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The Oil & Gas Industry

Drilling for Alpha Using Global Point-in-Time Industry Data

Identifying the key drivers of future earnings and cash flows are important steps in most equity valuation models. In the oil & gas industry, a key determinant of value and future cash flow streams is the level of oil & gas reserves a firm holds. While most fundamental analysts/investors take into consideration a company's reserves in arriving at price targets, a majority of systematic driven processes do not. Fundamental investors may be aided by knowing which reserve metrics are more predictive of stock price movement. Systematic investors often over look reserve metrics because oil & gas reserve data is buried under notes/supplemental data and not included in income, balance sheet and cash flow statements, which serve as the traditional sources for fundamental data used in most stock selection models.

Using S&P Capital IQ's Global Point-in-Time database, we investigate the importance of reserve and production information provided by oil & gas companies. We use this data to construct several stock selection strategies and confirm the following:

- **Six of the twelve reserve factors we tested had statistically significant average 1-month tertile spreads and information coefficients**. Based on factors with data from at least March 2002, Reserve Exhaustion Rate, a factor which considers how rapidly a firm is burning through its reserves, generated the best monthly spread return (0.81%).

- **Cash flow based metrics and capex are important indicators of future performance**. When we compared the performance of our pure oil & gas factors to traditional factors, Free Cash Flow Yield and Capex Coverage (cash flow divided by capex), were the top two factors in terms of average 1-month IC.

- **Signals constructed using oil & gas data are uncorrelated to popular generic signals used across industries**. The largest absolute rank correlation coefficient we saw given the indicators we considered was 0.4.

- **A simple equal-weighted six-factor Oil & Gas Model has an average 1-month spread and IC of 0.41% and 0.026 respectively**.

- **We see improvements in long-short returns and ICs (rank correlation of alphas to 1-month forward return) when we combined the Oil & Gas Model with S&P Capital IQ's three Benchmark Models.** When the Oil & Gas Model constitutes 50% of the combined model, the average 1-month ICs of the Quality and Value Benchmark Models increase by 88% (0.018 to 0.029) and 77% (0.018 to 0.032) respectively.

1 Introduction

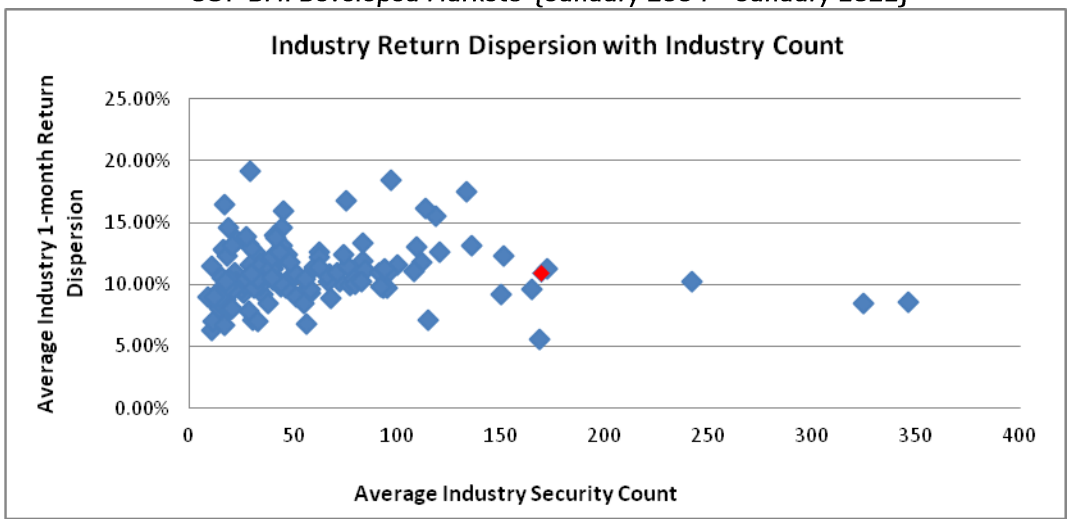
In this report, we turn our attention to the oil & gas industry. Specifically, we will be looking at uncovering new alpha signals to help investors select winners from a pool of global firms engaged in oil & gas exploration and production activities.

According to the fundamental law of active management, a manager's performance is mostly dependent on skill and breadth (See Grinold, R.C, - The Fundamental Law of Active Management). While Industry specific data sets offer an opportunity to increase skill, it comes at a cost - reduced breadth. One of the objectives of this research is determining if this trade-off (increased skill vs. reduced breath) leads to improved model or portfolio performance.

A natural starting point for any industry based research is determining the potential "pay-off" or "reward" for successful stock picking in that industry. One way to measure this payoff is by calculating return dispersion for industries; industries with high return dispersions offer bigger pay-offs compared to those with low return dispersions.

Figure 1 displays the average 1-month industry return dispersion since 1994, including industry average security count for the S&P BMI Developed Markets (the full list of countries included in this index is provided in Appendix A). Each square in the chart represents one of the GICS industries in the index (124 displayed in the chart), with the red square representing the oil & gas industry.

Figure 1: 1-month Average Return Industry Dispersion and Average Industry Security Count S&P BMI Developed Markets (January 1994 – January 2012)



Not surprisingly, the highest pay-offs appear to be in technology (computer equipment, storage, internet software) and bio-tech, but several of these high reward industries suffer from limited breadth (less than 50 securities in many instances). The oil & gas industry ranks in the middle in terms of return dispersion. However, in terms of breadth, the industry ranks in the top 5; diversified banks, regional banks and industrial machinery industries have the highest security count in the S&P BMI Developed Markets index.

2 Factor Formulation and Testing

Table 1 lists the 12 factors we tested, including their definitions and ranking order, where "A" and "D" stand for ascending and descending respectively.

