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Olivier d'Assier is Head of Applied Research, APAC for Axioma Inc. He is responsible for the performance, strategy, and commercial success of Axioma's operations in Asia Pacific and is a member of the firm's global Executive Committee. He joined Axioma in 2006 and oversaw its internationalisation with the opening of offices in Singapore, Hong Kong, London, Geneva, and Sydney. In the process, he brought Axioma's key innovations to the Asia Pacific marketplace via the development of Asian-centric products. Before joining Axioma, Mr. d'Assier spent seven years at Barra Inc. as VP for Asia Pacific and President of Barra Japan.

AN AUSSIE SENSE OF STYLE (PART TWO)

Olivier d'Assier

Profitability

Profitability has been a very, well, profitable factor to bet on in Australia YTD (see Figure 13). With the exception of the 'LO-FMP' strategy, this large cumulative factor return of 4.46% was not captured by the other three strategies. The main reason for this return difference comes from the large negative specific returns (the largest of any factor strategies in this paper) each variant incurred. So, while the percent of specific risk shown in Figure 11 is similar in size to that of other strategies for each variant, it would seem that the specific return of companies with a positive exposure to the profitability factor selected by the optimiser was particularly negative. In contrast, specific returns of securities owned by the value strategies were positive in aggregate. The 'LO-FMP' strategy did achieve positive YTD returns and specific returns, but this was not due to its exposure to profitability, which was just 0.07.

Neither the long-only constraint, nor the style or industry constraints seem to have been a big impediment to gaining a large exposure to the profitability factor for the other three strategies. Figure 14 shows that each strategy other than 'LO-FMP' was able to get a large and significant exposure to the target factor but that these exposures were not able to drive the majority of the active risk. The 'Unconstrained' variant, for example, reached a factor exposure of .90 and held almost twice the number of names as the other two variants (60 vs. 32 & 32), but only generated 50% of the active risk budget from that and other style factor exposures in aggregate. Specific risk was responsible for almost as much of the active risk budget at 45%.

In terms of sector allocation, the 'LO-FMP' stands alone again with outsized bets on the same two sectors and a penchant for defensive sectors over cyclical ones. For the 'Unconstrained' and 'No Style' strategies, their individual sector bets were of a much smaller magnitude than in their value or growth counterparts, and more in line with the scale seen in the momentum strategies (see Figure 12). With the exception of health care, IT, and telecomm, there was broad agreement between the two variants as to which industry was the best source of profitability exposure. Thematically, along the defensive versus cyclical spectrum, the two strategies were also aligned, with the 'Unconstrained' strategy taking smaller absolute active bets than the 'No Style' variant given its ability to go long or short certain style factors in order to generate its profitability exposure.

Imposing a tight constraint on active industry bets, however, had a large impact on the 'No Style / No Ind' strategy, which not only had the lowest exposure to profitability (other than the 'LO-FMP') but was also the least similar to the other strategies. Figure 15 shows the correlation of daily returns across the four strategies, as well as the benchmark and the factor return. The 'No Style / No Ind' returns shows no

