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FORWARD P/E RATIOS FOR S&P 500 STOCK PRICE INDEX*  

* S&P 500 stock price index divided by S&P 500 12-month forward consensus expected operating earnings.  
Source: I/B/E/S data by Refinitiv.

Figure 1.

S&P 500 FORWARD EARNINGS YIELD & NOMINAL US TREASURY 10-YEAR BOND YIELD  

* S&P 500 12-month forward consensus expected operating earnings divided by S&P 500 stock price index.  
Source: I/B/E/S data by Refinitiv and Federal Reserve Board.
Figure 3.

**STOCK VALUATION MODEL (using US Treasury 10-year bond yield)**
(ratio scale)

<table>
<thead>
<tr>
<th>Year</th>
<th>S&amp;P 500 Stock Price Index</th>
<th>S&amp;P 500 Fair-Value Price*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: I/B/E/S data by Refinitiv, Standard & Poor’s, and Federal Reserve Board.

Figure 4.

**STOCK VALUATION MODEL (using US Treasury 10-year bond yield)**
(percent overvalued or undervalued)

* S&P 500 stock price index divided by S&P 500 fair-value price defined as S&P 500 12-month forward consensus expected operating earnings divided by 10-year US Treasury bond yield converted to percentage.
Source: I/B/E/S data by Refinitiv, Standard & Poor’s, and Federal Reserve Board.
Figure 5.

S&P 500 LONG-TERM CONSENSUS EXPECTED EARNINGS GROWTH (LTEG)*
(percent annual rate)

* LTEG is 5-year forward consensus expected earnings growth.
Source: I/B/E/S data by Refinitiv.

Figure 6.

S&P 500 LONG-TERM CONSENSUS EXPECTED EARNINGS GROWTH
(percent annual rate)

LTEG*

S&P 500 (9.8)
S&P 500 Information Technology (12.9)

* LTEG is five-year forward consensus expected earnings growth.
Source: I/B/E/S data by Refinitiv.
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Figure 7.

CORPORATE BOND YIELDS
(percent)

Corporate Bond Yields*
- Aaa Corporate Bond Yield
- A-BBB Corporate Bond Yield
- Average Corporate Bond Yield

* Moody’s data for Aaa and Baa yields through 1996, then ICE Bofa Merrill Lynch data for AAA and BBB yields.
Source: Federal Reserve Board and Haver Analytics.

Figure 8.

YIELD SPREAD*: CORPORATE & US TREASURY 10-YEAR BOND
(basis points)

* Corporate bond yield is average of Moody’s Aaa and Baa yields through 1996, then average of ICE Bofa Merrill Lynch data for AAA and BBB yields.
Note: Shaded areas denote recessions according to the National Bureau of Economic Research.
Source: Federal Reserve Board and Haver Analytics.
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Figure 9.

S&P 500 FORWARD EARNINGS YIELD & CORPORATE BOND YIELD

*S&P 500 Forward Earnings Yield*
**Corporate Bond Yield**

*S&P 500 12-month forward consensus expected operating earnings divided by S&P 500 stock price index.
**Corporate bond yield is average of Moody’s Aaa and Baa yields through 1996, then ICE Bofa Merrill Lynch data for AAA and BBB yields.

Source: I/B/E/S data by Refinitiv, Standard & Poor’s, Federal Reserve Board, and Haver Analytics.

Figure 10.

S&P 500 FORWARD EARNINGS YIELD & CORPORATE BOND YIELD

*S&P 500 Forward Earnings Yield*
**Corporate Bond Yield Less LTEG Weighted by 0.0, 0.1, and 0.2**

* S&P 500 12-month forward consensus expected operating earnings divided by S&P 500 stock price index,
** Corporate bond yield (average of Moody’s Aaa and Baa yields through 1996, then average of ICE Bofa Merrill Lynch data for AAA and BBB yields) less analysts’ consensus of S&P 500 long-term earnings growth.

