HOTNESS: HIGH TURNOVER HOT STOCKS EVENTUALLY GO COLD

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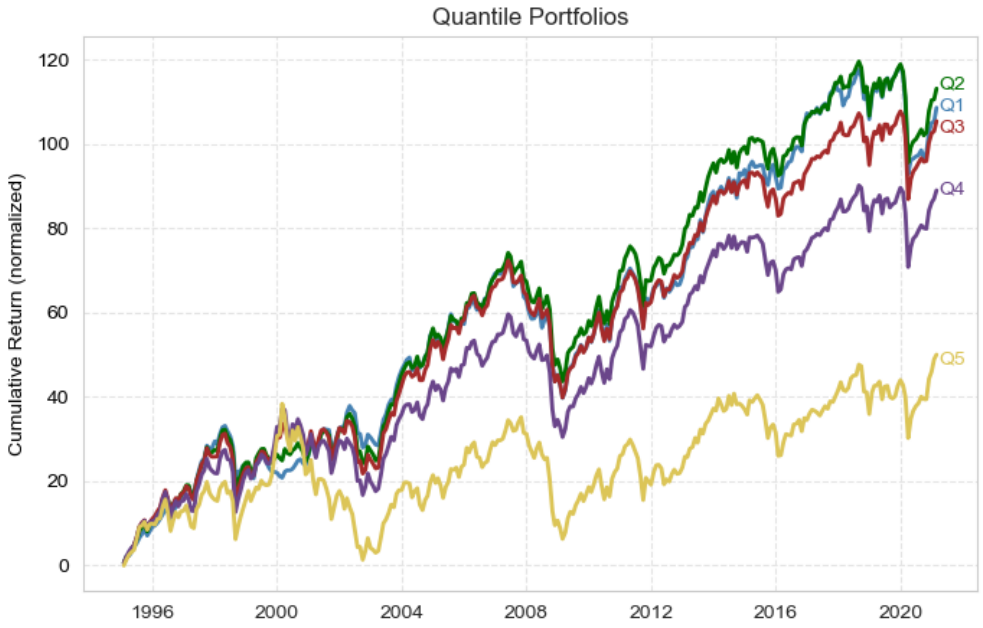

Figure 1: Cumulative monthly log returns for quantile portfolios formed on Hotness across our U.S. equity market universe. Q1 stocks have the least turnover and Q5 have the most. Results are equal-weighted and normalized with respect to intertemporal changes in market volatility.

Timothy Marble
Data Scientist
tim.marble@oneilglobaladvisors.com

Ronald P. Ognar, CFA
Quant Analyst
ron.ognar@oneilglobaladvisors.com

Jack Liu
Data Scientist
jack.liu@oneilglobaladvisors.com

KEY FINDINGS:

- Portfolios of stocks with high speculative trading intensity (Hotness) significantly underperform those with low levels of speculative activity.
- The effect is primarily concentrated in the sharp underperformance of the Q5 (highest) Hotness quintile.
- Q1–Q5 portfolios have moderate positive exposure to Size and significant positive exposure to Style.
- Hotness is prone to sharp drawdowns, as during the late 1990s tech bubble and the COVID-19 pandemic.

EXECUTIVE SUMMARY

We explore the relationship between levels of speculative trading intensity (Hotness) and excess returns. We perform cross-sectional studies comparing the returns of Hot versus Cold stocks, which we differentiate with our proprietary measure of speculative trading intensity. We find that Hot stocks tend to significantly underperform Cold stocks on a risk-adjusted basis, leading to potentially profitable market-neutral trading strategies. We conjecture that such effects are due to average net-long positioning of short-term speculators causing expected returns to diverge from fair values, and we discuss qualitative examples and potential explanations from behavioral finance literature. However, portfolios long low-Hotness stocks and short high-Hotness stocks come with moderately

positive exposure to Size and significant positive exposure to Style. These exposures may be the source of sharp periodic reversals in the direction of the Hotness factor. This implies extracting alpha in a market-neutral way exposes the investor to the relative performance of small stocks compared with big and Value stocks compared with Growth stocks, and such returns can be viewed as compensation for such risk assumption.