Table 1: Factor Definitions

	Factor	Description	Direction
Reserves Acquisition, Cost and Depletion Rate	Proved Reserves / $ Market Cap ("ProvdResMcap")	The valuation of oil & gas firms is tied closely to the level of reserves they hold. This signal measures the amount of reserves an oil & gas company holds relative to its market capitalization.	D
	Reserve Acquisition Cost (Year-on-Year Change in Proved Reserves / (Exploration + Development Cost))	This signal measures exploration and development costs associated with acquiring and increasing reserves.	D
	Reserve Exhaustion Rate	Measures the number of days it will take for a company's reserves to be exhausted given current daily production rate, assuming reserves are static (no additional reserves acquired).	D
	Reserve Replacement Ratio	This represents the percentage of annual production that was replaced with new reserves in a given period	D
Cashflow Valuation	Future Cashflow Yield (Estimated Future cash flow / Market Cap)	Oil & gas companies include estimates of future cash inflow from proved reserves. Inflows are estimated using assumptions for oil and gas prices. This signal uses this information together with market cap to determine how attractive a security is relative to its peers.	D
	Discounted Future Cashflow Yield (Estimated Discounted Future Cash Flow / Market Cap)	Similar to Future Cashflow Yield, this factor uses discounted cash flows (estimated net future cash inflows discounted at a 10% rate) divided by market cap in computing the attractivenes of a stock to its peers.	D
Growth	1-Year Growth in Future Cashflow Scaled by Total Assets ("YoYChgFCFAst")	A growth factor that measures the change in estimated future cashflow scaled by total assets	D
	Developed Reserves Per Share Growth (year on year growth in reserves per common share outstanding) - "ResPerShareG"	Another growth indicator that measures the growth in reserves per common share outstanding.	D
	Total Developed Reserves Growth ("TotResG")	This signal ranks securities based on the 1-year growth in total proved reserves. We prefer companies with strong growth measures.	D
	Net Developed Acreage Growth ("DevAcrG")	Net Developed Acreage represents acres allocated to productive wells. Growth in this metric implies that a company has acquired new landed areas with proven reserves.	D
Product Margin	Oil Margin	This is simply the average price of a barrel of oil sold minus the cost of producing that barrel, divided by average price per barrel.	D
	Gas Margin	The average price per unit of gas minus the cost of producing a unit, divided by the price of a unit.	D

Conceptually, factors were grouped into four categories: the first category is for factors that examine reserve acquisition costs and reserve depletion/replacement rates; the second bucket looks at the efficacy of factors based off projected cash inflows generated by existing reserves as stated in company supplemental financial statements; the third category measures the growth in

reserves and future cash inflows; while the last group rewards oil & gas companies with superior product margins.

2.1 Factor Test Results

Test results for oil & gas companies within the S&P BMI Developed Markets universe are displayed in Table 2. The table includes start dates (the date back tests commence for a given factor), information coefficients, equal-weighted 1-month long-short returns (in local currency and based on three fractiles or tertiles), information ratios (IR) and t-statistics. Results are shown by the four categories discussed in the previous section and are ordered by 1-month IC.

Table 2: Oil & Gas Factors Performance Summary
S&P BMI Developed Markets Universe (Start-Date – January 2012)

Factor	Start Date	Count	1M IC	1M IC IR	1M IC Tstat	1M Return	1M Return IR	1M Return Tstat
Reserve Acquisition, Cost and Depletion Rate								
Reserve Acquisition Cost	March 2001	83	0.043	0.32	3.78	0.72%	0.21	2.52
Reserve Replacement Ratio	March 2000	31	0.043	0.18	2.06	0.74%	0.15	1.73
ProvesResMCap	March 2000	133	0.034	0.23	2.79	0.68%	0.17	2.05
Reserve Exhaustion Rate	March 2000	87	0.032	0.20	2.38	0.81%	0.22	2.56
Cashflow Valuation								
Future Cashflow Yield	March 2000	84	0.029	0.22	2.57	0.73%	0.18	2.19
Disc Future Cashflow Yield	March 2000	84	0.019	0.13	1.61	0.32%	0.09	1.02
Growth								
ResPerShareG	March 2000	95	0.012	0.09	1.08	0.12%	0.03	0.39
TotResG	March 2000	95	0.007	0.06	0.66	-0.02%	0.00	-0.05
YoYChgFCFAst	March 2000	83	0.006	0.04	0.42	-0.21%	-0.05	-0.61
DevAcrG	March 2002	71	-0.010	-0.07	-0.76	-0.42%	-0.12	-1.30
Product Margin								
Oil Margin*	July 2004	20	0.055	0.20	1.92	1.50%	0.259	2.455
Gas Margin*	July 2004	19	0.018	0.06	0.61	0.45%	0.077	0.734

*Only Canadian companies have data for these factors

The factors in the first category (Reserves) are the best collectively out of all the four categories. The 1-month ICs of all the factors in the Reserve Acquisition, Cost and Depletion Rate (RCDR) category are statistically significant, at least at the 5% level. The 1-month spreads of three of four RCDR factors are statistically significant at the 5% level, with the last, Reserve Replacement Ratio, significant at the 10% level. These results support the view that reserves are important in forecasting future returns, and companies that are able to grow reserves quicker and cheaper than competitors, should deliver superior returns to investors. Reserve Acquisition Cost and Reserve Replacement Ratio are the top two factors in this group from an IC standpoint (0.04), while Reserve Exhaustion Rate generates the largest average 1-month spread at 0.81%

The other factors with statistically significant ICs and return spreads are Future Cashflow Yield and Oil Margin. The result for Disc Future Cashflow Yield, which removes estimates of future development and production costs from future cash inflows, is weak, even though its IC and spread are in the expected direction. It is possible that while cash inflows are simple to estimate (based on existing reserves and average prices), future production, development, well abandonment and rehabilitation costs are harder to quantify. Future Cashflow Yield is not

contaminated by these "cost" estimation errors and provides a "cleaner" indicator for a firm's future cash flow generation capabilities.

The performance of all four growth factors is weak; in fact, three of the four factors have negative tertile spreads. One possible explanation for this weakness is that "growth" on its own might not paint a complete picture of how attractive an oil & gas company is. Growth factors may need to be used with other indicators to make them meaningful. For example, Reserve Acquisition Cost combines both reserves growth (new reserves acquired) and the cost of the additional acquired reserves. It is possible that a firm is attractive in terms of growth, but this "growth" was achieved at significant cost.

2.2 Comparison with Traditional Factors

We benchmarked the performance of the oil & gas factors discussed in the previous section to several factors commonly used in systematic stock picking models. We also took into consideration signals popular amongst fundamental analysts (based on suggestions from our colleagues in the Equity Research Group) to determine the attractiveness of oil & gas firms. Factors were selected from the Alpha Factor Library, S&P Capital IQ's web based factor research library. We selected seven factors in total:

- EBITDA-to-Enterprise Value (EBITDA/EV) - Valuation
- Free Cash Flow Yield (FCFP) – Valuation
- 3-month Change in Fiscal Year 1 Estimates (3MRevFY1) – Analyst Expectation
- Return on Invested Capital (ROIC) – Capital Efficiency
- Capital Acquisition Ratio (Capacq): Operating Cash flow/ CAPEX – Capital Efficiency
- 1-Year Change in Earnings per Share (1YEPSG) – Growth
- 12-month Price Momentum (12MPriceMo) – Price Momentum

Figure 2: Traditional vs Oil & Gas Factor Comparison: BMI Developed Markets Index