Figure 11. Profitability – Percent of Active Risk

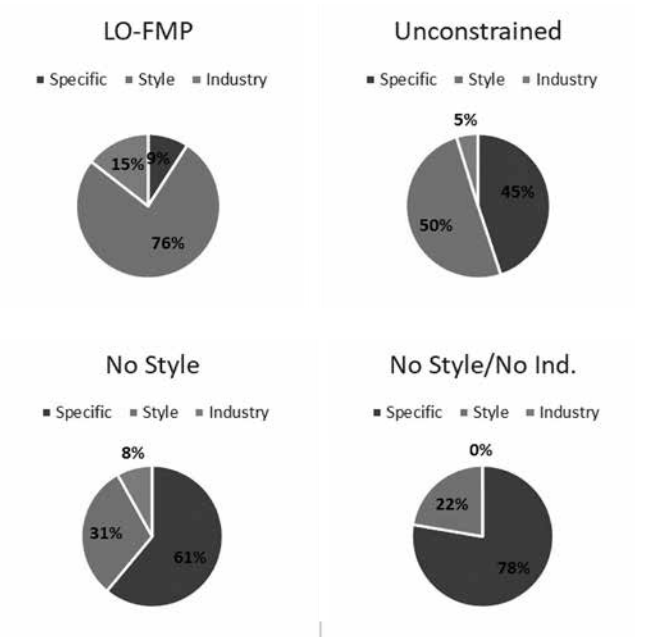


Figure 12. Profitability – Sector Allocation

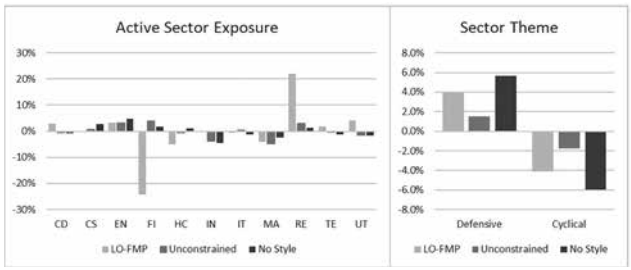


Figure 13. Profitability – Cumulative Performance

Source: S&P/ASX, Axioma

Figure 14. Profitability – Performance Attribution

	LO-FMP			Unconstrained			No Style			No Style/No Ind.		
Source of Return	Risk	Exposure	Return	Risk	Exposure	Return	Risk	Exposure	Return	Risk	Exposure	Return
Portfolio	5.01%		14.02%	9.58%		11.64%	10.05%		10.98%	10.03%		9.13%
Benchmark	9.79%		9.78%	9.79%		9.78%	9.79%		9.78%	9.79%		9.78%
Active	**7.25%**		**4.24%**	**2.75%**		**1.86%**	**2.86%**		**1.20%**	**2.48%**		**-0.65%**
Specific Return	2.51%		1.94%	2.32%		-2.21%	2.64%		-2.92%	2.54%		-3.33%
Factor Contribution	7.38%		2.30%	2.50%		4.07%	2.12%		4.12%	1.36%		2.68%
Style	**7.26%**		**5.56%**	**2.46%**		**4.41%**	**1.88%**		**3.46%**	**1.36%**		**2.66%**
Dividend Yield	0.53%	-0.24	0.74%	0.47%	0.21	-0.52%	0.05%	0.01	0.00%	0.05%	0.01	0.02%
EM Sensitivity	0.55%	0.20	-0.21%	0.13%	0.04	-0.13%	0.03%	0.00	-0.04%	0.03%	0.00	-0.04%
Exchange Rate Sensitivity	0.18%	-0.05	0.03%	0.07%	-0.02	0.03%	0.02%	0.00	-0.04%	0.03%	0.00	-0.04%
Growth	0.71%	0.28	1.11%	0.41%	0.15	0.31%	0.05%	0.00	0.03%	0.04%	0.00	0.02%
Leverage	0.42%	-0.20	0.26%	0.31%	0.15	-0.20%	0.02%	0.00	0.00%	0.02%	0.00	0.01%
Liquidity	3.57%	-1.15	0.44%	0.05%	-0.01	0.03%	0.02%	0.00	-0.01%	0.03%	0.00	0.04%
Market Sensitivity	4.61%	-1.24	-0.19%	0.25%	-0.06	0.01%	0.03%	0.00	-0.02%	0.03%	0.00	0.00%
Medium-Term Momentum	0.40%	-0.09	-0.50%	0.12%	-0.02	-0.04%	0.08%	0.00	0.04%	0.09%	0.01	0.12%
Profitability	**0.21%**	**0.07**	**0.38%**	**2.28%**	**0.90**	**4.43%**	**1.87%**	**0.74**	**3.60%**	**1.36%**	**0.53**	**2.64%**
Size	4.59%	-0.95	**4.19%**	0.59%	-0.12	0.58%	0.01%	0.00	0.00%	0.01%	0.00	-0.01%
Value	0.34%	0.12	-0.22%	0.31%	-0.11	-0.06%	0.03%	0.00	-0.04%	0.03%	0.00	-0.05%
Volatility	1.08%	0.18	**-0.48%**	0.14%	0.02	**-0.03%**	0.05%	0.00	-0.05%	0.03%	0.00	-0.04%
Sectors	**3.16%**		**-3.26%**	**0.76%**		**-0.33%**	**0.96%**		**0.66%**	**0.05%**		**0.02%**

