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Owain ap Gwilym,

Andrew Clare,

James Seaton

&

Stephen Thomas

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Centre for Asset Management Research
Cass Business School
City University
106 Bunhill Row London
EC1Y 8TZ
UNITED KINGDOM

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Dividends and Momentum

Owain ap Gwilym [1]

Andrew Clare,

James Seaton

&

Stephen Thomas

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Abstract

We investigate the relationship that exists between dividend yield and momentum strategies. Both have been shown to explain the cross-section of returns and yet they are negatively related to each other. We find that the outperformance of zero dividend stocks disappears when returns are measured on a value-weighted basis. Both value and momentum strategies work when the other is controlled for, although momentum is found to be the more statistically significant effect. Momentum seems to be most effective in lower dividend yield quintiles. When 130/30 portfolios were formed, this generated several percentage points of return on an annualized basis although there was a broadly commensurate increase in volatility.

[1] Corresponding author Tel: +44 1248 382176 Fax: +44 1248 383228 e-mail: owain.apgwilym@bangor.ac.uk

There has long been a debate within investment circles about the relative merits of fundamental and technical analysis. A recent article in the *Financial Times*[2] argues that the recent distress in the UK banking sector was evident in the price charts even though stock analysts were recommending purchases, directors were buying stock and there was a history of steadily increasing profits and dividends. Academic evidence, however, has provided support for the both value investing and momentum trading. Fama and French (1992) and Levis and Liodakis (1999) found positive returns to value strategies based on price-to-book ratio, Christie (1990) reports outperformance to high dividend yield stocks and Lakonishok et al (1994) observe a value effect using a price-to-cash flow measure. Jegadeesh and Titman (1993) find positive excess returns to momentum strategies based on the prior 6-12 months whilst George and Hwang (2004) report that stocks trading near 52-week highs outperform those far away from their annual high price. Asness (1997) sorts US firms on both value characteristics (book-to-market and dividend yield) and momentum, finding that significant momentum effects exist when value is controlled for and vice versa. Of particular interest from an investment perspective was the result that "expensive winners" markedly outperformed "cheap losers".

The aim of this paper is to investigate the relationship between dividend yield and momentum in the UK market. We focus on dividend yield as a measure of value because Asness (1997) found this generated the most significant results. In particular we extend previous work by considering zero dividend firms as a specific group rather than incorporating them into the lowest dividend quintile. We do this since both Keim (1985) in the US and Morgan and Thomas (1998) in the UK observe a "U-shaped" relationship between dividend yield and return, whereby zero dividend firms achieve returns comparable with the highest yielding firms. The performance of portfolios formed on both dividend yield and momentum are evaluated when formed on a long-only, 130/30 and directionally neutral long-short basis.

We find that the "U-shaped" dividend yield-return relationship disappears when returns are measured on a value-weighted basis. Zero-dividend stocks then become the worst performers as well as exhibiting higher volatility of returns. When portfolios were formed on the basis of both dividend yield and momentum it was observed that the differences between returns in high and low quintiles were statistically significant when momentum was controlled for and dividend yield was allowed to vary as well as *vice versa*. Furthermore "expensive winners" were observed to be a significantly better investment than "cheap losers". Multi-

[2] Davis, J. (2008), *Financial Times FTfm Supplement*, p. 28, 20th May.

strategy portfolios with both high yield and high momentum exhibited the best risk-adjusted performance among long-only strategies. When similar strategies were used to create 130/30 portfolios the average return level increased although it was also typically accompanied by higher volatility and larger maximum drawdowns.

Data & Methodology

We use monthly data for the UK market for the period of 1980-2006. All values are taken from the London Share Price Database (LSPD). We include any firm that has complete data. For a firm to qualify for the sample it must have at least 12 months of price data to enable the calculation of dividend yield and momentum variables. Dividend yield is calculated on a historic, 12-month rolling basis with splits and consolidations adjusted for. The momentum variable used is PAST(2,12), consistent with Asness (1997), which is calculated as a stock's return over the prior 12 months not including the most recent month. By excluding the most recent month of return data it excludes any possibility of picking up a "bid-offer bounce" that may contaminate the results.

Each month portfolios are formed independently on dividend yield and PAST(2,12). In the case of dividend yield, the zero dividend firms are initially split into their own group and the remainder then divided into quintiles. The monthly formation of momentum portfolios is done on a simple quintile basis. From the initial sorts, 30 additional sub-portfolios are created by combining the relative dividend and momentum rankings of each stock and hence creating a two-way sorting process.