Source: I/B/E/S data by Refinitiv, Standard & Poor’s, Federal Reserve Board, and Haver Analytics.
**Figure 11.**

STOCK VALUATION MODEL (using corporate bond yield)
(ratio scale)

- S&P 500 Stock Price Index
- S&P 500 Fair-Value Price*

* S&P 500 forward consensus expected operating earnings divided by corporate bond yield (average of Moody’s Aaa and Baa yields through 1996, then average of ICE Bofa Merrill Lynch data for AAA and A-BBB yields).

Source: I/B/E/S data by Refinitiv, Standard & Poor’s, Federal Reserve Board, and Haver Analytics.

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**Figure 12.**

FED’S STOCK VALUATION MODEL
(percent overvalued or undervalued)

Percentage S&P 500 Over/Under Valued Relative to Fair Value
- Using Treasury Bond Yield*
- Using Corporate Bond Yield**

* S&P 500 12-month forward consensus expected operating earnings divided by 10-year US Treasury bond yield converted to percentage.

** S&P 500 12-month forward consensus expected operating earnings divided by corporate bond yield (using average of Moody’s Aaa and Baa yields through 1996, then average of ICE Bofa Merrill Lynch data for AAA and A-BBB yields) converted to percentage.

Source: I/B/E/S data by Refinitiv, Standard & Poor’s, Federal Reserve Board, and Haver Analytics.
Figure 13.

S&P 500 FORWARD EARNINGS YIELD & CORPORATE BOND YIELD
(Percent)

* Corporate bond yield is average of Moody’s Aaa and Baa yields through 1996, then average of ICE BoFA Merrill Lynch data for AAA and A-BBB yields.
** S&P 500 12-month forward consensus expected operating earnings divided by S&P 500 stock price index.
Source: I/B/E/S data by Refinitiv, Standard & Poor’s, Federal Reserve Board, and Haver Analytics.

Figure 14.

S&P 500 BUYBACKS
(billion dollars, annualized)

Source: Standard & Poor’s.
Figure 15.

S&P 500 EARNINGS YIELD & REAL BOND YIELD

- Real US Treasury 10-Year Yield*
- S&P 500 Forward Earnings Yield**
- 10-Year TIPS Yield

* US Treasury 10-year bond yield minus median expected CPI inflation rate for next 10 Years using Philadelphia Fed Survey of Professional Forecasters data (monthly series interpolated from quarterly data starting as two quarters per year during Q4-1979 until Q4-1991 when the data continue with four quarters a year).

** S&P 500 12-month forward consensus operating earnings divided by S&P 500 stock price index.


Figure 16.

S&P 500 EARNINGS RISK PREMIUM*

* S&P 500 forward earnings yield minus the real interest rate defined as the nominal 10-year Treasury yield minus median expected CPI inflation rate for next 10 years using Philadelphia Fed Survey of Professional Forecasters data (monthly series interpolated from quarterly data starting as two quarters per year during Q4-1979 until Q4-1991 when the data continue with four quarters a year).

Average = 5.0

### EXPECTED INFLATION: SURVEY OF PROFESSIONAL FORECASTERS

**Professional Forecasters***

CPI: Ex Food & Energy
(Yearly percent change)

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* Median forecast of year-over-year CPI inflation rate over the next 10 years using Philadelphia Fed Survey of Professional Forecasters data.

### MEASURES OF EXPECTED INFLATION

**Expected Inflation**

- Professional Forecasters***
- 10-Year TIPS**

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* Median forecast of year-over-year CPI inflation rate over the next 10 years using Philadelphia Fed Survey of Professional Forecasters data.
** Nominal US Treasury 10-year minus 10-year TIPS yields.
Source: Federal Reserve Board and Federal Reserve Bank of Philadelphia.
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Figure 19.

S&P 500 P/E RATIOS

S&P 500 P/Es
- Trailing (using operating earnings)*
- Forward**

* Using 4-quarter trailing operating earnings.
** S&P 500 stock price index divided by S&P 500 12-month forward consensus expected operating earnings.
Source: I/B/E/S data by Refinitiv and Standard & Poor’s.