Figure 15. Profitability – Correlation matrix of daily returns

	Profitability	LO-FMP	Unconstrained	No Style	No Style/No Ind
Profitability					
LO-FMP	0.85				
Unconstrained	0.74	0.56			
No Style	0.57	0.38	0.91		
No Style/No Ind	-0.03	0.22	0.15	0.30	
ASX 200	0.63	0.45	0.26	0.07	-0.34

correlation with the factor returns at -0.03, and very little with the other three strategies, and a negative correlation to benchmark returns.

In summary, profitability was a great factor to gain exposure to in Australia this year and tilting on it would have added some style factor returns to your existing strategy. As a standalone strategy, however, it does seem to come with too much random specific risk/return to provide steady factor returns and may best be thought of as a companion to other signals than on its own. Regardless of how you approach this factor, as a complement to another factor premium or standalone, loosening or removing any industry constraints during the portfolio construction stage seems like a good idea.

Growth

Of all the factor premium strategies discussed in this paper, the additional industry constraints had the largest impact on the growth exposure as a percent of active risk (see Figure 16). Despite a roughly similar exposure to the target factor as its value and momentum counterparts, style risk in the 'No Style / No Ind' variant accounted for only 14% of the active risk budget (versus 23% in the other two), with specific risk being responsible for 86%. With that much 'noise' added to the daily returns, it is not surprising to see this strategy having non-trending cumulative returns ending the period at just 0.14% (see Figure 18).

The 'Unconstrained' variant's exposure to the growth style factor was twice that of the 'No Style / No Ind' variant as it was able to use a tilt towards small caps (-0.26 exposure to size) and away from high dividend paying stocks (-0.21 dividend yield), as well as having an 11.5% overweight in real estate. The 'LO-FMP', with directionally similar tilts on those same factors, was able to get an exposure of 0.29 to the target factor, the highest target factor exposure of any of the style factors for which we ran this strategy. The 'No Style' variant probably had to use a large portion of its industry risk budget to neutralise all non-target style exposures and so was only able to use the remaining portion to boost the 0.42 exposure seen in the 'No Style / No Ind' variant up to 0.60.

The table in Figure 19 shows a neutral exposure to financials for the 'Unconstrained' strategy, but a 7.3% over-weight for the 'No Style' variant. This suggests that growth exposure was not the reason for the latter's overweight of the financial sector and more likely its need to neutralise other style exposures. Having spent a lot of its risk budget on style neutralisation, it was only able to 'afford' a 5.7% over-weight in real estate following in the 'Unconstrained' variant's footstep in its search for additional growth exposure. At the sector level, both strategies are directionally identical with the exception of telecomm (see Figure 17). The 'LO-FMP' remained positive defensive sectors and negative cyclical ones while the other two strategies with industry bets were aligned in the opposite direction.

Year-to-date the growth style factor – with a cumulative return of 3% – performed well, although not as well as momentum or profitability. Figure 18 plots the cumulative return of our growth strategies. None of them seem to mirror the factor performance particularly well, though the 'LO-FMP' strategy came the closest, with the 'Unconstrained' strategy coming in second. All strategies had both growth and style factor returns that were in-line with that of the growth factor, but as with profitability, with the exception of the 'LO-FMP' strategy, all suffered large negative specific returns which affected their overall active portfolio returns.

