

# THE COMPACT MODEL PORTFOLIO: ITS METHODOLOGY, BENCHMARK AND PERFORMANCE

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## 1. INTRODUCTION AND METHODOLOGY

In this document we describe the construction and performance of a U.S. equity markets index designed by *Giller Investments* analysts to identify the stocks that have been chosen by the market as the most likely to outperform over a medium horizon (a holding period of several months). By attempting to identify the securities identified by the whole market as most interesting, we are taking a *semi-efficient markets* approach rather than attempting to identify a *private alpha*. We assume that it is possible to pick stocks to outperform the general market, but we rely upon the aggregate votes of many market participants to select those stocks. However, when following this methodology we must be careful to remember that our representative portfolio must be small in capital relative to the typical trading volume of the stocks selected, otherwise the implied and necessary assumption that the characteristics of market data are do not reflect our own activities in the market will be violated.

To this end we have applied canonical time-series analysis methods to the series of daily dollar volume<sup>1</sup> for every stock listed on the major exchanges. This allows us to compute a proprietary ranking metric for each stock, which is used to prepare an equal weighted index<sup>2</sup> from the stocks chosen by making a selection from the upper range of this data. We call this index the *Compact Model Portfolio*.

We have applied this method to historical data, and have been using it as part of a *proprietary trading* strategy<sup>3</sup>. In both cases, the analysis selects a representative portfolio on a daily basis. The portfolios selected typically are comprised of just six individual stocks plus a position in a security chosen to hedge the systematic risk represented by the index. Despite the daily composition of the index, trades which replace one index member company with another are rare and the holding period of each stock within the index is typically several months. Some daily turnover occurs to rebalance the portfolio back to equal weights, and this is important to correct the *buy-high sell-low* defect that would occur without rebalancing<sup>4</sup>. The

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*Date:* June 27, 2008. *Giller Investments Research Note:* 20080623/1.

<sup>1</sup>Total Shares Traded  $\times$  Stock Price.

<sup>2</sup>An equal weighted index is chosen as this methodology provides for more efficient variance reduction than the standard “capitalization weighted” indices such as the S&P 500.

<sup>3</sup>As implemented by the private investment company *Giller Investments (New Jersey), LLC*.

<sup>4</sup>This problem is particularly apparent in cap. weighted indices, which is another reason why we do not follow that methodology.

hedge instrument can be chosen to be either a short position in stock-index futures or a long position in an inverse-tracking exchange traded fund, according to the preferences and comfort with derivatives of the analyst. In general, stock index futures are typically more capital efficient than exchange traded funds.

## 2. PERFORMANCE RELATIVE TO BENCHMARK

The active fund manager has an almost overwhelming choice of indices to benchmark their performance against. However, the majority of the variance of any portfolio is explained by a common systematic factor — the market. In addition, we seek a benchmark that will allow us to remove as much systematic risk as we can manage via a suitable hedging implement. Therefore, in the choice of benchmark we restrict ourselves to those with liquid index futures markets. These are: the Dow Jones Industrial Average, the S&P 500, the Russell 2000 and the NASDAQ-100. We performed regressions of the historical daily adjusted<sup>5</sup> returns of the Compact Model Portfolio Index onto these indices using recent (21st. Century) data.

The best choice, chosen on the basis of our desire to explain as much of the systematic risk as possible, was the NASDAQ-100, as illustrated in Figure 1 on page 5. Regression on to this index gives an  $R^2$  of over 75% and, in addition, we find that for this sample period the unleveraged residual return has a positive mean of 12% on an annualized basis (4.5 bp per day). This confirms that our methodology has identified a group of stocks that are likely to outperform with a confidence of over 95%. The regression onto the benchmark has an overwhelming statistical significance. This provides an important insurance policy for the investor for it allows us to conclude that, even if the Compact Model Portfolio Index fails to outperform going forward, an unhedged portfolio is likely to follow the benchmark with a high degree of confidence.

In Figure 2 we illustrate the compounded growth of the Compact Model Portfolio Index throughout the dataset both for a net long portfolio and for a portfolio with the systematic risk removed by taking a short position in the benchmark index (see page 6). In Figure 3 we show the dramatic reduction in daily volatility that occurs when an appropriate hedging instrument is added to the portfolio (see page 7).

