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The Value Premium

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Abstract

Value premiums, which we define as value portfolio returns in excess of market portfolio returns, are on average much lower in the second half of the July 1963-June 2019 period. But the high volatility of monthly premiums prevents us from rejecting the hypothesis that expected premiums are the same in both halves of the sample. Regressions that forecast value premiums with book-to-market ratios in excess of market (BM-BM_M) produce more reliable evidence of second-half declines in expected value premiums, but only if we assume the regression coefficients are constant during the sample period.

Researchers and investors often use the ratio of book value to market value of equity (*BM*) to sort stocks into value and growth portfolios. Using data for the United States, Fama and French (FF 1992, 1993) document that high *BM* value stocks produce higher average returns than low *BM* growth stocks during the 28 years of July 1963-June 1991. (See also Stattman 1980, Rosenberg, Reid, and Lanstein 1985, and Chan, Hamao, and Lakonishok 1991.) Acknowledging the importance of out-of-sample robustness, Davis, Fama, and French (2000) document strong value premiums in U.S. average stock returns for the July 1926-June 1963 period preceding the FF (1992, 1993) sample. Likewise, Fama and French (FF 2017) find that there are large average value premiums in Europe, Japan, and Asia Pacific during the mostly out-of-sample July 1990-December 2015 period. Foreshadowing the results presented here, however, they find that U.S. value premiums are rather weak.

If investors do not judge that value stocks are, on some multifactor dimension, riskier than growth stocks, discovery of the value premium should lead to its demise. Armed with 28 years (July 1991 to June 2019) of out-of-sample U.S. returns, we ask whether we can confidently conclude that the expected value premium in the U.S. declines or even disappears after FF (1992, 1993).

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Researchers typically focus on the spread between the average returns on value and growth portfolios. For many investment and asset pricing applications, however, returns relative to the value-weight (VW) market return are more relevant and that is what we examine here. Value stocks in the U.S. produce higher average returns for the full July 1963-June 2019 period than the market portfolio of all listed U.S. stocks (*Market*). Average value premiums are larger in the 28-year Fama-French (1992) period, July 1963-June 1991, than in the 28-year out-of-sample period, July 1991-June 2019, and we don't reject the hypothesis that out-of-sample expected monthly premiums are zero. But inferences from average premiums are clouded by the high volatility of monthly premiums, and we also can't reject the hypothesis that out-of-sample expected premiums are the same as in-sample expected premiums. In this situation, the full sample arguably provides the best evidence on long-term expected premiums. The lower average premiums of the second half lean against the strong average premiums of the first, but full-period average value premiums provide statistically reliable evidence of positive expected premiums.

For value portfolios, regressions of returns in excess of *Market*, $R\text{-}R_M$, on lagged excess book-to-market ratios, $BM\text{-}BM_M$, uncover reliable evidence of variation in expected premiums. Like average $R\text{-}R_M$, average $BM\text{-}BM_M$ for value portfolios is lower in the second half of the sample. Thus, if the regression coefficients are constant, the forecasting regressions are evidence that expected value premiums are lower in the second half of the July 1963-June 2019 period. But if we allow the regression coefficients to change from the in-sample to the out-of-sample period, the noise that prevents average returns from revealing reliable in- and out-of-sample differences in unconditional expected returns also prevents the regressions from revealing reliable in- and out-of-sample differences in regression estimates of conditional expected returns.

From Schwert (2003) to Linnainmaa and Roberts (2018), many papers study post-1991 value premiums. The common finding is that average out-of-sample value premiums are low and statistically indistinguishable not from zero. Focusing only on this result, the inference is that expected value premiums have disappeared. We emphasize that the high volatility of month-to-month value premiums also rules out strong inferences about whether or how much expected value premiums change post-1991.

Going back at least to Cohen, Polk and Vuolteenaho (2003), many papers use regressions of monthly value premiums on lagged book-to-market spreads to identify variation in conditional expected value premiums. Our insight, to our knowledge absent from the previous literature, is that reliable inferences from this regression about conditional expected value premiums depend on the assumption that the coefficients in the forecasting regression are constant. This assumption, often implicit but unspoken in inferences from forecasting regressions, is tenuous in tests intended to determine whether investment opportunities have changed. If we allow the regression coefficients to change from the in-sample to the out-of-sample period, reliable inferences about conditional expected premiums from lower out-of-sample *BM* spreads disappear.

1. The Portfolios

The U.S. tests focus on seven portfolios. The baseline is *Market* (*M*), the value-weight market portfolio of NYSE, AMEX, and (after 1972) NASDAQ stocks. We form VW value and growth portfolios of small and big stocks at the end of each month from June 1963 to May 2019. Small stocks are NYSE, AMEX and NASDAQ stocks with end-of-month market cap below the NYSE median, and big stocks are those above the NYSE median. Value stocks are NYSE, AMEX, and NASDAQ stocks with *BM* at or above the 70th percentile of *BM* for NYSE stocks, and growth stocks are those below the 30th percentile. A stock's *BM* at the end of month τ from June of year t to May of t+1 is book equity for the fiscal year ending in t-1 divided by market cap at the end of month τ, with market cap adjusted for shares issued or repurchased from the t-1 fiscal yearend to month τ. There are three VW value portfolios: *Small Value* (*SV*), *Big Value* (*BV*), and their VW combination, *Market Value* (*MV*). The corresponding VW portfolios of growth stocks are *Small Growth* (*SG*), *Big Growth* (*BG*), and *Market Growth* (*MG*).

