Internet Appendix

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Holding Period Effects in Dividend Strip Returns

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This Internet Appendix collects supplementary material for the paper "Holding Period Effects in Dividend Strip Returns." Internet Appendix A illustrates the effect of errors in the risk-free rate on dividend strip returns. Internet Appendix B collects results for robustness checks. Internet Appendix C presents a model of measurement error. Internet Appendix D provides a comparison to BBK. Internet Appendix E reports results for the circular bootstrap. Internet Appendix F reports additional results. Internet Appendix G reports results for predicting term premia out-of-sample.

Internet Appendix A Calibration of Errors in the Risk-Free Rate

We provide a simple calibration exercise to illustrate the effect of errors in the risk-free rate on dividend strip returns according to Equation (1). We thank an anonymous referee for the suggestion to use the observed term structure at 1.4 and 1.9 years. In line with Figure 1, both zero curve interest rates are 6 bp below the option-implied interest rates (268 bp vs. 274 bp at 1.4 years and 278 bp vs. 284 bp at 1.9 years, all interest rates are annualized and in logs). To illustrate the resultant effect of interest rates on dividend returns, we use a simple example with index $S = 2,000$, strike price $X = 2,000$, standard deviation $\sigma = 0.2$, dividend yield $\delta = 0.02$, and risk-free rate equal to the implied rate at the required horizon. Based on these parameters, the Black-Scholes call and put prices are 225.01 and 194.53 for the 1.9-year maturity and 192.42 and 172.38 for the 1.4-year maturity. We set the value of collected dividends, D, after half a year to 22.00.

From Equation (1) and using the option-implied interest rates, we find $P^{1.9} = 74.57$ and $P^{1.4} = 55.22$. The corresponding (half-annual) return on the strategy is $(55.22 + 22.00)/74.57 - 1 = 0.0355$. Using the zero curve rates instead, we find $P^{1.9} = 72.41$ and $P^{1.4} = 53.61$. The corresponding biased (half-annual) return on the strategy is $(53.61 + 22.00)/72.41 - 1 = 0.0441$. Thus, small errors of -2.11% (at 1.9 years) and -2.19% (at 1.4 years) in interest rates translate into a sizable error of $+24.13\%$ in the dividend strip return. The resultant average elasticity of the strip return to interest rate errors is large at -11.22.

Errors are even larger when we use constant maturity Treasury rates, which are some 38 bp below the option-implied interest rates. The biased (half-annual) return on the strategy is (44.96+22.00)/60.84 - 1 = 0.1005, which translates into a large error of +182.84%. In light of this magnification of errors in interest rates, we prefer our option-implied interest rates over any exogenous interest rate.

Internet Appendix B Robustness

We consider several robustness checks with respect to dividend strip maturity, exogenous interest rates, option moneyness, and transaction costs. Table B.1 collects the robustness results for strip returns in excess of the risk-free rate (for reference, Panel A repeats the main result for strip returns in excess of the risk-free rate from Table 2). Table B.2 collects the robustness results for strip returns in excess of 2-year Treasury bond returns (for reference, Panel A repeats the main result for strip returns in excess of the Treasury bond returns from Table 2). The results for returns in excess of the Treasury returns are qualitatively the same as the results for returns in excess of the risk-free rate, except that Sharpe ratios are always lower as Treasury bond returns are higher than the risk-free rate. Results for hold-to-maturity returns that address concerns related to transaction costs are reported in Table B.3.

B.1 Dividend Strip Maturity

In the base case, we invest each January in a dividend strip with an approximate maturity of 1.9 years. We collect dividends each month and hold this position for half a year until we rebalance into a new 1.9-year dividend strip in July. We now check our results for different maturities of the strip. Panels B and C of Table B.1 show results for maturities of 1.3 and 0.9 years; the results are very similar to the base results in Panel A for a maturity of 1.9 years; while the average returns and standard deviations are slightly higher than in the base case, Sharpe ratios are very close to the base case Sharpe ratios and are always increasing in the length of the holding period.

B.2 Exogenous Interest Rates

In the base case, we estimate dividend strip prices using an option-implied interest rate. Now, we use zero curve interest rates instead. In Panel D of Table B.1, we find that excess returns are higher than in the base case (by around 1.6% for long holding periods and by almost 3.5% at the monthly holding period). Standard deviations are somewhat higher than in the base case (except for monthly returns, where the standard deviation is lower). As a result, Sharpe ratios are overestimated, in particular at the monthly horizon (with a relative error of about 50%). However, regardless of the bias in the level of Sharpe ratios, we observe the same pattern of increasing Sharpe ratios in the length of the holding period from 0.30 at the monthly holding period to 0.52 at the three-year holding period.

The error in the level of Sharpe ratios aligns with our earlier analysis that the zero curve rate underestimates the interest rate of marginal investors in the option markets and, thus, underestimates the prices of dividend strips, which leads to an upward bias in dividend strip returns. The fact that the differences in average returns and Sharpe ratios are largest for monthly holding periods is related to our sample. In Figure 1, we see that zero curve is lower than the implied rate especially toward the end of the sample. This difference in interest rates increases the difference in monthly strip returns, but it does not affect our estimates for longer holding periods as much as longer holding period returns undersample the returns near the end points of the sample. In Internet Appendix A, we show the mechanics of the upward bias and that using constant maturity Treasury rates further amplifies errors in strip returns.[1] We interpret these results as an additional argument for the use of the option-implied interest rate.

B.3 Option Moneyness

We identify option-implied interest rates by combining put-call pairs with different strike prices. In the base case, we use a wide range of strike prices to estimate implied rates with moneyness levels between 0.5 and 1.5. We use the same range of moneyness levels in the calculation of dividend

[1] We do not use overnight interest rates or repo rates, as neither matches the maturity range of our dividend strip (from 1.4 through 1.9 years) and are only available in recent years.

strips. We now consider the same time series except that, for the period from 2004 onward, we use only options with moneyness levels between 0.8 and 1.2. Panel E of Table B.1 shows that the main results are very similar to the base case results. Sharpe ratios are increasing in the length of the holding period, and all the main conclusions remain the same.

B.4 Transaction Costs

Our trading strategy consists of buying a 1.9-year dividend strip at the end of January. We collect dividends over the month of February, sell the asset at the end of February, and compute our February return. Then, we buy back the asset (or never sell it), collect dividends over the next month, and sell the asset again. We repeat this strategy for six months until the end of July, when the strip has a maturity of 1.4 years. Thereafter, we rebalance into a new 1.9-year strip. Based on this time series of monthly returns, we calculate cumulative returns (see Figure 2). Although we only rebalance into a new asset every six months, the cumulative strategy assumes that dividends are reinvested in the dividend strip every month. As the strategy involves options with large bid/ask spreads, we are concerned about trading costs. We follow Bansal, Miller, Song, and Yaron (2021) and consider holding the strip to maturity (instead of rebalancing monthly) to reduce trading costs.

More precisely, every January and July, we buy a dividend strip with a maturity of 1.9 years and hold it until maturity. We collect monthly dividends and reinvest them in the S&P 500 index. Our return is the logarithm of the value of reinvested dividends over the initial price. For comparison, we similarly calculate returns on the S&P 500 index as the logarithm of the future S&P 500 price, plus the value of reinvested dividends over the initial S&P 500 price. The holding period of this strategy is 1.9 years (22.8 months) and thus comparable to the main results for a holding period of 24 months in Table 2. Therefore, we copy the main results for 24 months into Table B.3 and report the hold-to-maturity results alongside. The average return is slightly higher, while standard deviations are comparable, which results in slightly higher Sharpe ratios. However, the main results are unchanged. Depending on the specifications of excess returns, the strip Sharpe ratio is between 1.3 and 2 times higher than the market Sharpe ratio, which is a similar relative difference as in the main analysis. Based on the arguments of Bansal, Miller, Song, and Yaron (2021), we conclude that our results are robust to the presence of transaction costs.

