

A Two Factor Portfolio Weighting Model
with US Wages and Salaries the “State”
Economic Variable: An Empirical
Analysis- 2009-2019

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Study Objectives

1. Determine if US wages and salaries are a priced-in risk factor in the US equity markets.
2. Determine if there is long term persistence in outperformance for the 2 factor portfolio weighting model versus the S&P 500

Factor Weighting Model

1. Factor 1- US wages and salaries
 - a. All private employees (WS-P)
 - b. All goods sector employees (WS-G)
 - c. All service sector employees (WS-S)
2. Factor 2- Relative price momentum

Factor Weighting Strategies

1. Constant Shares Model
2. Adjustable Shares Model
3. Time Period: 2009-2019

Factor 1 Weighting Algorithm

Factor 1 Algorithm

5 SPDR Sector

Constant Share Model

1st Iteration

Step 1: $\text{LN}(P_i) = A_i + B_i(\text{LN WS-P})$

Step 2: $W_i(t) = B_i / \text{Sum } B_i$

Step 3: $DI_i(t) = W_i(t) * 1,000,000$

Step 4: $\text{SHRS}_i(t) = DI_i(t) / P_i(t)$

Step 5: $MV_i(t+1) = \text{SHRS}_i(t) * P_i(t+1)$

Step 6: $PV(t+1) = \text{Sum } MV_i(t+1)$

2nd Iteration

Step 7: $MV_i(t+2) = \text{SHRS}_i(t) * P_i(t+2)$

Step 8: $PV(t+2) = \text{Sum } MV_i(t+2)$

Nomenclature

$\text{LN}(P)$ = Natural Log of P

P = Sector Price Index

LN WS-P = Log of wages and salaries- private

i = ith sector (5 sectors)

t = time in years (2009-2019)

A, B = equation parameters

W = sector weight

1,000,000 = original investment

B = slope coefficient

DI = dollar investment

SHRS = shares held in sector

MV = market value of sector

PV = 5 sector portfolio value

Factor 2 Weighting Algorithm

Factor 2 Algorithm

5 SPDR Sector

Adjustable Shares Model

1st Iteration

Step 1: $RPmi(t+1) = Pi(t+1)/Pi(t)$

Step 2: $ARPmi(t+1) = \text{Sum } RPmli(t+1)/N$

Step 3: $RPmWi(t+1) = RPmli(t+1)/ARPmli(t+1)$

Step 4: $ADSHRSi(t+1) = RPmWi(t+1) * SHRSi(t)$

Step 5: $MVi(t+2) = ADSHRSi(t+1) * Pi(t+2)$

Step 6: $PV(t+2) = \text{Sum } MVi(t+2)$

Added Nomenclature:

RPml = Relative Price Momentum Index

ARPml = Average RPml

RPmW = Relative Price Momentum Weight

ADSHRS = Adjusted Shares

N = Number of Sectors (N=5)

Remaining Iterations (9)

Table 1

Factor 1: Constant Share Model

Cumulative Return Analysis

2009-2019

<i>Economic Variable</i>	<i>CSM Model</i>	<i>SPY</i>	<i>Model Alpha</i>
WS-P	402.37%	335.20%	67.17%
WS-G	394.74%	335.20%	59.54%
WS-S	396.48%	335.20%	61.28%

Table 2

Factor 2: Adjustable Shares Model

Cumulative Return Analysis

2009-2019

<i>Economic Variable</i>	<i>ASM Model</i>	<i>SPY</i>	<i>Model Alpha</i>
WS-P	434.28%	335.20%	99.08%
WS-G	428.00%	335.20%	92.80%
WS-S	431.37%	335.20%	96.19%

Table 3

Alpha Ranking

<i>Factor Model</i>	<i>Cumulative Alpha</i>	<i>Rank</i>
WS-P (CSM)	67.17%	4
WS-G (CSM)	59.54%	6
WS-S (CSM)	61.28%	5
WS-P (ASM)	99.08%	1
WS-G (ASM)	92.18%	3
WS-S (ASM)	96.19%	2