



Carpenter Analytix

# Carpenter Analytical Services

Market Models & Metrics

[www.CarpenterAnalytix.com](http://www.CarpenterAnalytix.com)

(603) 643-6430

## Analytic Systems Corp.

### Sector Performance Analysis

February 2012

**Analytic Systems Corp** provides monthly analysis (“Sector Analysis Research”) ranking market sectors for relative opportunity based on historical economic relationships. The ASC model creates a compact set of composite factors from several dozen external economic series. Those factors are then related to historical sector returns, and current factor values suggest emerging sector strengths and weaknesses. Factor values are updated monthly, giving a statistical profile of current business/economic state. Each month’s profile of factor values determines how attractive are the background conditions for each market sector.

Each sector is finally assigned one of five grades, identified here as A-B-C-D-E, based on the factor profiles. “A” and “B” sectors are considered to have strong prospects in the then-current environment. “D” and “E” sectors have weak prospects in that environment. The rankings imply higher or lower probabilities for relative performance among the sectors.

**The Project.** Last year ASC retained Carpenter Analytix to compile performance analysis of monthly sector rankings over eleven years (2000-2010). The present report is an update including 2011 (and up to Jan 20 2012), plus a separate summary of the most recent three years. Sector returns are measured in nine ETFs corresponding to relevant market sectors. The SPDR S&P tracker (SPY) is used as a proxy for the S&P 500 market benchmark. Both the sector ETFs and the SPY are dividend-adjusted to reflect total return. Transaction costs are ignored in the present analysis. The analysis compares performance of the monthly top-ranked sectors (A&B) versus the SPY and versus the bottom-ranked sectors (D&E).

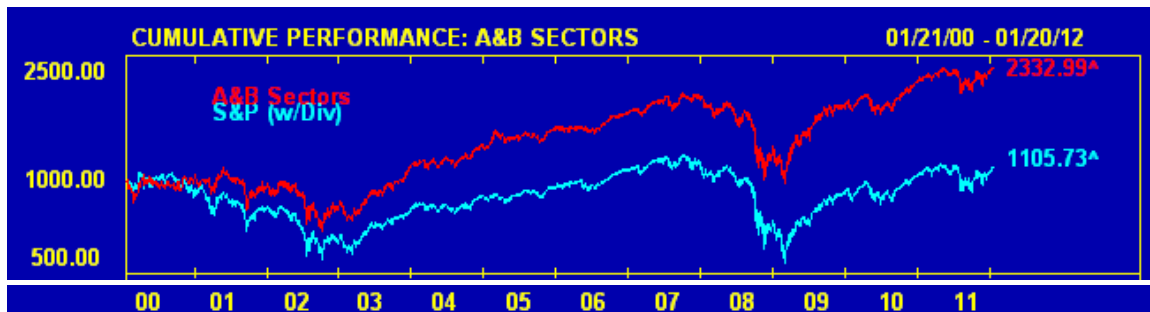
**Overview Findings.** For the full 12-year period, the A&B strategy produced a 7.36% average annual return. The D&E strategy averaged 1.60% return. Over the same period, the S&P (SPY) averaged 0.85% return. Volatilities did not differ greatly from the S&P’s 24.69% (annualized standard deviation). For the last three years ending January 20, 2012, the A&B strategy averaged 27.77% and the D&E strategy averaged 18.91%, with 19.94% for the S&P. Individual annual returns are listed in the appendix.



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## A & B Sector Returns

ASC's monthly most attractive sectors (A and B) have consistently outperformed the S&P 500 index. The graph shows cumulative performance of \$1000 invested monthly into equal portions of all sectors then rated A or B. The A&B returns path more than doubled (+133.3%) over the 12 years, while the S&P gained a total +10.6%.



On annualized basis, the A&B strategy averaged +7.36% per year vs +0.85% for the S&P. Total volatility differs little from the S&P, but systematic risk (beta) is reduced, at 0.84. The strategy is correlated with the broader index at  $R^2 = .77$ .