## 3. PERFORMANCE OF A PORTFOLIO HEDGED WITH LONG POSITION IN EXCHANGED TRADED FUND

The recent growth of *Exchange Traded Funds* has democratized the markets by providing retail investors access to strategies that were previously the province of experienced professionals or very wealthy individuals. In particular it is now possible to track an index, or even short an index, by buying a single ETF in a regular brokerage account.

Of particular interest to us is the ability acquire the equivalent performance of a fully short position in the NASDAQ-100, with two-times leverage, which can be achieved with an unmarginated long position in the *ProShares UltraShort QQQ*

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<sup>5</sup>i.e. Taking account of dividends and splits if any.

fund, or QID<sup>6</sup> This allows us to replicate the outperformance of the Compact Model Portfolio Index without the systematic risk of the benchmark, and without the use of leverage or margin accounts and short futures positions, by the simple step of allocating two thirds of our capital to the Compact Model Portfolio Index and one third to the QID fund. The performance of this portfolio<sup>7</sup> is show in Figure 4 on page 8

#### 4. ABOUT THE ANALYST

Giller Investments (New York), LLC is a private company formed to provide quantitative investment research to facilitate the operations of a family investment fund. Dr. Graham L. Giller, its sole owner and president, is a graduate of Oxford University with 1st. Class Honours in Physics and completed a doctorate in experimental elementary particle physics, also at Oxford. Dr. Giller's scientific research was centered on statistical astronomy with high energy cosmic radiation. Since 2004 he has managed a private investment company which operates advanced program trading systems based on proprietary statistical modelling. From 2000–2003 he operated a registered exempt commodity pool that traded in the Eurodollar markets. Prior to that he was employed as a portfolio manager and researcher in the Process Driven Trading group at Morgan Stanley, heading the Futures Group there.

#### 5. TABLES AND FIGURES

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<sup>6</sup>This ETF trades on the AMEX with the ticker QID.

<sup>7</sup>This fund was only listed recently, so less data is available.

Period	Index	Bchmk	Excess	Period	Index	Bchmk	Excess
2001:08	-11.15	-12.71	0.46	2005:01	29.73	-9.74	41.41
2001:09	-26.52	-30.60	2.59	2005:02	31.11	-10.25	43.56
2001:10	-13.10	-18.94	5.02	2005:03	23.87	-11.94	37.97
2001:11	3.53	-5.20	8.34	2005:04	20.46	-15.61	39.52
2001:12	-4.39	-6.33	0.95	2005:05	29.62	-7.95	38.67
2002:01	-5.87	-7.93	0.98	2005:06	19.34	-11.69	32.52
2002:02	-20.18	-19.27	-3.39	2005:07	22.34	-5.10	27.19
2002:03	-12.73	-13.71	-0.53	2005:08	20.99	-6.48	27.49
2002:04	-24.35	-24.15	-2.88	2005:09	22.21	-5.30	27.15
2002:05	-25.15	-28.23	1.28	2005:10	20.18	-8.13	28.58
2002:06	-28.96	-37.55	9.01	2005:11	31.48	-2.70	33.47
2002:07	-34.54	-42.85	8.56	2005:12	30.65	-4.29	34.63
2002:08	-35.91	-44.03	8.22	2006:01	31.54	-0.47	30.84
2002:09	-44.03	-50.55	5.68	2006:02	22.45	-2.81	22.98
2002:10	-34.92	-41.23	5.10	2006:03	25.14	-0.89	23.49
2002:11	-25.05	-33.71	8.33	2006:04	28.68	-1.06	27.17
2002:12	-34.18	-41.53	6.62	2006:05	14.50	-8.11	21.06
2003:01	-33.55	-41.61	7.73	2006:06	25.76	-8.36	33.25
2003:02	-30.32	-40.03	10.19	2006:07	24.42	-12.19	37.07
2003:03	-30.42	-39.50	9.09	2006:08	33.86	-8.10	41.48
2003:04	-22.50	-34.30	12.70	2006:09	43.99	-3.77	45.97
2003:05	-17.95	-28.85	10.93	2006:10	52.89	0.79	48.52
2003:06	-18.77	-28.62	9.41	2006:11	62.40	4.21	52.99
2003:07	-15.30	-24.15	7.89	2006:12	59.39	2.21	52.79
2003:08	-15.21	-20.34	3.22	2007:01	62.79	4.27	53.21
2003:09	-15.66	-22.57	5.32	2007:02	57.35	2.55	50.35
2003:10	-9.74	-15.87	4.54	2007:03	62.71	3.11	54.73
2003:11	-6.97	-15.40	7.25	2007:04	72.58	8.66	56.46
2003:12	7.05	-12.81	20.13	2007:05	84.73	12.18	62.66
2004:01	23.93	-11.32	37.12	2007:06	86.20	12.52	63.51
2004:02	22.03	-12.67	36.95	2007:07	86.29	12.40	63.74
2004:03	22.11	-14.56	39.89	2007:08	94.36	15.70	66.37
2004:04	21.99	-16.76	43.18	2007:09	124.86	21.65	83.78
2004:05	29.78	-12.91	46.14	2007:10	151.43	30.26	93.11
2004:06	34.87	-9.92	47.22	2007:11	121.52	21.54	81.65
2004:07	24.81	-16.82	46.47	2007:12	151.76	21.29	107.03
2004:08	20.94	-18.71	45.00	2008:01	116.66	7.13	99.36
2004:09	21.18	-16.09	41.16	2008:02	116.36	1.53	109.20
2004:10	27.62	-11.69	41.90	2008:03	115.47	3.59	105.08
2004:11	30.34	-6.66	37.77	2008:04	127.18	11.58	101.83
2004:12	38.68	-3.71	42.43	2008:05	134.51	18.25	97.62