Table B.1: **Robustness: Strip Returns in Excess of the Risk-free Rate**

	1m	6m	12m	18m	24m	30m	36m
Panel A: Strip-return - rf							
Mean	5.12%	5.71%	5.72%	5.89%	5.91%	5.88%	5.78%
Std. dev.	31.99%	18.48%	14.39%	13.22%	12.46%	12.09%	12.10%
Sharpe ratio	0.16	0.31	0.40	0.45	0.47	0.49	0.48
N	323	318	312	306	300	294	288
Panel B: 1.3 year strip-return - rf							
Mean	5.88%	6.36%	6.15%	6.07%	6.08%	6.07%	5.98%
Std. dev.	31.93%	17.52%	14.66%	13.45%	12.61%	12.67%	12.60%
Sharpe ratio	0.18	0.36	0.42	0.45	0.48	0.48	0.47
N	323	318	312	306	300	294	288
Panel C: 0.9 year strip-return - rf							
Mean	7.63%	7.72%	7.30%	7.10%	7.07%	7.14%	7.17%
Std. dev.	34.63%	22.37%	17.96%	16.48%	16.68%	16.46%	16.46%
Sharpe ratio	0.22	0.35	0.41	0.43	0.42	0.43	0.44
N	323	318	312	306	300	294	288
Panel D: 1.9 year zero-curve strip-return - rf							
Mean	8.63%	8.06%	7.71%	7.69%	7.65%	7.53%	7.40%
Std. dev.	29.88%	19.79%	17.25%	15.57%	14.44%	14.39%	13.79%
Sharpe ratio	0.29	0.41	0.45	0.49	0.53	0.52	0.54
N	323	318	312	306	300	294	288
Panel E: 1.9 year strip-return (Moneyness 0.8-1.2) - rf							
Mean	5.16%	5.72%	5.74%	5.90%	5.92%	5.89%	5.78%
Std. dev.	32.16%	18.52%	14.44%	13.27%	12.50%	12.13%	12.14%
Sharpe ratio	0.16	0.31	0.40	0.44	0.47	0.49	0.48
N	323	318	312	306	300	294	288

Table B.1 presents summary statistics for strip returns in excess of the risk-free rate for the holding period returns ranging from $h = 1$ month through $h = 36$ months. Panel A repeats the main strip results from Table 2, Panel A. In Panels B and C, dividend strip returns are based on rolling over investments in strips with maturities of 1.3 year or 0.9 years. In Panel D, dividend prices are estimated using the zero curve interest rate. In Panel E, only options with moneyness in the range from 0.8 to 1.2 are used. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. The period is from January 1996 through December 2022.

Table B.2: **Robustness: Strip Returns in Excess of the Treasury Bond Return**

	1m	6m	12m	18m	24m	30m	36m
Panel A: Strip-return - 2y Treasury return							
Mean	4.22%	4.71%	4.67%	4.77%	4.76%	4.70%	4.59%
Std. dev.	31.98%	18.78%	14.72%	13.65%	13.06%	12.78%	12.78%
Sharpe ratio	0.13	0.25	0.32	0.35	0.36	0.37	0.36
N	323	318	312	306	300	294	288
Panel B: 1.3 year strip-return - 2y Treasury return							
Mean	4.98%	5.36%	5.10%	4.95%	4.93%	4.89%	4.79%
Std. dev.	31.95%	17.77%	14.85%	13.57%	12.78%	12.92%	12.89%
Sharpe ratio	0.16	0.30	0.34	0.36	0.39	0.38	0.37
N	323	318	312	306	300	294	288
Panel C: 0.9 year strip-return - 2y Treasury return							
Mean	6.73%	6.73%	6.25%	5.98%	5.92%	5.96%	5.98%
Std. dev.	34.69%	22.68%	18.34%	16.89%	17.01%	16.82%	16.74%
Sharpe ratio	0.19	0.30	0.34	0.35	0.35	0.35	0.36
N	323	318	312	306	300	294	288
Panel D: 1.9 year zero-curve strip-return - 2y Treasury return							
Mean	7.72%	7.07%	6.65%	6.57%	6.50%	6.35%	6.21%
Std. dev.	30.14%	20.40%	17.65%	15.98%	14.86%	14.84%	14.20%
Sharpe ratio	0.26	0.35	0.38	0.41	0.44	0.43	0.44
N	323	318	312	306	300	294	288
Panel E: 1.9 year strip-return (Moneyness 0.8-1.2) - 2y Treasury return							
Mean	4.26%	4.73%	4.68%	4.78%	4.77%	4.71%	4.59%
Std. dev.	32.15%	18.83%	14.77%	13.70%	13.10%	12.81%	12.81%
Sharpe ratio	0.13	0.25	0.32	0.35	0.36	0.37	0.36
N	323	318	312	306	300	294	288

Table B.2 presents summary statistics for strip returns in excess of the two-year Treasury bond returns for the holding period returns ranging from $h = 1$ month through $h = 36$ months. Panel A repeats the main strip results from Table 2, Panel B. In Panels B and C, dividend strip returns are based on rolling over investments in strips with maturities of 1.3 year or 0.9 years. In Panel D, dividend prices are estimated using the zero curve interest rate. In Panel E, only options with moneyness in the range from 0.8 to 1.2 are used. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. The period is from January 1996 through December 2022.

Table B.3: **Hold-to-Maturity Returns (Annualized)**

	Holding period returns (24m)	Hold-to-maturity returns (22.8m)
Panel A: Returns in excess of the risk-free rate		
Market-ret. - rf		
Mean	6.75%	6.86%
Std. dev.	18.08%	17.94%
Sharpe ratio	0.37	0.38
N	300	51
Strip ret. - rf		
Mean	5.91%	6.29%
Std. dev.	12.46%	12.91%
Sharpe ratio	0.47	0.49
N	300	51
Panel B: Returns in excess of the Treasury bond returns		
Market ret. - 10y Treasury ret.		
Mean	3.94%	3.76%
Std. dev.	20.77%	20.10%
Sharpe ratio	0.19	0.19
N	300	51
Strip ret. - 2y Treasury ret.		
Mean	4.76%	5.07%
Std. dev.	13.06%	13.86%
Sharpe ratio	0.36	0.37
N	300	51

Table B.3 presents summary statistics for the 24-month holding period returns and for 1.9-year (22.8 months) hold-to-maturity returns. Returns are in excess of the risk-free rate (Panel A) and in excess of Treasury bond returns (Panel B). All returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. The period is from January 1996 through December 2022.

Internet Appendix C Model of Measurement Error

Suppose the actual log price p evolves as

$$p_{t+1} = \mu + p_t + \varepsilon_{t+1}, \tag{C.1}$$

where μ is the mean log return and ε is $i.i.d.$ with $\varepsilon \sim N(0, \sigma_\varepsilon^2)$. Thus, the variance of log returns is σ_ε^2. Next, suppose that the price is measured with error:

$$\hat{p}_{t+1} = p_{t+1} + \delta_{t+1}, \tag{C.2}$$

where δ is $i.i.d.$ with $\delta \sim N(0, \sigma_\delta^2)$. By substitution, we can write the measured price as

$$\hat{p}_{t+1} = \mu + \hat{p}_t + \varepsilon_{t+1} + \delta_{t+1} - \delta_t. \tag{C.3}$$

Assuming that returns and measurement errors are uncorrelated (i.e., $cov(\varepsilon, \delta) = 0$), the AR(1) coefficient Φ is

$$\Phi = \frac{cov(\hat{r_{t+1,}}, \hat{r}_t)}{var(\hat{r}_t)} = \frac{-\sigma_\delta^2}{2\sigma_\delta^2 + \sigma_\varepsilon^2}. \tag{C.4}$$

Thus, measurement error leads to a negative serial correlation in returns. This negative serial correlation inflates the variance of measured returns.