2. Average Returns

Table 1 shows summary statistics for returns in excess of *Market*, R-R_M, for the portfolios described above. The table shows results for the 56 years (672 months) from July 1963 to June 2019, which we denote 1963-2019, and for the July 1963-June 1991 and July 1991-June 2019 28-year half-periods, henceforth 1963-1991 and 1991-2019.

Average premiums in excess of *Market* for the three growth portfolios are small and indistinguishable from zero for 1963-2019 and for the 1963-1991 and 1991-2019 half-periods. For example, the average growth premiums for 1963-2019 are -0.03% per month (t = -0.70) for *MG*, -0.02% (t = -0.54) for *BG*, and 0.06% (t = 0.45) for SG.

Average value premiums over *Market* are strong for the first half of the sample, 1963-1991. *BV* beats *M* by 0.36% per month (t = 2.91) and *SV* wins by an impressive 0.58% per month (t = 3.19). Since it is a value-weight portfolio, *Market Value* is mostly *Big Value* and its average monthly premium for the first half of the sample, 0.42% (t = 3.25), is close to that of *Big Value*. Despite the low 1963-1991 average premiums for the three growth portfolios, the Hotelling T^2 test rejects the hypothesis that the 1963-1991 expected premiums for the six value and growth portfolios are all zero (F = 3.35, p-value = 0. 3%).

Average value premiums are much lower in the second half of the sample, 1991-2019. The *BV* average is 0.05% per month (t = 0.24). The 1991-2019 average premium for *SV* is larger, 0.33% per month (t = 1.52), but less than 60% of the 1963-1991 average, 0.58%. Average R-R_M for the portfolio of all value stocks (*MV*) falls from 0.42% per month in the first half to 0.11% (t = 0.60) in the second. But despite the low 1991-2019 average premiums, the T^2 test is only weakly consistent with the hypothesis that expected 1991-2019 premiums for the six value and growth are all zero (F = 1.80, p-value = 9.8%).

Is this marginal result from the T^2 test for 1991-2019 average premiums sufficient to conclude that expected premiums disappear during the second half of the sample? A different and perhaps more direct test is provided by the Table 1 summary statistics for differences between first-half and second-half averages of R-R_M. The largest declines in average premiums are 0.31% for *MV* and 0.32% for *BV*. These are economically large but only 1.39 and 1.41 standard errors from zero. For the other portfolios, including *SV*, average differences between premiums for the two half-periods are within a standard error of zero. The F-statistic for the T^2 test of the six changes in average premiums against zero is 0.41 and its p-value is

87.1%, so the six differences between first and second half average premiums are far from unusual if expected premiums do not change from the first to the second half of the sample.

The declines from 1963-1991 to 1991-2019 in average premiums for the value portfolios seem large, but statistically they are indistinguishable from zero. The culprit is volatility. For example, Table 1 shows that on average *Big Value* accounts for only 11.6% of the market capitalization (cap) of the overall *Market* portfolio and the correlation between *BV* and *M* returns, though a substantial 0.84, leaves room for lots of independent variation. The standard deviation of *Big Value*'s monthly premium is indeed large, 2.94% for the full sample (Table 1). Moreover, monthly premiums for the two half-periods are close to uncorrelated, so variances of differences between their average monthly premiums are close to the sums of the variances of the subperiod averages. As a result, inferences about differences between expected premiums for the two subperiods are clouded by imprecision.

In contrast, on average *Big Growth* is about 48% of aggregate market cap, the correlation between *BG* and *Market* returns is high, 0.97, and the full-sample standard deviation of monthly *BG* premiums is only 1.16%. The average *BG* premium is close to zero in both half-periods, however, so despite its relatively low volatility, the difference between the average premiums of the first and second half-periods is economically and statistically trivial.

Since we can't reject the hypothesis that expected premiums over R_M are the same for the two halves of the sample, average return premiums for the full sample are arguably the best evidence on long-run expected premiums. Full-period average premiums are halfway between average premiums for 1963-1991 and 1991-2019, but doubling the sample size increases precision. The full-period average premiums for *MV* and *SV*, 0.26% and 0.45% per month, are 2.37 and 3.21 standard errors from zero. The full-period average premium for *BV*, 0.21% per month, is 1.81 standard errors from zero. Thus, for *MV* (the market portfolio of value stocks) and especially for *SV*, full-period expected premiums over R_M are reliably positive. The inference leans in that direction for *BV*, but it is on shakier ground. The meager full-period average premiums for the three growth portfolios are within a standard error of zero. The T^2 test cleanly rejects the hypothesis that 1963-2019 expected premiums for the six value and growth portfolios are all zero (F = 3.37, p-value = 0. 3%).

3. Forecasting Regressions

A portfolio's expected return almost certainly varies through time. The challenge is to measure the variation. In the literature, the lagged dividend/price ratio, *DP*, is often used to forecast stock returns. The logic is that the price of a stock is the present value of expected dividends, where the discount rate is (roughly speaking) the expected stock return. Variation in the expected return thus has an inverse effect on price, which means variation in *DP* is in part due to variation in the expected stock return. The "in part" is important. Price is the present value of future expected dividends, and lagged dividends, the numerator in *DP*, may be a poor proxy for expected dividends, both because of differences in expected earnings growth across firms and because dividends can be affected by financing decisions that have little or no effect on expected earnings (Miller and Modigliani 1961).