Empirical Results

Exhibit 1 reports summary statistics for both of the single method sorts. All returns displayed are compound monthly averages. When firms are sorted on dividend yield, the "U-shaped" relationship is evident in the equally-weighted results with the zero dividend firms exhibiting the highest returns. On a value-weighted approach, however, these excess returns disappear and the zero dividend category becomes the worst performer. It is also noticeable that the non-payers are much smaller in size than the dividend payers, confirming the previous finding of Benito and Young (2001). The second smallest mean firm size is found in the highest yielding group although this is considerably greater than the comparable zero-dividend size. The value-weighted return amongst the high yielders is actually higher than the equally-weighted return. From a practical standpoint this makes this category more investable than the non-paying group. Finally, it can be seen that a negative relationship

exists between dividend yield and PAST(2,12). This becomes particularly evident when a value-weighted average is used.

The positive relationship observed between PAST(2,12) and subsequent monthly returns is consistent with that of Asness (1997). As with the zero-dividend category, there is a concentration of smaller market capitalization stocks in the lowest momentum category. This has some implications for long-short strategies since Ali and Trombley (2006) report that firms with small market size have short sales constraints that can affect the returns available to potential momentum methods. The difference between PAST(2,12) Q5 and Q1 returns increases when a value-weighted average is employed compared to an equally-weighted method. In terms of dividend yield there is little difference across the PAST(2,12) quintiles when measured on an equal-weight basis but this becomes clearly negative when the value-weight methodology is applied.

Exhibit 2 displays the results of forming 30 portfolios based on the ranking of firms in Exhibit 1. All returns reported from here onwards are value-weighted since given the small firm issue (particularly with the zero dividend firms) it is likely to offer a better representation of practical strategies. Results are also reported for the differences between the highest and lowest quintiles (Q5-Q1) of both dividend yield and PAST(2,12) along with Q5-Q0 to investigate the zero dividend stock relationship. Looking first at the portfolios where momentum is held constant, it is observed that the generally more significant results are found in Q5-Q1 rather than Q5-Q0. Whilst Q5-Q0 sometimes offers a greater return, the high volatility of Q0 compromises the statistical significance. Despite controlling for momentum, the conventional (positive) dividend yield-return relationship exists across most of the PAST(2,12) quintiles. The notable exception is in the (highest momentum) quintile containing the “winners” where the zero dividend firms return more than any of the other portfolios; in stark contrast to all the other quintiles. The difference between the highest and lowest dividend paying quintiles is also relatively small in the highest momentum quintile with the inference that value loses some power when one is dealing with stocks with the greatest relative strength. This supports the US evidence presented by Asness (1997).

When dividend yield is controlled for, the results for PAST(2,12) sorts are typically more significant than when the roles are reversed. The return difference between PAST(2,12) Q5 and Q1 (final row of Exhibit 2) is greater across every dividend yield quintile than when PAST(2,12) was controlled for (final column of Exhibit 2). It is observed that momentum-based returns are greatest and most significant in the lower yield quintiles, although all apart from the highest yield quintile are significant at the 95% level. While the greatest absolute

return is observed between momentum-sorted portfolios within the zero-dividend group, the statistical significance is relatively lower due to the high return volatility of the component firms. Finally it should also be noted that the return of the highest momentum, zero dividend portfolio produces a statistically significant excess return compared to the lowest momentum, high yield portfolio (*t*-statistic = 2.26).

The results thus far suggest that momentum is a more dominant theme than value when the holding period is one month. A potential implication of this for value investors is that focussing on high yield firms with momentum is likely to be more profitable than similar yield firms that are 'losers'. In addition, short-selling those "expensive winners" has historically not been a good means of hedging a value portfolio. In general, momentum offers the greatest potential for excess returns amongst zero or low yielding firms.

Exhibit 3 reports some performance statistics for the investment strategies considered so far. The first panel displays the quintiles for the single strategy approaches using only a value-weighted method of calculating returns. It is observed that not only do zero dividend firms offer the lowest compound annual growth rate (CAGR) but they also have a high standard deviation and thus a poor Sharpe ratio. In addition, investors holding a basket of these stocks would have experienced a very large maximum drawdown with a resulting high Ulcer index and low Martin ratio[3]. As the dividend yield quintiles increase so does the CAGR and, whilst there is a small increase in volatility in the highest yield quintiles, the Sharpe ratios also improve. The Martin ratio follows a very similar pattern.