Figure 20.

S&P 500 P/E RATIOS

S&P 500 P/Es
- Trailing (using reported earnings)*
- Forward**

* Using 4-quarter trailing reported earnings.
** S&P 500 stock price index divided by S&P 500 12-month forward consensus expected operating earnings.
Source: I/B/E/S data by Refinitiv and Standard & Poor’s.

Capped at 45 due to extreme values
**Figure 21.**

S&P 500 P/E BASED ON TRAILING EARNINGS*

- **Average = 16.1**
- **Capped at 30 due to extreme values**

*Using quarterly average of monthly data for S&P 500 price index and 4-quarter trailing reported earnings.

Source: Standard & Poor’s.

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**Figure 22.**

S&P 500 INDEX

- **P/E***
- **LTEG**

S&P 500 PEG RATIO

- **PEG***

* P/E = price-to-earnings ratio using mid-month price and 12-month forward consensus earnings expectations.
  ** LTEG = consensus median 5-year expected earnings growth.
  *** PEG = P/E divided by LTEG.

Source: I/B/E/S data by Refinitiv.

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* S&P 500 P/E BASED ON TRAILING EARNINGS* Using quarterly average of monthly data for S&P 500 price index and 4-quarter trailing reported earnings. Source: Standard & Poor’s.
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Figure 23.

S&P 500 VALUATION MEASURES
(weekly)

Forward P/E*
Forward P/S**

* Price divided by forward consensus expected operating earnings per share.
** Price divided by forward consensus expected sales per share.
Source: I/B/E/S data by Refinitiv.

Figure 24.

STOCK MARKET CAPITALIZATION RATIOS

- S&P 500 Market Cap
  (as a ratio of S&P 500 Revenues)
- US Equity Market Capitalization Ex Foreign Issues
  (as a ratio of nominal GNP)

Note: Shaded red areas denote S&P 500 bear market declines of 20% or more. Yellow areas show bull markets.
Figure 25.

STOCK MARKET CAPITALIZATION RATIO & S&P 500 PRICE-TO-SALES-RATIO

US Equity Market Capitalization Ex Foreign Issues*
(as a ratio of nominal GNP)
Forward P/S**

* Total excluding market value of holdings by US residents of foreign corporate equities, investment fund shares, and ADRs.
** S&P 500 index divided by forward consensus expected revenues per share for S&P 500. Monthly through 2005, then weekly.
Note: Shaded red areas denote S&P 500 bear market declines of 20% or more. Yellow areas show bull markets.

Figure 26.

Tobin's Q & STOCK MARKET CAPITALIZATION RATIO

Tobin's Adjusted q* for Nonfinancial Corporations
US Equity Market Capitalization Ex Foreign Issues
(as a ratio of nominal GNP)

* Actual divided by average since 1952.
Note: Shaded red areas denote S&P 500 bear market declines of 20% or more. Yellow areas show bull markets.
Figure 27.

S&P 500 P/E BASED ON TRAILING EARNINGS vs CPI

- Trailing P/E*
- CPI (yearly percent change)

* Using quarterly average of daily data for S&P 500 price index, and 4-quarter trailing reported earnings through Q3-1988, then operating earnings.
Source: Standard & Poor’s and Bureau of Labor Statistics.

Figure 28.

S&P 500 P/E BASED ON TRAILING EARNINGS vs US TREASURY 10-YEAR BOND YIELD

- Trailing P/E*
- 10-Year Bond Yield (percent)

* Using quarterly average of daily data for S&P 500 price index, and 4-quarter trailing reported earnings through Q3-1988, then operating earnings.
Source: Standard & Poor’s and Federal Reserve Board.
S&P 500 EARNINGS YIELD vs US TREASURY 10-YEAR BOND YIELD (percent)

* Using quarterly average of daily data for S&P 500 price index, and 4-quarter trailing reported earnings through Q3-1988, then operating earnings.
Source: Standard & Poor's and Federal Reserve Board.