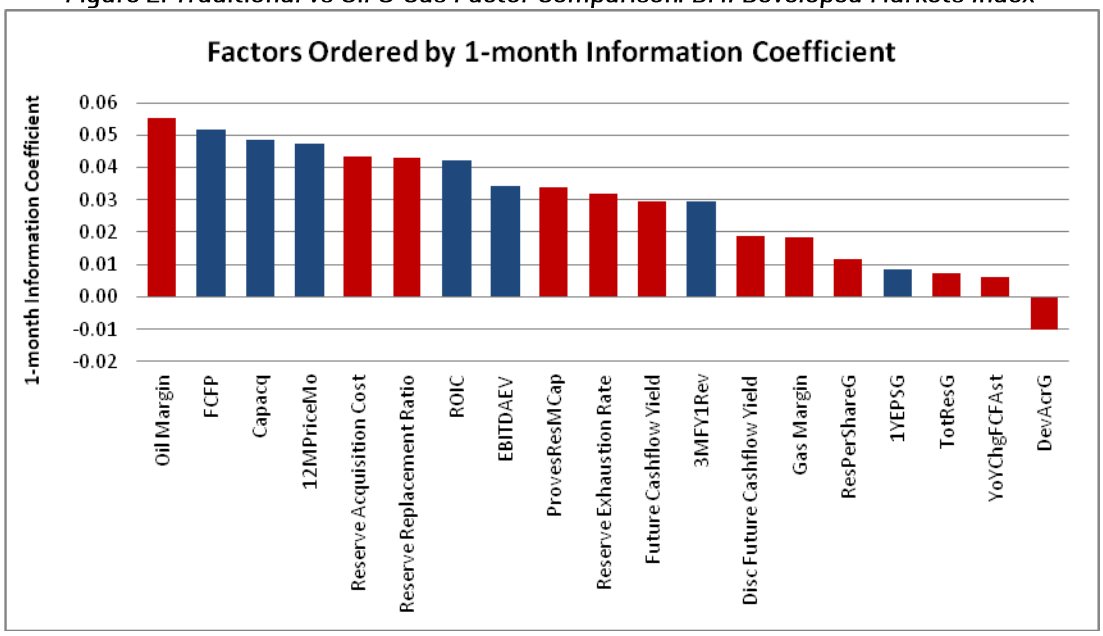


Figure 2 compares the performance of these seven factors with the oil & gas signals highlighted in the previous section. The red and blue bars represent the oil & gas and traditional factors respectively.

The performance of oil & gas factors compared to their traditional peers is encouraging, given that most of the data used in constructing the former are available annually, unlike the latter, which mostly rely on data available on a quarterly frequency. Excluding Oil Margin (which is mostly restricted to Canadian companies), two of the next five top factors, as measured by 1-month IC, are oil & gas specific factors – Reserve Acquisition Cost and Reserve Replacement Ratio. The best two traditional factors are those that consider a firm's cash flows and capital expenditures (FCFP and Capacq). Cash flows are important in this industry as they support reserve acquisition, debt servicing and financing of capital-intensive, long term projects.

2.3 Regime Analysis and Factor Performance

What signals work during oil price rallies? We investigate the impact of oil price changes on factor performance from March 2000 to January 2012, using oil price data from the St. Louis Federal Reserve. We adjust historical oil price for inflation (we also use nominal oil prices) and split the data into either positive or negative price changes. This regime classification system results in 86 and 56 data points for positive and negative price changes respectively. Factor performance in rising vs. falling oil price regimes is reported in Figure 3. We exclude Oil and Gas Margin factors from this analysis due to limited data points.

The only factor in the oil & gas category with a statistically significant 1-month IC in both regimes is Reserve Acquisition Cost. Four of the ten factors in this category have statistically significant average 1-month ICs in the positive oil price shock regime – Reserve Replacement Ratio, ProvedResMktCap, Future Cash flow Yield and Reserve Acquisition Cost. Five factors have statistically significant ICs in the negative oil price shock regime, although the IC of DevAcrG is negative.

In the traditional factor category, the only factor with an average 1-month IC not statistically significant in either regime is 1YEPSG. Three out of the of the four factors (Capacq, FCFP, ROIC, EBITDAEV) suggested by our colleagues at the Equity Research Desk as being important and widely followed by analysts in the industry, have statistically significant ICs in both regimes.

The majority of the potential oil & gas factors we found promising in Table 2 (especially the RCDR factors) appear not to be powerful stock selection indicators when oil prices are falling. A potential problem is the limited data points we used to define this regime (56). We should also bear in mind that the traditional factors that seemed to work well in both regimes were suggested to us and not randomly chosen, so it may not be surprising that these indicators seem to hold up better when oil prices fall.

Figure 3: Oil & Gas Factors Performance Summary
When Oil Price is Rising/Falling

Factor	Average 1-month IC	
	Positive Oil Price Change	Negative Oil Price Change
Oil & Gas Industry Factors		
Reserve Replacement Ratio	0.056**	0.023
ProvedResMktCap	0.046***	0.016
Future Cash flow Yield	0.039**	0.016
Reserve Acquisition Cost	0.035**	0.057**
Disc Future Cash flow Yield	0.023	0.013
Reserve Exhaustion Rate	0.016	0.056**
ChgFCFTotAst	0.008	0.004
DevAcrG	0.007	-0.039*
ResPerShareG	-0.004	0.035**
TotResG	-0.008	0.031*
Traditional Factors		
12MPriceMo	0.061***	0.027
Capacq	0.045***	0.054***
FCFP	0.038***	0.073***
1YEPSG	0.005	0.014
ROIC	0.042***	0.042**
EBITDAEV	0.047***	0.015
3MFY1Rev	0.040**	0.013

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level

2.4 Factor Correlation

The question that comes to mind is: Why not only utilize those traditional factors that seem to work quite well? The obvious response is that oil & gas factors may be uncorrelated with traditional factors, thus offering some benefit to an existing multi-factor stock selection process. A high correlation between the traditional and oil & gas factors would indicate that the new factors are redundant and offer no incremental benefit if blended with strategies based on generic signals.

The IC correlation matrix displayed in Figure 4 suggests that oil & gas indicators are reasonably different from their traditional counterparts. Due to space constraints, we only show the correlation results of traditional factors with oil & gas factors in this section. The largest 1-month IC correlation coefficient is 0.40 (Reserve Exhaustion Rate and Capacq), and there are several factors with correlation coefficients close to zero. We are encouraged by these low to moderate correlation coefficients, and we will explore the potential reward of combining our oil & gas signals with a multi-factor model in the next section.

