

Shiller CAPE

1. Real price: CPI Adjusted Price
 1. Composite price * Current CPI / Past CPI
2. Real Dividend: CPI adjusted Dividend
3. Real total return price
 1. Grow Factor; Grow that combine the price change and dividend

$$\text{Real Total Return Price}_t = \text{Real Total Return Price}_{t-1} \times \left(\frac{\text{Real Price}_t + \frac{1}{12} \times \text{Dividend}_t}{\text{Real Price}_{t-1}} \right)$$

- 2.
4. Real Earning: CPI adjusted Earnings
5. **Real TR Scaled Earnings:**
 1. **inflation-adjusted earnings that are scaled to align with the Total Return (TR) Index.**
 2. **This scaling allows you to compare earnings on the same basis as the total return of the market, which includes both price appreciation and reinvested dividends.**
 3. The **ratio** (Total Return Index/Price Index) shows how much **dividends** and **reinvestments** have boosted returns compared to just price changes. By multiplying **Real Earnings** by this ratio, you adjust earnings to account for the same growth factors.
 4. **Without Scaling:** You might underestimate how earnings contribute to the total growth of the market.
 5. **With Scaling:** You get a clearer picture of whether **earnings growth** supports the **total returns** investors are getting (including dividends).

Core:

1. CAPE: Real Price / average(Past 10 years Real Earnings)
2. CAPE (TR CAPE)

Key Differences:

Feature	CAPE (P/E10)	TR CAPE (Total Return P/E10)
Includes Dividends?	No – only reflects price changes	Yes – includes price changes and dividends
Earnings Basis	Uses real earnings	Uses scaled real earnings adjusted for total returns
Price Basis	Uses price index (no dividends)	Uses total return index (with reinvested dividends)
Best For	Assessing price-based valuation	Assessing full return-based valuation
Example Use	Robert Shiller's original model	More accurate for predicting total wealth growth

3.

3. Excess CAPE Yield = $(1/\text{CAPE}) - 10 \text{ year annualized inflation} - 10 \text{ year Treasury Yield return}$

1. This is the stock return minus inflation effects, and bond return (bench mark)

4. Monthly Bond return

Breaking Down Each Component:

1. $\frac{G_{129}}{G_{130}}$:

- This represents the **price change** of the bond due to changes in interest rates.
- When interest rates **fall**, bond prices **rise**, and vice versa. This fraction captures that **inverse relationship** between bond yields and bond prices.


2. $\frac{G_{129}}{1200}$:

- This approximates the **monthly coupon payment**.
- Since bond yields are annual, dividing by **1200** (12 months \times 100 for percentage) gives the **monthly interest income** from the bond.

3. $\left(1 + \frac{G_{130}}{1200}\right)^{-119}$:

- This term discounts the remaining **119 months of payments** for a bond that originally had 120 months (10 years).
- It reflects how the present value of future coupon payments changes as interest rates change.

4. $\left(1 - \frac{G_{129}}{G_{130}}\right)$:

- This measures the **difference in price** caused by the change in interest rates from last month to this month.
- If $G_{129} < G_{130}$, interest rates have **risen**, leading to a **drop** in bond prices.
- If $G_{129} > G_{130}$, interest rates have **fallen**, leading to a **rise** in  prices.

5.

Interpreting the Entire Formula:

- The formula calculates **total monthly bond return**, combining:
 1. **Price Change** due to interest rate movements $\left(\frac{G_{129}}{G_{130}}\right)$.
 2. **Coupon Income** from the bond $\left(\frac{G_{129}}{1200}\right)$.
 3. **Adjustment for Discounted Future Payments** (reflecting how remaining bond payments change with interest rate shifts).

1. Real Total Bond return (accumulated): Adjusted for CPI

Improved Model:

1 Question:

本文的观点：低真实利率 → 低盈利收益率 → 更高的 CAPE

本论文的观点是基于长期均衡的框架，强调的是股票盈利收益率 (Earnings Yield = $1/\text{CAPE}$) 与真实债券收益率 (Real Bond Yield) 的长期关系。关键逻辑如下：

1. 股票的实际盈利收益率 (Earnings Yield = $1/\text{CAPE}$) 和真实债券收益率 (Real Bond Yield) 在长期内是正相关的

- 这意味着：如果真实债券收益率下降，企业的盈利收益率也会下降。
- 反过来说，如果真实债券收益率上升，股票的盈利收益率 (E/P) 也会上升。

2. 为什么真实债券收益率下降会导致盈利收益率下降？

- 股票和债券的替代关系：
 - 真实债券收益率 (Real Bond Yield) 下降 → 债券吸引力下降 → 资金流向股票市场 → 股票估值 (P/E) 上升 → 盈利收益率 (E/P) 下降。
- 长期资本回报率降低：
 - 低利率往往伴随低经济增长 (例如“日本化”现象)。
 - 低增长意味着企业的长期盈利能力下降，盈利收益率 (E/P) 自然降低。

3. 低盈利收益率意味着高 CAPE

- 盈利收益率 (E/P) = $1 / \text{CAPE}$
- 低盈利收益率意味着 CAPE 会更高。
- 这就解释了为什么在低真实债券收益率的环境下，CAPE 长期处于较高水平。

↓

CAPE regression instability originates from at least two sources:

1. The first is *estimation bias* that arises when persistent (or, slow moving) variables such as the CAPE ratio are used to forecast long-run returns (Stambaugh, 1999).
2. The second relates to standard CAPE regressions omitting the explicit relationship between the expected return on equity (i.e., the real earnings yield) and the expected real discount rate or cost of capital (i.e., real bond yields).

Step 1 and Step 2

1. Predicting Change in P/E Ratio ($\% \Delta PE_{t+1}$)

- The earnings yield ($1/CAPE$) forecasted from **Step 1 (VAR model)** determines the implied future CAPE.
- If **earnings yield is expected to increase**, CAPE will decrease → P/E shrinks → Negative speculative return.
- If **earnings yield is expected to decrease**, CAPE will increase → P/E expands → Positive speculative return.

2. Assuming Constant Earnings Growth ($\% \Delta E_{t+1}$)

- Instead of modeling earnings growth explicitly, the study assumes it **follows its historical long-run average**.
- This helps avoid the **estimation bias** from including another predictive regression.

3. Computing Dividend Yield (DP_{t+1})

- The dividend yield is derived as:

$$DP_{t+1} = (1/CAPE) \times \text{Payout Ratio}$$