Looking at Figure 20, we see that the daily returns of the 'No Style' strategy are negatively correlated (-0.61) with those of the growth factor returns, but positively correlated to the 'LO-FMP' and 'Unconstrained' strategies. Daily returns of the 'LO-FMP' strategy are the most positively correlated with those of the growth factor at 0.64, followed by the 'Unconstrained' strategy at 0.57.

Figure 16. Growth – Percent of Active Risk

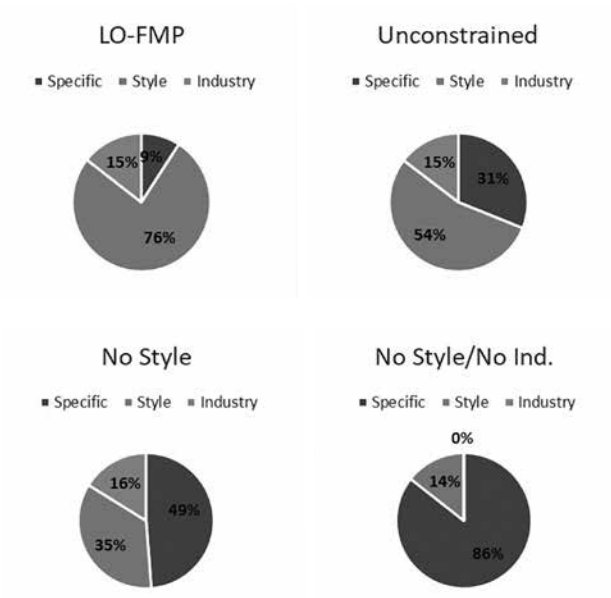


Figure 17. Growth – Sector Allocation

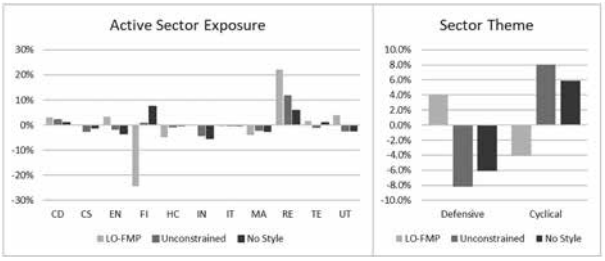
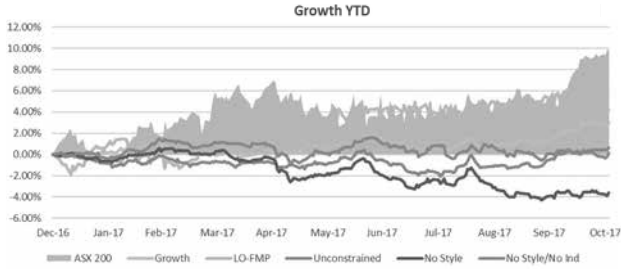


Figure 18. Growth – Cumulative Performance



Source: S&P/ASX, Axioma

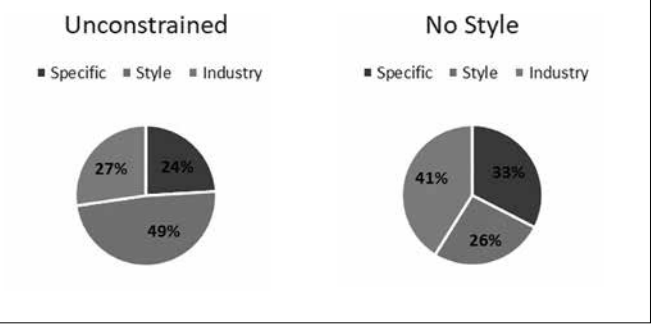
Figure 19. Growth – Performance Attribution

