



Ford Value/Momentum Model Enhancement March 31, 1999

Effective with the March 31, 1999 database the Value/Momentum Model will be enhanced by adding three earnings estimate factors to the calculation. The addition of the one month change in the IBES consensus earnings estimates for both the current (FY1) and next (FY2) fiscal years and the Standard Unexpected Earnings (SUE) score improves both the historical performance and consistency of the model. The results of the model will still appear as the Value/Momentum percentile (VMO) with 100 as the best. The Value/Momentum Model was originally based on just the three Ford factors, Operating Earnings Yield, Earnings Momentum and Price Momentum.

The results of the original Value/Momentum model without the earnings estimates (below) were good in backtests and in real time (1998). Using the Selected Stock List, high quality criteria in a 20 stock portfolio produced a 22.2% total return in 1998, versus 28.6% for the S&P 500 and 0.4% for the broadly based Ford universe of 4000 stocks. Adding earnings estimate factors improves the historical top decile performance by over 250 basis points annually with only a slight increase in standard deviation and turnover. The top decile of the enhanced model also outperforms the old in 9 out of the 13 years tested, with the worst year underperforming by 1.2%. The information coefficient for the enhanced model (a measure of how predictive the model is on individual stocks) improved, indicating a strong correlation between the model rankings and future quarterly performance of individual stocks.

Decile Performance, monthly rebalancing, December 1985 to December 1998
Complete Ford Universe

Table with 12 columns: Annualized Rtn%, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Univ. Rows include Original Model and Enhanced Model with sub-rows for Annual STD and Avg. I.C.

Model performance also improved 300 basis points in the top decile of the high quality sector (quality rating B or better, growth persistence rating B or better) which is used for the Selected Stock List criteria:

Table with 12 columns: Annualized Rtn%, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Univ. Row includes High Quality with sub-rows for Annual STD and Avg. I.C.

We tested the model for size of company by cutting the Ford Universe into thirds by capitalization and ranking each third into deciles (below). The average capitalization of the small cap sector was \$97 million, mid cap \$478 million, and large cap \$5.7 billion. Adding estimate revision added about 200 basis points to the top decile in each sector, and also improved the distribution of the large cap universe. There seems to be some cap effect, with better performance and information coefficient in the small versus mid and mid versus large.

Decile Performance, monthly rebalancing, December 1985 to December 1998

Annualized Rtn%	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>Univ.</u>
Large Cap Sector	24.7	22.5	21.8	18.1	15.6	13.2	13.8	9.2	9.1	5.9	15.4
Annual STD	18.0	16.6	15.7	16.1	15.7	15.6	15.3	16.2	15.8	17.0	15.7
Avg. I.C.	0.071		T-Ratio	1.802		Points	605				
Mid Cap Sector	30.2	24.6	20.5	17.8	15.0	13.5	8.4	5.1	4.5	-0.9	13.7
Annual STD	19.0	18.1	17.9	17.3	17.4	17.5	17.3	17.9	18.6	20.5	17.6
Avg. I.C.	0.091		T-Ratio	2.255		Points	603				
Small Cap Sector	37.9	30.9	22.0	15.2	12.6	13.7	5.5	1.6	-2.4	-12.5	11.9
Annual STD	19.4	18.2	18.2	18.0	19.1	19.5	19.6	20.5	23.0	23.7	19.0
Avg. I.C.	0.125		T-Ratio	3.105		Points	603				

The Value/Momentum model seems to work well in both high growth and low growth companies. The Ford Universe was divided into halves by the Ford projected earnings growth rate and the information coefficients were almost the same for each growth sector, while the performance was slightly better for the higher projected earnings growth sector.

Annualized Rtn%	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>Univ.</u>
High Growth	33.7	25.3	21.3	15.9	13.0	11.1	6.9	5.7	1.7	-6.3	12.5
Annual STD	21.4	20.2	20.0	19.6	19.7	19.8	19.8	19.8	20.2	21.9	19.7
Avg. I.C.	0.110		T-Ratio	3.779		Points	1190				
Low Growth	30.3	24.1	21.8	18.9	15.5	15.1	12.1	10.7	5.8	-4.3	14.8
Annual STD	16.2	14.8	14.3	13.8	13.6	13.9	14.7	14.4	17.0	20.9	14.6
Avg. I.C.	0.111		T-Ratio	3.920		Points	1188				

The enhanced Value/ Momentum Model model was also tested in 20 stock, equally weighted, portfolios to test turnover and holding strategies. In each universe a portfolio of the top 20 stocks based on the Value/Momentum were selected and held as long as they remained in the top 10%, 20%, 30% etc. of stocks ranked by the model. The average annual performance over the 13 year period ending 12/98 is shown with no transaction costs as well as with 1%, 2% and 3% round turn transaction costs included. Also shown are the average turnover, months held, and annualized standard deviation.

The 20 best Value/Momentum companies on the complete Ford Universe produced the best initial results, however those results drop quickly when longer holding periods were applied. As one might expect the results were achieved with smaller capitalization companies with an average capitalization of \$1.3 billion vs. the universe at \$2.1 billion. The smaller companies also deserve a higher transaction cost so the 3% column may be appropriate.

