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How Smart Beta Strategies Work in the Hong Kong Market

EXECUTIVE SUMMARY

Since the launch of the Hong Kong-Mainland Stock Connect programs, there has been increasing interest in smart beta strategies within the Hong Kong equity market. Our analysis examined the effectiveness of six well-known risk factors including size, value, low volatility, momentum, quality, and dividends in the Hong Kong equity market from June 30, 2006, to June 30, 2017.

- Apart from small caps, the rest of the examined factors delivered higher absolute and risk-adjusted returns in their equal-weighted top quintile portfolio versus their respective bottom quintile portfolios.
- The 50-stock high value and dividend portfolios delivered the highest excess returns, while those for the low volatility and quality showed reduced volatility compared to the underlying benchmark.
- Our macro regime analysis showed that factor portfolios in Hong Kong are sensitive to both the local market cycles and investor sentiment regimes.
- The distinct cyclical nature in Hong Kong factor performance indicated its potential for implementation of active views on the local equity market.

Exhibit 1: Performance Across Different Market Cycles and Investor Sentiment Regimes in Hong Kong

CATEGORY	PHASE	SMALL CAP	VALUE	LOW VOLATILITY	MOMENTUM	QUALITY	DIVIDEND
Market Cycles	Bullish	▲	▲	▼	▲	▲	▲
	Bearish	▼	▲	▲	▼	▲	▲
	Recovery Period	▲	▲	▲	▼	▲	▲
Investor Sentiment	Bullish	▲	▲	▼	▲	▼	▲
	Neutral	▼	▲	▲	▲	▲	▲
	Bearish	▲	▲	▲	▼	▲	▲

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC. Figures based on total returns in HKD of the 50-stock factor portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes. Note: Light blue, upward triangles represent favorable performance, while navy, downward triangles represent unfavorable performance based on excess return versus HSCI of each factor. The two factors with the highest information ratio in each of the market cycle phases are circled in yellow.

FACTOR-BASED INVESTING IN THE HONG KONG EQUITY MARKET

Since the launch of the Hong Kong-Mainland Stock Connect programs, there has been increasing demand for factor-based index-linked products within the Hong Kong equity market.

Smart beta strategies have gained significant attention in the asset management industry, and the exchange-traded products tracking factor indices have experienced significant asset growth since the end of 2008 [1]. Factor-based investing shares some common characteristics with passive investing such as rules-based construction, transparency, and cost-efficiency, and it also shares features of active investing by aiming to enhance return and reduce risk compared to market-cap-weighted indices.

Single-factor indices are constructed explicitly to capture a specific risk factor and exhibit distinct cyclical behavior in response to a changing market environment, which also makes them ideal tools for implementation of active views. Index-linked products in low volatility (minimum variance) and multi-factor categories witnessed the strongest asset inflows among smart beta products in recent years [1].

In Hong Kong, the adoption of factor-based investing by local market participants is far behind the U.S. and other Asian markets like Japan. However, since the launch of the Hong Kong-Mainland Stock Connect programs, there has been increasing demand for factor-based index-linked products within the Hong Kong equity market. Due to the sluggish Chinese economy, potential renminbi depreciation, and the tight control on QDII quota, the stock connect programs have become favorable channels to facilitate offshore diversification for many mainland Chinese asset managers.

In this paper, we examined the effectiveness of six well-known risk factors (size, value, low volatility, momentum, quality, and dividend) in the Hong Kong equity market and their investability in practice, as well as the behavior of these factors under different market regimes.

UNIVERSE AND METHODOLOGY

We first included all stocks in the [S&P Access Hong Kong Index](#), which is the investable Hong Kong equity universe for both Hong Kong and mainland Chinese market participants through stock connect programs.¹ For the consideration of portfolio investability, we then eliminated all low-liquidity stocks with a three-month average daily value traded below HKD 10 million from the universe for the analysis. Our sample period for the analysis was from June 30, 2006, to June 30, 2017.

¹ The S&P Access Hong Kong Index is designed to reflect the universe of Hong Kong-listed stocks available to Chinese mainland market participants through the Southbound Trading Segments of the Shanghai-Hong Kong Stock Connect and Shenzhen-Hong Kong Stock Connect Programs. It represents approximately 90% of the aggregated float-cap of all Hong Kong-listed stocks in the S&P Global BMI, based on year end data from 2010 to 2016.

For each risk factor, we ranked all stocks in the universe based on their designated factor measure² and formed the hypothetical top and bottom quintile portfolios (Q1 and Q5, respectively) with equal- and float-adjusted market cap weighting, respectively. All portfolios were reviewed semiannually in June and December.³ We examined these portfolios across multiple dimensions including return, risk, turnover, liquidity, sector composition, and performance during up and down markets.

Small cap did not deliver risk-adjusted return premium in the Hong Kong equity market.

In addition, we constructed a simulated 50-stock portfolio for each factor to demonstrate the indexing implementation for each factor strategy. These portfolios comprised 50 stocks with the highest designated factor scores incorporating rebalancing buffers, weighting method, and stock and sector concentration constraints following the S&P Dow Jones Indices standard factor methodologies.⁴

All the portfolios mentioned above are hypothetical, based on back-tested data.

SMALL CAP

Small cap (size) was one of the earliest identified systematic risk factors [2, 3]. Academic explanations for the small-cap premium mainly focus on the uncertainty, vulnerability, and illiquidity of small-cap companies, as well as market participants' behavioral bias [4-8]. The small-cap anomaly has been observed in both developed and emerging markets [9].

In our analysis, the size portfolios were constructed based on companies' float-adjusted market cap. Stocks with lowest float-adjusted market cap formed the small-cap portfolio (Q1) and vice versa for the large-cap portfolio (Q5). During the examined period, the equal-weighted small-cap portfolio generated slightly higher absolute return compared to the equal-weighted large-cap portfolio, but both the equal- and float-cap-weighted small-cap portfolios recorded much higher return volatility, lower risk-

² Size was measured by float-adjusted market cap. Value is measured as the average z score of earnings-to-price, sales-to-price, and book value-to-price ratios. Volatility is measured as the one-year realized price return volatility. Momentum is measured by the z score of six-month risk-adjusted momentum, calculated as the price return over the past six months (excluding the most recent month) divided by the standard deviation of daily price returns during the same period. Quality is measured as the average z score of balance sheet accrual ratio (BSA ratio), financial leverage and ROE. Dividend is measured by the last 12-month dividend yield.

³ The low volatility portfolios were rebalanced quarterly effective on the third Friday of March, June, September, and December. The rest of the factor portfolios were rebalanced semiannually, effective on the every third Friday in June and December.