The results from following the momentum strategy have some similarities to those of dividend yield. CAGR increases with momentum. The lowest PAST(2,12) quintile also exhibits the highest volatility and the poorest risk-adjusted statistics. Both the Sharpe and Martin ratios are positively related to momentum although these values are lower than the comparable dividend yield portfolios. As a single, long-only strategy, dividend yield thus appears to have slightly more favourable risk-adjusted characteristics.

The second panel of Exhibit 3 reports the performance statistics for the 30 portfolios formed on the interaction of dividend yield and PAST(2,12). Firstly it is noticeable that very few of the 2-way portfolios manage to produce Sharpe ratios in excess of those of the highest single dividend yield and momentum quintiles. It is only in dividend yield Q4-momentum Q5 (D4M5), D5M4 and D5M5 where this is achieved. These portfolios also have

[3] See Martin and McCann (1989) for more details on this metric.

some of the lowest Ulcer indexes, and Martin ratios considerably higher than those of the best single sort methods. Even though these strategies have good risk-adjusted returns, investors still have to contend with maximum drawdowns in excess of 40%. The other point to note is that the "value" portfolios with the lowest momentum also suffer extremely large drawdowns, with D5M1 having a maximum decline of 82%. From a practical standpoint this is likely to be unpalatable to most investors and adds credence to the old adage of "don't try to catch a falling knife". Even value investors can thus benefit from waiting until stocks show some degree of relative strength before making purchases.

In recent years there has been more discussion about the use of long/short strategies and in particular the creation of 130/30 funds or other active extension products (see Tyler, 2007, for more details on these funds). Lo and Patel (2007) highlight the significant asset growth expected in this class of fund in the forthcoming years and provide a full review of the literature in this area. They suggest that, by construction, the leverage in a 130/30 portfolio is 1.6:1 but that typically volatility is comparable with other long-only funds and the CAPM betas are similar too.

Exhibit 4 reports the results of forming selected 130/30 portfolios of interest based on the value and momentum portfolios constructed earlier. In the interests of brevity not all possible combinations are reported. The results are somewhat hypothetical since they do not account for any stock lending fees on the short side (see D'Avolio, 2002, for more details). However, such data is not readily available for the UK market, particularly going back to 1980. Looking firstly at the portfolios formed on a single strategy it can be seen that the dividend yield portfolios with a long position in D5 and a short position in one of the other dividend quartiles produced up to 200 bps of additional return compared to 100% in D5 alone. The volatility does also rise, and the Sharpe and Martin ratios remain very similar to the long-only experience. It is also interesting to note that similar risk-adjusted results are achieved regardless which of the dividend quartiles is chosen as the short extension. This is useful as it means there are less likely to be short sale constraints than if the smaller, zero dividend portfolio was the only acceptable choice for this component of the portfolio. The portfolios created from momentum groups are generally less successful than their dividend counterparts. With the exception of M5-M1, all the other strategies return lower CAGRs. The risk-adjusted returns are also markedly poorer for the momentum strategies.

Looking next at the selection of multi-strategy 130/30 portfolios that might be anticipated to be amongst the best performers, it can be seen that the CAGR is in many cases higher than both the highest returning long-only multi-strategy portfolios and also the single strategy

130/30 portfolios. The downside, however, comes from the higher volatility of returns and also slightly higher drawdowns. In general though a 130/30 strategy with a long position in D5M5 and a short position in a low dividend yield-M1 portfolio produces good risk-adjusted returns. The ability to take short positions in the lowest PAST(2,12) quintile remains an important factor though[4].

The lower panel of Exhibit 4 reports the results of the same strategies as the 130/30 portfolios except on this occasion equal positions are taken in both the long and short legs. Given that the proceeds of the long and short positions should cancel out, it is assumed that the return each month is equal to the sum of the returns of the long and short positions plus the monthly return on UK T-Bills. This provides a consistency with the other results reported in Exhibit 3 whereby 100% of cash is invested in an asset class and is comparable with a fund being given a sum of money to manage. Looking once again initially at the single strategy portfolios it is noticeable that the CAGR are markedly lower than for the 130/30 portfolios. The Sharpe and Martin ratios are almost universally lower too although the maximum drawdown experienced is generally kept somewhat more under control. Despite this, any investors following such a strategy have to be willing to accept a drawdown in excess of 20%, and often more, despite it being directionally neutral. Similar patterns of risk and return are observed for the multi-strategy portfolios with lower CAGR and also lower risk-adjusted returns than comparable 130/30 portfolios. Given that the majority of the period of this study encompassed a very significant bull market in equities it is perhaps not entirely surprising that the portfolios with a net 100% weighting in equities performed the best.