TABLE 1. Monthly cumulative percentage returns for the Compact Model Portfolio Index (Index); the NASDAQ-100 Benchmark (Bchmk); and the composite hedged portfolio (Excess). Period is encoded as *year:month*.

THE COMPACT MODEL PORTFOLIO: ITS METHODOLOGY, BENCHMARK AND PERFORMANCES

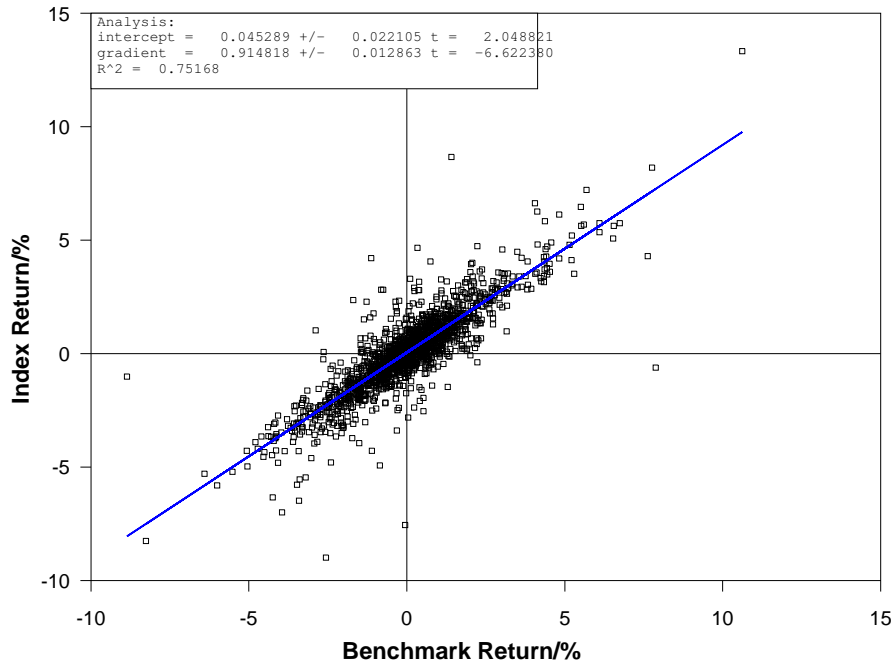


FIGURE 1. Graph illustrating the correlation between the performance of the equal weighted Compact Model Portfolio Index (index return) and the best fitting benchmark the NASDAQ-100 Index (benchmark return). This data is daily.