⁴ All portfolio constituents are drawn from the S&P Access Hong Kong index universe. Low-liquidity stocks with a three-month average daily value traded below HKD 10 million were eliminated. The value, momentum, and quality portfolios include the 50 stocks with highest factor scores weighted by score-tilted market cap, subject to security and sector constraints such that the weight of each security is between 0.05% and the lower of 5% and 20 times its float-adjusted market-cap weight in the starting universe, and the maximum weight of any given GICS sector is 40%. The low volatility portfolio includes the top 50 stocks with the least volatility weighted by inverse of volatility without any security or sector constraints. The dividend portfolio is constructed following the S&P Dividend Opportunities Index Methodology which includes the 50 stocks with the highest 12-month dividend yield with positive 12-month EPS and positive 3-year EPS growth rate. Constituents are weighted by dividend yield, subject to security, and sector constraints of 5% and 33%, respectively. The small-cap portfolio includes the 50 smallest stocks by float market cap, and constituents are weighted by stocks' float market caps. All portfolios are rebalanced semiannually apart from the low volatility portfolio, which is rebalanced quarterly. A 20% rebalance buffer by number of stocks was applied at each rebalance for all the portfolios except for the small-cap portfolio.

adjusted return, and worse historical return drawdowns than their respective large-cap portfolios (see Exhibit 2). This suggested that the small-cap factor has not delivered risk-adjusted return premium in the Hong Kong equity market, historically.

Exhibit 2: Risk/Return Profile of Small-Cap Portfolios

CATEGORY	S&P ACCESS HONG KONG INDEX	SMALL-CAP PORTFOLIOS (Q1)		LARGE-CAP PORTFOLIOS (Q5)	
		FLOAT-CAP WEIGHTED	EQUAL WEIGHTED	FLOAT-CAP WEIGHTED	EQUAL WEIGHTED
Annualized Return (%)	9.3	8.2	9.0	9.3	8.3
Annualized Volatility (%)	24.3	32.6	33.1	23.5	24.0
Risk-Adjusted Return	0.38	0.25	0.27	0.40	0.35
Rolling 12-Month Maximum Drawdown (%)	-57.1	-66.1	-67.5	-54.4	-56.3
Annualized Excess Return (%)	-	-1.1	-0.3	0.0	-1.0
Annualized Tracking Error (%)	-	15.2	15.9	3.2	3.9
Information Ratio	-	-0.07	-0.02	0.01	-0.26
Average Annualized Turnover (%)	10.7	111.9	113.5	14.8	30.8

Small-Cap Portfolios (Q1) and Large-Cap Portfolios (Q5) are hypothetical portfolios. Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Average annual turnover is calculated from 2007 to 2016.

The small-cap portfolios tended to outperform the benchmark during up market and underperform during down market.

The small-cap portfolios tended to outperform the benchmark during up markets and underperform during down markets, demonstrating the pro-cyclical nature of small-cap stocks (see Exhibit 18 in the Appendix). The small-cap stocks were most concentrated in industrials, consumer discretionary, and materials, whereas large-cap portfolios and the benchmark index were largely dominated by financials stocks.

VALUE

Value investing was first documented in 1934 by Graham and Dodd [10]. According to academic reviews, value companies may have a higher level of risk as they tend to have less flexibility in times of financial distress compared with their growth counterparts, and therefore demand a higher risk premium [11]. Value factor is traditionally measured by price valuation ratios such as earnings yield, cash flow yield, sales yield, book value-to-price ratio, and dividend yield.

Historically, the equal-weighted high value portfolio delivered the highest excess return compared to the low value portfolio on both absolute and risk-adjusted basis.

Our value portfolios were constructed based on the average z-score⁵ of earnings-to-price ratio, sales-to-price ratio, and book value-to-price ratio. Stocks with cheapest valuations formed the high value portfolio (Q1) and vice versa for the low value portfolio (Q5). Historically, the equal-weighted high value portfolio delivered pronounced excess return compared to the low value portfolio on both absolute and risk-adjusted basis, despite higher return volatility (see Exhibit 3). However, the return spread disappeared when the portfolios were weighted by float-adjusted market cap, as the float-cap-weighted low value portfolio was largely dominated by a couple of large-cap information technology and financials stocks, which had remarkable performance during the back-tested period, such as Tencent and Hong Kong Exchanges & Clearing Ltd.

As small-cap factor did not deliver risk-adjusted return premium on Hong Kong equities historically, the equal-weighted high value portfolio did not perform better than its respective float-cap weighted portfolio on risk-adjusted basis. In contrast, the float-cap-weighted high value portfolio had the advantages of lower return volatility, lower tracking error, and smaller return drawdown, and it also exhibited lower portfolio turnover.

Exhibit 3: Risk/Return Profile of Value Portfolios

CATEGORY	S&P ACCESS HONG KONG INDEX	HIGH VALUE PORTFOLIOS (Q1)		LOW VALUE PORTFOLIOS (Q5)	
		FLOAT-CAP WEIGHTED	EQUAL WEIGHTED	FLOAT-CAP WEIGHTED	EQUAL WEIGHTED
Annualized Return (%)	9.3	12.8	13.1	14.1	4.8
Annualized Volatility (%)	24.3	29.1	32.6	26.5	28.3
Risk-Adjusted Return	0.38	0.44	0.40	0.53	0.17
Rolling 12-Month Maximum Drawdown (%)	-57.1	-57.2	-64.2	-60.9	-67.7
Annualized Excess Return (%)	-	3.5	3.8	4.8	-4.5
Annualized Tracking Error (%)	-	11.8	14.2	9.3	10.4
Information Ratio	-	0.30	0.27	0.51	-0.43
Average Annualized Turnover (%)	10.7	78.5	88.0	54.0	79.6

The high value portfolios historically performed better in up markets.

High Value Portfolios (Q1) and Low Value Portfolios (Q5) are hypothetical portfolios. Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Average annual turnover is calculated from 2007 to 2016.

The high value portfolios historically performed better in up markets, with the equal-weighted portfolio demonstrating stronger pro-cyclical

⁵ Outlier fundamental ratios are winsorized at 97.5 percentile and 2.5 percentile. Then the z-score for each of the three ratios for each security is calculated using the mean and standard deviation of the relevant variable within the index universe passing the liquidity screen (disclosed on page 2). The higher the fundamental ratio, the higher the resulting z-score. For each security, the average z-score is computed by taking a simple average of the three z-scores. A security must have at least one z-score for it to be included in the index. Outlier average z-scores are winsorized at +/-4.

characteristic than the float-cap weighted portfolio due to the small-cap bias (see Exhibit 18 in the Appendix). Most companies in the high value portfolios were from the real estate, industrials, and materials sectors, while those included in the low value portfolios were mostly from the consumer discretionary, consumer staples, and information technology sectors.

To investigate the return and risk contribution from each of the three value components (earnings-to-price ratio, sales-to-price ratio, and book value-to-price ratio) to the value portfolios, we constructed the top and bottom value quintile sub-portfolios based on each of these three valuation ratio following the same methodology. As shown in Exhibit 4, all of the high value sub-portfolios (Q1) outperformed their respective low value sub-portfolios, with the excess return of the sub-portfolio based on the sales-to-price ratio being most pronounced. All of the three top value quintile sub-portfolios recorded similar return volatility. This result indicated that the outperformance of the high value portfolio was attributable to a combination of all its component factors.

The outperformance of the high value portfolio was contributed by all of its component factors.

