OliverWyman Forum

A new understanding of the past, present, and future of the US equity market

A WHITE PAPER SERIES BY OLIVER WYMAN FORUM
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Overview of the work

Executive Summary

Markets fluctuate, and many investors are naturally drawn to short-term swings, particularly in periods of despair or speculation. This work takes a longer view. It uncovers what gets missed in the day-to-day tumult by studying US financial markets not over months or years, but rather over the past century and a half. It strips away the cyclical factors in order to reveal the deep secular forces that have driven the market over the long term. Its main focus is the equity market, but it also addresses the Treasury market. The ultimate objective is to explain the past in order to better frame questions about the future.

The work offers a new perspective to academics, Treasury and Federal Reserve officials, and professional investors alike. From an academic standpoint, it brings our understanding of the drivers of the US equity and Treasury markets to the next level; one will never look at the Capital Asset Pricing Model in the same way again. Treasury and Fed officials can now see the impact on equity prices of monetary and tax policy for the last 150 years. From an investor's perspective, it offers a new paradigm to frame the future path of markets in the face of uncertainty, casting the concept of "mean reversion" in a new and unflattering light.

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1.1. Context of this work

The context of this work is the evolution of the price per share of the Standard & Poor's 500-stock index over 150 years, given three key facts.

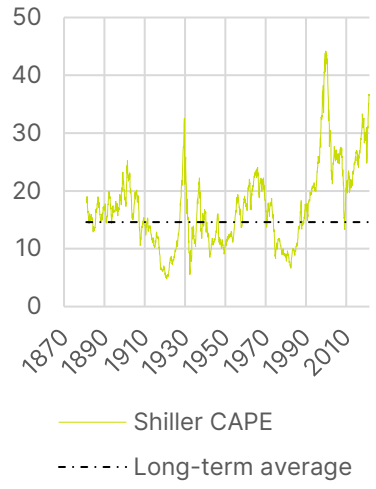
First, stock market valuations in the United States have varied widely throughout history. Commonly accepted yardsticks suggest the market's valuations in recent years have been extreme. For instance, before COVID-19[1] the cyclically adjusted price/earnings multiple popularized by Nobel Prize-winning economist Robert Shiller was at about twice its long- term historical average.[2] Mid-2021 multiples were even higher, as Exhibit 1 shows.

Second, corporate profit margins have also varied widely and stood near 100-year highs in recent years, as Exhibit 2 shows[3].

And third, the real price per share of the S&P 500 was at about two and a half times its long- term trend before COVID-19, and was close to three times in mid-2021, as Exhibit 3 shows.

Exhibit 1: Shiller CAPE of the S&P 500 vs. its long-term harmonic average

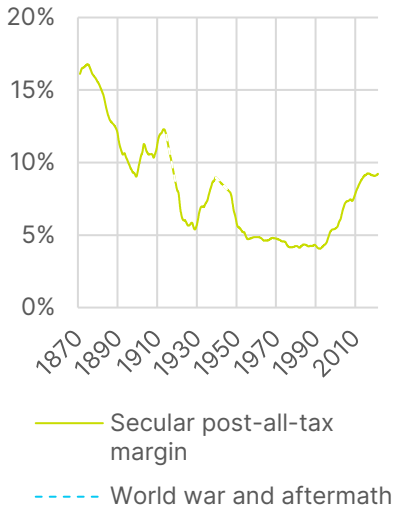
January 1871–June 2021



Source: Professor Shiller, Oliver Wyman

Exhibit 2: Secular post-corporate-and-investor-personal-tax S&P 500 profit margin

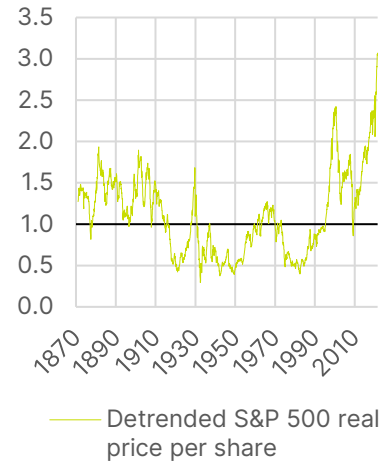
January 1871–June 2021



Source: S&P, Cowles Commissions, BEA, Oliver Wyman

Exhibit 3: Detrended S&P 500 real price per share

January 1871–June 2021



Source: S&P, Cowles Commissions, Oliver Wyman

[1] Between 2017 and 2019.