Source of Return	LO-FMP Risk	LO-FMP Exposure	LO-FMP Return	Unconstrained Risk	Unconstrained Exposure	Unconstrained Return	No Style Risk	No Style Exposure	No Style Return	No Style/No Ind. Risk	No Style/No Ind. Exposure	No Style/No Ind. Return
Portfolio	5.01%		14.03%	9.94%		10.44%	10.46%		6.18%	10.10%		9.92%
Benchmark	9.79%		9.78%	9.79%		9.78%	9.79%		9.78%	9.79%		9.78%
Active	**7.25%**		**4.24%**	**2.52%**		**0.66%**	**3.14%**		**-3.60%**	**2.96%**		**0.14%**
Specific Return	2.51%		1.92%	1.76%		-1.36%	2.28%		-3.39%	2.67%		-1.05%
Factor Contribution	7.38%		2.32%	2.17%		2.02%	1.89%		-0.21%	1.09%		1.19%
Style	**7.26%**		**5.59%**	**2.33%**		**4.54%**	**1.93%**		**1.87%**	**1.09%**		**1.17%**
Dividend Yield	0.53%	-0.24	0.74%	0.47%	-0.21	0.75%	0.04%	0.00	-0.01%	0.05%	0.00	-0.05%
EM Sensitivity	0.54%	0.19	-0.20%	0.08%	0.03	-0.08%	0.02%	0.00	0.00%	0.03%	-0.01	-0.03%
Exchange Rate Sensitivity	0.18%	-0.05	0.03%	0.13%	-0.03	-0.14%	0.03%	0.00	-0.01%	0.03%	0.00	-0.01%
Growth	**0.73%**	**0.29**	**1.13%**	**2.10%**	**0.83**	**2.86%**	**1.52%**	**0.60**	**1.92%**	**1.07%**	**0.42**	**1.34%**
Leverage	0.42%	-0.20	0.26%	0.17%	-0.06	0.01%	0.03%	0.00	0.00%	0.03%	-0.01	0.00%
Liquidity	3.57%	-1.15	0.44%	0.35%	0.11	-0.03%	0.03%	0.00	-0.05%	0.05%	0.01	-0.01%
Market Sensitivity	4.61%	-1.24	-0.19%	0.24%	-0.06	0.04%	0.07%	0.00	0.06%	0.05%	0.00	0.00%
Medium-Term Momentum	0.40%	-0.09	-0.50%	0.22%	-0.04	-0.11%	0.05%	0.00	-0.02%	0.05%	0.01	-0.06%
Profitability	0.21%	0.07	0.38%	0.19%	0.06	0.49%	0.04%	0.00	-0.02%	0.04%	0.00	-0.06%
Size	4.59%	-0.95	**4.19%**	1.24%	-0.26	**1.23%**	0.03%	0.00	-0.03%	0.03%	0.00	-0.01%
Value	0.34%	0.12	-0.22%	0.33%	0.11	-0.19%	0.04%	0.00	-0.01%	0.04%	0.01	0.00%
Volatility	1.08%	0.18	**-0.47%**	0.56%	0.09	**-0.29%**	0.05%	0.00	0.05%	0.05%	0.00	0.05%
Sectors	**3.16%**		**-3.27%**	**1.21%**		**-2.53%**	**1.31%**		**-2.09%**	**0.07%**		**0.02%**

Figure 20. Growth – Correlation matrix of daily returns

	Growth	LO-FMP	Unconstrained	No Style	No Style/No Ind
Growth					
LO-FMP	0.64				
Unconstrained	0.57	-0.07			
No Style	-0.61	-0.87	0.12		
No Style/No Ind	-0.01	-0.18	0.17	0.47	
ASX 200	0.60	0.45	0.20	-0.59	-0.01

Figure 21. MinVar – Percent of Active Risk



In summary, growth is a style best captured without other style factor constraints. At least this year, the factor premium seems to be nested in the real estate sector, and among small caps and low dividend-paying stocks. Preventing the optimiser from tilting on these other style dimensions hurt the 'No Style' variant and gave it a return footprint that was increasingly opposite to the factor premium it was designed to track. The 'Unconstrained' variant captured the most target factor premium and had returns that were the most positively correlated with those of the growth factor.