[4] There were no legislative restrictions on short selling during the period of study.

Conclusion

This paper investigates the interaction between dividend yield and momentum in the UK market. The “U-shaped” relationship reported by Keim (1985) and Morgan and Thomas (1998) between dividend yield and returns disappeared when evaluated using a value-weighted approach. Zero dividend stocks were then found to be the worst performers in terms of return as well as having high volatility. Momentum as measured by the PAST(2,12) variable has the positive relationship with return reported previously by, amongst others, Asness (1997). When portfolios were formed on the basis of both dividend yield and momentum it was observed that the differences between returns in high and low quintiles were statistically significant when momentum was controlled for and dividend yield was allowed to vary as well as *vice versa*. Excess returns to momentum were found to be most significant amongst the lower dividend yield quintiles. Value was less effective as an investment strategy within the highest momentum quintile. A notable result was that the performance of “expensive winners” was found to be significantly better than “cheap losers”. This suggests that value investors may be well advised to refrain from purchasing high yielding firms until they demonstrate at least some relative strength compared to the broader market. Multi-strategy portfolios comprising stocks with both high yield and high momentum exhibited the highest risk-adjusted performance on a 100% long-only basis.

When similar strategies were used to create 130/30 portfolios the average return level increased although it was also typically accompanied by higher volatility and larger maximum drawdowns. The greater returns are not entirely unexpected given the higher leverage embedded in this strategy. Of all the portfolios considered, these did produce the highest Sharpe ratios and also some of the highest Martin ratios. The performance of the 130/30 portfolios were markedly better than comparable directionally neutral long-short portfolios. The latter probably suffered from not having a net long position in equities during a period when stocks were in a bull market for the majority of the time.

References

Ali, A. and Trombley, M. (2006). “Short Sales Constraints and Momentum in Stock Returns”, *Journal of Business Finance & Accounting* 33, 587-615.

Asness, C. (1997). “The Interaction of Value and Momentum Strategies”, *Financial Analysts Journal* 53, 29-36.

Benito, A. Young, G., (2001). “Hard Times or Great Expectations: Dividend Omissions and Dividend Cuts by UK Firms.” Bank of England working paper.

Christie, W.G., (1990). “Dividend Yields and Expected Returns: The Zero Dividend Puzzle.” *Journal of Financial Economics* 28, 95-125.

D’Avolio, G. (2002). “The Market for Borrowing Stock”, *Journal of Financial Economics* 66, 271-306.

Fama, F. and French, K. (1992). “The Cross Section of Expected Returns”, *Journal of Finance* 47, 427-465.

George, T. and Hwang, C. (2004). “The 52-Week High and Momentum Investing”, *Journal of Finance* 59, 2145-2176.

Jegadeesh, N. and Titman, S. (1993). “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency”, *Journal of Finance* 48, 65-91.

Keim, D.B., (1985). “Dividend Yields and Stock Returns: Implications of Abnormal January Returns.” *Journal of Financial Economics* 14, 473-489.

Lakonishok, J., Shleifer, A. and Vishny, R. (1994). “Contrarian Investment, Extrapolation and Risk”, *Journal of Finance* 49, 1541-1578.

Levis, M., and Liodakis, M., (1999). “The Profitability of Style Rotation Strategies in the United Kingdom”, *Journal of Portfolio Management* 26, 73-86.

Lo, A. and Patel, P. (2007). “130/30: The New Long-Only”, MIT Sloan School of Management Working Paper.

Martin, P., McCann, B., (1989). *The Investor's Guide to Fidelity Funds*. John Wiley & Sons.

Morgan, G., Thomas, S.H., (1998). "Taxes, Dividend Yields and Returns in the UK Equity Market." *Journal of Banking and Finance* 22, 405-423.

Tyler, M., (2007). "Demystifying the Addition of Short Positions to an Equity Portfolio", *Journal of Investing* 16, 60-65.