To reduce the influence of measurement error, we focus on longer holding periods. Define h-period returns as $r_{t,t+h} = \sum_{j=1}^{h} r_{t+j}$. Variance of actual returns scales with the time horizon, whereas variance due to measurement error stays constant across holding periods. As a result, the variance bias decreases in the length of the holding period. For single period returns, the ratio of measured variance to actual variance is:

$$\frac{var(r_{t,\hat{t+1}})}{var(r_{t,t+1})} = \frac{2\sigma_\delta^2 + \sigma_\varepsilon^2}{\sigma_\varepsilon^2} = 1 + 2\frac{\sigma_\delta^2}{\sigma_\varepsilon^2}. \tag{C.5}$$

For h-period returns, the same ratio is:

$$\frac{var(r_{t,\hat{t+h}})}{var(r_{t,t+h})} = 1 + \left(\frac{2}{h}\right)\frac{\sigma_\delta^2}{\sigma_\varepsilon^2}. \tag{C.6}$$

C.1 Measurement Error in Sharpe Ratios

Hence, in the limit, an infinitely long holding period would completely eliminate the variance bias due to measurement error. We can express the ratio of h-period measured Sharpe ratio to actual Sharpe ratio as:

$$\frac{SR(\hat{r}_t)}{SR(r_t)} = \frac{E[r_{t,\hat{t+h}}] - rf_{t,t+h}}{\sqrt{(2\sigma_\delta^2 + h\sigma_\varepsilon^2)}} \frac{\sqrt{(h\sigma_\varepsilon^2)}}{E[r_{t,\hat{t+h}}] - rf_{t,t+h}} = \frac{\sqrt{(h\sigma_\varepsilon^2)}}{\sqrt{(2\sigma_\delta^2 + h\sigma_\varepsilon^2)}} = \frac{1}{\sqrt{1 + \left(\frac{2}{h}\right)\frac{\sigma_\delta^2}{\sigma_\varepsilon^2}}} = \frac{1}{\sqrt{\frac{var(r_{t,\hat{t+h}})}{var(r_{t,t+h})}}}. \tag{C.7}$$

C.2 Measurement Error in Market Model Betas

Next we explain strip returns via a market model:

$$r_{t,t+h}^{\hat{Strip}} - rf = \alpha_{t,t+h} + \beta_{t,t+h}(r_{t,t+h}^{Mkt} - rf) + error_t. \tag{C.8}$$

where rf is the constant risk-free rate. From Equation (C.3), the h-period strip returns with measurement error is:

$$\hat{r^{Strip}_{t,t+h}} = \sum_{j=1}^{h} r_{t+j} = h\mu^{Strip} + \sum_{j=1}^{h} \varepsilon^{Strip}_{j+1} + \delta^{Strip}_{t+h} - \delta^{Strip}_{t} \tag{C.9}$$

and the h-period market return is $r^{Mkt}_{t+h} = h\mu^{Mkt} + \sum_{j=1}^{h} \varepsilon^{Mkt}_{j+1}$. The errors ε^{Strip}_t and ε^{Mkt}_t are correlated with correlation coefficient ρ. The measurement error is uncorrelated with returns. Then, the regression coefficient turns out to be the same as the actual beta (i.e., using actual returns without measurement error). The beta estimate is also independent of holding period h:

$$\beta_{t,h} = \frac{cov(\hat{r^{Strip}_{t,t+h}}, r^{Mkt}_{t,t+h})}{var(r^{Mkt}_{t,t+h})} = \frac{h\rho\sigma^{Strip}\sigma^{Mkt}}{h\sigma^{Mkt^2}} = \beta^{actual}_{t,h}. \tag{C.10}$$

The confidence intervals around beta are determined by:

$$Var(\beta_{t,h}) = \frac{\sigma^{error^2}}{NVar(r^{Mkt}_{t,t+h})}, \tag{C.11}$$

(Greene (2020), p. 101). In our market model with measurement error and h-period returns, this evaluates to:

$$Var(\beta_{t,h}) = \frac{h\sigma^{Strip^2} + 2\sigma^2_\delta}{Nh\sigma^{Mkt^2}} = \frac{h\sigma^{Strip^2} + \frac{2}{h}\sigma^2_\delta}{Nh\sigma^{Mkt^2}}. \tag{C.12}$$

Note that these variances are higher than those in the case without measurement error (when $\sigma^2_\delta = 0$).

Internet Appendix D A Comparison to Van Binsbergen, Brandt, and Koijen (2012)

We compare our empirical estimates for dividend strip prices and returns to those reported by Van Binsbergen, Brandt, and Koijen (2012). First, we replicate their estimates. That is, we estimate dividend strip prices from S&P 500 options using the zero curve interest rate. Figure D shows that we are able to almost perfectly replicate their estimates for 12-month dividend strip prices. We estimate dividend strip prices with 12-month constant maturities by linearly interpolating the prices for dividend strips just above and below the one year maturity.

Table D reports monthly log returns for dividend strips and the market. We prefer mean logarithmic returns, which are less prone to standard deviation bias of the mean return. In Panel A, the time period matches the one used by BBK (January 1996 through October 2009). Based on the BBK data, dividend strips (0.85%) outperform the market (0.44%). Our dividend strip returns based on zero curve interest rates closely correlate with the BBK original series (0.98). On average, they are slightly lower than those reported by BBK, but still substantially higher than the market returns, thus confirming BBK's results (0.71% for the strip, 0.44% for the market). When we switch from the zero curve interest rate to the option-implied interest rate, dividend strips no longer outperform the market (0.41% for the strip, 0.44% for the market).

Next, we extend the sample period through 2022, adding more than a decade of data. Panel B of Table D reports the results. Using the zero curve interest rate during the long sample, we find that dividend strips (0.88%) perform slightly better than the market (0.71%). Using the option-implied interest rate during the long sample inverts the relation, and the market (0.71%) outperforms the strip (0.59%).

Table D: **Monthly Returns**

	Strip ret.	Market ret.
Panel A: BBK sample (Jan 1996 - Oct 2009)		
Original data	0.85%	0.44%
Zero curve	0.71%	0.44%
Option-implied interest rate	0.41%	0.44%
Panel B: Long Sample (Jan 1996 - Dec 2022)		
Zero curve	0.88%	0.71%
Option-implied interest rate	0.59%	0.71%

Table D presents the mean for monthly logarithmic returns for dividend strips and the market. Dividend strip returns are based on BBK data (Original data) or our estimates of dividend strips where we use as the interest rate the zero curve (Zero curve) or the option-implied interest rate. In Panel A, the sample period matches the BBK sample from January 1996 through October 2009. In panel B, the sample period is from January 1996 through December 2022.

Figure D: **Dividend Prices**

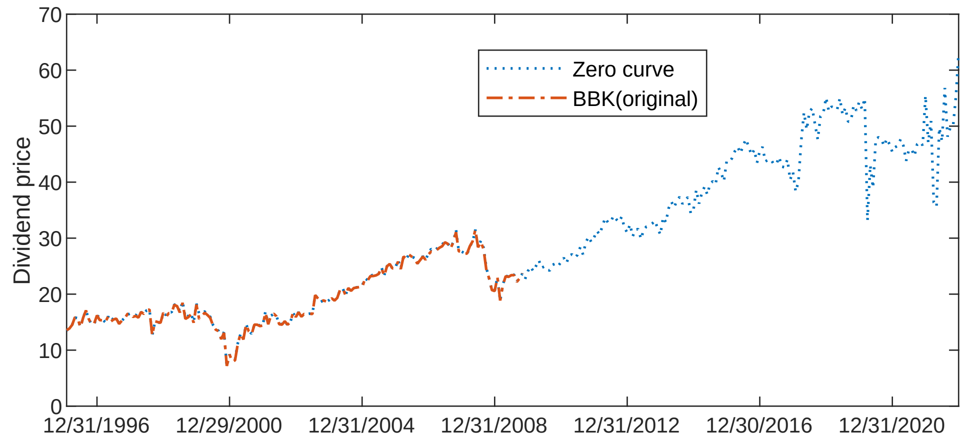


Figure D plots prices for 12-month dividend strips on the S&P 500 index. The period is from January 1996 through December 2022.