Exhibit 4: Value Factor Performance Decomposition			
CATEGORY	S&P ACCESS HONG KONG INDEX	HIGH VALUE PORTFOLIO (Q1)	LOW VALUE PORTFOLIO (Q5)
EARNINGS-TO-PRICE RATIO: Q1 = HIGHER RATIO			
Annualized Return (%)	9.3	10.3	3.5
Annualized Volatility (%)	24.3	31.9	29.1
Risk-Adjusted Return	0.38	0.32	0.12
SALES-TO-PRICE RATIO: Q1 = HIGHER RATIO			
Annualized Return (%)	9.3	13.2	3.6
Annualized Volatility (%)	24.3	31.8	25.8
Risk-Adjusted Return	0.38	0.42	0.14
BOOK VALUE-TO-PRICE RATIO: Q1 = HIGHER RATIO			
Annualized Return (%)	9.3	10.9	6.0
Annualized Volatility (%)	24.3	32.7	27.2
Risk-Adjusted Return	0.38	0.33	0.22

High Value Portfolio (Q1) and Low Value Portfolio (Q5) are hypothetical portfolios. Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the equally weighted factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

The low volatility portfolios delivered higher absolute and risk-adjusted returns than the high volatility portfolios.

LOW VOLATILITY

The inverse relationship between equity volatility and long-term return have been well documented [12-18]. The academic explanations for the low volatility premium have mainly focused on the behavioral biases that drive excess demand for high-risk stocks and the limitation on arbitrage in practice [19]. The two most commonly used metrics to measure volatility are realized volatility and the combination of predicted volatility and

covariance. The low and high volatility portfolios constructed for our analysis are based on stocks' one-year realized daily price return volatility.

Exhibit 5 summarizes the risk/return characteristics of the low and high volatility quintile portfolios (Q1 and Q5) based on the realized return volatility of stocks. The low volatility portfolios delivered higher absolute and risk-adjusted returns than the high volatility portfolios, with the return spread of the equal-weight portfolios being more pronounced. The return volatility of the low volatility portfolios was almost one-half that of the high volatility portfolios on both an equal- and float-cap-weighted basis.

Exhibit 5: Risk/Return Profiles of Low Volatility Portfolios

CATEGORY	S&P ACCESS HONG KONG INDEX	LOW VOLATILITY PORTFOLIOS (Q1)		HIGH VOLATILITY PORTFOLIOS (Q5)	
		FLOAT-CAP WEIGHTED	EQUAL WEIGHTED	FLOAT-CAP WEIGHTED	EQUAL WEIGHTED
Annualized Return (%)	9.3	8.0	9.1	3.8	1.7
Annualized Volatility (%)	24.3	19.7	19.7	39.0	38.5
Risk-Adjusted Return	0.38	0.41	0.46	0.10	0.04
Rolling 12-Month Maximum Drawdown (%)	-57.1	-44.4	-49.1	-77.1	-76.9
Annualized Excess Return (%)	-	-1.3	-0.2	-5.5	-7.6
Annualized Tracking Error (%)	-	8.1	8.7	19.9	19.4
Information Ratio	-	-0.16	-0.02	-0.28	-0.39
Average Annualized Turnover (%)	10.7	35.7	59.3	92.0	104.8

The low volatility portfolios exhibited a marked defensive nature, with much better performance in down markets.

Low Volatility Portfolios (Q1) and High Volatility Portfolios (Q5) are hypothetical portfolios. Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Average annual turnover is calculated from 2007 to 2016.

The low volatility portfolios exhibited a marked defensive nature, outperforming the benchmark the majority of time in down markets but mostly underperforming during up markets (see Exhibit 18 in the Appendix). In Hong Kong, there are few companies from the traditional defensive sectors like telecommunication services, utilities, and consumer staples, therefore companies in the Hong Kong low volatility portfolios were mostly concentrated in the financials, real estate, and industrials sectors.

MOMENTUM

The momentum effect has been well documented in the U.S. market and other markets [20-21]. These studies have found that stock price trends tended to extend over certain periods, meaning winners continued to win and losers continued to lose. Theories behind the momentum effect have been mainly in the investor behavioral context [22-24].

The high momentum portfolios based on a six-month look-back period tended to generate better performance than those measured by 12-month look-back period.

The high and low momentum portfolios (Q1 and Q5) constructed for the analysis are based on 6- or 12-month risk-adjusted price momentum.⁶ The high-momentum portfolios based on a six-month look-back period tended to generate better performance and higher risk-adjusted returns than those measured by a 12-month look-back period (see Exhibit 6). However, the shorter look-back period for the momentum, the higher the resulted portfolio turnover. Among the momentum portfolios, those based on the six-month look-back period and equal-weighting method had the highest top and bottom quintile return spread.

Exhibit 6: Risk/Return Profiles of Momentum Portfolios

6-MONTH, RISK-ADJUSTED MOMENTUM	S&P ACCESS HONG KONG INDEX	HIGH MOMENTUM PORTFOLIOS (Q1)		LOW MOMENTUM PORTFOLIOS (Q5)	
		FLOAT-CAP WEIGHTED	EQUAL WEIGHTED	FLOAT-CAP WEIGHTED	EQUAL WEIGHTED
Annualized Return (%)	9.3	10.4	10.4	7.2	5.6
Annualized Volatility (%)	24.3	25.7	28.9	26.4	29.5
Risk-Adjusted Return	0.38	0.41	0.36	0.27	0.19
Rolling 12-Month Maximum Drawdown (%)	-57.1	-56.3	-63.9	-55.8	-60.9
Annualized Excess Return (%)	-	1.1	1.1	-2.1	-3.7
Annualized Tracking Error (%)	-	10.0	11.2	11.8	13.2
Information Ratio	-	0.11	0.10	-0.18	-0.28
Average Annualized Turnover (%)	-	162.3	163.6	168.4	164.2
12-MONTH, RISK-ADJUSTED MOMENTUM					
Annualized Return (%)	9.3	10.4	8.7	6.5	6.7
Annualized Volatility (%)	24.3	28.3	29.5	25.9	29.8
Risk-Adjusted Return	0.38	0.37	0.30	0.25	0.22
Rolling 12-Month Maximum Drawdown (%)	-57.1	-64.7	-68.2	-57.0	-60.5
Annualized Excess Return (%)	-	1.1	-0.6	-2.8	-2.6
Annualized Tracking Error (%)	-	10.7	11.2	12.0	13.7
Information Ratio	-	0.11	-0.05	-0.23	-0.19
Average Annualized Turnover (%)	-	121.6	128.8	140.1	132.9

High Momentum Portfolios (Q1) and Low Momentum Portfolios (Q5) are hypothetical portfolios. Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Average annual turnover is calculated from 2007 to 2016.

The pro-cyclical characteristic has been observed for the high momentum portfolios in Hong Kong, consistent with the observation in other markets. The high momentum portfolios, regardless of the weighting method, had better performance in up markets with a higher win ratio and a higher

⁶ The six- and 12-month risk-adjusted price momentum are calculated as the price return over the past six and 12 months (excluding the most recent month) respectively divided by the standard deviation of daily price returns during the same periods.

average monthly excess return relative to the benchmark (see Exhibit 18 in the Appendix).

The high momentum portfolios had better performance in up markets.