INTRODUCTION

Many hyped and popular stocks fail to live up to the promise of their story and fail to deliver the future growth implied by their market price. Such stocks are often the object of intensive speculative trading activity, causing dollar trading volumes that are often multiples of what would be expected given the company's market capitalization or other relevant attributes. Higher volumes are indicative of shorter average holding periods. We theorize that such abnormal trading volumes are driven by short-term speculators. If such traders are on balance net long, then their presence would be expected to drive prices above their equilibrium values, such that these stocks have expected returns that are lower than what would be expected given their betas.

Previous studies (Lee, Kim & Kim, 2016) have demonstrated a negative relationship between turnover and expected stock returns. Such studies of turnover use measures of trading frequency and intensity that are somewhat blunt and fail to account for limitations of market capitalization calculations or adequately control for prior expectations of trading volume intensity.

In this study, we measure the Hotness of a stock using a proprietary measure of relative trading intensity that incorporates a ratio of recent dollar volume of trading activity to each stock's longer-term model-based expectation. Using this measure, we hypothesize that, contrary to expectations in a purely efficient market, portfolios of stocks with high average Hotness can be expected to underperform portfolios of stocks with low average Hotness such that market-neutral portfolios comprised of long positions in low-Hotness stocks and short positions in high-Hotness stocks should earn predictably significantly positive returns.

METHODOLOGY

For the purposes of this study, we define a stock's Hotness as its 50-day average dollar volume divided by its expected dollar liquidity as derived from our proprietary model. Each month, during our study period from January 1995 to December 2020 (inclusive), we sort the stocks in our U.S. equity universe[1] into one of five portfolios according to their quintile ranking with respect to Hotness such that quintile one (Q1) is comprised of the bottom 20% of the universe with the least turnover and Q5 the top 20% with the most turnover. Within each quintile, we weight each stock equally. We then apply a normalizing adjustment in respect of point-in-time model-based expectations of broader market volatility. Results are thus effectively normalized for changes over time in broader market volatility expectations such that daily portfolio returns are determined as a function of constant risk levels to avoid periods of higher volatility contributing disproportionately to average returns and measures of risk. This also is tantamount to and reflective of a portfolio manager who tactically reduces overall exposure when volatility is high and raises it when volatility is low in order to maintain a target constant level of risk.

We then compute the time series of returns to hypothetical long-short portfolios comprised of a long position in the Q1 portfolio and a short position in the Q5 portfolio, with weights further scaled in consideration of systematic differences in volatility between the Q1 and Q5 portfolios such that each side has equal portfolio-level volatility, and then subtract the Q5 return from the Q1 return.

From the resulting time series of Q1–Q5 long-only and Q1–Q5 long-short portfolios, we then run ordinary least squares (OLS) regressions against the liquidity-weighted market portfolio (MKT) and portfolios that mimic the relative return of Small-Cap stocks versus Large Caps (SMB) and the relative returns of Value Stocks compared with Growth Stocks (HML).

In an efficient market, it is axiomatic that two portfolios with comparable risk would on average produce comparable returns, the difference between which would be statistically indistinguishable from zero. If Hotness carries no information about future returns, we would expect no material risk-adjusted difference between the Q5 and Q1 portfolios. However, if the Q1–Q5 long-short portfolio produces statistically significant positive (or negative) return, we might consider this evidence of the existence of an anomaly. This would not necessarily by itself prove the existence of an inefficiency exploitable by arbitrage, however. While market-neutral long-short returns may generate positive returns, such return could merely reflect compensation for carrying some other orthogonal but systematic risk exposure. For this

1 Our universe construction methodology is free of survivorship bias and considers each stock each day for inclusion on the basis of investability while excluding potential confounders such as penny stocks, ADRs, ETFs, and corporate events. The bottom 20% of stocks by price and the bottom 50% by liquidity are removed, with the remaining stocks weighted by liquidity.

reason, we will weigh careful resultant exposures to SMB and HML alongside any significant results.