Internet Appendix E Circular Bootstrap

Table E.1 reports the results for the circular bootstrap. We wrap the data by connecting the last return with the first. We then repeat the main analysis from Table 2 using each month as a starting point and averaging. We present the corresponding plots in Figures E.1 and E.2. The results are similar to using Sharpe ratios with constant means. The strip Sharpe ratio is sizable and statistically significantly different from zero at longer holding periods. The strip Sharpe ratio is also higher than the market Sharpe ratio but insignificantly so.

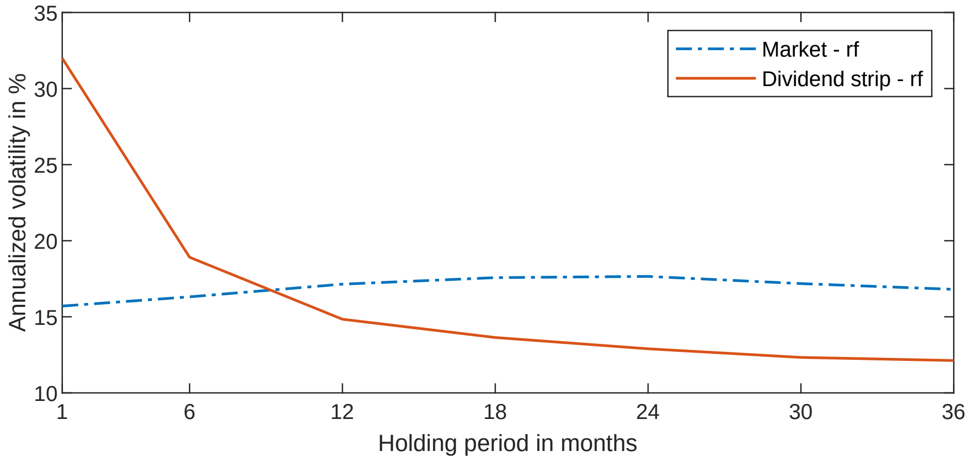
Table E.1: **Holding Period Returns and Sharpe Ratios (Annualized): Circular Bootstrap**

	1m	6m	12m	18m	24m	30m	36m
Panel A: Returns in excess of the risk-free rate							
Market-ret. - rf							
Mean	6.57%	6.57%	6.57%	6.57%	6.57%	6.57%	6.57%
Std. dev.	15.71%	16.31%	17.15%	17.57%	17.66%	17.18%	16.80%
Sharpe ratio	0.42	0.40	0.38	0.38	0.37	0.39	0.40
N	323	318	312	306	300	294	288
Strip ret. - rf							
Mean	5.12%	5.12%	5.12%	5.12%	5.12%	5.12%	5.12%
Std. dev.	31.99%	18.91%	14.84%	13.64%	12.90%	12.33%	12.13%
Sharpe ratio	0.16	0.27	0.35	0.38	0.40	0.42	0.42
Diff. (*p*-val.)	(0.21)	(0.53)	(0.82)	(0.81)	(0.66)	(0.54)	(0.52)
Diff. wrt. zero [*p*-val.]	[0.40]	[0.13]	[0.03]	[0.01]	[0.00]	[0.00]	[0.00]
N	323	318	312	306	300	294	288
Panel B: Returns in excess of the Treasury bond returns							
Market ret. - 10y Treasury ret.							
Mean	4.60%	4.60%	4.60%	4.60%	4.60%	4.60%	4.60%
Std. dev.	18.08%	19.49%	19.70%	20.10%	20.28%	19.81%	19.54%
Sharpe ratio	0.25	0.24	0.23	0.23	0.23	0.24	0.24
N	323	318	312	306	300	294	288
Strip ret. - 2y Treasury ret.							
Mean	4.22%	4.22%	4.22%	4.22%	4.22%	4.22%	4.22%
Std. dev.	31.98%	19.11%	14.94%	13.72%	13.06%	12.55%	12.44%
Sharpe ratio	0.13	0.22	0.28	0.31	0.32	0.34	0.34
Diff. (*p*-val.)	(0.55)	(0.92)	(0.75)	(0.51)	(0.30)	(0.20)	(0.18)
Diff. wrt. zero [*p*-val.]	[0.50]	[0.22]	[0.08]	[0.02]	[0.01]	[0.00]	[0.00]
N	323	318	312	306	300	294	288

Table E.1 presents summary statistics for the holding period returns ranging from $h = 1$ month through $h = 36$ months. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. Risk-free rate (rf) is the one-month Treasury bill rate. Panel A reports results for returns in excess of the risk-free rate. Panel B reports results for returns in excess of the Treasury bond returns. Sharpe ratio for a given holding period h is calculated as the mean excess return over the standard deviation of excess returns for the holding period h. All calculations are based on wrapping the data by connecting the last return with the first (same approach is used in the circular bootstrap of Politis and Romano 1992). We then repeat our analysis using each month as a starting point. The table reports the mean across those samples. In parentheses are p-values for the HAC test of Ledoit and Wolf (2008) for the difference in Sharpe ratios between excess returns for the stip and the excess returns for the market. In brackets are the p-values for the same HAC test based on demeaned excess market returns. The period is from January 1996 through December 2022.

Figure E.1: **Annualized Standard Deviation Across Different Holding Periods: Circular Bootstrap**

Panel A: Returns in excess of the risk-free rate



Panel B: Returns in excess of Treasury bond returns

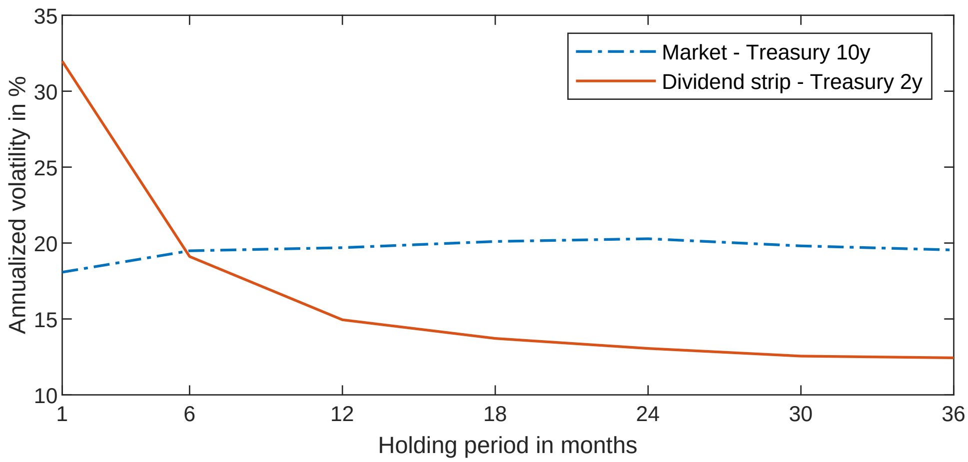
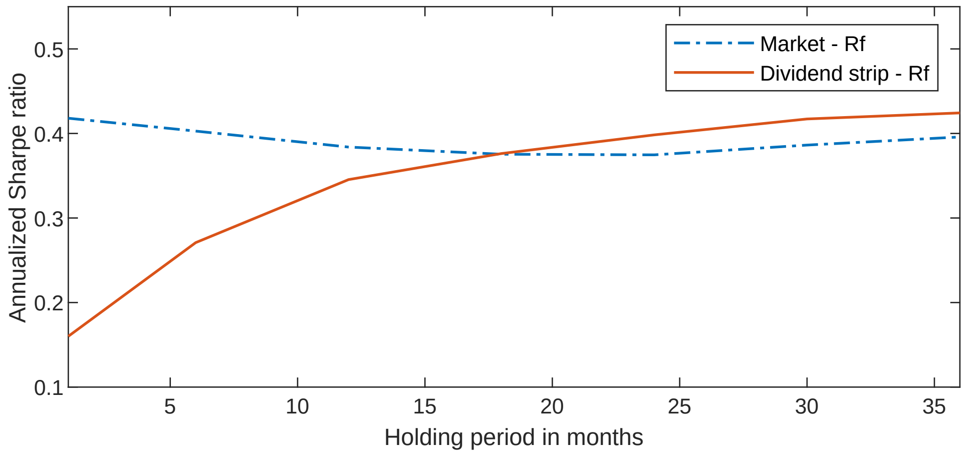


Figure E.1 plots the annualized standard deviation for excess market and strip returns for holding periods of 1, 6, 12, 18, 24, 30, and 36 months. All calculations are based on wrapping the data by connecting the last return with the first (same approach is used in the circular bootstrap of Politis and Romano 1992). We then repeat our analysis using each month as a starting point and plot the mean across those samples. The returns are in excess of the risk-free rate (Panel A) and in excess of the Treasury returns (Panel B). The period is from January 1996 through December 2022.

