

NCEL30 – A comparative analysis of 1 year history

Introduction

NCEL30 started life with a base of 10,000 on 31st March 2006. It is a liquidity-screened market-capitalisation index adjusted for free float. The aim of the index is to provide an accurate replication of systematic equity market risk of Pakistani stocks. The index is composed of 30 largest actively traded stocks on Pakistani stock exchanges. Number of stocks in the index is based on mathematical simulations which result in 30 as the most optimal number of securities which collectively represent the true nature of a stock market the size of Pakistan's. This is further verified by running simulations of billions of different sized portfolios and checking for correlation against the index.

The index is calculated daily in real-time and reconstituted every quarter. NCEL30 is a price-only index and hence is not adjusted for any cash dividends. A parallel index called NCEL30 Total Returns (NCEL30TR) is maintained which adjusts NCEL30 for cash dividends in order to provide an equivalent returns-based performance benchmark. However, from a trading and hedging perspective, the unadjusted NCEL30 is the appropriate index in order to provide accurate hedge ratios for stock price moves. NCEL30TR shows the returns one would get from taking a position in NCEL30. NCEL30 can be viewed at www.ncel.com.pk/ncel30ds/index.html.

NCEL30 has been specifically and solely designed to capture systematic equity market risk and hence its primary usefulness is as an underlying for index futures trading. This will allow various market players to replicate, hedge, position, strategise, and develop new products. Stock indices can be developed to fit any purpose whether it is performance measurement, turnover, activity, liquidity, sector representation, investment strategy etc but none of these indices can fulfil the basic need of all market traders, i.e. risk management. NCEL30 is the only such index in Pakistan, developed specifically for the purpose of capturing market and liquidity risk. The index has not been designed to provide superior returns; rather the aim is to capture the true profile of the Pakistani equity markets, whatever it is. However, it should not come as a surprise

to market practitioners that an index developed with such analytically secular objectives without any inherent bias should also come out to be one of the best indices in terms of returns and risk-reward profile. The superior methodology of NCEL30 construction actually ensures that the top determinants of equity market risk and direction are captured. Given the small size of Pakistani market and lack of many alternative investment stocks, it does not come as a surprise that the NCEL30 constituents also deliver a better return over a period of time, in addition to capturing the true risk profile of the overall market.

Methodology

This paper compares various market indices covering Pakistani equity markets over a 1-year period from April 2006 to March 2007, with the exception of KSE30 which went live on 1st September 2006. It is quite surprising to see such a large number of stock indices for a market the size of Pakistan's but can be explained by the fact that most of these indices are not clear about their objectives and hence different entities have ventured on their own to fulfil their own particular needs. This plethora of indices makes it difficult for market participants to choose the best of the lot especially given lack of detailed information about construction methodologies. NCEL30 is designed to correct this discrepancy by introducing an index which is truly designed to fulfil the need of all market participants.

In analysing comparisons in this paper, it is important to realise that some indices are not directly comparable with others given differences in treatment of dividends. However, for the period under discussion these differences are minor and do not detract from the overall results of the analysis.

The indices compared in this paper are shown in Table 1. Of all these indices aiming to measure Pakistani capital markets, ABAMCO30 is the only one which is specifically designed from a proprietary point of view and as such not much information about its construction methodology is publicly available. This index may not be a good candidate for comparisons in this study since it is specifically designed as

an investment strategy designed to outperform the market, but is nevertheless still shown here and its results will be interpreted later. Given the nature of the index, it is not suitable as a publicly available benchmark of overall market.