RESULTS

Somewhat consistent with our hypothesis, the plots of the time series of cumulative returns to each of our five quantile portfolios reveal the differentiation of average returns for portfolios comprising high- and low-Hotness stocks. Figure 2 shows the cumulative performance of quantile portfolios formed on Hotness. Such plots have been scaled further such that each has the same volatility to emulate parity of risk. In general, we find that **portfolios of stocks in the top Hotness quintile have consistently lower returns than those in the lower quintiles**. In the plot below , the Q5 line running at the bottom of the stack represents the cumulative return to portfolios in the top quintile with respect to Hotness. The Q1 line snaking around the top conversely represents that of the bottom quintile.

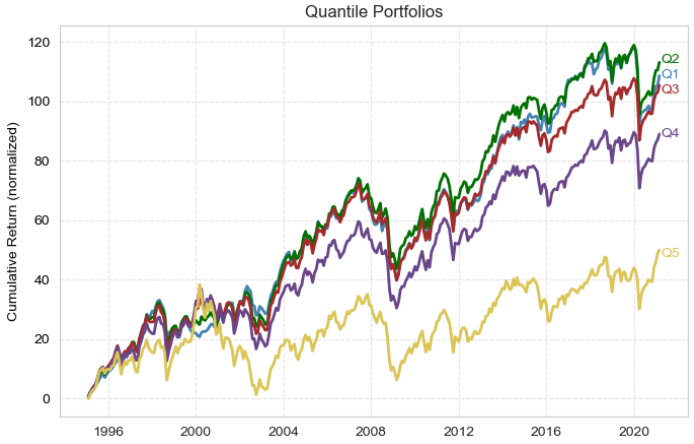

Figure 2: Cumulative monthly log returns for quantile portfolios formed on Hotness across our U.S. equity market universe. Q1 stocks have the least turnover and Q5 have the most. Results are equal-weighted and normalized with respect to intertemporal changes in market volatility.

As we can leverage up and down the returns to either portfolio to achieve a desired risk target, the relevant question is what we receive in return in each case for taking such a risk. In this respect, the relatively superior risk-return tradeoff offered by the lowest Hotness portfolio costs significantly less, or rather provides much more in return per unit of risk. The first line of Table 1 shows the percentage return to each of the five quintile portfolios as well of that of the properly hedged Q1–Q5 long-short portfolio. On the second to last line of the table, we see the corresponding annualized volatility figures for these portfolios. The Q1 portfolio, compared with the Q5 portfolio, has both a higher annualized return, 8.55% versus 6.21%, and lower annualized volatility, 5.18% versus 8.39%. The risk-return tradeoff is summed up succinctly in the bottom row of the table: we see a Sharpe ratio of 0.49 for the Q1 portfolio, compared with 0.23 for the Q5 portfolio.

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The O'Neil Global Advisors Quantitative Services Group grew out of a desire to create quantitative research based on the work pioneered by Mr. O'Neil. The Quant Group develops quantitative research and systematic investment strategies for the O'Neil family of companies. The program comprises a global team of data scientists, software engineers, and investment professionals. Our research is composed primarily of factor studies for discretionary and quantitative portfolio managers, and our current interests include factor investing, time series analysis, and machine learning techniques.

The Quant Group provides quantitative research and data science expertise for O'Neil Global Advisors. The two benefit from a common heritage and passion for finding what leads to outperformance in global equity markets.

	Q1	Q2	Q3	Q4	Q5	Q1-Q5
Annualized Return (normalized)	8.55%	10.32%	10.29%	9.27%	6.21%	4.38%
	(2.5307)	(2.6367)	(2.4568)	(2.0743)	(1.1663)	(2.0106)
CAPM						
Alpha	1.14%	1.29%	0.54%	-0.90%	-5.10%	4.29%
	(0.9943)	(1.5719)	(1.1598)	(-1.6236)	(-3.1779)	(2.0848)
Fama-French 3-Factor						
Alpha	2.91%	2.52%	0.78%	-1.62%	-7.59%	7.59%
	(2.752)	(3.3977)	(1.7256)	(-3.0257)	(-5.4522)	(4.1666)
Beta Market (MKT)	0.73	0.9	1.01	1.09	1.26	-0.05
Beta Size (SMB)	0.13	0.02	-0.07	-0.08	0.01	0.12
Beta Value (HML)	0.3	0.24	0.08	-0.1	-0.52	0.62
Annualized Volatility	5.18%	5.87%	6.28%	6.79%	8.39%	3.51%
Sharpe	0.49	0.52	0.48	0.41	0.23	0.39