Historically, the sector composition of the high momentum portfolio rotated more rapidly than other factor portfolios. Over the period studied, most companies selected for the high momentum portfolio have been more concentrated in the industrials, consumer discretionary, and real estate sectors.

QUALITY

Performance of high quality stocks cannot be comprehensively explained by classical risk factors alone—namely size, momentum, volatility and value. We believe that quality is a multi-faceted concept as demonstrated by the three-pronged approach to identify high-quality companies that consider profitability generation, earnings sustainability and financial robustness. [25]. In this paper, we constructed the high and low quality portfolios (Q1 and Q5) following the S&P Quality Indices framework, which measures quality based on the average z-score⁷ of return on equity (ROE), balance sheet accruals ratio (BSA), and financial leverage (LEV).

The high quality portfolio delivered higher absolute and risk-adjusted returns and lower volatility than low quality portfolios.

The high quality portfolios delivered higher returns and lower volatility than the low quality portfolios on both an equal- and float-cap-weighted basis (see Exhibit 7). The high quality portfolio with float-cap-weighting recorded higher returns, lower volatility, and smaller return drawdown than that with equal-weighting.

⁷ Outlier fundamental ratios are winsorized at 97.5 percentile and 2.5 percentile. Then the z-score for each of the three ratios for each security is calculated using the mean and standard deviation of the relevant variable within the index universe passing the liquidity screen (disclosed on page 2). The higher the ROE ratio, the higher the resulting z-score. However, the higher BSA and LEV ratios, the lower the resulting z-score. If a given stock's earnings per share and book value per share are both negative, leading to a positive ROE, its ROE value will be excluded and the stock will be assigned an ROE Z-score set as equal to the ROE Z-score value of the 2.5 percentile ranked security. If a given stock's book value per share is negative, leading to a negative leverage, its leverage value will be excluded and the stock will be assigned a LEV Z-score set as equal to the LEV Z-score value of the 2.5 percentile ranked security. For each security, the average z-score is computed by taking a simple average of the three z-scores. A security must have at least one z-score for it to be included in the index. Outlier average z-scores are winsorized at +/-4.

Exhibit 7: Risk/Return Profile of Quality Portfolios

CATEGORY	S&P ACCESS HONG KONG INDEX	HIGH QUALITY PORTFOLIOS (Q1)		LOW QUALITY PORTFOLIOS (Q5)	
		FLOAT-CAP WEIGHTED	EQUAL WEIGHTED	FLOAT-CAP WEIGHTED	EQUAL WEIGHTED
Annualized Return (%)	9.3	10.6	9.4	6.7	6.4
Annualized Volatility (%)	24.3	23.2	25.0	27.8	32.0
Risk-Adjusted Return	0.38	0.46	0.38	0.24	0.20
Rolling 12-Month Maximum Drawdown (%)	-57.1	-56.9	-57.8	-60.5	-67.6
Annualized Excess Return (%)	-	1.3	0.1	-2.6	-2.9
Annualized Tracking Error (%)	-	7.3	7.6	8.5	11.9
Information Ratio	-	0.18	0.01	-0.31	-0.24
Average Annualized Turnover (%)	10.7	49.1	86.1	81.6	87.1

High Quality Portfolios (Q1) and Low Quality Portfolios (Q5) are hypothetical portfolios. Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Average annual turnover is calculated from 2007 to 2016.

The high quality portfolios exhibited strong defensive nature as indicated by their better performance, higher win ratio, and average monthly excess return (relative to the benchmark) during down markets (see Exhibit 18 in the Appendix). The float-cap-weighted high quality portfolio demonstrated stronger defensive characteristics than the equal-weighted high quality portfolio due to the large-cap bias.

Historically, most companies in the top quintile quality portfolios were from the consumer discretionary, industrials, and information technology sectors, while the bottom quintile quality portfolio was dominated by industrials and financials. The sector bias of high quality portfolios resulted from the combination of three different quality measures. While the companies with low BSA tilted the portfolio toward the industrials and consumer discretionary sectors, the companies with low LEV and high ROE tilted the portfolio toward the consumer discretionary, information technology, and industrials sectors.

To understand the contribution of ROE, BSA, and LEV to the overall performance of quality portfolios, we constructed the top and bottom quality quintile sub-portfolios based on each of these three quality measures following the same methodology.⁸

The high quality portfolios exhibited strong defensive nature, as indicated by their better performance in down markets.

⁸ The quintile stocks with highest ROE z-score formed the Q1 ROE portfolio and vice versa for the Q5 ROE portfolio. The quintile stocks with lowest LEV z-score formed the Q1 LEV portfolio and vice versa for the Q5 LEV portfolio. The quintile stocks with lowest BSA z-score formed the Q1 BSA portfolio and vice versa for the Q5 BSA portfolio.

Exhibit 8: Quality Factor Performance Decomposition

CATEGORY	S&P ACCESS HONG KONG INDEX	Q1 PORTFOLIOS		Q5 PORTFOLIOS	
		FLOAT-CAP WEIGHTED	EQUAL WEIGHTED	FLOAT-CAP WEIGHTED	EQUAL WEIGHTED
BALANCE SHEET ACCRUALS RATIO (BSA): Q1 = LOWER RATIO					
Annualized Return (%)	9.3	6.8	8.6	10.8	2.2
Annualized Excess Return (%) Over Q5	N/A	-4.0	6.4	N/A	N/A
Annualized Volatility (%)	24.3	23.5	25.8	30.8	33.1
Risk-Adjusted Return	0.38	0.29	0.33	0.35	0.07
FINANCIAL LEVERAGE (LEV): Q1 = LOWER RATIO					
Annualized Return (%)	9.3	9.3	8.0	6.2	9.2
Annualized Excess Return (%) Over Q5	N/A	3.1	-1.2	N/A	N/A
Annualized Volatility (%)	24.3	23.9	26.1	26.1	32.4
Risk-Adjusted Return	0.38	0.39	0.31	0.24	0.28
RETURN ON EQUITY (ROE): Q1 = HIGHER RATIO					
Annualized Return (%)	9.3	11.0	7.1	5.0	7.8
Annualized Excess Return (%) Over Q5	N/A	6.0	-0.7	N/A	N/A
Annualized Volatility (%)	24.3	27.1	29.0	25.0	30.2
Risk-Adjusted Return	0.38	0.41	0.24	0.20	0.26

Q1 and Q5 Portfolios are hypothetical portfolios.

Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Although none of the three quality components generated consistent outperformance individually...

... combining signals generated by these factors resulted in consistent outperformance of the quality factor.

As shown in Exhibit 8, none of the top quality quintile sub-portfolios generated consistent outperformance versus the benchmark and the respective bottom quintile portfolios. BSA was the only measure that generated positive quintile return spread when the portfolios were equally weighted, while ROE and LEV recorded positive quintile return spread when the portfolios were weighted by float cap. However, the high quality portfolios that combined these three quality components delivered positive excess return versus the low quality portfolios with both equal and float cap weighting (see Exhibit 7).

BSA measures the quality of earnings and does not guarantee the profitability of the company. We noticed that companies with low BSA tended to have lower profit margins, ROE, and earnings growth compared to the benchmark, and they performed better during down markets, historically. Low LEV companies tended to have lower beta and were less vulnerable during market downturns. They tended to perform better during down markets than in up markets, historically (see Exhibit 19 in the Appendix).