Table 1: Indices

Index Name	Owner	Description
NCEL30	National Commodity Exchange Limited	Price-based, Free-Float adjusted, Liquidity screened based on Impact costs
NCEL30TR	National Commodity Exchange Limited	Dividend adjusted Total Returns NCEL30
KSE100	Karachi Stock Exchange	Sector Representation, Full market cap, Total Returns
KSE30	Karachi Stock Exchange	Free Float adjusted, No adjustment for dividends
KSEALL	Karachi Stock Exchange	Full Market cap, Total Returns
MSCIPK	Morgan Stanley Capital International	Free Float Adjusted, Total Returns
SBP	State Bank of Pakistan	Price Index, Paidup Capital weighted
ABAMCO30	JS Abamco	Proprietary index
BRINDEX30	Business Recorder	Turnover based
ISE	Islamabad Stock Exchange	Price based
LSE25	Lahore Stock Exchange	Price based
LSETRI	Lahore Stock Exchange	Total Return based
LFT25	Lahore Stock Exchange	Free float adjusted

Seven of the thirteen indices used here are calculated by the respective stock exchanges themselves. MSCI index for Pakistan is computed as part of Morgan Stanley Capital International's broad coverage of most markets around the world and while it may conform to a standard criteria for ease of comparison with other indices around the world, this requirements also makes it less tuned to specific nature of Pakistani equity market, e.g. liquidity. State Bank of Pakistan, Business Recorder and JS Abamco created indices to fulfil their own particular needs. Brindex30 differs from other indices in terms of its inclusion criteria which relies on turnover as the deciding variable. SBP General index of share prices differs from others in that it uses paidup capital of companies as the basis for index weightings.

The comparisons show some expected as well as some surprise results due to differences in index construction methodology. These are discussed below. The sources for the data are Reuters and individual websites of index owners.

Returns

Returns is the first natural element to look at when comparing indices. The results over different periods of time are shown in Table 2.

Table 2: *Returns (not annualised)*

Returns	1m	3m	6m	1y
NCEL30	-1.88%	13.32%	6.58%	-2.00%
NCEL30TR	-1.20%	14.40%	9.23%	2.41%
KSE100	-0.94%	12.26%	7.22%	-1.87%
KSE30	-2.51%	11.92%	7.17%	N/A
KSEALL	-0.61%	11.29%	7.05%	-1.84%
MSCIPK	-1.78%	14.23%	7.27%	-6.41%
SBP	-1.82%	0.64%	-5.08%	-19.99%
ABAMCO30	2.64%	19.18%	11.92%	-0.49%
BRINDEX30	-3.29%	14.61%	7.12%	-4.29%
ISE	-6.73%	4.61%	-1.52%	-23.75%
LSE25	-8.37%	4.33%	-4.14%	-22.88%
LSETRI	-3.17%	9.72%	2.66%	-13.23%
LFT25	-8.88%	6.71%	-1.85%	-17.01%
Max	2.64%	19.18%	11.92%	2.41%
Min	-8.88%	0.64%	-5.08%	-23.75%
Ave	-2.97%	10.56%	4.12%	-9.28%

As mentioned earlier, Abamco30 is a proprietary index specifically designed by a fund manager to outperform the market and hence it should not come as a surprise that over certain periods it is the best performing index. An index designed specifically to give higher returns to investors should be able to do so. All the other indices do not purport to achieve high returns and in this league NCEL30TR comes on top; not bad for an index which does not have an explicit aim of high returns but also not surprising given the superior methodology which includes analytically determining best stock eligible for inclusion based on impact cost analysis.

Returns measurement is only meaningful when done over a longer period of time and NCEL30TR shows better returns than even ABAMCO30 over a 1 year period. Relatively higher returns of KSEAll and KSE100 are actually symptomatic of the well documented problems with these two indices, namely the presence of a large number of illiquid stocks which exhibit stale prices for long periods of time and hence show misleading returns.

A surprising result is the low performance of ISE, LSE and SBP indices. SBP index assigns weightings to constituents based on their paid-up capital. This method bears no relation to market capitalisation based weighting and hence results in an index performance which does not capture the reality of market pricing. This is a serious shortcoming of the SBP General index of stock prices and also calls into question any research and analysis done on this data. ISE and LSE indices are based on 10 and 25 stocks respectively and extensive simulations by NCEL Research show conclusively that the minimum sample needed to represent Pakistani equity market is 30. It seems that ISE and LSE indices are not representing a significant portion of Pakistani stocks and hence show returns which are at variance with other bigger indices.