20 Stock Portfolio, Equally Weighted, Rebalanced Monthly, 12/85 to 12/98

Complete Ford Universe

<u>Holding criteria</u>	<u>No trans return</u>	<u>1% trans return</u>	<u>2% trans return</u>	<u>3% trans return</u>	<u>Avg. Annual Turnover%</u>	<u>months held</u>	<u>Standard Deviation%</u>
10%	38.9	34.0	29.3	24.7	368.1	3.3	22.9
20%	34.3	31.0	27.7	24.5	260.2	4.6	23.3
30%	29.7	27.1	24.6	22.1	205.0	5.9	23.2
40%	27.7	25.8	23.9	22.0	155.9	7.7	22.9
50%	28.9	27.5	26.0	24.6	114.7	10.5	22.6
60%	26.9	25.9	25.0	24.1	75.7	15.9	21.4
70%	21.9	21.4	20.8	20.2	48.3	24.8	20.4
Universe	13.7						16.9

The large cap universe results stabilized with longer holding periods and produced consistent after 1% transaction results out to a 12-month holding period. The average capitalization of the portfolio was \$5.0 billion.

Large Capitalization Universe

<u>Holding criteria</u>	<u>No trans return</u>	<u>1% trans return</u>	<u>2% trans return</u>	<u>3% trans return</u>	<u>Avg. Annual Turnover%</u>	<u>months held</u>	<u>Standard Deviation%</u>
10%	26.3	21.2	16.3	11.5	421.5	2.8	20.5
20%	21.8	18.5	15.3	12.2	278.1	4.3	20.0
30%	21.6	19.3	17.0	14.7	196.3	6.1	19.7
40%	21.9	20.1	18.3	16.5	153.7	7.8	19.5
50%	20.4	19.0	17.6	16.3	117.9	10.2	19.0
60%	21.9	20.8	19.8	18.7	90.6	13.2	18.9
70%	19.0	18.2	17.4	16.6	67.0	17.9	18.5
Universe	15.4						15.7

The high quality universe (quality B or better, growth persistence B or better) which is used for the Selected Stock List produced very good portfolio results out to a six month holding period. The average capitalization was also large at \$4.5 billion which may also result in lower transaction costs.

Quality of B or better, Growth persistence of B or better portfolio

<u>Holding criteria</u>	<u>No trans return</u>	<u>1% trans return</u>	<u>2% trans return</u>	<u>3% trans return</u>	<u>Avg. Annual Turnover%</u>	<u>months held</u>	<u>Standard Deviation%</u>
10%	33.8	26.9	20.4	14.2	536.9	2.2	18.2
20%	31.8	27.5	23.3	19.2	340.3	3.5	17.8
30%	30.0	26.9	23.7	20.7	252.1	4.8	18.3
40%	30.2	27.8	25.4	23.1	188.8	6.4	18.6
50%	26.7	24.9	23.0	21.2	152.3	7.9	18.6
60%	25.6	24.2	22.9	21.5	110.6	10.8	18.1
70%	22.2	21.2	20.2	19.2	82.9	13.5	17.6
Universe	15.6						15.5

The following companies would have met the Selected Stock List criteria had the enhanced Value/Momentum Model been initiated December 31, 1998:

<u>Company Name</u>	<u>Ticker</u>	<u>Cap(\$Mil)</u>	<u>Company Name</u>	<u>Ticker</u>	<u>Cap(\$Mil)</u>
Adobe Systems	ADBE	3,071	Sierra Health	SIE	571
Applebee's	APPB	619	Unifirst	UNF	468
BMC Software	BMCS	9,603	Vertex Communic	VTEX	81
Comair	COMR	2,204	Warner-Lambert	WLA	61,761
Corus Bankshares	CORS	471	Clayton Homes	CMH	1,999
Dell Computer	DELL	93,244	Freddie Mac	FRE	42,073
Ennis Bus Forms	EBF	160	Gap	GPS	37,391
Franklin Covey	FC	374	King World Prod	KWP	1,982
Intel	INTC	197,640	Pacificare B	PHSYB	3,219
Invacare	IVCR	718	Amgen	AMGN	31,782
Jacobs Engineer	JEC	1,043	Bergen Brunswig	BBC	2,525
Lennar	LEN	1,467	Federal Signal	FSS	1,062
Nautica	NAUT	558	Hewlett-Packard	HWP	67,463
Otter Tail Power	OTTR	471	NCI Bldg Syst	NCS	416
Ryans Family Stk	RYAN	495	Schwab, Charles	SCH	29,899
Schulman, A	SHLM	756	Xilinx	XLNX	5,043

Our research indicates that both the Ford Earnings Momentum factor and earnings estimate revision factors are excellent predictors of future returns and they have a very low correlation. When combined the factors produce better returns and consistency than separately. Part of the reason for the low correlation may be the different time frames being measured. The Ford Earning Momentum factor looks backward and measures the change in the 12-month growth rate of earnings for the last four quarters and a current quarter estimate. The Standard Unexpected Earnings factor (SUE) measures how the actual reported earnings compared to the estimate for the latest quarter. The change in the mean earnings estimates measures how much the expected earnings for the current fiscal and next fiscal year have been revised upward or downward in the last month. We also tested both a diffusion index of the number of managers making changes, and changes in the high versus the low estimates, and found high correlation to the one-month change factor and not quite as good performance characteristics.

Ford's Earnings Momentum, Standard Unexpected Earnings and change in the mean earnings estimate will be weighted approximately equally for companies that have earnings estimate data and will comprise a little over half of the Value/Momentum model weighting. Companies that do not have earnings estimate data will have a Ford Earnings Momentum weighting of 28.5% and almost half the weighting will go to operating earnings yield.

The results quoted here are the results of backtesting and should be qualified in several respects: (1) results are not necessarily indicative of the returns that individual investors could have obtained, since portfolios were large and transaction costs excluded; (2) no analysis technique is effective for every security to which it is applied, even though it is effective on the average; and (3) there is, of course, no assurance that future results will duplicate past results.