Figure 4: Factor IC Correlation Matrix

	12MPriceMo	Capacq	FCFP	1YEPSG	ROIC	EBITDAEV	3MFY1Rev
ProvdResMCap	-0.26	0.12	-0.31	-0.13	-0.12	0.04	-0.14
Reserve Acquisition Cost	0.10	-0.17	-0.23	0.11	-0.10	0.02	0.01
Reserve Exhaustion Rate	0.23	0.40	0.31	0.22	0.24	-0.15	0.12
Reserve Replacement	0.19	-0.05	-0.26	0.13	-0.03	0.18	0.09
Future Cash Flow Yield	-0.23	0.08	-0.13	0.01	-0.02	0.05	-0.11
Disc Future Cash flow Yield	-0.29	0.09	-0.14	-0.06	-0.07	0.12	-0.09
Oil Margin	0.06	0.18	0.19	0.09	0.23	0.11	0.09
Gas Margin	0.08	0.08	0.09	0.18	-0.02	-0.17	0.07
YoYChgFCFAst	0.34	0.02	-0.13	0.22	0.12	0.21	0.07
TotResG	0.20	-0.09	0.07	0.18	0.06	-0.11	0.06
DevAcrG	-0.01	-0.02	-0.15	0.03	-0.01	-0.06	-0.12
ResPerShareG	0.17	-0.05	0.12	0.17	0.08	-0.09	0.05

3 Oil & Gas Factors in a Multi-Factor Stock Selection Process

We used a two-stage process to develop an alpha strategy for the oil & gas industry. The first step was to create a stand-alone Oil & Gas Model using the factors identified in Table 2. The second step was to blend this stand alone model with three of S&P Capital IQ's four stock selection models. The models used at this phase are: Value Benchmark Model ("VBM"), Growth Benchmark Model ("GBM") and the Quality Model ("QUAL"). Since scores for our alpha models are only available for U.S securities, we will restrict our analysis to oil & gas stocks in the Russell 3000 index (About 70 oil & gas stocks are in this universe on average since 2000).

3.1 Selecting Factors for the Oil & Gas Model

Our starting point is the 1-month IC factor correlation matrix for all the oil & gas factors (Figure 5). We once again exclude Oil and Gas Margin factors because of limited history and coverage (data is only available for Canadian securities). Only two cells shows elevated correlation - Future Cash flow Yield and Disc Cash flow Yield at 0.89 and ResPerShareG and TotResG at 0.93. Three other cells have correlation coefficients greater than 0.5 (all shaded in yellow). All the factors in the RCDR bucket, which we found to be the most promising indicators, have low to moderate correlation coefficients, with the largest being 0.42.

Figure 5: Oil & Gas Factors - IC Correlation Matrix

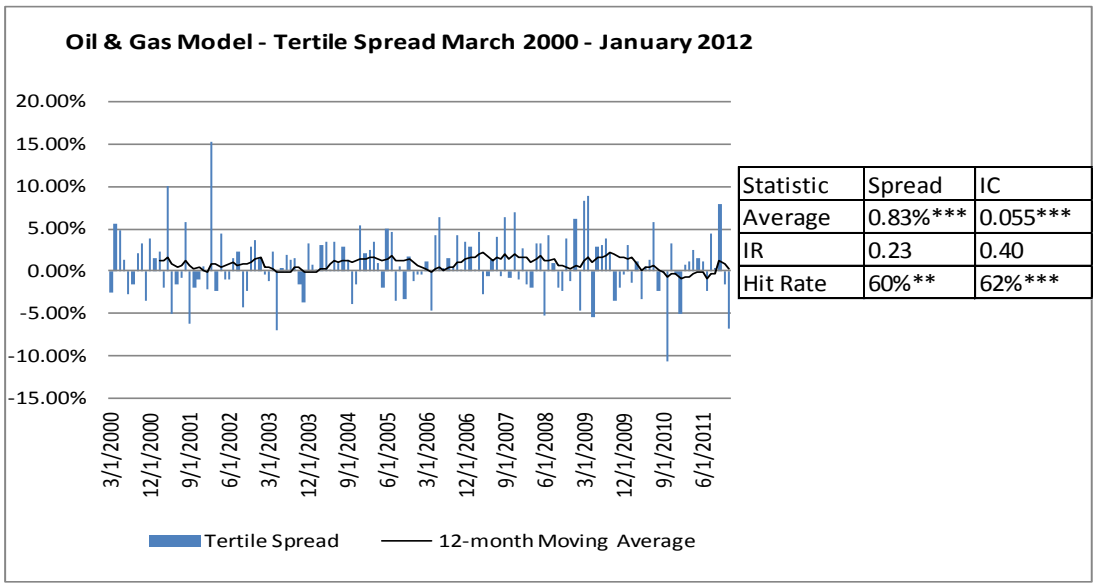
	ProvdResMCap	Res. Acq Cost	Res. Exh Rate	Res. Replacement	Future Cash Flow Yield	Disc Future Cash flow	ResPer ShareG	YoYChg FCFAst	TotResG	DevAcrG
ProvdResMCap	1.00									
Reserve Acquisition Cost	0.06	1.00								
Reserve Exhaustion Rate	0.37	-0.02	1.00							
Reserve Replacement	0.28	0.42	-0.06	1.00						
Future Cash Flow Yield	0.59	-0.09	0.20	0.15	1.00					
Disc Future Cash flow Yield	0.55	-0.17	0.08	0.09	0.89	1.00				
ResPerShareG	-0.07	0.43	0.07	0.10	0.01	-0.04	1.00			
YoYChgFCFAst	0.19	0.38	0.06	0.45	0.19	0.12	0.32	1.00		
TotResG	-0.10	0.51	0.09	0.07	-0.02	-0.07	0.93	0.35	1.00	
DevAcrG	0.10	0.18	0.14	0.10	0.08	0.02	-0.05	0.27	0.10	1.00

3.2 An Alpha Model Using only Oil &Gas Factors

We picked six factors based on average 1-month IC and correlation using half of our available data points. The factors we chose included all four factors in the RCDR group, plus Future Cash flow Yield and TotResG . We required that a security has data for at least three factors before it is included in the final model.

Figure 6 shows the time series of model tertile spread, including spread and IC summary statistics. The model was created by equal-weighting all six selected factors. Overall, it appears that the model has worked reasonably well with a spread and IC of 0.83% and 0.055 respectively (both statistically significant at the 1% level). The spread and IC hit rates (% of positive spreads or IC) are also statistically significant. Model spread and IC are also higher than that of any individual factor (Table 2).

Figure 6: Oil & Gas Model – Tertile Spread Summary Time Series with Summary Statistics Russell 3000 Universe



Statistic	Spread	IC
Average	0.83%***	0.055***
IR	0.23	0.40
Hit Rate	60%**	62%***

While we are pleased with the model's performance, we were curious as to what type of exposures or bets the model was taking. For this analysis, we looked at two characteristics – size and beta (60-month CAPM beta). We use median values to capture the size and beta attributes of each fractile. Table 3 details our results for the top (Fractile 1) and bottom (Fractile 3) fractiles.