Correlations

Results of 1 year correlations are presented in Table 3. These results show that NCEL30 has a high correlation with all the indices except SBP, ISE and LSE indices. As discussed above, the smaller size of the LSE and ISE indices seriously impacts their correlation with the overall Pakistani equity market. The low correlation of SBP is again an expected result due to the practice of using paid up capital of companies as the weighting factor in the index. Paid-up capital is an accounting figure and its use in market performance measurement is incorrect. No wonder that the SBP index shows low correlation to all other indices that use some aspect of market capitalisation as the basis for weightings.

Since NCEL30 is primarily designed to satisfy the needs of all market participants of replicating and hedging portfolios, such high correlation with various

other indices is a good indication of the usefulness of one benchmark to satisfy the needs of maximum number of users. This basic requirement also needs to be complemented by certain other prerequisites as well in order to render an index such as NCEL30 as the most suitable candidate for index trading. NCEL30 construction methodology improves on recent advances in index construction methodologies around the world in order to achieve an index which satisfies multiple criteria.

Table 3: 1 Year Correlations

Correlations	NCE L30	NCEL30TR	KSE100	KSE30*	KSEALL	MSCI PK	SBP	ABAMCO	BRINDEK30	ISE	LSE25	LSETRI	LFT25
NCEL30	1.00	0.98	0.99	0.99	0.99	0.98	0.57	0.98	0.98	0.73	0.76	0.87	0.92
NCEL30TR		1.00	0.96	0.99	0.96	0.93	0.42	0.95	0.95	0.60	0.64	0.78	0.84
KSE100			1.00	0.98	1.00	0.99	0.62	0.99	0.97	0.78	0.81	0.91	0.94
KSE30*				1.00	0.98	0.99	0.22	0.98	0.94	0.72	0.75	0.88	0.93
KSEALL					1.00	0.99	0.63	0.99	0.97	0.79	0.82	0.91	0.94
MSCIPK						1.00	0.70	0.99	0.97	0.84	0.87	0.94	0.96
SBP							1.00	0.65	0.62	0.95	0.93	0.83	0.77
ABAMCO								1.00	0.98	0.79	0.82	0.91	0.94
BRINDEK30									1.00	0.77	0.79	0.89	0.93
ISE										1.00	0.99	0.95	0.89
LSE25											1.00	0.95	0.92
LSETRI												1.00	0.97
LFT25													1.00

*Correlations against KSE30 are only for the period 1 Sep 2006 to 31 Mar 2007

Volatility

Volatility analysis also highlights shortcomings of certain indices. KSEAll and KSE100 exhibit relatively less volatility. This misleading result is again due to inclusion of a large number of illiquid stocks with stale prices with the result that market volatility is being considerably underreported.

Brindex30, on the other hand, has consistently the highest volatility. This is also misleading as it does not represent the true picture of the overall market. Brindex30 is a turnover based index, i.e. those stocks exhibiting the highest volumes are the most likely candidates for inclusion in the index. In the context of Pakistan, high volumes are often a sign of excessive speculation in certain stocks and these stocks will show higher volatility as long as they are the focus of market participants. This focus results in higher traded volumes. Brindex30, by the nature of its design, will always be the most volatile index since it will always include the most volatile stocks. This may be useful for some specific analysis but is certainly not a desirable trait in a market-wide benchmark.