S&P 500 REPORTED EARNINGS YIELD* vs CPI INFLATION RATE**

* S&P 500 reported earnings as a percent of quarterly average S&P 500 index. Q4-2008 dropped because of negative value.
** Year-over-year percent change in three-month average of each quarter.
Source: Standard & Poor’s and Bureau of Labor Statistics.
Figure 31.

S&P 500 REPORTED EARNINGS YIELD* MINUS CPI INFLATION RATE**

* S&P 500 reported earnings as a percent of quarterly average S&P 500 index. Q4-2008 dropped because of negative value.
** Year-over-year percent change in three-month average of each quarter.
Note: Shaded red areas denote S&P 500 bear market declines of 20% or more. Yellow areas show bull markets.
Source: Standard & Poor’s and Bureau of Labor Statistics.

Figure 32.

RULE OF 20: S&P 500 FORWARD P/E vs 20 MINUS CPI INFLATION RATE

* Yearly percent change.
** Average monthly S&P 500 stock price index divided by S&P 500 12-month forward consensus expected operating earnings per share.
Note: Shaded red areas denote S&P 500 bear market declines of 20% or more. Yellow areas show bull markets.
RULE OF 20: S&P 500 FORWARD P/E PLUS CPI INFLATION*

* Using forward P/E monthly and yearly percent change in CPI.
Note: Bear markets are declines of 20% or more (in red shades).
Source: I/B/E/S data by Refinitiv, Standard & Poor’s, and Bureau of Labor Statistics.

FORWARD PE RATIO FOR S&P 500 vs MISERY INDEX

* Unemployment rate plus yearly percent change in consumer price index.
** Price divided by 12-month forward consensus expected operating earnings per share.
Source: I/B/E/S data by Refinitiv, Standard & Poor’s, and Bureau of Labor Statistics.
**Predicting Valuation**

### Figure 35.

**MISERY INDEX* & STOCK MARKET CYCLE (percent)**

*Unemployment rate plus yearly percent change in consumer price index.

Note: Shaded red areas denote S&P 500 bear market declines of 20% or more. Yellow areas show bull markets.


### Figure 36.

**S&P 500 FORWARD P/E* PLUS MISERY INDEX**

*Average monthly S&P 500 stock price index divided by S&P 500 12-month forward consensus expected operating earnings per share.

**Unemployment rate plus yearly percent change in consumer price index.

Note: Bear markets are declines of 20% or more (in red shades).

Figure 37.

S&P DIVIDEND PAYOUT RATIO*
((percent)

S&P 500
S&P Industrials Composite

* Four-quarter trailing dividends per share divided by four-quarter trailing reported earnings.
S&P 500 dividend payout not available from Q4-2008 to Q3-2009 because dividends exceeded earnings.
Source: Standard & Poor’s.

Figure 38.

S&P 500 COMPANIES PAYING A DIVIDEND
(percent of total)

Source: Standard & Poor’s.
Figure 39.

S&P 500 DIVIDEND YIELD
(trailing 4-quarter sum)

- Invested in 1970
- Invested in 1980
- Invested in 1990
- Invested in 2000

Source: Standard & Poor’s.

Figure 40.

S&P 500 DIVIDEND YIELD vs US TREASURY 10-YEAR BOND YIELD
(percent)

- Bond Yield
- S&P 500 Dividend Yield*

* S&P 500 four-quarter trailing dividends per share divided by quarterly closing value of the S&P 500 index.
Source: Standard & Poor’s and Federal Reserve Board.
Figure 41.

S&P 500 Index and Dividend Yield
(ratio scale)

* Blue lines show hypothetical values of S&P 500 stock price index using actual S&P 500 dividend (4-quarter trailing sum) divided by dividend yields from 1.0% to 6.0%
Source: Standard & Poor’s.

Figure 42.

S&P 500 Trailing 4-Quarter Dividends with 5% to 8% CAGR Growth Paths
(base period Dec 1946 = 0.71, ratio scale)

Source: Standard & Poor’s.