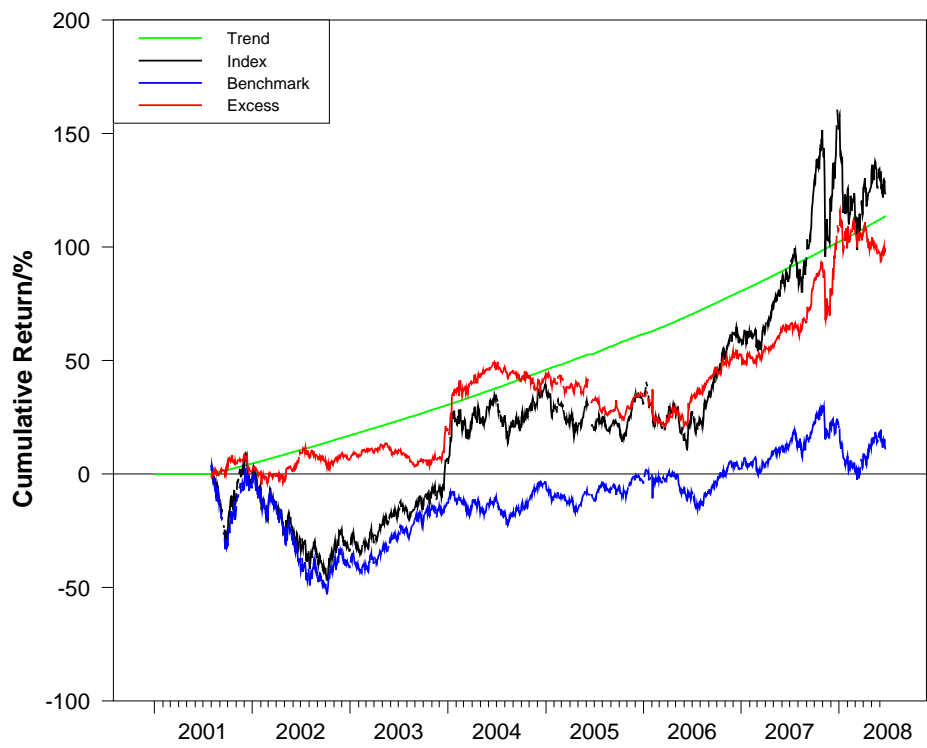


FIGURE 2. Time series of cumulative returns for: the Compact Model Portfolio Index; the NASDAQ-100 benchmark; the excess return over the benchmark; and, the trend growth of that excess return.

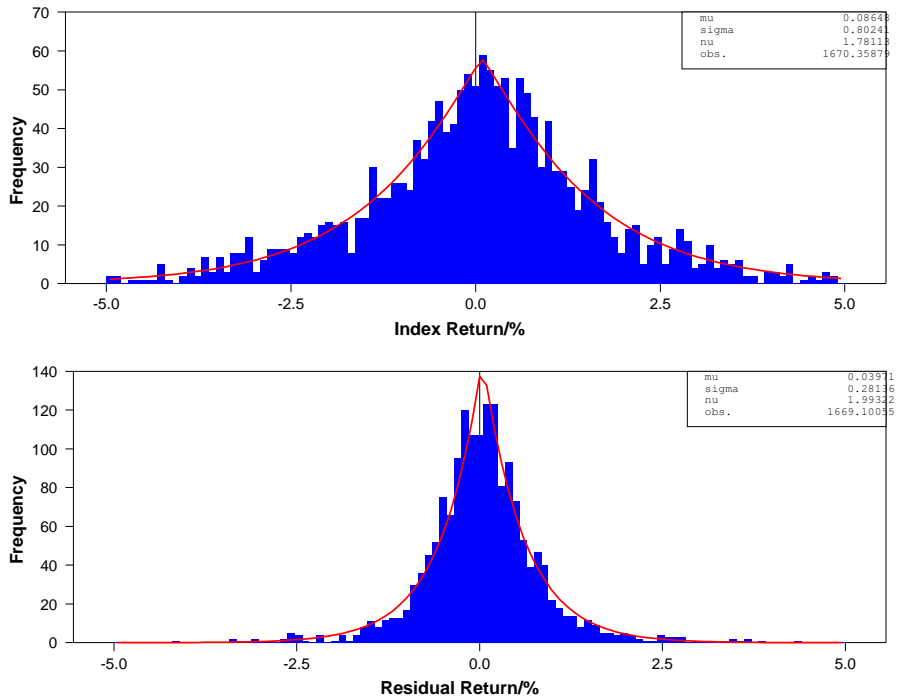


FIGURE 3. Histograms of the daily returns of a long position the Compact Model Portfolio Index (labelled “index return”) and relative to the benchmark (labelled “residual return”). In both cases the histogram is fitted convincingly to the *generalized error distribution*, which is an analytically tractable distribution more suited to financial data series than the Normal distribution (“bell curve”) but which includes the Normal as a special case. Note that both histograms have the same horizontal scale.



FIGURE 4. Daily performance of Compact Model Portfolio Index when hedged with QID exchange traded fund.