Here we use lagged book-to-market ratios in excess of *Market*, $BM\text{-}BM_M$, to forecast returns in excess of *Market*, $R\text{-}R_M$. Like the price in *DP*, the market cap in *BM* responds to variation in expected dividends as well as to variation in expected returns. This makes *BM* a noisy measure of expected returns. But *B*, the book value of equity-financed assets, is less subject to arbitrary financing decisions than *D*. This (perhaps arguably) makes *B* a less noisy scaling variable for extracting variation in the expected stock return from the stock's price. We regress returns in excess of R_M on lagged *BM* in excess of BM_M for evidence on whether value premiums decline and perhaps disappear in the second half of 1963-2019,

$$R_{it}\text{-}R_{Mt} = a_i + b_i\,(BM_{it-1}\text{-}BM_{Mt-1}) + e_{it}. \tag{1}$$

In this regression, R_{it} and R_{Mt} are the returns on portfolio i and *Market* in month t, BM_{it-1} and BM_{Mt-1} are the book-to-market-equity ratios of portfolio i and *Market* at the end of month $t\text{-}1$, a_i and b_i are the intercept and slope for portfolio i, and e_{it} is a residual. (We use subscripts i and t only when needed for clarity.)

Table 2 shows summary statistics for $BM\text{-}BM_M$. The cross-portfolio correlations of $BM\text{-}BM_M$ in Panel B of Table 2 generally line up with the correlations of $R\text{-}R_M$ in Panel B of Table 1. For *MV* and *MG*, for example, the correlation is -0.72 for $R\text{-}R_M$ and -0.30 for $BM\text{-}BM_M$. For *MV* and *SV,* both correlations are strongly positive, 0.76 for $R\text{-}R_M$ and 0.96 for $BM\text{-}BM_M$. Many *SG* correlations violate the general rule. For example, for *SG* and BG, the correlation is -0.06 for $R\text{-}R_M$ and 0.93 for $BM\text{-}BM_M$.

Time-series plots of *BM* for *M*, *MV*, and *MG* in Figure 1 and of $BM\text{-}BM_M$ for *MV* and *MG* in Figure 2 illustrate many of the takeaways from Table 2. The *BM* ratios for the six value and growth portfolios share a common market component: the *BM* ratios for *MV* and *MG* in Figure 1 move with BM_M, and the correlation of *BM* with BM_M for each of the six portfolios (Panel B of Table 2), is 0.69 or greater. After subtracting the common market component, book-to-market ratios for value and growth portfolios tend to be negatively correlated. The correlation between the $BM\text{-}BM_M$ of *MV* and *MG*, for example, is -0.30 (Panel B of Table 2) and the negative relation is apparent in Figure 2. Thus, if the regressions say $BM\text{-}BM_M$ tracks expected return premiums, the expected premiums for value and growth portfolios tend to move in opposite directions.

Figure 2 and Panel A of Table 2 also say that *BM* in excess of *Market BM* is more variable for value than for growth portfolios. The full-sample standard deviation of $BM\text{-}BM_M$ for *MV*, for example, is 0.33, versus 0.10 for *MG*. Figure 2 suggests and Panel C of Table 2 confirms that $BM\text{-}BM_M$ is autocorrelated, and more so for growth than for value portfolios. For example, the autocorrelations of $BM\text{-}BM_M$ for *MG* decline from 0.99 at lag 1 to 0.88 at lag 12, versus 0.95 to 0.44 for *MV*. Thus, if $BM\text{-}BM_M$ tracks variation in expected return premiums, the expected values are persistent. But at least for the value portfolios, the decay of the autocorrelations suggests that $BM\text{-}BM_M$ reverts to a long-run mean.

Table 3 summarizes the regressions of monthly return premiums on lagged $BM\text{-}BM_M$. For the three value portfolios, we can conclude that $BM\text{-}BM_M$ captures variation in expected premiums. The $BM\text{-}BM_M$ slopes for *MV*, *BV*, and *SV*, 2.20, 2.26, and 2.26, are more than six standard errors from zero. The slopes for *MG* and *BG*, 0.66 (t = 1.63) and 0.76 (t = 1.75), are about one third those for the value portfolios and the *SG* slope is a trivial 0.02 (t = 0.02). Even for the value portfolios, the estimated variation in expected premiums tracked by $BM\text{-}BM_M$ is small relative to the variation in realized premiums. The regression R^2 for the value portfolios are 0.05 and 0.06. For all portfolios, residual standard errors (*RSE* in Table 3) are close to the standard deviations of return premiums (Table 1).

