Comparing Changes in the S&P 500, Consumer Prices, and Wages

1. Measures and method

This note compares changes in three indexes over the same period. For a U.S. analysis, use the U.S. dollar S&P 500 price index, a U.S. consumer price index, and a U.S. nominal wage index. Align the observation periods and frequencies.

Let $X(t), C(t), Y(t)$ denote the stock price, consumer price, and wage indexes. Let $S(t), P(t), W(t)$ be their respective rates of logarithmic change. Write I_S, I_P, I_W for the cumulative log changes over $[a, b]$. The three differences are

$$D_{SP} = I_S - I_P, \qquad D_{SW} = I_S - I_W, \qquad D_{PW} = I_P - I_W.$$

For example, $D_{SP} = \log\{[X(b)/C(b)]/[X(a)/C(a)]\}$. Its sign shows whether the inflation-adjusted stock price index rose or fell. D_{SW} measures the change in the stock price index relative to the wage index. The sign of D_{PW} is the reverse of the sign of the change in real wages.

An index level and its rate of change can move in different directions. A fall in inflation from 4% to 2% means that the price index is still rising. If a rate rises from −3% to −1%, the index is still falling.

2. Six cases for cumulative changes

Case	What the difference shows	Implications when the second index rises or falls
1A. Stocks – prices > 0 $I_S > I_P$	The inflation-adjusted stock price index rose.	**If prices rose,** stocks also rose, by more than prices. **If prices fell,** stocks could rise, stay flat, or fall. If stocks fell, they fell by less than prices.
1B. Stocks – prices < 0 $I_S < I_P$	The inflation-adjusted stock price index fell.	**If prices rose,** stocks could rise, stay flat, or fall. If stocks rose, they rose by less than prices. **If prices fell,** stocks also fell, by more than prices.
2A. Stocks – wages < 0 $I_S < I_W$	The wage index rose relative to the stock price index.	**If wages rose,** stocks could rise, stay flat, or fall. If stocks rose, they rose by less than wages. **If wages fell,** stocks also fell, by more than wages.
2B. Stocks – wages > 0 $I_S > I_W$	The stock price index rose relative to the wage index.	**If wages rose,** stocks also rose, by more than wages. **If wages fell,** stocks could rise, stay flat, or fall. If stocks fell, they fell by less than wages.
3A. Prices – wages < 0 $I_P < I_W$	Real wages rose.	**If wages rose,** prices could rise, stay flat, or fall. If prices rose, they rose by less than wages. **If wages fell,** prices also fell, by more than wages.
3B. Prices – wages > 0 $I_P > I_W$	Real wages fell.	**If wages rose,** prices also rose, by more than wages. **If wages fell,** prices could rise, stay flat, or fall. If prices fell, they fell by less than wages.

If the second index is unchanged over the period, a positive difference means the first index rose, and a negative difference means it fell. A zero cumulative difference means that the indexes changed by the same proportion over the period. Differences of opposite signs within the period can offset one another.

3. How changes in the rates affect the gap

For a difference between rates $g(t) = A(t) - B(t)$, the change between two observations is $\Delta\, g = \Delta\, A - \Delta\, B$. The table holds the first rate fixed and assumes that the gap retains its sign.

Difference	If the second rate rises	If the second rate falls
Stocks minus prices $S - P$	The signed gap decreases. It narrows in **1A** and widens in **1B**.	The signed gap increases. It widens in **1A** and narrows in **1B**.
Stocks minus wages $S - W$	The signed gap decreases. It widens in **2A** and narrows in **2B**.	The signed gap increases. It narrows in **2A** and widens in **2B**.
Prices minus wages $P - W$	The signed gap decreases. It widens in **3A** and narrows in **3B**.	The signed gap increases. It narrows in **3A** and widens in **3B**.

In this table, the case labels refer to the corresponding signs of the gap **at the time of observation**. If the gap crosses zero, the ordering of the rates reverses. When both rates move, compare their changes. For example, if wage growth rises from 2% to 3% and inflation rises from 4% to 6%, the price–wage gap widens from 2 to 3 percentage points.

A positive gap continues to add to the cumulative difference even while the gap narrows. An empirical analysis should report the sign of the gap, its change over time, and its cumulative value over the chosen period.

4. Interpretation for policy analysis

The gap between stock price growth and inflation measures the change in real stock prices. Judgments about equity valuation require additional evidence, including expected earnings and interest rates. The stock–wage difference measures how the stock price and wage indexes moved relative to each other. Assessing labor shortages requires evidence such as vacancies and unemployment. Assessing how much value added accrues to labor requires compensation and labor-share data. The wage–price comparison measures the purchasing power of the chosen wage measure. An analysis of household income should also consider hours worked and employment.

The three differences satisfy $D_{SW} = D_{SP} + D_{PW}$, so only two are independent. The six cases describe the positive and negative outcomes of the three pairwise comparisons. Report changes in each index alongside the gaps and their evolution over time. Test explanations about overheating, equity valuation, or labor market conditions using evidence specific to each question.

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SI Assistance: Copilot and ChatGPT were used to assist with drafting, editing, proofreading, and refinement.
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