Table 3: Oil & Gas Model Fractile Portfolio Characteristics

	Market Cap	Beta
Fractile 1	$2.18B	0.92
Fractile 3	$1.09B	0.96
Difference	$1.01B***	-0.04*

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level

The model takes a big bet on large cap stocks as the median market cap of the top fractile is almost twice that of the bottom fractile. The beta of the model's top fractile is also smaller than that of the bottom fractile, and this difference is statistically significant at the 10% level. Given the model's tilt to large cap and low beta names, we decided to neutralize the effects of both attributes by re-ranking, and re-ran our back-test. Our revised results are shown in Table 4.

Table 4: Oil & Gas Model – Model summary statistics after Market Cap and Beta Neutralization (March 2000 – January 2012)

Statistic	Spread	IC
Average	0.41%	0.026***
IR	0.14	0.22
Hit Rate	55%	55%

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level

We notice about a 50% decline in both average monthly spread (0.83% to 0.41%) and IC (0.05 to 0.03) respectively, suggesting that the initial model benefitted from the large cap and low beta tilts. The spread return is also no longer statistically significant. This version of the model (stripped of its large cap and beta tilts) is the one we will use in all future tests in this report, as we believe that a majority of our readers will prefer to eliminate/reduce these two exposures.

3.2 Blending the Oil & Gas Model with SPCIQ Benchmark Models

Table 5 details the performance of S&P Capital IQ's Benchmark Models in the oil & gas industry within the Russell 3000 index. Each Benchmark Model (Value, Growth and Quality) was formulated using approximately 22 factors. We include the result of the Oil & Gas Model at the top of the table for comparison purposes.

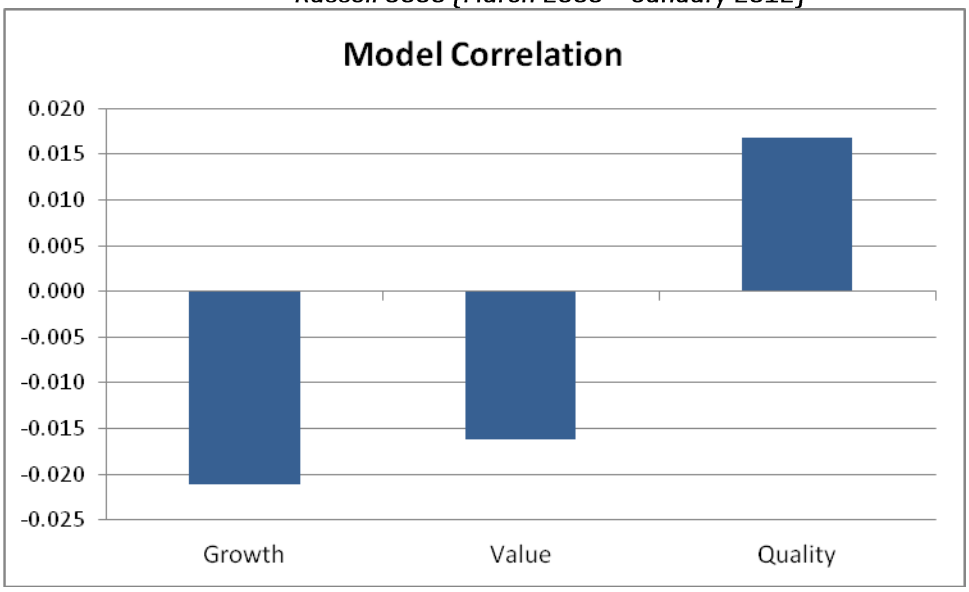
Table 5: Oil & Gas and SPCIQ Benchmark Models – Performance Summary Statistics Russell 3000 (March 2000 – January 2012)

Model	Spread	Spread - IR	IC	IC - IR
Oil & Gas	0.41%	0.12	0.026***	0.21
Growth	0.00%	0.00	0.025**	0.17
Value	-0.16%	-0.03	0.018	0.10
Quality	0.09%	0.02	0.018	0.11

*** significant at the 1% level; ** significant at the 5% level;

The performance of the Benchmark Models in the oil & gas industry is rather disappointing, as the only model with a statistically significant 1-month IC is the Growth Benchmark Model (GBM). We also observe that the Oil & Gas Model has a higher information ratio (both IC and return spread) than the other three models. Figure 7 shows the 1-month IC correlation between the Oil and Gas Model and each of our Benchmark Models. The correlation is quite low and ranges from -0.021 to 0.017. Given this low correlation, we are hopeful that the performance of our Benchmark Models would improve when they are combined with the Oil & Gas Model.

Figure 7: Oil & Gas Model 1-month IC correlation with SPCIQ Benchmark Models Russell 3000 (March 2000 – January 2012)



Our initial weighting scheme allocates 20% to the Oil & Gas Model and 80% to each Benchmark Model. This weighting scheme is based on the proportion of factors in the former (six) and latter (average of twenty-two in each Benchmark Model).

Table 6 details our results, where OGGRW, OGQUA and OGVAL represent the combination of the Oil & Gas Model with the Growth, Quality and Value Benchmark Models respectively.

Table 6: Combined Models - Oil & Gas and SPCIQ Benchmark Models – Performance Summary Statistics
Russell 3000 (March 2000 – January 2012)

	OGGRW		OGQUA		OGVAL	
Statistic	Spread	IC	Spread	IC	Spread	IC
Average	0.05%	0.030**	0.18%	0.023*	0.13%	0.021
IR	0.01	0.21	0.04	0.15	0.03	0.12
Hit Rate	54%	61%***	56%	53%	56%	56%

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level

We see some improvement in performance metrics for the combined models (OGGRW, OGQUA, OGVAL) compared to the original models (Growth, Quality and Value). The average 1-month IC for OGQUA is 38% higher than the initial Quality Model (0.023 vs 0.018), and it is now statistically significant at the 10% level; the information ratio of the combined model is also higher by 36% (0.15 vs 0.11). The hit rate of the IC for OGGRW improved from 57% to 61% (statistically significant at the 1% level) and we also observe that the IC is 20% higher (0.030 vs 0.025). Although we see improvements in absolute numbers for OGVAL, the IC and spreads for the model are still not statistically significant at any level.

We decided to test different combinations of the Oil & Gas and Benchmark Models (Table 7 and Table *8*). The header indicates the weight of the Oil & Gas Model in the combined model. In both tables, asterisks are used to show statistically significant ICs and spreads, while colored cells indicate whether the hit rate of the IC/spread is statistically significant; yellow at the 10% level, orange at the 5% level and blue at the 1% level. White cells imply that the hit rate is not statistically significant.