Panel A of Table 2 shows that from the first to the second half of the sample, the positive average values of $BM\text{-}BM_M$ for value portfolios and the negative averages for growth portfolios shrink toward zero. Average $BM\text{-}BM_M$ falls from 0.85 to 0.71 for *MV*, for example, and rises from -0.35 to -0.21 for *MG*. Is this compression of $BM\text{-}BM_M$ for value and growth portfolios reliable evidence that conditional expected return premiums are closer to zero in the second half of the sample? The answer is yes if we assume the regression coefficients in (1) are the same for the first and second halves of the sample, but the answer is no without that aggressive assumption

In tests to determine whether changes in market conditions, such as increasing demand for value stocks, cause expected value and growth premiums to shrink from the first to the second half of 1963-2019, the assumption in regression (1) that the intercept and slope are constant is questionable. Regression (2) allows the intercept and slope in (1) to change from 1963-1991 to 1991-2019,

$$R_{it}\text{-}R_{Mt} = a_i + da_i\, D + b_i\,(BM_{it-1}\text{-}BM_{Mt-1}) + db_i\, D(BM_{it-1}\text{-}BM_{Mt-1}) + e_{it}. \tag{2}$$

In (2), D is a dummy variable, zero in 1963-1991 and one in 1991-2019. $D(BM_{it-1}\text{-}BM_{Mt-1})$ is also zero in 1963-1991 and it is the portfolio's monthly excess book-to-market ratio in 1991-2019. Since the new variables in regression (2) are zero for 1963-1991, a_i and b_i are the estimated regression (1) coefficients for this period, and da_i and db_i are the changes in estimated regression (1) coefficients from 1963-1991 to 1991-2019.

Panel B of Table 3 shows that all estimates of da_i and db_i in regression (2) are within 1.56 standard errors of zero and so offer little evidence that the coefficients in regression (1) change from the first to the second half of 1963-2019. But the standard errors of da_i and db_i from (2) are large, so there is also little evidence against a wide range of non-zero true values of da_i and db_i.

Standard errors of the difference between first-half and second-half average forecasts of R-R_M from regressions (1) and (2) depend critically on the precision of coefficient estimates. Table 3 shows that the standard errors of da_i and db_i from (2) are larger than the standard errors of a_i and b_i from (2), which in turn are much larger than the standard errors of a_i and b_i from the univariate regression (1). We show next that the relative precision of the slope estimates from the univariate, constant-slope regression (1) leads to strong inferences about declines in value premiums from the first to the second half of 1963-2019. But when we use regression (2) to allow changes in regression coefficients, imprecise coefficient estimates rule out reliable inferences about changes in expected premiums.

An error in the estimated intercept from regression (1) affects first- and second-half forecasts equally, so it has no effect on the difference between the regression's average forecasts of R-R_M for the two periods. Conditional on the observed values of BM-BM_M, the only source of noise in the difference between the first- and second-half average forecasts from regression (1), $\hat{Y}_{11} - \hat{Y}_{12}$, is sampling error in b, the estimated full-period slope. Thus, the standard error of the difference between the first- and second-half average forecasts of R-R_M for a portfolio is

$$SE(\hat{Y}_{11} - \hat{Y}_{12}) = |A(BM\text{-}BM_M)_1 - A(BM\text{-}BM_M)_2|\ SE(b), \tag{3}$$

where $|A(BM\text{-}BM_M)_1 - A(BM\text{-}BM_M)_2|$ is the magnitude of the difference between the portfolio's average excess book-to-market ratios for the two periods and $SE(b)$ is the standard error of the estimate of b.

Panel C of Table 3 reports summary statistics for the conditional forecasts of R-R_M. The bottom line is that, up to a possible sign change, the t-statistic for testing whether the change from 1963-1991 to 1991-2019 in average expected R-R_M from regression (1) is reliably different from zero is just the t-statistic for the regression slope in (1),

$$\begin{aligned} t(\hat{Y}_{11} - \hat{Y}_{12}) &= (\hat{Y}_{11} - \hat{Y}_{12}) \,/\, SE(\hat{Y}_{11} - \hat{Y}_{12}) \\ &= [A(BM\text{-}BM_M)_1 - A(BM\text{-}BM_M)_2]\ b \,/\, [|A(BM\text{-}BM_M)_1 - A(BM\text{-}BM_M)_2|\ SE(b)] \\ &= \text{sign}[A(BM\text{-}BM_M)_1 - A(BM\text{-}BM_M)_2]\ t(b). \end{aligned} \tag{4}$$

The intuition is straightforward. Given the assumption that the intercept and slope in regression (1) are constant, the estimated slope is the only source of sampling error in the difference between the regression's first- and second-half average forecasts of R-R_M for a portfolio, so our confidence that the true difference is not zero matches our confidence that the true slope is not zero. If regression (1) is well specified, slope estimates more than six standard errors from zero and excess book-to-market ratios that shrink toward zero are strong evidence that expected premiums for the value portfolios are smaller in the second, out-of-sample half of 1963-2019. Smaller t-statistics for the growth portfolio slopes from (1), 1.63, 1.75, and 0.02, imply less confidence that the shrinkage of the excess book-to-market ratios for growth portfolios implies shrinkage toward zero of their negative expected return premiums.

The power of regression (1) comes from the fact that its intercept, a, does not affect the difference between the first- and second-half average forecasts and that its univariate slope, b, is estimated rather precisely. Regression (2) in effect estimates different intercepts and slopes for the two halves of 1963-2019. If we switch from regression (1) to (2), even for the value portfolios, we can no longer infer that expected premiums are lower for the second half of the sample. The culprit is the low precision of the estimates of the regression coefficients in (2), documented in Panel B of Table 3.