Figure E.2: **Annualized Sharpe Ratio Across Different Holding Periods: Circular Bootstrap**

Panel A: Returns in excess of the risk-free rate



Panel B: Returns in excess of Treasury bond returns

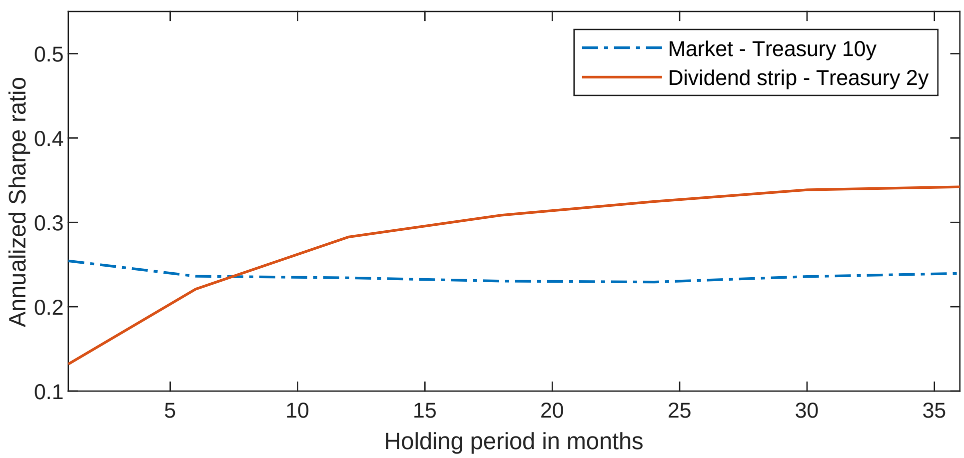


Figure E.2 plots the annualized Sharpe ratio for excess market and strip returns for holding periods of 1, 6, 12, 18, 24, 30, and 36 months. All calculations are based on wrapping the data by connecting the last return with the first (same approach is used in the circular bootstrap of Politis and Romano 1992). We then repeat our analysis using each month as a starting point and plot the mean across those samples. The returns are in excess of the risk-free rate (Panel A) and in excess of the Treasury returns (Panel B). The period is from January 1996 through December 2022.

Internet Appendix F Additional Results

Table F.1 reports summary statistics for different holding periods for the BBK subsample from January 1996 through October 2009. Table F.2 reports summary statistics for different holding periods for the subsample from December 2004 through December 2022. Table F.3 reports summary statistics for different holding periods for the subsample from January 1996 through November 2007. Table F.4 reports summary statistics for different holding periods for the subsample from December 2004 through January 2020. Figure F.1 plots the annualized Sharpe ratios from Tables F.3 and F.4.

Table F.5 reports market model estimates using Fama-French market factor. Table F.6 reports results for market model estimates using raw returns (not in logarithms). Table F.7 reports results for predicting term premia (without using the moving average for strip dp-ratio). Table F.8 reports results for predicting the realized term premia using alternative measures of business cycle. Table F.9 reports results for predicting the term structure of Sharpe ratios (with returns in excess of Treasury bond returns). Table F.10 reports results for predicting the term structure of Sharpe ratios using alternative measures of business cycle. Table F.11 reports results for predicting the term structure of alphas using alternative measures of business cycle.

Table F.1: **Holding Period Returns and Sharpe Ratios (Annualized): 1996 - 2009**

	1m	6m	12m	18m	24m	30m	36m
Panel A: Returns in excess of the risk-free rate							
Market-ret. - rf							
Mean	1.95%	1.48%	0.64%	0.98%	1.18%	1.28%	1.31%
Std. dev.	16.44%	19.16%	20.03%	20.87%	20.91%	20.21%	19.54%
Sharpe ratio	0.12	0.08	0.03	0.05	0.06	0.06	0.07
Strip ret. - rf							
Mean	1.60%	2.87%	1.91%	2.37%	2.57%	2.80%	3.05%
Std. dev.	38.49%	22.10%	16.14%	15.27%	14.08%	13.98%	13.35%
Sharpe ratio	0.04	0.13	0.12	0.16	0.18	0.20	0.23
Diff. (p-val.)	(0.81)	(0.85)	(0.54)	(0.15)	(0.00)	(0.00)	(0.00)
Diff. wrt. zero [p-val.]	[0.89]	[0.62]	[0.40]	[0.04]	[0.00]	[0.00]	[0.00]
N	165	160	154	148	142	136	130
Panel B: Returns in excess of the Treasury bond returns							
Market ret. - 10y Treasury ret.							
Mean	-0.42	-1.25	-2.27	-1.85	-1.57	-1.28	-1.07
Std. dev.	18.85	22.68	23.06	23.91	23.76	22.88	22.23
Sharpe ratio	-0.02	-0.05	-0.10	-0.08	-0.07	-0.06	-0.05
Strip ret. - 2y Treasury ret.							
Mean	0.15	1.31	0.32	0.83	1.04	1.34	1.65
Std. dev.	38.35	22.34	16.38	15.52	14.31	14.17	13.43
Sharpe ratio	0.00	0.06	0.02	0.05	0.07	0.09	0.12
Diff. (p-val.)	(0.93)	(0.62)	(0.34)	(0.06)	(0.00)	(0.00)	(0.00)
Diff. wrt. zero [p-val.]	[0.99]	[0.80]	[0.88]	[0.45]	[0.05]	[0.01]	[0.00]
N	165	160	154	148	142	136	130

Table F.1 presents summary statistics for the holding period returns ranging from $h = 1$ month through $h = 36$ months. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. Risk-free rate (rf) is the one-month Treasury bill rate. Panel A reports results for returns in excess of the risk-free rate. Panel B reports results for returns in excess of the Treasury bond returns. In parentheses are p-values for the HAC test of Ledoit and Wolf (2008) for the difference in Sharpe ratios between excess returns for the strip and the excess returns for the market. In brackets are the p-values for the same HAC test based on demeaned excess market returns. The period is from January 1996 through October 2009.

Table F.2: **Holding Period Returns and Sharpe Ratios (Annualized): 2004 - 2022**

	1m	6m	12m	18m	24m	30m	36m
Panel A: Returns in excess of the risk-free rate							
Market-ret. - rf							
Mean	7.24%	7.65%	8.04%	8.39%	8.47%	8.34%	8.14%
Std. dev.	15.37%	16.54%	16.75%	16.61%	16.43%	15.76%	15.61%
Sharpe ratio	0.47	0.46	0.48	0.50	0.52	0.53	0.52
Strip ret. - rf							
Mean	5.62%	5.61%	5.82%	5.94%	6.17%	6.21%	6.20%
Std. dev.	21.66%	14.84%	13.13%	12.38%	12.37%	11.86%	12.36%
Sharpe ratio	0.26	0.38	0.44	0.48	0.50	0.52	0.50
Diff. (p-val.)	(0.38)	(0.53)	(0.64)	(0.70)	(0.78)	(0.79)	(0.51)
Diff. wrt. zero [p-val.]	[0.25]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
N	216	211	205	199	193	187	181
Panel B: Returns in excess of the Treasury bond returns							
Market ret. - 10y Treasury ret.							
Mean	5.39%	5.62%	5.71%	5.67%	5.53%	5.15%	4.76%
Std. dev.	17.61%	19.60%	19.34%	19.61%	19.63%	18.30%	17.46%
Sharpe ratio	0.31	0.29	0.30	0.29	0.28	0.28	0.27
Strip ret. - 2y Treasury ret.							
Mean	5.01%	4.93%	5.03%	5.03%	5.16%	5.14%	5.08%
Std. dev.	21.87%	15.50%	13.80%	13.31%	13.55%	13.11%	13.54%
Sharpe ratio	0.23	0.32	0.36	0.38	0.38	0.39	0.38
Diff. (p-val.)	(0.73)	(0.79)	(0.48)	(0.29)	(0.09)	(0.00)	(0.00)
Diff. wrt. zero [p-val.]	[0.29]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
N	216	211	205	199	193	187	181

Table F.2 presents summary statistics for the holding period returns ranging from $h = 1$ month through $h = 36$ months. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. Risk-free rate (rf) is the one-month Treasury bill rate. Panel A reports results for returns in excess of the risk-free rate. Panel B reports results for returns in excess of the Treasury bond returns. In parentheses are p-values for the HAC test of Ledoit and Wolf (2008) for the difference in Sharpe ratios between excess returns for the strip and the excess returns for the market. In brackets are the p-values for the same HAC test based on demeaned excess market returns. The period is from December 2004 through December 2022.