Exhibit 1

Summary Statistics For Portfolios Formed on Dividend Yield and Momentum 1980-2006

	Dividend Yield						PAST(2,12)				
	Zero	Q1 (Low)	Q2	Q3	Q4	Q5 (Hi)	Q1 (Low)	Q2	Q3	Q4	Q5 (Hi)
Monthly Return (%)											
Equal Weight	1.63	1.21	1.25	1.30	1.38	1.49	1.00	1.05	1.21	1.52	2.02
Value Weight	0.96	1.01	1.02	1.12	1.37	1.65	0.22	0.77	1.16	1.18	1.49
Size (£m)											
Median	10	49	66	69	49	24	11	30	48	54	39
Mean	22	462	722	779	718	249	157	391	570	613	461
Dividend Yield (%)											
Median	0	1.45	2.89	4.14	5.66	9.02	3.04	3.72	3.77	3.47	2.48
Value-Wt Average	0	1.52	2.92	4.14	5.63	12.58	7.63	5.48	4.43	4.01	3.38
PAST(2,12) (%)											
Median	0.00	1.77	1.64	1.36	0.87	0.14	-3.41	-0.44	0.95	2.16	4.33
Value-Wt Average	2.68	2.66	2.04	1.59	1.07	0.54	-3.03	-0.53	0.92	2.28	5.02

Exhibit 2

Monthly Return Matrix for Portfolios Formed on Both Dividend Yield and Momentum 1980-2006

Momentum Quintiles	Dividend Yield Quintiles							
	Zero (Q0)	Q1 (Lo)	Q2	Q3	Q4	Q5 (Hi)	Q5-Q0 (t-stat)	Q5-Q1 (t-stat)
Q1	-0.16	-0.10	-0.34	-0.07	0.35	0.70	0.86	0.80
							(2.07)	(2.02)
Q2	0.61	0.41	0.40	0.62	1.06	1.17	0.56	0.76
							(1.14)	(2.26)
Q3	0.75	0.80	0.73	1.30	1.45	1.30	0.65	0.50
							(1.20)	(1.79)
Q4	0.74	0.89	1.24	1.14	1.45	1.97	1.23	1.08
							(2.83)	(3.21)
Q5	2.01	1.61	1.43	1.41	1.75	1.82	-0.19	0.21
							(-0.74)	(0.70)
Q5-Q1	2.17	1.71	1.77	1.48	1.40	1.12		
(t-stat)	(3.86)	(3.55)	(4.88)	(3.16)	(3.16)	(1.91)		

Exhibit 3

Performance Statistics for Long-Only Portfolios Formed on Dividend Yield and Momentum 1980-2006

Div. Yield Quintile	Moment. Quintile	CAGR	Standard Deviation	Sharpe Ratio	Max. Drawdown	Ulcer Index	Martin Ratio
Single Strategy							
Zero	-	12.12	24.42	0.17	72.48	26.76	0.15
1	-	12.84	18.29	0.26	67.17	25.10	0.19
2	-	12.98	16.66	0.30	40.83	13.34	0.37
3	-	14.29	16.24	0.39	34.96	8.61	0.73
4	-	17.75	17.13	0.57	32.59	7.67	1.27
5	-	21.63	20.25	0.67	43.51	10.36	1.31
-	1	2.71	25.23	-0.21	85.23	39.90	-0.13
-	2	9.61	18.63	0.09	59.48	19.96	0.08
-	3	14.79	16.73	0.40	41.69	11.59	0.58
-	4	15.14	16.72	0.43	43.75	13.12	0.54
-	5	19.49	18.37	0.62	46.65	16.44	0.70
Multi-Strategy							
Zero	1	-1.86	30.59	-0.32	94.32	56.60	-0.17
Zero	2	7.61	28.18	-0.01	73.22	31.62	-0.01
Zero	3	9.34	25.73	0.05	73.79	35.96	0.04
Zero	4	9.27	24.51	0.05	65.70	36.64	0.03
Zero	5	27.02	33.35	0.57	59.85	22.45	0.85
1	1	-1.15	28.86	-0.32	87.58	37.90	-0.24
1	2	5.05	21.70	-0.14	73.48	28.18	-0.11
1	3	10.06	19.69	0.10	66.68	25.52	0.08
1	4	11.22	19.36	0.16	65.53	26.80	0.12
1	5	21.08	20.33	0.64	56.09	20.93	0.62
2	1	-4.04	29.37	-0.41	94.34	57.66	-0.21
2	2	4.89	21.91	-0.14	78.13	31.79	-0.10
2	3	9.09	18.52	0.06	53.59	21.96	0.05
2	4	15.89	17.82	0.44	43.05	13.25	0.59
2	5	18.65	19.34	0.55	38.70	13.03	0.82
3	1	-0.86	28.80	-0.31	92.98	51.62	-0.17
3	2	7.67	19.55	-0.02	36.68	14.26	-0.03
3	3	16.71	17.29	0.50	32.97	8.75	0.99
3	4	14.60	18.18	0.36	40.64	10.83	0.61
3	5	18.24	19.01	0.54	36.37	9.34	1.09
4	1	4.30	25.50	-0.15	71.74	33.77	-0.11