The difference between average premium forecasts for 1963-1991 and 1991-2019 from regression (2), ($\hat{Y}_{21} - \hat{Y}_{22}$), is

$$\hat{Y}_{21} - \hat{Y}_{22} = da + db_i\, A(BM\text{-}BM_M)_2 + b[A(BM\text{-}BM_M)_2 - A(BM\text{-}BM_M)_1]. \qquad (5)$$

Define $V = [1,\ A(BM\text{-}BM_M)_2,\ A(BM\text{-}BM_M)_2 - A(BM\text{-}BM_M)_1]'$ as the vector of loadings on da, db, and b in (5). If Σ is the covariance matrix of the regression (2) coefficients da, db, and b, the standard error of $\hat{Y}_{21} - \hat{Y}_{22}$ is

$$\text{SE}(\hat{Y}_{21} - \hat{Y}_{22}) = \text{Sqrt}(V'\Sigma V). \qquad (6)$$

Like the message from (3), the message from (6) is that uncertainty about the expected value of the regression forecasts of changes in average return premia from the first to the second half of the sample centers on the precision of the estimated regression coefficients. In the constant-slope regression (1) the uncertainty is about the univariate regression slope *b*. In regression (2), which allows regression coefficients to change from the first to the second half of 1963-2019, the uncertainty is about *b* (the first-half regression slope), and *da*, and *db* (the changes in the intercept and slope from the first to the second half of the sample). The uncertainty about the true values of these three coefficients is captured by Σ, their covariance matrix.

Panel C of Table 3 shows that the standard error estimates from (6) for the three value portfolios, 0.22 (*MV*), 0.22 (*BV*), and 0.27 (*SV*), are roughly five times those from (3), 0.04, 0.05, and 0.05, which assume constant regression coefficients. Differences between SE($\hat{Y}_{11} - \hat{Y}_{12}$) from (3) and SE($\hat{Y}_{21} - \hat{Y}_{22}$) from (6) are smaller for growth portfolios, but even for the growth portfolios, the standard errors from regression (2) are roughly 50% larger than those from regression (1).

The low precision of the coefficient estimates from (2) rules out reliable inferences about changes in average expected value and growth premiums from the first to the second half of the sample. The *t*-statistics for differences between average premium forecasts for 1963-1991 and 1991-2019 for the three value portfolios (Panel C of Table 3) are 1.44 (*MV*), 1.44 (*BV*), and 0.90 (*SV*). For the three growth portfolios, the differences are less than a standard error from zero.

There is a different perspective on regression (2). The regression in effect estimates separate coefficients for 1963-1991 and 1991-2019, so the average residual for each of the two half-periods is zero, and the average conditional forecast of the premium for each half-period matches the average realized premium. Regression (2) thus provides a more powerful test for changes in expected premiums than the tests on unconditional average premiums in Table 1 only if regression (2) absorbs some of the variance of monthly premiums. With R^2 of 0.00, regression (2) explains virtually none of the monthly variation in $R-R_M$ for the three growth portfolios. As a result, the standard errors of the differences in average half-period regression (2) forecasts for the growth portfolios, (Panel C of Table 3) match the standard errors for differences in unconditional average premiums in Table 1. Matching standard errors and matching differences in average premiums produce matching *t*-statistics for the average differences.

Similarly, regression (2) explains only 5% to 6% of the variance of R-R_M for the value portfolios. As a result, the standard errors of differences in half-period average premium forecasts from (2) in Panel C of Table 3 are only a bit smaller than the standard errors of differences in average premiums in Panel A of Table 1. The premium regression (2) thus produces only slightly improved *t*-statistics for differences in half-period average premiums. The *t*-statistics testing whether the average unconditional expected return premiums for the value portfolios fall from 1963-1991 to 1991-2019 are 1.39 for *MV*, 1.41 for *BV*, and 0.87 for *SV* (Panel A of Table 1). The *t*-statistics testing whether, conditional on the observed values of BM-BM_M, the average expected premiums produced by regressions (2) fall (Panel C of Table 3), are only slightly higher, 1.44 for *MV*, 1.44 for *BV*, and 0.90 for *SV* (Panel C of Table 3).

In short, just as the volatility of average return premiums in Panel A of Table 1 prevents us from making reliable inferences about changes in unconditional expected value and growth premiums from the first to the second half of 1963-2019, imprecision in the regression (2) coefficients prevents us from making reliable inferences about changes in conditional expected premiums.

4. Conclusions

Our goal is to determine whether expected value premiums – the expected differences between value portfolio returns and the VW market return – decline or perhaps disappear after Fama and French (1992, 1993). The 1963-2019 period used here doubles the 1963-1991 sample of the earlier papers, so we compare results for the first (in-sample) and second (out-of-sample) halves of 1963-2019.

The initial tests confirm that realized value premiums fall from the first half of the sample to the second. The average premium for *Big Value* drops from 0.36% per month (t = 2.91) to a puny 0.05% (t = 0.24). The *Small Value* average premium is a hefty 0.58% (t = 3.19) for 1963-1991, versus 0.33% (t = 1.52) for 1991-2019. *Market Value*, which is mostly *Big Value*, produces a first-half average premium of 0.42% (t = 3.25), declining to 0.11% (t = 0.60) for the second half.

The high volatility of monthly value premiums clouds inferences about whether the declines in average premiums reflect changes in expected premiums. Comparing the first and second half-period averages, we don't come close to rejecting the hypothesis that out-of-sample expected premiums are the same as in-sample expected premiums. But the imprecision of the estimates implies that we also can't reject a wide range of lower values for second half expected premiums.