Performance Statistics Twelve Years: A&P Sectors 01/21/00 - 01/20/12		
	A&B	S&P
Overall Returns:		
Cum Return	133.30%	10.57%
Ann Return	7.36%	.85%
Ann Std Dev	23.58%	24.69%
Avg Monthly Ret	.59%	.06%
Monthly Std Dev	5.17%	4.84%
Months	144	144
Gains & Losses:		
Avg Gain Month	+ 3.91%	+ 3.35%
Avg Loss Month	- 3.82%	- 3.91%
Gain Months Share	.58	.55
Loss Months Share	.42	.44
Best 12 Mos	+ 76.33%	+ 61.94%
Worst 12 Mos	- 40.06%	- 44.90%
Max Drawdown	- 48.92%	- 55.20%
Longest Drawdown	758d	1669d
MPT Stats:		
Alpha (Ann)	+ .06	+ .00
Beta (vs S&P)	.84	1.00
R-Sq (vs S&P)	.77	1.00
Sharpe Ratio	.31	.03



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## D & E Sector Returns

ASC's least attractive sectors (D&E) have also outperformed the S&P 500 index, but only marginally. The performance graph shows cumulative performance of \$1000 rebalanced monthly into equal portions of sectors rated D or E. The D&E returns path gained about 20.9% over the whole 12-year span, while the S&P gained 10.6%.



The D&E strategy averaged +1.6% per year vs +0.85% for the S&P. Total volatility differs from the S&P very little, and most other strategy statistics (e.g., gain/loss mix, draw-downs, alpha) are also barely distinguishable from the 500 index.

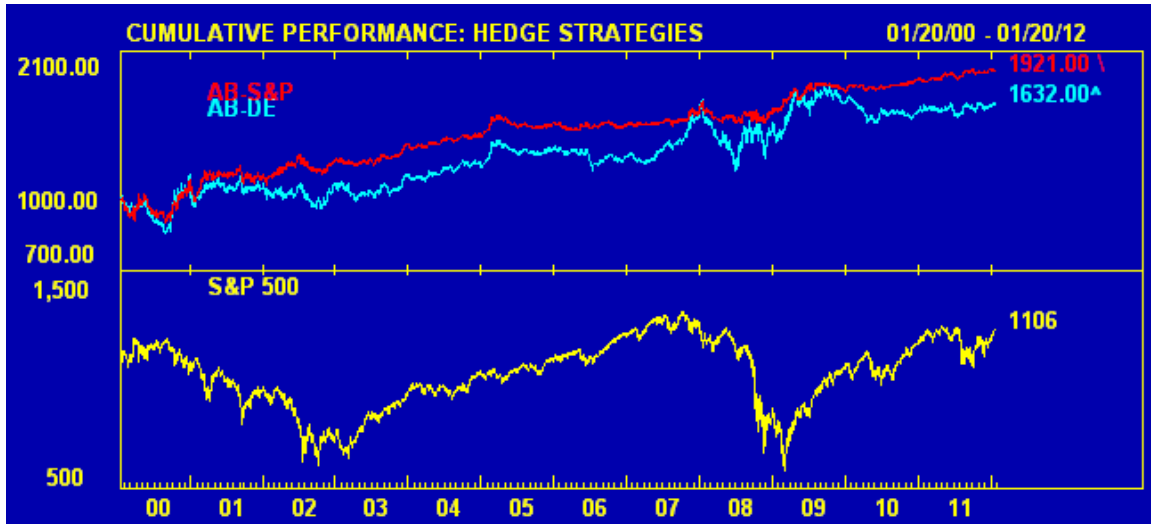
Performance Statistics Twelve Years: D&E Sectors 01/21/00 - 01/20/12		
	D&E	S&P
<b>Overall Returns:</b>		
Cum Return	20.85%	10.57%
Ann Return	1.60%	.85%
Ann Std Dev	24.59%	24.69%
Avg Monthly Ret	.13%	.06%
Monthly Std Dev	5.06%	4.84%
Months	144	144
<b>Gains &amp; Losses:</b>		
Avg Gain Month	+ 3.14%	+ 3.35%
Avg Loss Month	- 4.37%	- 3.91%
Gain Months Share	.60	.55
Loss Months Share	.39	.44
Best 12 Mos	+ 61.40%	+ 61.94%
Worst 12 Mos	- 41.78%	- 44.90%
Max Drawdown	- 56.50%	- 55.20%
Longest Drawdown	1473d	1669d
<b>MPT Stats:</b>		
Alpha (Ann)	+ .01	+ .00
Beta (vs S&P)	.87	1.00
R-Sq (vs S&P)	.76	1.00
Sharpe Ratio	.06	.03