Table 7: IC Sensitivity Analysis to Varying Oil & Gas Model Weight
Russell 3000 (March 2000 – January 2012)

Increasing Oil & Gas Model Weight

Model	20%	30%	40%	50%
OGGRW	0.030**	0.033***	0.034***	0.035***
OGQUA	0.023*	0.027**	0.030**	0.034***
OGVAL	0.021	0.024*	0.029*	0.032**

*** significant at the 1% level; **significant at the 5% level; * significant at the 10% level

Table 8: Return Spread Sensitivity to Varying the Weight of the Oil & Gas Model
Russell 3000 (March 2000 – January 2012)

Increasing Oil & Gas Model Weight

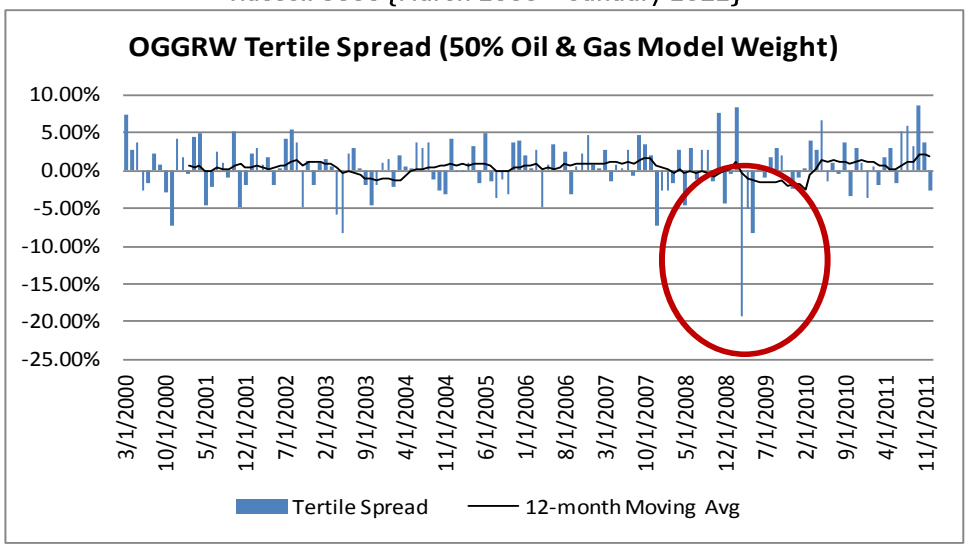
Model	20%	30%	40%	50%
OGGRW	0.05%	0.21%	0.20%	0.43%
OGQUA	0.18%	0.14%	0.21%	0.29%
OGVAL	0.13%	0.14%	0.10%	0.30%

*** significant at the 1% level; **significant at the 5% level; * significant at the 10% level

As we increase the weight of the Oil & Gas Model, we see significant improvements in IC, especially for OGQUA and OGVAL (Table 7). The average 1-month IC of OGVAL increased by 52% from 0.021 (20% Oil & Gas Model weight) to 0.032 (50% Oil & Gas Model weight). The 1-month IC of OGGRW and OGQUA is also statistically significant at the 1% when the Oil & Gas Model constitutes 50% of each model. In terms of IC hit rate, all the three models show some degree of statistical significance when the Oil & Gas Model has a 50% weight in the final model.

The picture is slightly different for the return spreads (Table 8). Although spreads improve in absolute terms as we ratchet up the weight of the Oil & Gas Model, they are still not statistically significant for any model at any combination weight. However, the tertile spread hit rates are statistically significant (as indicated by the yellow, orange and blue cells), suggesting that the model has a few months with large draw downs. To confirm, we show the time series spread return distribution for OGGRW (50% Oil & Gas Model weight) in Figure 8. The return distribution is negatively skewed (-1.19) and has several months with large draw downs, including the beta rally months of early 2009 (circled in red).

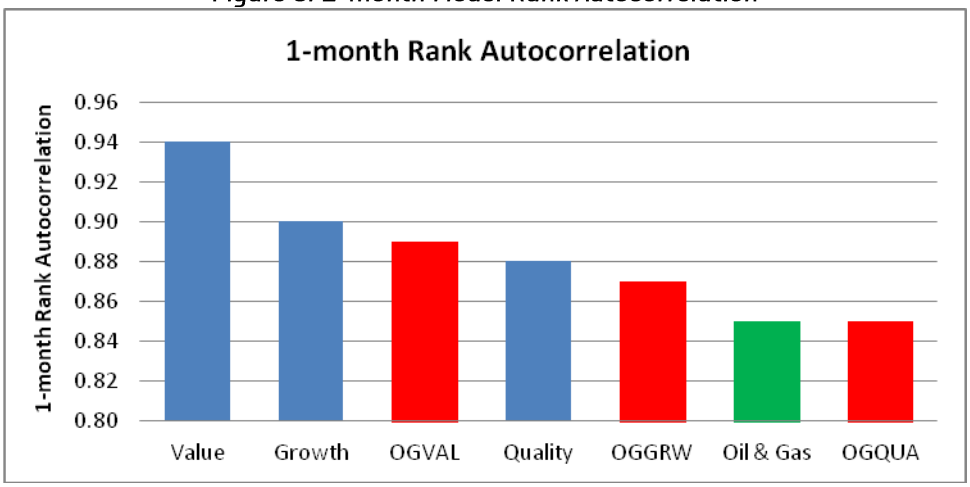
Figure 8: OGGRW Tertile Spread Time Series with 12-month Moving Average Russell 3000 (March 2000 – January 2012)



3.3 Impact on Model Turnover

Figure *9* details the 1-month rank auto-correlation of the Oil & Gas Model (green bar), Benchmark Models (blue bars) and the combined modes (using 50% Oil & Gas Model weight) – red bars. There is a slight deterioration in turnover, ranging from 3.3% - 5.4%, when the Oil & Gas Model is combined with our SPCIQ Benchmark models. The 1-month rank auto-correlation for the stand-alone Oil & Gas Model (beta and market cap neutralized version) is 0.85.

Figure 9: 1-month Model Rank Autocorrelation



4 Data and Universe Definition

We used S&P Capital IQ's Global Point-in-Time database for this study. Data generally starts in March 2000 for most of the data items, although coverage for some items is sparse till 2006/2007. Appendix B lists the data items available in the database. The universe is made up of

oil & gas companies with GICS sub-industry codes 10102010 (Integrated oil & gas) and 10102020 (oil & gas exploration and production) in the S&P BMI Developed Markets Index. A list of all the countries in the S&P BMI Developed Markets Index is provided in Appendix A.

Figure *10* shows the time series universe count in addition to a breakdown of the securities into three regions – U.S, Canada and International (universe ex North America). The universe count has averaged 182 securities since December 1999 and peaked at 253 securities in October 2005. About 80% of the securities are from North America, with 20% from other developed markets.