The forecasting regression (1) provides reliable evidence that conditional expected value premiums are lower in the second half of 1963-2019, if we assume the coefficients in (1) are constant. For the three value portfolios, regressions of premiums, $R\text{-}R_M$, on book-to-market ratios in excess of the *Market*, $BM\text{-}BM_M$, produce positive slopes more than six standard errors above zero. Since the average $BM\text{-}BM_M$ for value portfolios are lower in the second half of the sample, the constant-slope regressions imply lower expected value premiums for 1991-2019.

Our focus is whether changes in market conditions lead to lower expected premiums in the second half of the sample, so it seems appropriate to allow the regression coefficients in (1) to change from 1963-1991 to 1991-2019. When we use regression (2) to accommodate the changes, noise in the coefficient estimates rules out confident inferences about whether or how much conditional expected premiums change from 1963-1991 to 1991-2019.

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Table 1 -- Summary statistics for return premiums, $R\text{-}R_M$, average percent of aggregate market cap, correlations of portfolio returns with R_M, and correlations of return premiums, July 1963-June 2019

We use independent sorts on market cap (*MC*) and book-to-market equity (*BM*) to form four VW portfolios at the end of each month. The breakpoint for *Small* and *Big* (*S* and *B*) is the median NYSE *MC*. *Growth* and *Value* are stocks with *BM* below the 30th or at or above the 70th NYSE percentile. *Market Value* and *Growth* (*MV* and *MG*) are VW portfolios of all *Value* or all *Growth* stocks. A portfolio's return premium is its monthly return *R* minus the return on the VW market portfolio R_M. The Hotelling T^2 statistic tests the hypothesis that expected premiums for the six portfolios do not change from 1963-1991 to 1991-2019.

Panel A: Summary statistics for monthly return premiums, $R\text{-}R_M$

	MV	*BV*	*SV*	*MG*	*BG*	*SG*
1963-2019						
Average	0.26	0.21	0.45	-0.03	-0.02	0.06
Standard Deviation	2.88	2.94	3.66	1.10	1.16	3.64
t-statistic	2.37	1.81	3.21	-0.70	-0.54	0.45
1963-1991						
Average	0.42	0.36	0.58	-0.07	-0.06	0.09
Standard Deviation	2.36	2.30	3.32	1.23	1.28	3.48
t-statistic	3.25	2.91	3.19	-0.98	-0.89	0.48
1991-2019						
Average	0.11	0.05	0.33	0.01	0.01	0.03
Standard Deviation	3.31	3.46	3.98	0.96	1.03	3.80
t-statistic	0.60	0.24	1.52	0.11	0.25	0.17
Difference between 1963-1991 and 1991-2019 average monthly premiums						
Average	0.31	0.32	0.25	-0.07	-0.08	0.06
Standard Deviation	4.07	4.15	5.18	1.56	1.64	5.16
t-statistic	1.39	1.41	0.87	-0.84	-0.85	0.20

T^2 statistic testing that 1963-1991 and 1991-2019 expectations are equal = 0.413, *p*-value = 87.1%

Panel B: Average percent of aggregate market cap

	MV	*BV*	*SV*	*MG*	*BG*	*SG*
Ave percent of *MC*	13.9	11.6	2.3	51.9	48.4	3.5

Panel C: Correlations of portfolio and market returns, *R* and R_M, and of return premiums, $R\text{-}R_M$

	MV	*BV*	*SV*	*MG*	*BG*	*SG*
Cor(R, R_M)	0.85	0.84	0.82	0.97	0.97	0.87
MV	1.00	0.97	0.76	-0.72	-0.72	-0.03
BV	0.97	1.00	0.60	-0.70	-0.67	-0.19
SV	0.76	0.60	1.00	-0.54	-0.64	0.45
MG	-0.72	-0.70	-0.54	1.00	0.97	0.14
BG	-0.72	-0.67	-0.64	0.97	1.00	-0.06
SG	-0.03	-0.19	0.45	0.14	-0.06	1.00

Table 2 – Summary statistics for monthly excess book-to-market equity ratios, $BM\text{-}BM_M$, correlations of portfolio and market book-to-market equity, correlations of portfolios' $BM\text{-}BM_M$, and autocorrelations of monthly $BM\text{-}BM_M$, July 1963-June 2019

MV, *BV*, and *SV* are the value portfolios, and *MG*, *BG*, and *SG* are the growth portfolios of Table 1.