Minimum Variance

We constructed two versions of a minimum variance strategy, the 'No Style' and 'Unconstrained' portfolios. This strategy does not seek any specific factor tilts, only to minimise the total portfolio variance while maintaining a reasonable effective number of names. The 'No Style' variant has an added constraint to neutralise all style factor exposures with the exception of the market sensitivity and volatility factors. The 'Unconstrained' strategy is a pure minimum variance portfolio where the optimiser is allowed to leverage the full factor covariance matrix in order to minimise total portfolio variance.

The performance attribution table in Figure 24 shows that both variants were able to achieve a lower portfolio variance than the benchmark, with the 'Unconstrained' variant being slightly lower than its 'No Style' counterpart. The latter's lower overall risk came at a much higher active risk to the S&P/ASX 200 index than the 'No Style' portfolio (5.37% versus 3.60%).

Surprisingly, neither variant had a negative exposure to the volatility factor, but both had a large negative exposure to the market sensitivity factor. Consistent with what we have seen in many other markets (and somewhat counterintuitively), the 'Unconstrained' variant favoured small cap growth stocks and tilted away from liquidity and momentum. The latter is what tends to hurt the strategy's performance in up-markets, as was the case in Australia YTD (see Figure 23).

At the sector level there was again broad agreement across the two variants, both over-weighting defensive sectors overall, consumer staples and utilities in particular, and under-weighting cyclical sectors, especially financials, but over-weighting real estate (see Figure 22).

Constraining the other style factors led to a more concentrated portfolio of just 37 names on average during the period (versus 71 for the 'Unconstrained' variant), and resulted in daily returns that were very negatively correlated with the benchmark (-0.71), and uncorre-

Figure 22. MinVar – Sector Allocation

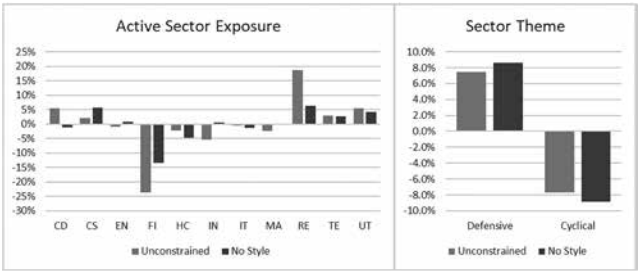
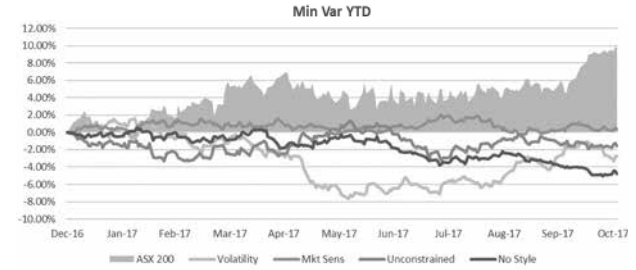


Figure 23. MinVar – Cumulative Performance



Source: S&P/ASX, Axioma

Figure 24. MinVar – Performance Attribution

Source of Return	Unconstrained			No Style		
	Risk	Exposure	Return	Risk	Exposure	Return
Portfolio	8.20%		8.20%	8.64%		4.98%
Benchmark	9.79%		9.78%	9.79%		9.78%
Active	**5.37%**		**-1.58%**	**3.60%**		**-4.80%**
Specific Return	3.38%		-0.75%	2.06%		-4.15%
Factor Contribution	5.37%		-0.83%	2.88%		-0.65%
Style	**4.80%**		**3.87%**	**1.85%**		**-0.16%**
Dividend Yield	0.19%	-0.05	0.20%	0.04%	0.002	-0.02%
EM Sensitivity	0.35%	0.10	-0.06%	0.04%	0.002	-0.02%
Exchange Rate Sensitivity	0.45%	-0.14	-0.04%	0.04%	0.002	0.01%
Growth	0.84%	0.33	0.89%	0.07%	0.014	-0.04%
Leverage	0.19%	-0.07	0.07%	0.01%	0.002	-0.01%
Liquidity	1.12%	-0.36	0.19%	0.02%	0.001	0.02%
Market Sensitivity	**3.36%**	**-0.90**	**-0.30%**	**1.84%**	**-0.489**	**-0.11%**
Medium-Term Momentum	0.66%	-0.17	-0.93%	0.09%	-0.008	-0.05%
Profitability	0.61%	0.24	1.04%	0.04%	0.003	0.04%
Size	3.21%	-0.66	2.88%	0.02%	0.000	0.00%
Value	0.18%	-0.05	-0.01%	0.03%	0.004	0.00%
Volatility	**0.24%**	**0.04**	**-0.08%**	**0.31%**	-0.041	**0.02%**
Industry	**3.60%**		**-4.69%**	**2.32%**		**-0.53%**