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# Long-Short Hedge Returns

Hedging the A&B strategy against the S&P index generates 5.62% average annual return. Hedging A&B vs D&E generates 4.19% annual average. The S&P hedge reduces total volatility to about half of the S&P alone (11% vs 24%). And the largest draw-down of the S&P hedge is only -13%, compared with -55% for the S&P alone.



Performance Statistics  
 A&B - S&P Hedge: Twelve Years  
 01/20/00 - 01/20/12

	AB-S&P	S&P 500
<b>Overall Returns:</b>		
Cum Return	92.10%	10.57%
Ann Return	5.62%	.85%
Ann Std Dev	11.49%	24.69%
Avg Monthly Ret	.46%	.06%
Monthly Std Dev	2.47%	4.84%
Months	144	144
<b>Gains &amp; Losses:</b>		
Avg Gain Month	+ 1.87%	+ 3.35%
Avg Loss Month	- 1.70%	- 3.91%
Gain Months Share	.60	.55
Loss Months Share	.38	.44
Best 12 Mos	+ 24.95%	+ 61.94%
Worst 12 Mos	- 5.59%	- 44.90%
Max Drawdown	- 13.36%	- 55.20%
Longest Drawdown	664d	1669d
<b>MPT Stats:</b>		
Alpha (Ann)	+ .06	+ .00
Beta (vs S&P)	- .16	1.00
R-Sq (vs S&P)	.11	1.00
Sharpe Ratio	.49	.03

See appendix for comparable table for the A&B - D&E hedge.



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## Three Years 2009-10-11

Performance has accelerated over the past three years. While the S&P was generating an average annual +19.9% (roughly 2x its very long-term average), the A&B sectors were generating an annual +27.8% (about 3.8x the twelve-year average shown on page 2). The 7.9 percentage point differential is almost 1.5x the 5.6% spread of the A&B-S&P hedge shown on page 4.

A&B volatility (standard deviation) remains about the same as for the S&P in these last three years, as it also is in the overall period. Systematic risk (beta) is about at market parity in these recent years (.98 vs 1.00), compared with being somewhat less-than-market (.84 vs 1.00) in the twelve year A&B analysis of page 2.

Performance Statistics Three Years; A&B Sectors 01/21/09 - 01/20/12		
	A&B	S&P
<b>Overall Returns:</b>		
Cum Return	108.19%	72.28%
Ann Return	27.77%	19.94%
Ann Std Dev	26.03%	25.04%
Avg Monthly Ret	1.93%	1.31%
Monthly Std Dev	5.09%	5.32%
Months	36	36
<b>Gains &amp; Losses:</b>		
Avg Gain Month	+ 4.84%	+ 4.89%
Avg Loss Month	- 3.28%	- 4.02%
Gain Months Share	.64	.58
Loss Months Share	.33	.36
Best 12 Mos	+ 76.33%	+ 61.94%
Worst 12 Mos	+ 10.13%	+ 7.01%
Max Drawdown	- 18.58%	- 22.06%
Longest Drawdown	163d	183d
<b>MPT Stats:</b>		
Alpha (Ann)	+ .07	+ .00
Beta (vs S&P)	.98	1.00
R-Sq (vs S&P)	.90	1.00
Sharpe Ratio	1.07	.80

The mix of up-months and down-months (64% up) is now moving ahead of the S&P (50% up). But the average rising month is now up about the same degree as the S&P (+4.84% and +4.89%), while the average losing month lost less (-3.28% and -4.02%).