Panel A: Summary statistics for excess book-to-market equity ratios, $BM\text{-}BM_M$

	MV	*BV*	*SV*	*MG*	*BG*	*SG*
1963-2019						
Average	0.78	0.74	0.97	-0.28	-0.28	-0.28
Standard Deviation	0.33	0.30	0.39	0.10	0.10	0.12
1963-1991						
Average	0.85	0.80	1.05	-0.35	-0.35	-0.35
Standard Deviation	0.30	0.27	0.35	0.09	0.09	0.12
1991-2019						
Average	0.71	0.67	0.89	-0.21	-0.20	-0.20
Standard Deviation	0.34	0.31	0.42	0.06	0.06	0.07
Difference between 1963-1991 and 1991-2019 averages						
Average	0.13	0.13	0.16	-0.15	-0.15	-0.14
Standard Deviation	0.45	0.41	0.55	0.11	0.10	0.14

Panel B: Correlation of portfolio and market *BM*, and correlations of $BM\text{-}BM_M$

	MV	*BV*	*SV*	*MG*	*BG*	*SG*
Cor(BM, BM_M)	0.74	0.76	0.69	0.96	0.96	0.85
MV	1.00	1.00	0.96	-0.30	-0.32	-0.07
MG	-0.30	-0.32	-0.30	1.00	1.00	0.94
SV	0.96	0.94	1.00	-0.30	-0.32	-0.07
SG	-0.07	-0.10	-0.07	0.94	0.93	1.00
BV	1.00	1.00	0.94	-0.32	-0.34	-0.10
BG	-0.32	-0.34	-0.32	1.00	1.00	0.93

Panel C: Autocorrelations of $BM\text{-}BM_M$

	MV	*BV*	*SV*	*MG*	*BG*	*SG*
1	0.95	0.94	0.95	0.99	0.99	0.99
2	0.88	0.87	0.88	0.98	0.98	0.99
3	0.82	0.81	0.82	0.97	0.97	0.98
4	0.75	0.74	0.75	0.96	0.96	0.97
5	0.68	0.67	0.68	0.95	0.95	0.97
6	0.63	0.62	0.63	0.94	0.94	0.96
7	0.59	0.57	0.58	0.93	0.92	0.95
8	0.56	0.54	0.54	0.92	0.91	0.95
9	0.53	0.51	0.52	0.91	0.90	0.94
10	0.50	0.48	0.50	0.90	0.90	0.93
11	0.47	0.45	0.48	0.89	0.89	0.93
12	0.44	0.42	0.45	0.88	0.88	0.92

Table 3: Full-period and half-period regressions of return premiums, $R\text{-}R_M$, on excess book-to-market equity, $BM\text{-}BM_M$, 1963-2019

See Table 1 for description of portfolios. Panels A and B report coefficients, standard errors, and *t*-statistics for the coefficients, R^2, and residual standard errors (*RSE*) for regressions (1) and (2),

$$R_{it}\text{-}R_{Mt} = a_i + b_i\,(BM_{it\text{-}1}\text{-}BM_{Mt\text{-}1}) + e_{it}. \quad (1) \qquad R_{it}\text{-}R_{Mt} = a_i + da_i\,D + b_i\,(BM_{it\text{-}1}\text{-}BM_{Mt\text{-}1}) + db_i\,D(BM_{it\text{-}1}\text{-}BM_{Mt\text{-}1}) + e_{it}. \quad (2)$$

Panel C reports average values of the independent variable, $BM\text{-}BM_M$, and average forecasts from regression (1), $\hat{Y}_{11}$ and $\hat{Y}_{12}$, and regression (2), $\hat{Y}_{21}$ and $\hat{Y}_{22}$, for the first and second half-period, differences between the average forecasts, and standard errors and *t*-statistics for the differences.

Panel A: Full-period regressions of of return premiums, $R\text{-}R_M$, on excess book-to-market equity, $BM\text{-}BM_M$, 1963-2019

	Coefficient		Standard Error		*t*-statistic			
	a	*b*	*a*	*b*	*a*	*b*	R^2	*RSE*
MV	-1.46	2.20	0.28	0.33	-5.24	6.71	0.06	2.79
BV	-1.46	2.26	0.29	0.37	-4.97	6.12	0.05	2.86
SV	-1.74	2.26	0.37	0.35	-4.76	6.48	0.06	3.56
MG	0.15	0.66	0.12	0.41	1.28	1.63	0.00	1.10
BG	0.19	0.76	0.13	0.43	1.46	1.75	0.00	1.16
SG	0.07	0.02	0.35	1.16	0.20	0.02	-0.00	3.65

Panel B: Split-sample regressions of of return premiums, $R\text{-}R_M$, on excess book-to-market equity, $BM\text{-}BM_M$, 1963-1991 and 1991-2019

	Coefficient				Standard Error				*t*-statistic					
	a	*da*	*b*	*db*	*a*	*da*	*b*	*db*	*a*	*da*	*b*	*db*	R^2	*RSE*
MV	-1.21	-0.40	1.93	0.49	0.45	0.58	0.50	0.68	-2.67	-0.69	3.82	0.72	0.06	2.79
BV	-1.27	-0.30	2.04	0.37	0.48	0.61	0.57	0.76	-2.62	-0.49	3.57	0.48	0.05	2.87
SV	-1.11	-1.01	1.62	1.13	0.62	0.77	0.56	0.72	-1.81	-1.31	2.89	1.56	0.06	3.55
MG	0.21	-0.01	0.78	0.16	0.24	0.33	0.67	1.26	0.86	-0.03	1.16	0.13	-0.00	1.10
BG	0.28	-0.05	0.97	0.08	0.26	0.36	0.73	1.34	1.05	-0.13	1.33	0.06	0.00	1.16
SG	-0.06	0.62	-0.44	3.02	0.61	0.89	1.64	3.44	-0.10	0.70	-0.27	0.88	-0.00	3.65

Wald test that *da* and *db* are zero in all 6 regressions = 0.647, DOF = (12, 648), *p*-value = 80.3%