Table F.3: **Holding Period Returns and Sharpe Ratios (Annualized): 1996 - 2007**

	1m	6m	12m	18m	24m	30m	36m
Panel A: Returns in excess of the risk-free rate							
Market-ret. - rf							
Mean	5.06%	5.20%	5.13%	4.60%	4.03%	3.41%	2.98%
Std. dev.	14.75%	14.43%	16.49%	17.95%	19.11%	19.57%	19.54%
Sharpe ratio	0.34	0.36	0.31	0.26	0.21	0.17	0.15
Strip ret. - rf							
Mean	2.81%	4.56%	4.62%	4.93%	4.97%	5.00%	5.07%
Std. dev.	40.72%	21.66%	15.23%	13.96%	12.26%	12.32%	11.61%
Sharpe ratio	0.07	0.21	0.30	0.35	0.40	0.41	0.44
Diff. (*p*-val.)	(0.41)	(0.75)	(0.98)	(0.51)	(0.08)	(0.03)	(0.01)
Diff. wrt. zero [*p*-val.]	[0.83]	[0.62]	[0.26]	[0.03]	[0.00]	[0.00]	[0.00]
N	142	137	131	125	119	113	107
Panel B: Returns in excess of the Treasury bond returns							
Market ret. - 10y Treasury ret.							
Mean	3.15%	3.19%	3.05%	2.41%	1.86%	1.20%	0.80%
Std. dev.	17.37%	17.62%	19.27%	20.40%	21.35%	21.88%	22.11%
Sharpe ratio	0.18	0.18	0.16	0.12	0.09	0.05	0.04
Strip ret. - 2y Treasury ret.							
Mean	1.63%	3.40%	3.45%	3.73%	3.74%	3.73%	3.75%
Std. dev.	40.52%	21.57%	14.99%	13.47%	11.67%	11.90%	11.29%
Sharpe ratio	0.04	0.16	0.23	0.28	0.32	0.31	0.33
Diff. (*p*-val.)	(0.68)	(0.95)	(0.78)	(0.31)	(0.08)	(0.03)	(0.01)
Diff. wrt. zero [*p*-val.]	[0.90]	[0.67]	[0.37]	[0.08]	[0.02]	[0.01]	[0.00]
N	142	137	131	125	119	113	107

Table F.3 presents summary statistics for the holding period returns ranging from $h = 1$ month through $h = 36$ months. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. Risk-free rate (rf) is the one-month Treasury bill rate. Panel A reports results for returns in excess of the risk-free rate. Panel B reports results for returns in excess of the Treasury bond returns. In parentheses are p-values for the HAC test of Ledoit and Wolf (2008) for the difference in Sharpe ratios between excess returns for the strip and the excess returns for the market. In brackets are the p-values for the same HAC test based on demeaned excess market returns. The period is from January 1996 through November 2007.

Table F.4: **Holding Period Returns and Sharpe Ratios (Annualized): 2004 - 2020**

	1m	6m	12m	18m	24m	30m	36m
Panel A: Returns in excess of the risk-free rate							
Market-ret. - rf							
Mean	7.29%	7.34%	7.27%	7.22%	7.26%	7.24%	7.16%
Std. dev.	13.94%	16.25%	16.52%	16.80%	17.05%	16.55%	16.61%
Sharpe ratio	0.52	0.45	0.44	0.43	0.43	0.44	0.43
Strip ret. - rf							
Mean	6.44%	6.28%	6.22%	6.18%	6.31%	6.10%	6.08%
Std. dev.	13.55%	12.48%	12.08%	12.15%	12.51%	12.73%	13.25%
Sharpe ratio	0.48	0.50	0.52	0.51	0.50	0.48	0.46
Diff. (p-val.)	(0.85)	(0.38)	(0.37)	(0.31)	(0.28)	(0.32)	(0.25)
Diff. wrt. zero [p-val.]	[0.04]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
N	181	176	170	164	158	152	146
Panel B: Returns in excess of the Treasury bond returns							
Market ret. - 10y Treasury ret.							
Mean	3.94%	4.03%	4.01%	3.95%	3.93%	3.75%	3.53%
Std. dev.	16.86%	19.72%	19.21%	19.56%	19.82%	18.74%	18.41%
Sharpe ratio	0.23	0.20	0.21	0.20	0.20	0.20	0.19
Strip ret. - 2y Treasury ret.							
Mean	5.47%	5.28%	5.20%	5.13%	5.22%	4.94%	4.88%
Std. dev.	13.71%	13.22%	12.90%	13.24%	13.77%	14.07%	14.67%
Sharpe ratio	0.40	0.40	0.40	0.39	0.38	0.35	0.33
Diff. (p-val.)	(0.50)	(0.05)	(0.15)	(0.12)	(0.08)	(0.01)	(0.00)
Diff. wrt. zero [p-val.]	[0.09]	[0.00]	[0.02]	[0.01]	[0.00]	[0.00]	[0.00]
N	181	176	170	164	158	152	146

Table F.4 presents summary statistics for the holding period returns ranging from $h = 1$ month through $h = 36$ months. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. Risk-free rate (rf) is the one-month Treasury bill rate. Panel A reports results for returns in excess of the risk-free rate. Panel B reports results for returns in excess of the Treasury bond returns. In parentheses are p-values for the HAC test of Ledoit and Wolf (2008) for the difference in Sharpe ratios between excess returns for the strip and the excess returns for the market. In brackets are the p-values for the same HAC test based on demeaned excess market returns. The period is from December 2004 through January 2020.

Table F.5: **Holding Period Returns and the Market Model (Annualized)**

	1m	6m	12m	18m	24m	30m	36m
$alpha$	0.03	0.04	0.04	0.04	0.04	0.04	0.04
$t-stat.$	(0.80)	(1.47)	(1.80)	(1.88)	(1.81)	(1.75)	(1.65)
$beta$	0.33	0.29	0.27	0.23	0.24	0.27	0.31
$t-stat.$	(1.85)	(2.31)	(2.21)	(1.65)	(1.54)	(1.60)	(1.77)
R^2	0.03	0.07	0.11	0.10	0.12	0.15	0.19
N	323	318	312	306	300	294	288

Table F.5 presents market model estimates for dividend strip returns in excess of the risk-free rate for holding periods ranging from $h = 1$ month through $h = 36$ months. Returns are continuously compounded (in logarithms), annualized, and expressed as a percentage. We use the market factor from the Fama-French data library. The risk-free rate is the one-month Treasury bill rate. In parentheses are the Newey-West t-statistics with $h+6$ lags, where h is the holding period expressed in months. The period is from January 1996 through December 2022.