Despite some research that suggested ROE is not comparable across industries and does not work well as the primary screening factor, our study showed that low ROE companies tended to generate lower performance than the benchmark [26, 27]. ROE could be a good complement to other quality factors to eliminate companies that are likely to underperform. We observed that high ROE stocks were historically characterized as having high growth, small size, high price-to-book ratios, and higher beta, meaning they tended to perform better during up markets (see Exhibit 19 in the Appendix).

Although none of the three quality components generated consistent outperformance individually, combining signals generated by these factors resulted in consistent outperformance of the quality factor.

DIVIDEND

Dividend yield has been traditionally considered as a value metric, however it deserves separate attention due to its distinct risk/return profile, and dividend strategies have also been popular among income-seeking market participants.

The equal-weighted high dividend portfolio delivered higher absolute and risk-adjusted returns than the low dividend portfolio.

In our analysis, the high and low dividend portfolios (Q1 and Q5) are constructed based on companies' 12-month trailing dividend yield. During the examined period, the high dividend portfolio delivered higher absolute and risk-adjusted return than the low dividend portfolio when the portfolios were equally weighted (see Exhibit 9). However, the observation was distorted when the portfolios were weighted by float cap due to strong performance of the float-cap-weighted low dividend portfolio, which was dominated by a few large-cap information technology and financials stocks with remarkable performance during the back-tested period, such as Tencent, China Life Insurance, and Industrial and Commercial Bank of China Limited.

Despite the fact that the equal-weighted high dividend portfolio delivered higher excess return than the float-cap-weighted high dividend portfolio, it had higher return volatility and bigger historical return drawdown.

Exhibit 9: Risk/Return Profile of Dividend Portfolios

CATEGORY	S&P ACCESS HONG KONG INDEX	HIGH DIVIDEND PORTFOLIOS (Q1)		LOW DIVIDEND PORTFOLIOS (Q5)	
		FLOAT-CAP WEIGHTED	EQUAL WEIGHTED	FLOAT-CAP WEIGHTED	EQUAL WEIGHTED
Annualized Return (%)	9.3	10.0	11.3	16.0	5.9
Annualized Volatility (%)	24.3	24.3	27.4	30.9	32.8
Risk-Adjusted Return	0.38	0.41	0.41	0.52	0.18
Rolling 12-Month Maximum Drawdown (%)	-57.1	-49.2	-56.5	-56.3	-69.0
Annualized Excess Return (%)	-	0.7	2.0	6.7	-3.4
Annualized Tracking Error (%)	-	8.7	10.7	11.8	13.3
Information Ratio	-	0.08	0.19	0.57	-0.26
Average Annual Turnover (%)	10.7	57.1	87.5	109.8	105.3

High Dividend Portfolios (Q1) and Low Dividend Portfolios (Q5) are hypothetical portfolios. Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD of the factor quintile portfolios. Data from June 30, 2006, to June 30, 2017. Float-cap- and equal-weighted dividend portfolios are ranked by the last 12-month dividend yield in the starting universe without applying any rebalance buffer. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Average annual turnover is calculated from 2007 to 2016.

The high dividend portfolios displayed strong defensive features with higher win ratio and average monthly excess return in down market than in up market.

The high dividend portfolios displayed strong defensive features with higher win ratios and average monthly excess return in down markets than in up markets (see Exhibit 18 in the Appendix). Compared with the float-cap-weighted high dividend portfolio, the equal-weighted high dividend portfolio had more balanced performance with positive average excess return in both up and down markets. Historically, most companies in the high dividend portfolio were from the industrials, real estate, and financials sectors.

INDEXING OF SMART BETA STRATEGIES

To demonstrate indexing implementation for each of the examined factor strategies, we constructed a simulated 50-stock portfolio for each factor following the S&P Dow Jones Indices standard factor methodologies.⁹ These portfolios comprised the 50 stocks with the highest designated factor measures and were weighted by float cap (small-cap portfolio), factor score

⁹ All portfolio constituents are drawn from the S&P Access Hong Kong Index universe. Low-liquidity stocks with a three-month average daily value traded below HKD 10 million were eliminated. The value, momentum, and quality portfolios include 50 stocks with highest factor scores weighted by score-tilted market cap, subject to security and sector constraints such that the weight of each security is between 0.05% and the lower of 5% and 20 times its float-adjusted market cap weight in the starting universe, and the maximum weight of any given GICS® sector is 40%. The low volatility portfolio includes the 50 stocks with the lowest volatility weighted by the inverse of volatility without any security or sector constraints. The dividend portfolio is constructed following the S&P Dividend Opportunities Index Methodology, which includes the 50 stocks with the highest 12-month dividend yield with positive 12-month EPS and positive three-year EPS growth rate. Constituents are weighted by dividend yield, subject to security and sector constraints of 5% and 33%, respectively. The small-cap portfolio includes the 50 smallest stocks by float market cap, and constituents are weighted by float market cap. All portfolios are rebalanced semiannually apart from the low volatility portfolio, which is rebalanced quarterly. A 20% rebalance buffer by number of stocks was applied at each rebalance for all the portfolios except for the small-cap portfolio.

(low volatility portfolio), and score-tilted market cap¹⁰ (rest of the factor portfolios).

Excess return for the value and dividend portfolios were the highest, while the low volatility portfolio delivered the highest risk-adjusted return.

Over the examined period between June 2006 and June 2017, except for small-cap and momentum, all the other factor portfolios generated excess returns on an absolute and risk-adjusted basis versus the underlying benchmark (see Exhibit 10). Excess return for the value and dividend portfolio were the highest, while the low volatility portfolio delivered the highest risk-adjusted return. The low volatility and high quality portfolios recorded lower volatility and smaller return drawdowns than the underlying benchmark, while small cap and value were more volatile. Constituents in the momentum and small-cap portfolios tended to rotate faster and resulted in higher portfolio turnover.

Exhibit 10: Risk/Return Profile of 50-Stock Factor Portfolios

FACTOR	SMALL CAP	VALUE	LOW VOLATILITY	MOMENTUM	QUALITY	DIVIDEND	S&P ACCESS HONG KONG INDEX
Annualized Return (%)	6.1	12.4	9.8	10.2	9.9	11.4	9.3
Annualized Volatility (%)	32.5	30.0	19.8	27.2	23.5	26.7	24.3
Risk-Adjusted Return	0.19	0.41	0.49	0.37	0.42	0.43	0.38
12-Month Maximum Drawdown (%)	-66.5	-60.6	-53.2	-59.4	-54.6	-55.1	-57.1
Annualized Excess Return (%)	-3.2	3.1	0.5	0.9	0.6	2.1	N/A
Annualized Tracking Error (%)	14.6	11.1	8.6	10.2	5.8	9.9	N/A
Information Ratio	-0.22	0.28	0.06	0.09	0.1	0.21	N/A
Average Annualized Turnover (%)	117.3	66.2	63.0	153.5	61.1	91.6	10.7
Latest Basket Liquidity	515.5	1599.3	528.0	1046.9	714.8	252.7	N/A

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC. Figures based on total returns in HKD of the 50-stock factor portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Latest basket liquidity is calculated as of 2017 June rebalance. Average annual turnover is calculated from 2007 to 2016.