Table 4: Average daily volatility over different periods

Volatility	1m	3m	6m	1y
NCEL30	1.37%	1.22%	1.33%	1.89%
NCEL30TR	1.38%	1.22%	1.33%	1.89%
KSE100	1.06%	1.00%	1.17%	1.67%
KSE30	1.33%	1.19%	1.27%	N/A
KSEALL	1.00%	0.93%	1.09%	1.57%
MSCIPK	1.32%	1.24%	1.34%	1.91%
SBP	0.90%	0.76%	0.86%	1.33%
ABAMCO	1.53%	1.31%	1.36%	1.91%
BRINDEX30	1.87%	1.49%	1.68%	2.21%
ISE	1.07%	1.25%	1.69%	1.99%
LSE25	1.36%	1.38%	1.56%	2.06%
LSETRI	1.00%	1.20%	1.31%	1.65%
LFT25	1.30%	1.33%	1.35%	1.65%
Max	1.87%	1.49%	1.69%	2.21%
Min	0.90%	0.76%	0.86%	1.33%
Ave	1.27%	1.19%	1.33%	1.81%

Risk-Reward

Looking at returns and volatility in isolation does not give a complete picture about the superiority of one portfolio, index or strategy over another. One should look at the risk-reward ratio to compare different instruments in terms of their performance. One of the most commonly used measures of risk-reward is the Sharpe ratio. This ratio normalises excess market returns over volatility exhibited by the data. Sharpe ratios of

indices under consideration are shown in Table 5. Average Kibor rates over relevant periods were used in order to compute excess market returns.

Abamco30 stands out in terms of risk-reward ratio but the point to be reiterated here is that Abamco30 is a proprietary index designed to outperform the market, and hence should not be a surprise that it is able to do so over short time horizons. Over 1-year period, NCEL30TR is still the best index of all the 13 indices currently measuring Pakistani equity markets, despite the fact that it is not designed specifically for that purpose.

Table 5: Sharpe ratios

Sharpe Ratio	1m	3m	6m	1y
NCEL30	-8.54	2.87	-2.44	-6.26
NCEL30TR	-8.01	3.75	-0.44	-3.92
KSE100	-10.18	2.45	-2.22	-6.99
KSE30	-9.23	1.77	-2.09	N/A
KSEALL	-10.40	1.58	-2.54	-7.40
MSCIPK	-8.78	3.56	-1.91	-8.50
SBP	-12.95	-12.15	-17.23	-22.36
ABAMCO	-4.68	7.13	1.54	-5.38
BRINDEX30	-6.99	3.22	-1.61	-6.39
ISE	-15.49	-4.16	-6.70	-16.90
LSE25	-13.38	-3.98	-8.95	-15.84
LSETRI	-12.93	-0.08	-5.47	-13.97
LFT25	-14.36	-2.34	-8.66	-16.29
Max	-4.68	7.13	1.54	-3.92
Min	-15.49	-12.15	-17.23	-22.36
Ave	-10.46	0.28	-4.52	-10.85

Conclusion

The way any particular index is constructed also determines the bias of results obtained from its data. It is fairly clear from the above analysis that various indices have been created for Pakistani market with only narrow objectives in mind with the result that analysis of data highlights inherent biases in results which can also be predicted a priori. Some indices explicitly aim to measure only one aspect of stock prices, e.g.

Brindex30 is primarily a turnover index, whereas other indices have deficiencies relating to size, weightings, sectors, constituents, international comparisons, stale prices, proprietary concerns etc. An index designed to meet the requirements of all traders and observers should be analytically assessed against various measures of suitability and any inherent bias should be eliminated if it is to become a true market benchmark for use in portfolio construction.

As NCEL30 is designed to fulfil the needs of all market participants, it should come as no surprise that it also succeeds in better performance in terms of returns along with its main aim of providing the best proxy for market risk. As these features continue to attract investor interest, it is inevitable that the market will choose the best benchmark for hedging as well as portfolio/strategy replication and performance measurement. NCEL30 was designed for risk replication and hedging first, but it soon became clear that good risk replication should also lead to a better performance benchmark. This will become increasingly obvious in the future as the price history of the index builds further.