Table 1: Normalized returns, alphas, and factor loadings for portfolios formed on Hotness. Portfolios are equal and normalized with respect to intertemporal volatility shifts and rebalanced monthly. Q1–Q5 portfolios are scaled to have the same volatility. Monthly returns are expressed in standardized volatility units.

* Annualized returns are expressed as simple returns. Annualized volatility and Sharpe are computed with logged returns.

An additional implication of this divergence in Sharpe ratio is that it is possible to compose these two portfolios into a long-short portfolio whose broader market exposures offset one another, effectively neutralizing market risk while maintaining a positive expected return irrespective of the overall market direction. Note that in our study we have constructed our long-short portfolios such that we are long low-Hotness (Q1) stocks and short high-Hotness (Q5) stocks. Of interest to us is the predictable absolute and persistent deviation from zero offered by these portfolios. This is demonstrated by the Q1–Q5 columns, which are the performance metrics to a portfolio which is long the Q1 portfolio and short the Q5 portfolio, having correctly scaled up or down the Q5 portfolio exposure in accordance with a properly reckoned hedge ratio. Such a portfolio yields a statistically significant positive average annualized return, denoted by a t-statistic of (2.01). This is reflective of and comprised of substantially significant non-zero monthly CAPM and Fama-French 3-Factor alphas. This suggests that a substantial portion of this return stream is a diversifiable risk, meaning that it could be combined with other like return streams to devise a portfolio whose average return approaches the average of each return stream but whose risk is minimized as the number of such return streams grows.

Though much of this is diversifiable risk, it is important to recognize that a substantial portion of the returns to the long-short portfolio may be coming from non-diversifiable risk. Note in Table 1 the positive coefficients of 0.12 and 0.62 for SMB and HML, respectively, for the Q1–Q5 portfolios. This is reflective of a portfolio with moderately positive exposure to the relative returns of small-cap versus large-cap stocks and solidly positive exposure to that of value stocks versus growth stocks, meaning that, when applying this as a strategy, investors will have a tendency to be short smaller, more speculative stocks and long larger, more stable value-oriented stocks.

In this respect, such returns can be thought of as compensation for exposure to an alternative set of risks than those posed by the movements of broad market averages. In Figure 3, we can see that while the general trend of the Q1–Q5 chart is up, there are period such as the late 1990s, the 2008 financial crisis, and most recently during the COVID-19 pandemic that this relationship for a short time appeared to work in reverse. Investors in the Hotness factor will need healthy intestinal fortitude to endure the short-term financial setbacks during these periods of a purportedly market-neutral investment program.