Compared to the underlying benchmark, which was heavily dominated by the financials sector, all factor portfolios tended to underweight financials to different extents.

Compared to the underlying benchmark, which was heavily dominated by the financials sector, all factor portfolios tended to underweight financials to different extents. Apart from financials, different sector tilts were observed in various factor portfolios. While the value portfolio was historically overweight in the real estate and industrials sectors, the small-cap, dividend, and momentum portfolios were more biased toward the consumer

¹⁰ Float-adjusted market cap times factor scores.

discretionary and industrials sectors. The low volatility portfolio was more allocated toward the utilities and industrials sectors, while the quality portfolio had consistent sector bias to the consumer discretionary and information technology sectors (see Exhibit 11).

Exhibit 11: Sector Breakdown of 50-Stock Factor Portfolios

AVERAGE SECTOR BIAS (%)	SMALL-CAP	VALUE	LOW VOLATILITY	MOMENTUM	QUALITY	DIVIDEND
Energy	-6.9	-2.1	-6.4	-4.3	-1.6	-5.6
Materials	9.1	5.7	-2.5	3.6	1.0	5.1
Industrials	14.7	14.3	7.4	5.0	-1.6	8.9
Consumer Discretionary	12.4	-2.1	0.5	8.1	18.3	11.2
Consumer Staples	4.5	-0.6	2.4	3.9	4.1	-2.0
Health Care	2.8	-0.7	-0.8	1.7	2.0	-0.1
Financials	-30.0	-25.6	-9.9	-20.5	-21.1	-18.5
Information Technology	2.4	-0.4	-4.3	4.0	5.5	-0.1
Telecommunication Services	-6.4	-4.9	-1.8	-4.0	-1.9	-2.8
Utilities	-0.9	-2.7	9.5	3.3	-0.1	0.8
Real Estate	-1.7	19.0	5.9	-0.9	-4.6	3.0

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC. Average figures of semiannual rebalancing from June 30, 2006, to June 30, 2017, for the 50-stock factor portfolios. Table is provided for illustrative purposes. Light blue numbers indicate sectors in which the factor portfolio was most underweight, and dark blue numbers indicate sectors in which the factor portfolio was most overweight.

While value and momentum portfolios were pro-cyclical, low volatility, quality, and dividend portfolios demonstrated defensive characteristics.

As mentioned in the previous sections, factors exhibited distinct cyclical features. While value, small-cap, and momentum portfolios were pro-cyclical with better performance in up markets, low volatility, quality, and dividend portfolios demonstrated defensive characteristics with better performance in down markets (see Exhibit 12). Apart from the dividend, value, and small-cap portfolios, which had highly correlated returns among each other, correlation across different factors was fairly low, historically (see Exhibit 13). This indicates the potential benefit of blending various factor for risk diversification benefits.

Exhibit 12: Performance of the 50-Stock Factor Portfolios in Up and Down Markets

50-STOCK FACTOR PORTFOLIOS	% OF MONTHS OUTPERFORMED			AVERAGE MONTHLY EXCESS RETURN (%)		
	UP MONTHS	DOWN MONTHS	ALL MONTHS	UP MONTHS	DOWN MONTHS	ALL MONTHS
Small Cap	51.3	44.2	48.5	0.5	-0.9	-0.1
Value	56.3	40.4	50.0	0.8	-0.4	0.4
Momentum	52.5	50.0	51.5	0.4	-0.3	0.1
Quality	47.5	65.4	54.5	-0.3	0.5	0.0
Low Volatility	27.5	86.5	50.8	-1.2	1.8	0.0
Dividend	48.8	61.5	53.8	0.1	0.4	0.2

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD. Data from June 30, 2006, to June 30, 2017. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 13: Correlation of Factor Excess Return

CORRELATION	SMALL CAP	VALUE	LOW VOLATILITY	MOMENTUM	QUALITY	DIVIDEND
SMALL CAP	1	0.60	0.19	0.33	0.31	0.65
VALUE	-	1	0.22	0.09	0.14	0.64
LOW VOLATILITY	-	-	1	0.01	0.29	0.41
MOMENTUM	-	-	-	1	0.34	0.15
QUALITY	-	-	-	-	1	0.38
DIVIDEND	-	-	-	-	-	1

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC. Correlation based on daily excess total returns in HKD for the 50-stock factor portfolios relative to the S&P Access Hong Kong. Data from June 30, 2006, to June 30, 2017. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

MACROECONOMIC REGIME ANALYSIS

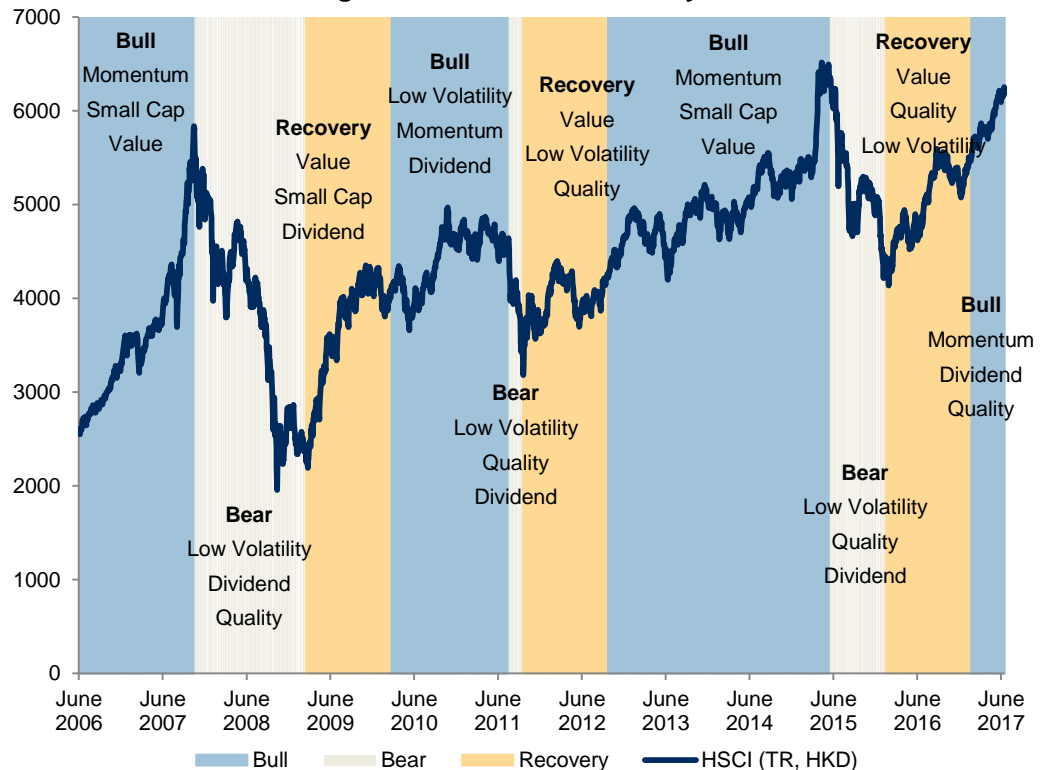
Factor portfolios exhibited cyclical in their return with short-term periods of outperformance and underperformance.