Figure 10: Universe Count and Regional Decomposition– Oil & Gas Companies in S&P BMI Developed Market Index

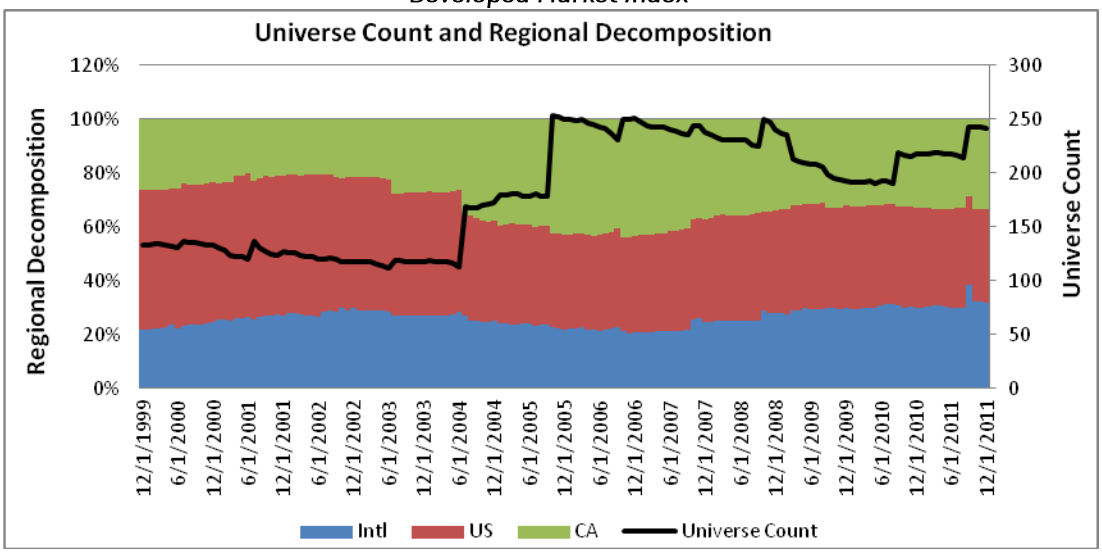
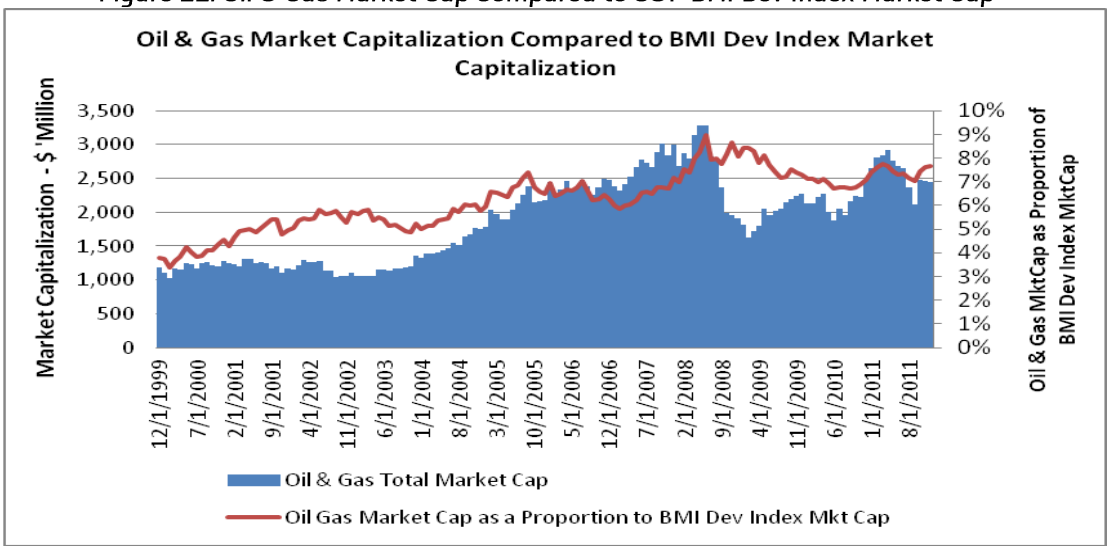


Figure 11 compares the market cap of oil & gas firms in the S&P BMI Developed Market Index to that of the index and also shows the total market cap of all oil & gas securities in the index. The weight of oil and gas stocks in the index has averaged 6.25% since the beginning of 2000 and is currently at 7.4%. Successful stock picking within the oil & gas industry can therefore have a meaningful impact on total portfolio return.

Figure 11: Oil & Gas Market Cap Compared to S&P BMI Dev Index Market Cap



5 Conclusions

Reserves are key inputs in assigning value to oil & gas firms. Whilst most fundamental analysts incorporate reserve data in their analysis, most systematic processes do not. Utilizing S&P Capital IQ's Global Point-in-Time data, we identify several signals with strong performance summary characteristics. When we blended the oil & gas signals with S&P Capital IQ's stock selection models, we see improvements in average 1-month ICs and hit rates. However, the blended models' spreads are not statistically significant (in spite of the statistically significant spread hit rates).

The 12 factors discussed in this paper will be available on Alpha Factor Library in the coming months. This will deepen the offering of industry specific factors we have on the platform which currently includes banks and retail.

REFERENCES

Grinold, Richard C. 1989. "The Fundamental Law of Active Management." Journal of Portfolio Management, vol 15, no 3 (Spring): 30-37

Appendix A – List of Countries in BMI Developed Markets Index

BMI Developed Market	
Australia	Japan
Austria	Netherlands
Belgium	New Zealand
Canada	Norway
Denmark	Portugal
Finland	Singapore
France	Spain
Germany	Sweden
Greece	Swizerland
Hong Kong	U.K
Ireland	U.S
Italy	