Panel C: Subperiod averages of conditional expected premiums from full-period and split-sample regressions

	Average $BM\text{-}BM_M$		Full-Period Regressions					Split-sample Regressions				
	X_1	X_2	$\hat{Y}_{11}$	$\hat{Y}_{12}$	$\hat{Y}_{11}-\hat{Y}_{12}$	Std Err	*t*-stat	$\hat{Y}_{21}$	$\hat{Y}_{22}$	$\hat{Y}_{21}-\hat{Y}_{22}$	Std Err	*t*-stat
MV	0.85	0.71	0.41	0.12	0.30	0.04	6.71	0.42	0.11	0.31	0.22	1.44
BV	0.80	0.67	0.35	0.06	0.29	0.05	6.12	0.36	0.05	0.32	0.22	1.44
SV	1.05	0.89	0.63	0.28	0.35	0.05	6.48	0.58	0.33	0.25	0.27	0.90
MG	-0.35	-0.21	-0.08	0.02	-0.10	0.06	-1.63	-0.07	0.01	-0.07	0.09	-0.84
BG	-0.35	-0.20	-0.08	0.03	-0.11	0.06	-1.75	-0.06	0.01	-0.08	0.09	-0.85
SG	-0.35	-0.20	0.06	0.06	-0.00	0.17	-0.02	0.09	0.03	0.06	0.28	0.2

Figure 1 - BM for Market, Market Value, and Market Growth

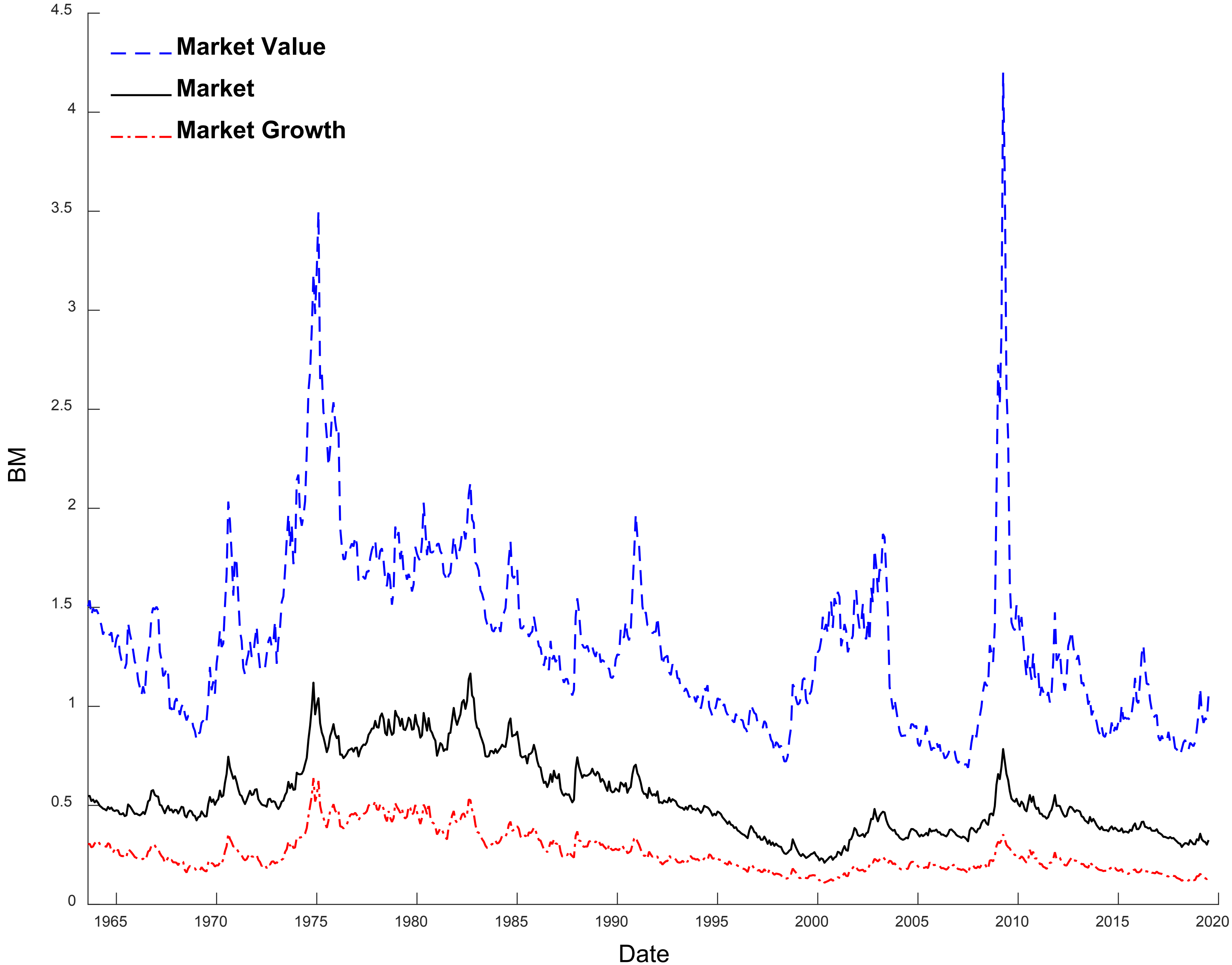

Figure 2 - Excess BM for Market Value and Market Growth