Although empirical evidence suggested factor strategies generated enhanced risk-adjusted return in the long run, they also exhibited cyclical in their return with short-term periods of outperformance and underperformance. To better understand the behavior of factor strategies over time, we examined factor performance in two financial regimes—the market cycle and the market sentiment—from June 30, 2006, to June 30, 2017.

Factor Performance Across Market Cycles

Market cycles refer to the upward and downward movements of financial or stock markets. We divided the Hong Kong equity market into 10 market cycle phases (three bearish, three recovery, and four bullish) based on the performance trends of the Hang Seng Composite Index (HSCI; see Exhibit 14).¹¹

Exhibit 14: Best-Performing Factors* Across Market Cycle Phases



Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC, Hang Seng Indexes Company Limited. Figures based on total returns in HKD of the 50-stock factor portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. *Factors are ordered by excess return relative to the HSCI in descending order in each period.

Momentum and small cap appeared more often as top-performing factors in the bullish market.

Exhibit 15 highlights the factors that delivered the most favorable return in each bullish, bearish, and recovery period. Momentum and small cap appeared more often as top-performing factors in bullish markets, however they recorded the biggest loss during bearish markets. While high momentum stocks suffered from price trend reversals during recovery periods, small-cap stocks were well-rewarded when the market recovered.

¹¹ As HSCI is the most widely used market benchmark for the Hong Kong equity market, we used its price trends as the basis to define market cycles. A bearish phase is defined as a period during which the HSCI goes from peak to trough. A recovery phase is defined as the 12-month period after the HSCI trough. A bullish phase is defined as a period from the end of the recovery phase to the next HSCI peak.

Historically, value stocks had strong outperformance when the market rebounded from its troughs.

Historically, value stocks had strong outperformance when the market rebounded from its troughs, and they delivered moderate excess returns in the ensuing bull markets, though they underperformed during bear markets. High dividend stocks also performed well during recovery periods, but they tended to be more defensive and delivered small outperformance during bear markets.

Low volatility stocks were defensive with the most outperformance in bearish markets, while underperforming mostly in bullish markets. Quality stocks outperformed the benchmark across different market phases, with more pronounced excess return during bearish and recovery markets. Quality stocks exhibited defensive features, but not as strongly as low volatility stocks.

Factor portfolios in Hong Kong are sensitive to the local market cycles.

Consistent with our previous study in the U.S. market [28], factor portfolios in Hong Kong are sensitive to the local market cycles, with momentum and small cap being most cyclical and low volatility and quality being most defensive. The market cycle analysis helps to identify the cyclical characteristics of different factors.

Exhibit 15: Factor Performance Versus the HSCI in Different Market Cycle Phases

MARKET CYCLE PHASE	SMALL CAP	VALUE	LOW VOLATILITY	MOMENTUM	QUALITY	DIVIDEND
AVERAGE EXCESS RETURN (ANNUALIZED, %)						
Bull	3.8	2.2	-4.1	11.6	0.2	2.1
Bear	-19.6	-5.8	14.9	-9.7	4.3	2.0
Recovery	12.4	23.8	2.3	-2.1	3.9	10.1
INFORMATION RATIO						
Bull	0.33	0.22	-0.67	1.21	0.03	0.25
Bear	-1.13	-0.49	1.39	-0.68	0.58	0.20
Recovery	0.67	1.74	0.33	-0.21	0.69	0.78
PERCENTAGE OF OUTPERFORMANCE (%)						
Bull	51.4	50.0	42.9	57.1	55.7	57.1
Bear	30.8	42.3	69.2	34.6	50.0	46.2
Recovery	52.8	66.7	55.6	55.6	63.9	52.8

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC, Hang Seng Indexes Company Limited. Figures based on total returns in HKD of the 50-stock factor portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Excess return, information ratio, and percentage of outperformance were calculated relative to the HSCI.

Factor Performance Across Different Investor Sentiment Regimes

Investor sentiment regimes refer to the overall attitude of market participants toward the financial market, as measured by the activity and price movement of the stock market. In our analysis, the 30-day return volatility of the HSCI is used as indicator of investor sentiment (bullish,

Factor portfolios tended to be more sensitive to bullish and bearish sentiment

neutral, and bearish) toward the Hong Kong equity market. We sorted the month-end volatility values over the examined period with values in the top quintile (high market volatility) representing a bearish market sentiment, values in the bottom quintile (low market volatility) representing a bullish market regime, and values between the top and bottom quintiles representing a neutral market regime. We then compared the performance of each factor portfolio across different regimes (see Exhibit 16).

Historically, most examined factor portfolios tended to be more sensitive to bullish and bearish sentiments, as most noticeable outperformance and underperformance appeared under these two conditions. Momentum stocks delivered excess returns in both bullish and neutral sentiment conditions, with much stronger outperformance when investor sentiment was bullish. However, they were heavily penalized in times of bearish sentiment. In contrast, low volatility stocks were rewarded by bearish conditions, while they lagged the market when sentiment was bullish. Quality stocks shared similar behavior as the low volatility stocks across different sentiment regimes, but with a much smaller performance spread between bullish and bearish sentiments.

Value and high dividend stocks outperformed the market under all sentiment conditions, with more pronounced excess return during bearish sentiments. However, on a risk-adjusted basis, high dividend stocks tended to perform better during bullish sentiment conditions. Small-cap stocks outperformed the market and had higher incidence of outperformance under bullish sentiment conditions, but they lagged when market participants were neutral.

Exhibit 16: 50-Stock Factor Portfolio Performance Versus the HSCI in Different Investor Sentiment Regimes

INVESTOR SENTIMENT	SMALL CAP	VALUE	LOW VOLATILITY	MOMENTUM	QUALITY	DIVIDEND
AVERAGE EXCESS RETURN (ANNUALIZED, %)						
Bullish	12.5	4.5	-8.2	11.8	-0.9	7.4
Neutral	-5.2	4.7	2.3	3.8	1.1	1.0
Bearish	9.7	11.7	7.5	-6.0	8.0	11.1
INFORMATION RATIO						
Bullish	1.67	0.57	-1.75	1.42	-0.19	1.08
Neutral	-0.39	0.49	0.38	0.38	0.19	0.12
Bearish	0.40	0.62	0.59	-0.38	0.83	0.68
PERCENTAGE OF OUTPERFORMANCE (%)						
Bullish	73.1	53.8	34.6	69.2	50.0	53.8
Neutral	40.0	53.8	55.0	48.8	57.5	55.0
Bearish	46.2	50.0	57.7	46.2	61.5	50.0

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC, Hang Seng Indexes Company Limited. Figures based on total returns in HKD of the 50-stock factor portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. Excess returns and tracking errors were calculated relative to the HSCI.

Investor sentiment changes more frequently than market cycle phases, and its analysis could serve as a useful complement to explain short-term factor performance in different market conditions. In general, low volatility and quality stocks tended to perform better during times of bearish sentiment, while small cap and high momentum stocks had a higher tendency to outperform the market when investor sentiment was bullish. Exhibit 17 summarizes the factor performance characteristics across various market cycles and investor sentiment regimes.

