are from time-series regressions of monthly excess returns on the indicated factors. Newey-West heteroskedasticity- and autocorrelation-consistent standard errors (lag = 12) are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. Pre-crisis: January 1990 to December 2007. Post-crisis: January 2009 to present (crisis year excluded).*

Table EU9: Chow Test (Structural Break in European Value Premium at 2008)

Regression of excess returns including a post-2008 dummy and its interaction with HML.

	Dependent variable:	
	Excess Return: EU SMALL HiBM	
	M1: FF3	M4: FF5+UMD+QMJ
	(1)	(2)
MKT-RF	0.877*** (0.015)	0.901*** (0.020)
SMB	0.950*** (0.031)	0.940*** (0.031)
HML (B3)	0.375*** (0.036)	0.276*** (0.054)
RMW		-0.077* (0.041)
CMA		0.147*** (0.054)
UMD		0.012 (0.017)
QMJ		0.050 (0.038)
D post2008	-0.014 (0.103)	-0.086 (0.116)
HML x D post2008	-0.033 (0.050)	0.009 (0.050)
Constant	0.159* (0.081)	0.217** (0.104)
Newey-West SEs	Yes	Yes
NW Lag	12	12
Observations	429	393
R2	0.961	0.965

*Note: Coefficients are from time-series regressions of monthly excess returns on the indicated factors. Newey-West heteroskedasticity- and autocorrelation-consistent standard errors (lag = 12) are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively. D_post2008 is a dummy equal to 1 from January 2009 onward; HML × D_post2008 is its interaction with the HML factor loading.*

Table 11: EU QMJ versus UK QMJ

M4 specification, excess returns on the EU Small/High-BM portfolio

MKT-RF	M4: QMJ (EU)	M4: QMJ (UK)
MKT-RF	0.900*** (0.020)	0.892*** (0.017)
SMB	0.939*** (0.032)	0.932*** (0.031)
HML	0.282*** (0.035)	0.255*** (0.039)
RMW	-0.073 (0.041)	-0.050 (0.036)
CMA	0.148** (0.052)	0.157** (0.048)
UMD	0.014 (0.017)	0.031 (0.021)
QMJ	0.045 (0.041)	0.023 (0.020)
Constant	0.170* (0.072)	0.174** (0.065)
R2	0.965	0.965

*Note: Coefficients are from time-series regressions of monthly excess returns on the indicated factors. Newey-West heteroskedasticity- and autocorrelation-consistent standard errors (lag = 12) are reported in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels respectively.*