Appendix B – List of Oil & Gas Industry Data Items

Data Items	
• Acquisition costs (proved & unproved)	• Other Adjustments
• Avg Daily Prod	• Other costs
• Avg Daily Sales Volume	• Prices (Excluding Hedges)
• Avg Sales Price	• Production
• Avg Production Cost	• Production Growth
• Closing Balance	• Proved Developed Gas Reserves
• Daily Production Growth	• Proved UnDeveoped Gas Reserves
• Development Reserves –	• Purchases in Place
• Development costs	• Reserve Additions (NGL)
• Discounted Future CF bf taxes	• Reserve Replacement Ratio
• Exploration costs	• Reserve Revisions (NGL)
• Extension, Diccoveries & Other Additions	• Revisions of Prior Estimates (Oil, Gas)
• Future CFs bf Income Taxes	• Sales Volume Incl affiliates
• Future Cash Inflows	• Sales in Place
• Future Development Costs	• Standardized DCF
• Future Production costs	• Standardized DCF including hedging
• Future Income Taxes	• Total Costs Incured
• Gross Developed Area	• Total Gas Production
• Gross Dev Dry Wells Drilled	• Total Gas Equivalent Production
• Gross Dev Productive Wells Drilled	• Total Gross Development Wells Drilled
• Gross Exploratory Dry Wells Drilled	• Total Gross Exploratory Wells Drilled
• Gross Operated Wells	• Total Gross Productive Wells
• Number of rigs	• Total Gross Wells Drilled
• Gross Producing Wells	• Total Net Development Wells Drilled
• Gross Producing Wells Drilled	• Total Net Exploratory Wells Drilled
• Gross Productive Wells	• Total Net Productive Well
• Gross Undeveloped Area	• Total Net Wells Drilled
• Improved Recovery (Oil, Gas, NGL)	• Total Number of Rigs
• Net Developed Area	• Total Oil Equivalent – Production
• Net Development Dry Wells Drilled	• Total Possible Gas/Oil Reserves
• Net Development Productive Wells Drilled	• Total Probable Gas/Oil Reserves
• Next Exploratory Dry Wells Drilled	• Total Production
• Net Exploratory Productive wells Drilled	• Total Production Growth
• Net Operated Wells	• Total Proved Reserves – Gas/Oil
• Net Producing Wells	• Undeveloped Reserves (Oil/Gas)
• Net Producing Wells Drilled	• Net Undeveloped Area
• Other Adjustments – Future Cash flow	

Our Recent Research

April 2012: Case Study: S&P Capital IQ – The Platform for Investment Decisions
Ten years ago, AAPL traded just below $12 and closed at $583.98 on April 30, 2012. That is an average annual return of 48.1% over the period. During this same time the S&P 500 grew at an annual rate of only 2.65%. On April 2nd, Topeka Capital Markets initiated coverage of AAPL with a price target of $1001. If achieved, this would make AAPL the first company to ever reach a $1 trillion market cap. In this case study, we highlight some key S&P Capital IQ functionality in analyzing AAPL hypothetically reaching $1000:

March 2012: Exploring Alpha from the Securities Lending Marker – New Alpha Stemming from Improved Data
Numerous studies have examined the information content of short interest and found that heavily shorted stocks tend to underperform and liquid stocks with low levels of short interest subsequently outperform. Most studies relied on short interest data obtained directly from the exchanges available with a significant delay.

January 2012: S&P Capital IQ Stock Selection Model Review – Understanding the Drivers of Performance in 2011
In this report, we review the performance of S&P CIQ's four U.S stock selection models in 2011. These models were launched in January 2011, and this analysis will assess the underlying drivers of each model's performance over the last 12 months.

January 2012: Intelligent Estimates – A Superior Model of Earnings Surprise
As residual stakeholders, equity investors place enormous importance on a company's earnings. Analysts regularly forecast companies' future earnings. The prospects for a company's future earnings then become the basis for the price an investor will pay for a company's shares. Market participants follow sell side analysts' forecasts closely, identifying those analysts that demonstrate forecasting prowess and track those analysts' forecasts going forward.

December 2011: Factor Insight – Residual Reversal
Many investors employ price reversal strategies (strategies that buy "losers" and sell "winners" based on short-term price changes) in their stock selection decisions. One popular reversal strategy is constructed as the change in 1-month stock price over the most recent month. This report compares the performance of this factor to a "residual reversal" signal proposed by Blitz, Huij, Lansdorp and Verbeek in their 2011 paper, "Short-Term Residual Reversal".

November 2011: Research Brief: Return Correlation and Dispersion – All or Nothing

October 2011: The Banking Industry
Investors can improve model and portfolio risk adjusted returns using various approaches, including incorporating new alpha signals in an existing investment process. In this research piece, we build on our earlier work (See "Is your Bank Under Stress? Introducing our Dynamic Bank Model", November 2010), to determine if bank specific data provided by financial institutions regulatory bodies (FFIEC standardized data), can yield alpha signals orthogonal to those found in most stock selection models.

September 2011: Methods in Dynamic Weighting
In this report, we introduce a powerful discovery tool in Alphaworks and provide a pragmatic survey covering the identification and potential dynamic techniques to handle financial regimes and security level context. With increasingly volatile factor performance, the ability to implement adaptive strategies is paramount in maximizing factor efficacy.

September 2011: Research Brief: Return Correlation and Dispersion - Tough Times for Active Managers

July 2011: Research Briefs- A Topical Digest of Investment Strategy Insights
Investors must sort through a constant stream of information in order to identify opportunities, structural changes, and market risks. Wading through information quickly and efficiently is critical as investors must understand how their strategy and exposures are impacted. Typical classes of questions include: What strategy should I use in response to a regime shift? How do I invest in a specific industry? Do other markets behave differently than the US market? In this report we highlight several classes of questions that investors are routinely interested in and share our thoughts on these topics.

June 2011: A Retail Industry Strategy: Does Industry Specific Data tell a different story?
Investors are on a constant quest for new investment insights. A more complete understanding of the dynamics that shape an industry is integral to this search. As S&P Capital IQ's quantitative research begins a more thorough examination industry specific sources of alpha, we turn our attention first to the retail industry utilizing the Compustat database. Many of the strategies validate common investor best practice when looking at the retail space. In this paper we develop several new retail specific factors and use them to construct a 6-factor retail specific model.

May 2011: Introducing S&P Capital IQ's Global Fundamental Equity Risk Models
Global investors invest in assets across multiple countries. Building on the success of S&P Capital IQ's release of our U.S. Fundamental Equity Risk models we use similar building blocks viz. the best of breed point-in-time S&P Capital IQ data, state of the art Alphaworks alpha factor library, GICS global industry classification system and an open and robust risk estimation methodology to construct the S&P Capital IQ Global Fundamental Equity Risk Model.

May 2011: Topical Papers That Caught Our Interest

April 2011: Can Dividend Policy Changes Yield Alpha?

April 2011: CQA Spring 2011 Conference Notes

March 2011: How Much Alpha is in Preliminary Data?

February 2011: Industry Insights – Biotechnology: FDA Approval Catalyst Strategy

January 2011: US Stock Selection Models Introduction

January 2011: Variations on Minimum Variance

January 2011: Interesting and Influential Papers We Read in 2010

November 2010: Is your Bank Under Stress? Introducing our Dynamic Bank Model

October 2010: Getting the Most from Point-in-Time Data

October 2010: Another Brick in the Wall: The Historic Failure of Price Momentum

July 2010: Introducing S&P Capital IQ's Fundamental US Equity Risk Model