Table F.6: **Holding Period Returns and the Market Model (Annualized Returns)**

	1m	6m	12m	18m	24m	30m	36m
$alpha$	0.08	0.05	0.05	0.05	0.05	0.05	0.05
$t-stat.$	(2.19)	(1.90)	(1.94)	(2.02)	(1.96)	(1.92)	(1.84)
$beta$	0.31	0.27	0.26	0.22	0.22	0.24	0.27
$t-stat.$	(1.87)	(1.86)	(1.99)	(1.55)	(1.54)	(1.51)	(1.67)
R^2	0.02	0.05	0.09	0.08	0.10	0.11	0.15
N	323	318	312	306	300	294	288

Table F.6 presents market model estimates for dividend strip returns in excess of the risk-free rate for holding periods ranging from $h = 1$ month through $h = 36$ months. We use returns (not in logarithms), annualized, and expressed as a percentage. We use the S&P 500 index as a proxy for the market. The risk-free rate is the one-month Treasury bill rate. In parentheses are the Newey-West t-statistics with $max(h, 6)$ lags, where h is the holding period expressed in months. The period is from January 1996 through December 2022.

Table F.7: **Predicting the Realized Term Premia**

	12m	18m	24m	30m	36m
Panel A:					
dp_t^{Mkt}	0.29	0.46	0.65	0.76	0.87
$t-stat(Overlap.)$	(1.86)	(2.07)	(2.55)	(2.68)	(2.88)
$t-stat(Nonoverlap.)$	[1.94]	[2.51]	[3.59]	[3.38]	[3.05]
R^2	0.10	0.16	0.26	0.31	0.37
Panel B:					
$A^h dp_t^{Mkt} - dp_t^{Strip}$	0.71	0.97	1.14	1.25	1.42
$t-stat(Overlap.)$	(3.87)	(3.94)	(3.85)	(4.69)	(6.96)
$t-stat(Nonoverlap.)$	[3.23]	[3.23]	[5.08]	[4.33]	[5.57]
R^2	0.23	0.31	0.36	0.41	0.50
Panel C:					
$A^h dp_t^{Mkt} - dp_t^{Strip}$	0.94	1.24	1.36	1.37	1.55
$t-stat(Overlap.)$	(5.62)	(5.78)	(5.14)	(5.73)	(8.57)
$t-stat(Nonoverlap.)$	[4.24]	[5.03]	[5.40]	[3.79]	[5.71]
g_t^{Ind}	-1.14	-1.49	-1.32	-0.81	-0.95
$t-stat(Overlap.)$	(-4.71)	(-6.66)	(-4.89)	(-2.96)	(-3.52)
$t-stat(Nonoverlap.)$	[-3.27]	[-3.22]	[-2.87]	[-1.64]	[-1.63]
R^2	0.29	0.38	0.41	0.43	0.52
N	312	306	300	294	288

Table F.7 presents the results of the predictive regressions for the difference between market and strip returns for holding periods ranging from $h = 12$ month through $h = 36$ months. In panel A, the predictor variable is the market dp-ratio. In Panel B, the predictor variable is the scaled difference between the market and strip dp-ratios. In panel C, we add a control for indicative dividend growth. In parentheses are t-statistics based on the Newey-West (1987) correction with h lags. In brackets are the average t-statistics from h non-overlapping samples starting in months $1, ..., h$. For each non-overlapping sample, we set the number of lags for Newey-West correction equal to 3. N reports the number of overlapping observations. The period is from January 1996 through December 2022.

Table F.8: **Predicting the Realized Term Premia**

	12m	18m	24m	30m	36m
Panel A:					
$ln(1/CAPE)$	0.16	0.28	0.43	0.54	0.65
$t-stat(Overlap.)$	(1.30)	(1.46)	(1.76)	(1.90)	(2.23)
$t-stat(Nonoverlap.)$	[1.39]	[1.71]	[2.24]	[2.39]	[2.39]
R^2	0.04	0.07	0.14	0.19	0.25
N	312	306	300	294	288
Panel B:					
$-\Delta consumption$	0.84	1.19	1.84	2.31	4.10
$t-stat(Overlap.)$	(2.14)	(1.45)	(1.14)	(1.14)	(1.25)
$t-stat(Nonoverlap.)$	[1.69]	[1.32]	[1.86]	[1.21]	[0.91]
R^2	0.02	0.03	0.03	0.04	0.07
N	312	306	300	294	288
Panel C:					
$-output\ gap$	0.01	0.02	0.02	0.03	0.05
$t-stat(Overlap.)$	(0.72)	(1.01)	(0.82)	(1.12)	(1.48)
R^2	0.01	0.03	0.03	0.06	0.11
N	104	102	100	98	96

Table F.8 presents the results of the predictive regressions for the difference between market and strip returns for holding periods ranging from $h = 12$ month through $h = 36$ months. We have monthly observations for the Cyclically Adjusted Price Earnings ratio (CAPE) and consumption. For the output gap, we only have quarterly observations. In parentheses are t-statistics based on the Newey-West (1987) correction with h lags. For CAPE and consumption, we report in brackets the average t-statistics from h non-overlapping samples starting in months $1, ..., h$. For each non-overlapping sample, we set the number of lags for the Newey-West correction equal to 3. N reports the number of overlapping observations. The period is from January 1996 through December 2022.

Table F.9: **Predicting the Term Structure in Sharpe Ratios**

	12m	18m	24m	30m	36m
Panel A:					
dp_t^{Mkt}	5.14	6.85	9.27	8.83	8.63
$t-stat(Overlap.)$	(1.69)	(1.62)	(1.99)	(1.54)	(1.28)
$t-stat(Nonoverlap.)$	[1.83]	[1.98]	[2.38]	[1.83]	[1.21]
R^2	0.06	0.07	0.12	0.11	0.11
Panel B:					
$A^h dp_t^{Mkt} - dp_t^{Strip}$	9.52	14.86	18.82	19.19	20.00
$t-stat(Overlap.)$	(1.93)	(2.44)	(3.48)	(4.44)	(5.46)
$t-stat(Nonoverlap.)$	[1.71]	[1.81]	[2.60]	[3.67]	[3.19]
R^2	0.06	0.11	0.18	0.21	0.25
N	310	304	298	292	286

Table F.9 presents the results of the predictive regressions for the difference between market and strip Sharpe ratios for holding periods ranging from $h = 12$ month through $h = 36$ months. Sharpe ratios are based on returns in excess of Treasury bond returns. We subtract the 2-year Treasury bond returns from dividend strip returns and the 10–year Treasury bond returns from market returns. In panel A, the predictor variable is the market dp-ratio. In Panel B, the predictor variable is the scaled difference between the market and strip dp-ratios. In parentheses are t-statistics based on the Newey-West (1987) correction with h lags. In brackets are the average t-statistics from h non-overlapping samples starting in months $1, \ldots, h$. For each non-overlapping sample, we set the number of lags for the Newey-West correction equal to 3. N reports the number of overlapping observations. The period is from January 1996 through December 2022.

Table F.10: **Predicting the Term Structure in Sharpe Ratios**

	12m	18m	24m	30m	36m
Panel A:					
$ln(1/CAPE)$	4.39	6.50	9.24	9.85	10.73
$t-stat(Overlap.)$	(1.75)	(1.67)	(1.86)	(1.60)	(1.60)
$t-stat(Nonoverlap.)$	[1.58]	[1.71]	[1.98]	[1.79]	[1.64]
R^2	0.05	0.08	0.13	0.14	0.16
N	312	306	300	294	288
Panel B:					
$-\Delta consumption$	23.63	25.46	25.63	21.86	35.15
$t-stat(Overlap.)$	(2.68)	(1.59)	(0.81)	(0.53)	(0.49)
$t-stat(Nonoverlap.)$	[2.00]	[1.45]	[0.93]	[0.39]	[0.20]
R^2	0.03	0.02	0.01	0.01	0.01
N	312	306	300	294	288
Panel C:					
$-output\ gap$	0.24	0.32	0.31	0.46	0.77
$t-stat(Overlap.)$	(0.97)	(0.92)	(0.67)	(0.90)	(1.25)
R^2	0.01	0.02	0.01	0.03	0.07
N	104	102	100	98	96

Table F.10 presents the results of the predictive regressions for the difference between market and strip Sharpe ratios for holding periods ranging from $h = 12$ month through $h = 36$ months. Sharpe ratios are based on returns in excess of the risk-free rate. We have monthly observations for the Cyclically Adjusted Price Earnings ratio (CAPE) and consumption. For the output gap, we only have quarterly observations. In parentheses are t-statistics based on the Newey-West (1987) correction with h lags. For CAPE and consumption, we report in brackets the average t-statistics from h non-overlapping samples starting in months $1, \ldots, h$. For each non-overlapping sample, we set the number of lags for the Newey-West correction equal to 3. N reports the number of overlapping observations. The period is from January 1996 through December 2022.