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## Conclusions

- The ASC factors model successfully identifies sectors (A&B) likely to out-perform the S&P. The average annual excess return was about 7% over twelve years and 28% over the last three years.
- In only one year (2006) did the S&P return exceed the A&B sectors return. See appendix data table below.
- The model is less effective, or ineffective, identifying sectors (D&E) likely to under-perform the S&P.
- Both the A&B and D&E strategies generate total volatilities about comparable with the S&P 500, but with somewhat reduced systematic risk (beta).
- Both A&B and D&E strategies are strongly correlated with the S&P 500 ( $R^2 = .77$  and  $.76$  respectively). The high correlation and significant excess return of the A&B strategy make it favorable for hedging vs S&P. Twelve-year history shows average annual hedging returns of 5.6% with essentially no correlation with the S&P ( $R^2 = .11$ ) and total volatility about half the S&P.
- Sharp ratios (excess return relative to total volatility) are strong, at  $+0.31$  for the A&B sectors alone and  $+0.49$  when A&B is hedged against the S&P. Sortino Ratios (excess return relative to downside-only volatility) are also strong, at  $+0.29$  for the A&B sectors and  $+0.46$  when A&B is hedged.
- The various return relationships are stronger in the past three years ending January 20, 2012 than in the twelve-year overall analysis. The reasons for this recent enhancement are not known, and may deserve further analysis.



## Appendix

### A. The Nine Sectors

Sector	Symbol
Consumer Discretionary	XLY
Consumer Staples	XLP
Energy	XLE
Financials	XLF
Health Care	XLV
Industrials	XLI
Basic Materials	XLB
Technology	XLK
Utilities	XLU

### B. Annual Returns

Year	A&B Sectors	D&E Sectors	AB-S&P Hdge	S&P 500
2000*	+04.2%	- 10.7%	+11.8%	- 07.6%
2001	- 09.5	- 06.2	+02.5	- 12.0
2002	-14.2	- 17.3	+07.9	- 22.1
2003	+38.8	+32.3	+10.4	+28.4
2004	+16.8	+09.7	+06.1	+10.7
2005	+11.3	+03.2	+06.5	+04.8
2006	+13.4	+17.9	- 02.1	+15.5
2007	+12.5	- 09.2	+05.8	+06.7
2008	- 34.2	- 33.9	+02.8	- 37.0
2009	+40.7	+22.7	+14.2	+26.5
2010	+21.6	+25.8	+06.7	+14.9
2011	+07.1	+03.9	+05.2	+01.9

\*Analysis begins January 20, 2000.

**Note:** "AB-S&P Hedge" returns in Table B above average 6.43% per year, compounded. This differs from the 5.62% average given in the hedged "Performance Statistics" table of page 4 due to different rebalancing assumptions. The hedge column of Table B above shows simple differences of annual returns. The page 4 table reflects continuous rebalancing among sectors. Either way, the sector model is shown to contribute about 6% a year above market return.



## Appendix (Continued)

### C. The A&B vs D&E Hedge

As evident in the line graphs of page 4, hedging A&B sectors vs the D&E sectors is both less productive and more variable than hedging A&B vs the S&P. The A&B-D&E statistics are omitted from the body of this report because a hedge versus the S&P is plainly preferable. But for the record, here are the 12-year A&B – D&E performance statistics.

Performance Statistics		
A&P - D&E Hedge: Eleven Years		
01/20/00 - 01/20/12		
	AB-DE	S&P 500
Overall Returns:		
Cum Return	63.20%	10.57%
Ann Return	4.19%	.85%
Ann Std Dev	17.02%	24.69%
Avg Monthly Ret	.34%	.06%
Monthly Std Dev	3.85%	4.84%
Months	144	144
Gains & Losses:		
Avg Gain Month	+ 2.96%	+ 3.35%
Avg Loss Month	- 2.66%	- 3.91%
Gain Months Share	.53	.55
Loss Months Share	.45	.44
Best 12 Mos	+ 40.08%	+ 61.94%
Worst 12 Mos	- 13.47%	- 44.90%
Max Drawdown	- 29.98%	- 55.20%
Longest Drawdown	747d	1669d
MPT Stats:		
Alpha (Ann)	+ .04	+ .00
Beta (vs S&P)	- .03	1.00
R-Sq (vs S&P)	.00	1.00
Sharpe Ratio	.24	.03

End