Figure 25. MinVar – Correlation matrix of daily returns

	Volatility	*Mkt Sens*	*Unconstrained*	*No Style*
Volatility				
Mkt Sens	0.00			
Unconstrained	-0.43	-0.70		
No Style	0.36	-0.08	0.08	
ASX 200	-0.33	0.03	-0.04	-0.71

lated with those of the 'Unconstrained' variant (see Figure 25). The returns of the 'Unconstrained' portfolio were negatively correlated with those of both the market sensitivity and volatility factors. While the former was to be expected given the strong negative exposure to that factor, the portfolio had a neutral exposure to volatility.

In summary, the 'Unconstrained' variant performed much more in line with our expectation, and had a very negative correlation to the volatility and market sensitivity factors. The 'No Style' variant had a positive correlation with the volatility factor. Additionally, the 'Unconstrained' variant had less of its risk driven by stock specific sources (24% vs. 33%). The higher active risk to the core benchmark should not be a deterrent to investors seeking volatility protection and not constraining the covariance matrix seems like a better way to go for this strategy.

Conclusion

Our attempt to mimic the 'Long/Short FMP' portfolio with a long-only strategy had very mixed results. With the exception of the value strategy, the 'LO-FMP' strategies generated daily returns that were strongly positively correlated with the factor return of the same name. The problem is that this 'likeness' was achieved without a significant exposure to the target style factor. In fact, no matter the style factor being targeted, the 'LO-FMP' strategies had very similar exposures across the board. It seems that since the objective of this strategy was to minimise the tracking error to the long-short portfolio, the optimiser focused on building a portfolio whose asset-asset covariance matrix structure resembled that of the L/S FMP target portfolio and ignored the exposures we wanted to mimic. In each case, the 'LO-FMP' portfolio had the lowest exposure to the target factor of all the strategies (see 'Performance Attribution' tables in each of the factors).

For all of the style factor strategies reviewed in this paper, maximising the exposure to the target factor was best achieved by allowing the optimiser to do what it does best, without overly constraining it during the portfolio construction process. In several cases, this exposure came at a cost. For both the momentum and minimum variance strategies, the 'Unconstrained' variant had the highest realised active risk to the S&P/ASX 200 benchmark. For the value and growth strategies, the 'Unconstrained' portfolios had very large active sector bets of more than 10%. They also held more names in the portfolio than the other variants in their respective strategies, thereby limiting the influence of stock specific risk. With the exception of the value strategy, the 'Unconstrained' variant achieved daily returns that were always more positively correlated with those of the target style factor than the more constrained strategies. Unlike other variants, its active returns were always of the same sign as those of the target factor, thereby representing a better proxy for the factor premium in question than other variants. If the goal is to build a portfolio whose cumulative return will most closely resemble those of the target-factor, then the Lo-FMP strategy is best, despite generating factor exposures that will be hard to defend. On the other hand, if the goal is to maximise the target-factor exposure, then the unconstrained strategy works best, but be prepared to show a large deviation to the core benchmark via industry bets. So, it would seem smart beta designers have a choice to make; capture the factor return or the factor exposure, but not both. As long as there is transparency as to the compromise chosen, investors should be able to make an informed decision that suits their investment goal. **FS**