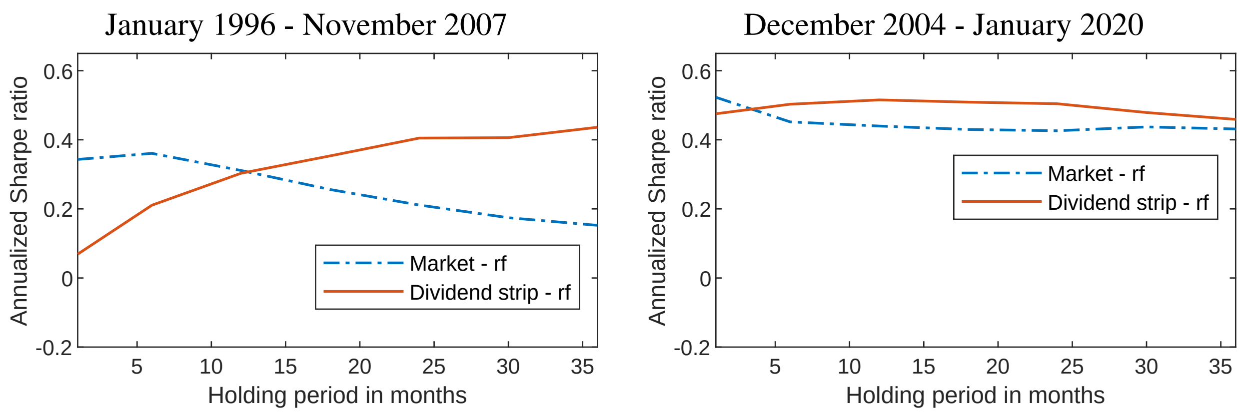
Table F.11: **Predicting the Term Structure in Market Model Alphas**

	12m	18m	24m	30m	36m
Panel A:					
$ln(1/CAPE)$	-0.00	-0.01	-0.02	-0.03	-0.03
$t-stat(Overlap.)$	(-0.16)	(-0.48)	(-0.72)	(-0.86)	(-0.98)
$t-stat(Nonoverlap.)$	[-0.11]	[-0.43]	[-0.62]	[-0.78]	[-1.21]
R^2	0.00	0.01	0.03	0.04	0.06
N	312	306	300	294	288
Panel B:					
$-\Delta consumption$	-0.04	-0.13	-0.37	-0.40	-0.52
$t-stat(Overlap.)$	(-0.51)	(-1.23)	(-2.20)	(-1.97)	(-1.31)
$t-stat(Nonoverlap.)$	[-0.54]	[-1.29]	[-2.06]	[-2.02]	[-1.67]
R^2	0.01	0.05	0.15	0.13	0.11
N	312	306	300	294	288
Panel C:					
$-output\ gap$	-0.00	-0.00	-0.01	-0.01	-0.01
$t-stat(Overlap.)$	(-2.40)	(-2.60)	(-2.64)	(-2.52)	(-2.16)
R^2	0.14	0.19	0.23	0.23	0.23
N	104	102	100	98	96

Table F.11 presents the results of the predictive regressions for the term structure of market model alphas (market alpha minus strip alpha) ranging from $h = 12$ month through $h = 36$ months. We have monthly observations for the Cyclically Adjusted Price Earnings ratio (CAPE) and consumption. For the output gap, we only have quarterly observations. In parentheses are t-statistics based on the Newey-West (1987) correction with h lags. For CAPE and consumption, we report in brackets the average t-statistics from h non-overlapping samples starting in months $1, \ldots, h$. For each non-overlapping sample, we set the number of lags for the Newey-West correction equal to 3. N reports the number of overlapping observations. The period is from January 1996 through December 2022.

Figure F.1: **Annualized Sharpe Ratios: Subsamples**

Panel A: Returns in excess of the risk-free rate



Panel B: Returns in excess of Treasury bond returns

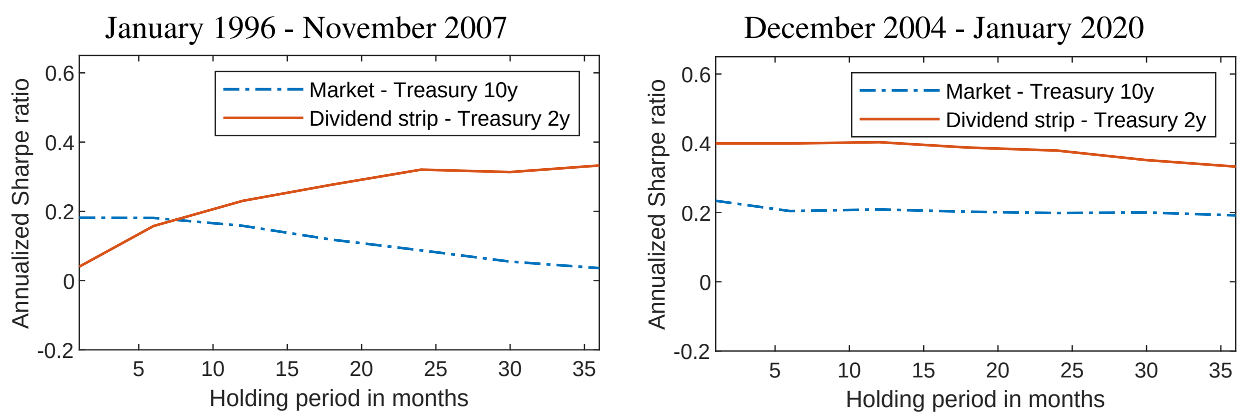


Figure F.1 plots the annualized Sharpe ratio for holding periods of 1, 6, 12, 18, 24, 30, and 36 months. The returns are in excess of the risk-free rate (Panel A) and in excess of the Treasury returns (Panel B). The period is from January 1996 through November 2007 (left) and from December 2004 through January 2020 (right).

Internet Appendix G Out-of-Sample Predictability

In-sample predictability does not necessarily imply that returns are predictable in real time (Goyal and Welch 2003; Goyal and Welch 2008; Cochrane 2008). We check this by computing the out-of-sample R-square (ROOS) as in Goyal and Welch (2008):

$$ROOS = 1 - \frac{\sum_{\tau=1}^{T}\left(\left(r_\tau^{Mkt} - r_\tau^{Strip}\right) - \left(r_\tau^{\hat{Mkt}} - r_\tau^{\hat{Strip}}\right)\right)^2}{\sum_{\tau=1}^{T}\left(\left(r_\tau^{Mkt} - r_\tau^{Strip}\right) - \left(\overline{r_\tau^{Mkt}} - \overline{r_\tau^{Strip}}\right)\right)^2}, \tag{G.1}$$

where $r^{Mkt} - r^{Strip}$ is the difference between the actual returns on the market and the strip, $r^{\hat{Mkt}} - r^{\hat{Strip}}$ is the difference between the predicted returns on the market and the strip estimated on the sample up to $\tau - 1$, and $\overline{r^{Mkt}} - \overline{r^{Strip}}$ is the difference in mean returns up to $\tau - 1$. As a predictor variable, we use the model with the scaled dp-ratios (Eq. 9). We use 36 months for the first training sample and average strip dp-ratios over the last three months as above. Our training sample limits the lengths of holding periods that we can reasonably estimate. We limit ourselves to 12- and 24-month ahead returns, for which we compute ROOS and Clark and West (2007) t-statistics. For 12-months holding period returns, the ROOS is 11.19% with a t-statistics of 1.88. For 24-months holding period returns, ROOS is 15.66% with a t-statistics of 1.85.

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