A 3 Factor Portfolio Weighting Model for Select Stocks in the Consumer Discretionary Sector: An Empirical Analysis: 2009-2019

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- Study Purpose
  - Determine if revenue growth, operating profit, and relative price momentum are priced-in risk factors in the equity market
- Investment Strategy
  - Develop Constant Shares and Adjustable Shares Models
- Factor Weighting Strategies
  - Revenue/Share(R/S) and Relative Price Momentum(RPM)
  - Operating Profits(OP) and Relative Price Momentum(RPM)

- Factor Weighting Models
  - Original Weights based on univariate regressions
  - (1) R/S f (Time)
  - (2) OP f (Time)
  - (3) RPM f P_{t+1}/P_t
- Factor Weighting Algorithms (R/S,RPM)
- See Next Slides

Factor 1 Algorithm
Consumer Discretionary
Constant Share Model

<u>1st Iteration</u>

Step 1 $RS_i = A_i + B_i(t)$ $LnRS_i = A_i + B_i(t)$

Step 2 $W_i(t) = B_i \,/\, Sum\ B_i$

Step 3 $D_i(t) = W_i(t) * 1{,}000{,}000$

Step 4 $SHRS_i(t) = D_i(t) \,/\, P_i(t)$

Step 5 $MV_i(t+1) = SHRS_i(t) * P_i(t+1)$

Step 6 $PV(t+1) = Sum\ MV_i(t+1)$

<u>2nd Iteration</u>

Step 7 $MV_i(t+2) = SHRS_i(t) * P_i(t+2)$

Step 8 $PV(t+2) = Sum\ MV_i(t+2)$

Total Iterations: 11

Nomenclature:

Ln = Natural Log
RS = Revenue Per Share
i = ith Sector (5 sectors)
t = time in years (2009-2019)
A,B = Equation Parameters
W_i = Stock Weight
1,000,000 = Original Investment
B_i = Slope coefficient
D_i = Dollar Investment
SHRS = Shares held in Stock(i)
P_i = Price Index for Stock(i)
MV_i = Market Value, Stock(i)
PV = 10 Stock Portfolio Value

Factor 2 Algorithm
Consumer Discretionary
Adjusted Share Model

<u>1st Iteration</u>

Step 1 $RPI_i(t+1) = P_i(t+1) / P_i(t)$

Step 2 $RPW_i(t+1) = RPI_i(t+1)/ (SUM\ RPI_i\ (t+1)/ N)$

Step 3 $ASHRS_i(t+1) = RPW_i(t+1)*SHRS_i(t)$

Step 4 $MV_i(t+2) = ASHRS_i(t+1)*P_i(t+2)$

Step 5 $PV(t+2) = Sum\ MV_i(t+2)$
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Total Iterations: 10

Added Nomenclature:

RPI = Relative Price Momentum Index
RPW = Relative Price Momentum Weight
N = Number of Stocks in Portfolio (N=10)

ASHRS = Adjusted Shares

Revenue/Share Returns vs SPY & XLY

Revenue/Share
Cumulative Returns
Constant Share Model (CSM)
2009-2019

	Model	Cumulative	SPY	XLY	Alpha vs SPY	Alpha vs XLY
CSM	R/S	2066.33%	288.42%	550.00%	1777.91%	1516.33%
CSM	R/S Logs	1656.85%	288.42%	550.00%	1368.43%	1106.85%

Revenue/Share
Cumulative Returns
Adjusted Share Model (ASM)
2009-2019

	Model	Cumulative	SPY	XLY	Alpha vs SPY	Alpha vs XLY
ASM	R/S	5508%	288.42%	550.00%	5219.90%	4958.32%
ASM	R/S Logs	3814%	288.42%	550.00%	3525.39%	3263.81%

Operating Profit/Share Returns vs SPY & XLY

Operating Profit/Share
Cumulative Returns
Constant Share Model (CSM)
2009-2019

	Model	Cumulative	SPY	XLY	Alpha vs SPY	Alpha vs XLY
CSM	OP/S	1144.79%	288.42%	550.00%	856.36%	594.79%
CSM	OP/S Logs	1467.26%	288.42%	550.00%	1178.84%	917.26%

Operating Profit/Share
Cumulative Returns
Adjusted Share Model (ASM)
2009-2019

	Model	Cumulative	SPY	XLY	Alpha vs SPY	Alpha vs XLY
ASM	OP/S	1863%	288.42%	550.00%	1575.05%	1313.47%
ASM	OP/S Logs	3406%	288.42%	550.00%	3117.19%	2855.61%

Cumulative Return Comparison

Model		Cumulative	Ranking
R/S	(ASM)	5508%	1
R/S Logs	(ASM)	3814%	2
OP/S Logs	(ASM)	3406%	3
R/S	(CSM)	2066.33%	4
OP/S	(ASM)	1863%	5
R/S Logs	(CSM)	1656.85%	6
OP/S Logs	(CSM)	1467.26%	7
OP/S	(CSM)	1144.79%	8