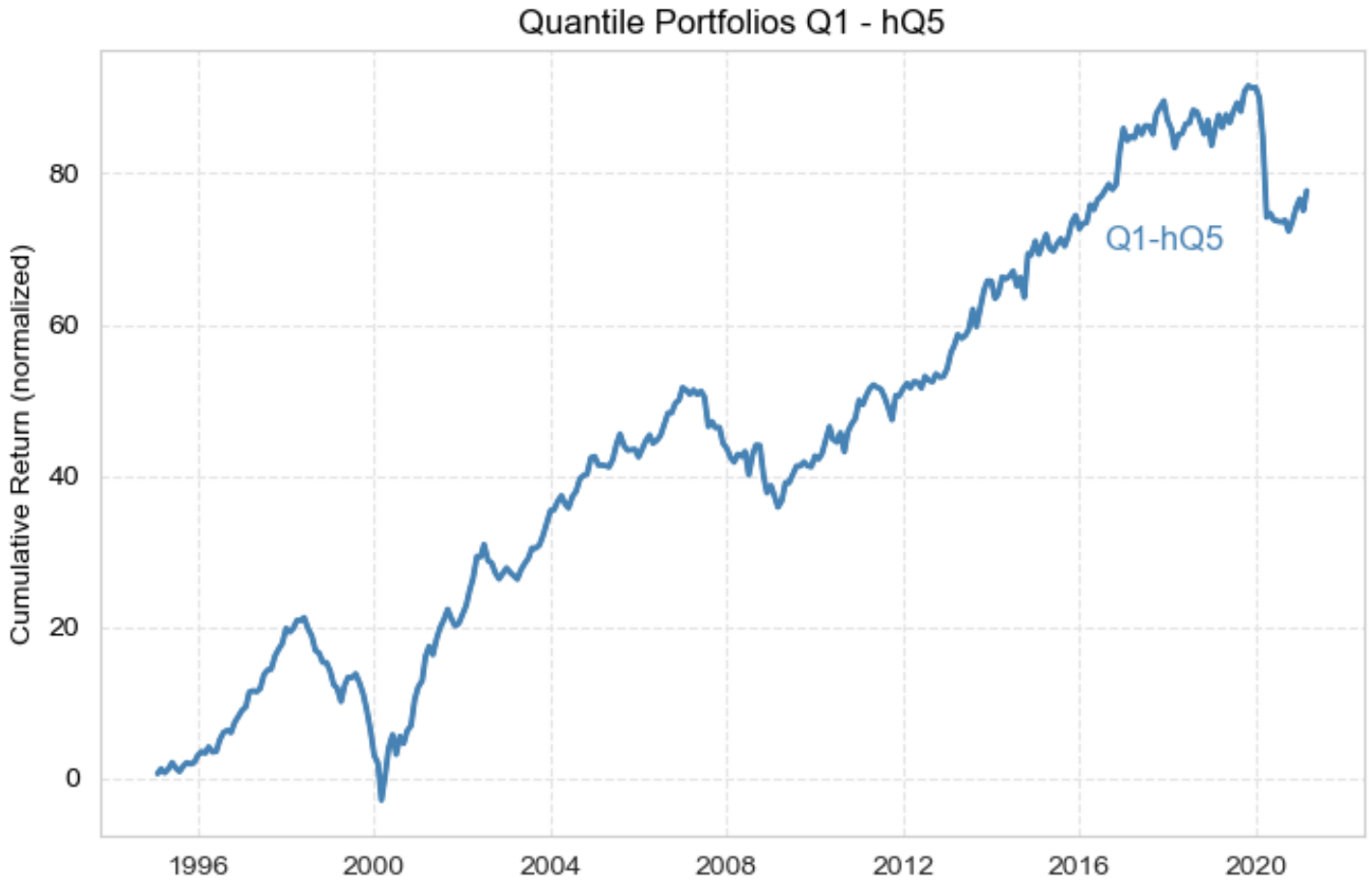

Figure 3: Cumulative returns of the Q1–Q5 portfolio. We form Q1–Q5 portfolios by scaling the returns of the Q5 portfolio up or down by such scaling factor that results in the two time series having equal volatility, and then subtracting the Q5 return from the Q1 return.

CONCLUSION

We have seen firm evidence that Hot stocks, with high levels of speculative trading intensity, have on average lower risk-adjusted returns, but that such differences in returns to the trained eye do not come without certain attendant risks that are at best orthogonal to those of outright market risk. We conjecture that such returns are reflective of market prices that have been driven into disequilibrium by the quasi-rational activities of short-term speculators, whose presence we can infer by recent average trading volumes in dollars that are multiples of what would be expected. We can infer from this study that, to their detriment, such trading activity is a negative proposition in relative terms, and taking the opposing position represents a tactical trading opportunity.

REFERENCES

Lee, Deok Hyeon, Min Ki Kim, and Tong Suk Kim. "Abnormal Trading Volume and the Cross-Section of Stock Returns." KAIST College of Business Working Paper Series 2016-008 (2016).

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