Investor sentiment analysis could serve as a useful complement to explain short-term factor performance in different market conditions.

Exhibit 17: Performance Across Different Market Cycles and Investor Sentiment Regimes in Hong Kong

CATEGORY	PHASE	SMALL CAP	VALUE	LOW VOLATILITY	MOMENTUM	QUALITY	DIVIDEND
Market Cycles	Bullish	▲	▲	▼	▲	▲	▲
	Bearish	▼	▼	▲	▼	▲	▲
	Recovery Period	▲	▲	▲	▼	▲	▲
Investor Sentiment	Bullish	▲	▲	▼	▲	▼	▲
	Neutral	▼	▲	▲	▲	▲	▲
	Bearish	▲	▲	▲	▼	▲	▲

Factor portfolios shown are hypothetical. Source: S&P Dow Jones Indices LLC. Figures based on total returns in HKD of the 50-stock factor portfolios. Data from June 30, 2006, to June 30, 2017. Past performance is no guarantee of future results. Table is provided for illustrative purposes. Note: Light blue, upward triangles represent favorable performance, while navy, downward triangles represent unfavorable performance based on excess return versus HSCI of each factor. The two factors with the highest information ratio in each of the market cycle phases are circled in yellow.

CONCLUSION

Factor-based investing shares some common characteristics with passive investing such as rules-based construction, transparency, and cost-efficiency, and it also shares features of active investing in that it aims to enhance return and reduce risk compared to market-cap-weighted indices. Since the launch of the Hong Kong-Mainland Stock Connect programs, there has been increasing demand for smart beta index-linked products within the Hong Kong equities space.

Results from the factor quintile analysis showed the benefit of factor-based investing for return enhancement and risk reduction in the Hong Kong equity market.

In this paper, we examined the effectiveness of six well-known factors including size, value, low volatility, momentum, quality, and dividend in the Hong Kong equity market, their investability in practice, as well as the behavior of these factors under different market regimes from June 30, 2006, to June 30, 2017. From the quintile analysis, we observed that the equal-weighted top quintile portfolios outperform their respective bottom quintile portfolio on both an absolute and risk-adjusted basis for all examined factors except small cap. In addition, we also noticed volatility and drawdown reduction from the low volatility, quality, and dividend factors, historically. This result showed the potential benefit of smart beta strategies for return enhancement and risk reduction in the Hong Kong equity market.

The results of our study on the 50-stock factor portfolios following the S&P Dow Jones Indices standard factor methodologies suggested the value and dividend factors delivered the highest excess return, while the low volatility and quality factors reduced return volatility and drawdown compared to the underlying benchmark, the S&P Access Hong Kong Index, when the strategies were implemented through indexing. Compared to the underlying benchmark, which was heavily dominated by the financials sector, all factor portfolios tended to underweight financials with other unique sector tilts. On the other hand, factors exhibited distinct cyclical features, with different factors leading and lagging in the up and down markets. Apart from the dividend, value, and small-cap factors, which had highly correlated returns among each other, correlation across different factors was fairly low historically, indicating the potential benefit of blending various factors for risk diversification benefits.

Factor portfolios in Hong Kong displayed distinct cyclical performance historically...

Based on our macro regime analysis, factor portfolios in Hong Kong tend to be sensitive to the local market cycles, with momentum and small cap being most cyclical, and low volatility and quality being most defensive. The market cycle analysis helps to identify the cyclical characteristics of different factors. Investor sentiment, on the other hand, switches more frequently than market cycle phases, and its analysis could serve as a useful complement to explain short-term factor performance in different market conditions. Most examined factor portfolios tended to be more sensitive to bullish and bearish sentiment in the Hong Kong equity market, as most noticeable outperformance and underperformance appeared under these two conditions. Low volatility and quality stocks had a higher tendency to outperform the market during periods of bearish sentiment, while small cap and high momentum stocks tended to perform better when investor sentiment was bullish.

...they could be ideal tools for implementation of active views of the local equity market.

As Hong Kong factors displayed distinct cyclical performance historically, they could be useful tools for implementation of active views of the local equity market. In addition, a multi-factor approach to blend different factors may also be a potential way to harvest the factor premium while diversifying factor risk exposure.

APPENDIX

Exhibit 18: Performance of Top Quintile Factor Portfolios in Up And Down Markets

FACTOR	% OF MONTH OUTPERFORMED			AVERAGE MONTHLY EXCESS RETURN (%)		
	UP MONTHS	DOWN MONTHS	ALL MONTHS	UP MONTHS	DOWN MONTHS	ALL MONTHS
EQUAL-WEIGHTED TOP QUINTILE PORTFOLIOS						
Small Cap	51.3	50.0	50.8	0.7	-0.6	0.2
Value	56.3	38.5	49.2	1.2	-0.6	0.5
Low Volatility	22.5	82.7	46.2	-1.2	1.7	-0.1
Momentum	51.3	42.3	47.7	0.6	-0.5	0.2
Quality	45.0	61.5	51.5	-0.3	0.4	0.0
Dividend	48.8	57.7	52.3	0.1	0.4	0.2
FLOAT-CAP-WEIGHTED TOP QUINTILE PORTFOLIOS						
Small Cap	50.0	48.1	49.2	0.6	-0.6	0.1
Value	52.5	55.8	53.8	0.6	0.1	0.4
Low Volatility	25.0	76.9	45.5	-1.2	1.3	-0.2
Momentum	61.3	53.8	58.3	0.3	-0.2	0.1
Quality	45.0	67.3	53.8	-0.2	0.5	0.1
Dividend	35.0	59.6	44.7	-0.4	0.8	0.0

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC. Performance based on monthly total return in HKD. Data from June 30, 2006, to June 30, 2017. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 19: Performance of Top Quintile Quality Factor Sub-Portfolios in Up And Down Markets

FACTOR	% OF MONTH OUTPERFORMED			AVERAGE MONTHLY EXCESS RETURN (%)		
	UP MONTHS	DOWN MONTHS	ALL MONTHS	UP MONTHS	DOWN MONTHS	ALL MONTHS
EQUAL-WEIGHTED TOP QUINTILE QUALITY FACTOR SUB-PORTFOLIOS						
BSA Ratio	46.3	55.8	50.0	-0.1	0.1	0.0
Financial Leverage	46.3	55.8	50.0	-0.2	0.2	-0.1
ROE	51.3	42.3	47.7	0.3	-0.6	-0.1
FLOAT-CAP-WEIGHTED TOP QUINTILE QUALITY FACTOR SUB-PORTFOLIOS						
BSA Ratio	31.3	55.8	40.9	-0.6	0.4	-0.2
Financial Leverage	41.3	59.6	48.5	-0.3	0.4	0.0
ROE	60.0	48.1	55.3	0.5	-0.2	0.2

Factor portfolios shown are hypothetical.

Source: S&P Dow Jones Indices LLC. Figures based on monthly total return in HKD. Data from June 30, 2006, to June 30, 2017. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

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Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown. The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

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