4	2	13.43	23.44	0.23	64.63	19.81	0.27
4	3	18.91	18.95	0.57	38.85	8.81	1.24
4	4	18.88	17.95	0.61	32.30	9.86	1.10
4	5	23.16	21.06	0.72	42.69	10.11	1.50
5	1	8.78	30.74	0.02	81.94	36.67	0.02
5	2	15.02	26.13	0.27	55.19	16.21	0.43
5	3	16.80	21.59	0.41	61.48	15.25	0.58
5	4	26.42	21.72	0.85	42.44	8.76	2.10
5	5	24.23	22.30	0.73	45.04	11.69	1.39

Exhibit 4

Performance Statistics for 130/30 and Long-Short Portfolios Formed on Dividend Yield and Momentum 1980-2006

Portfolio Formation		Performance Statistics					
Long	Short	CAGR	St. Dev	Sharpe Ratio	Max. Draw.	Ulcer Index	Martin Ratio
130/30 Strategies							
D5	D0	23.44	23.56	0.65	48.55	12.41	1.24
D5	D1	23.70	23.37	0.67	49.72	12.57	1.25
D5	D2	23.91	22.83	0.70	47.03	11.91	1.33
D5	D3	23.55	22.70	0.68	48.33	11.76	1.32
D5	D4	22.57	22.09	0.66	47.86	11.68	1.24
M5	M1	23.82	20.89	0.76	55.50	17.59	0.90
M5	M2	22.02	20.78	0.67	51.55	18.64	0.75
M5	M3	20.58	20.31	0.62	55.08	20.11	0.62
M5	M4	20.52	20.15	0.62	50.75	18.93	0.66
D0M5	D0M1	34.23	40.71	0.64	56.65	22.51	1.16
D0M5	D0M2	30.62	41.23	0.55	61.70	26.47	0.85
D5M1	D0M1	10.59	34.91	0.07	85.17	37.74	0.07
D5M5	D0M1	30.67	27.37	0.83	53.68	14.76	1.53
D5M5	D1M1	30.80	27.02	0.84	51.57	15.21	1.50
D5M5	D2M1	31.64	27.18	0.87	52.45	13.08	1.81
D5M5	D3M1	30.68	26.81	0.85	51.60	13.17	1.72
D5M5	D4M1	28.98	27.24	0.77	51.34	13.98	1.50
D5M5	D5M1	26.95	26.73	0.71	53.05	14.82	1.28
D5M5	D5M2	25.39	26.82	0.65	49.47	16.34	1.06
Long-Short Directionally Neutral Strategies							
D5	D0	13.23	22.69	0.23	66.61	14.26	0.37
D5	D1	15.21	17.02	0.42	42.97	10.10	0.71
D5	D2	16.03	13.48	0.59	31.53	7.35	1.09
D5	D3	14.94	12.51	0.55	23.94	5.73	1.21
D5	D4	11.65	10.49	0.35	21.28	5.03	0.72
M5	M1	20.80	22.05	0.58	59.97	17.88	0.71
M5	M2	16.31	15.83	0.52	46.87	10.52	0.79
M5	M3	11.95	12.22	0.32	46.12	12.58	0.31
M5	M4	11.72	11.49	0.32	27.58	6.70	0.55
D0M5	D0M1	32.39	35.58	0.68	48.25	17.69	1.38
D0M5	D0M2	21.40	35.52	0.38	67.18	21.98	0.61
D5M1	D0M1	15.90	26.37	0.30	50.06	17.21	0.46
D5M5	D0M1	27.24	31.44	0.61	62.95	24.65	0.78
D5M5	D1M1	27.83	29.31	0.68	62.20	25.52	0.78

D5M5	D2M1	30.87	30.07	0.76	53.28	17.97	1.27
D5M5	D3M1	27.70	28.77	0.68	51.79	16.80	1.17
D5M5	D4M1	23.04	27.41	0.55	49.31	17.81	0.84
D5M5	D5M1	15.22	30.13	0.24	68.07	29.02	0.25
D5M5	D5M2	11.65	26.78	0.14	50.03	25.10	0.14