[2] We have used the harmonic average calculated in the logarithmic space, which we believe is more appropriate than other kinds of averages because it correctly compounds the earnings yield.

[3] Please see Section 2 below for how the corporate margins have been calculated in this exhibit. The post-all-tax margin in the 19th century was high because there was no tax.

Our ultimate objective is to better frame future uncertainty. We believe this requires first mastering the past, so we start by answering three questions. Why have stock market valuations in the United States varied so much throughout history? Relative to historical benchmarks, are valuations in recent years as extreme as commonly believed? And why have margins also varied so much and why are they near a 100-year high?

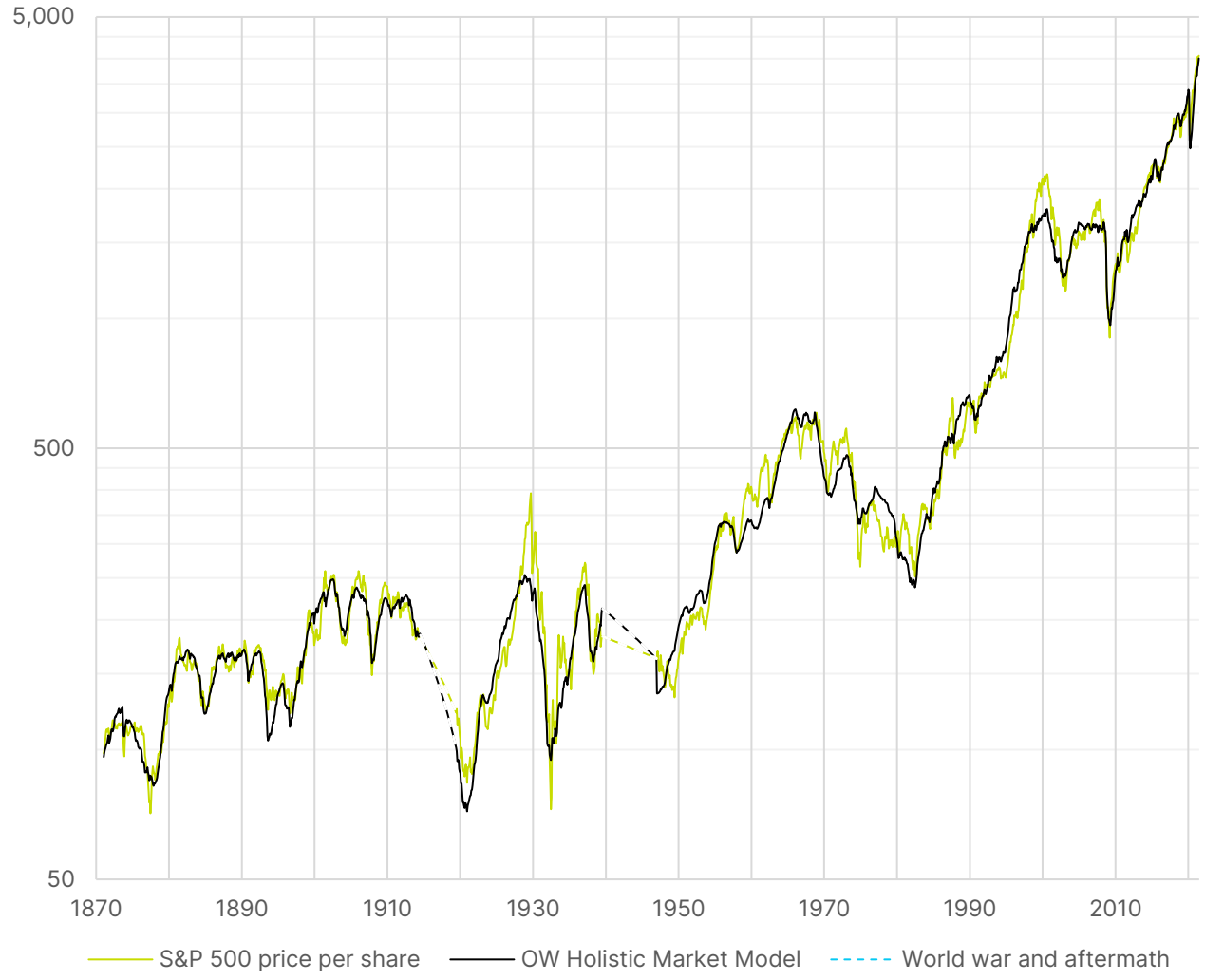
Only then do we address the implications of our findings with respect to the future of the stock market. Along the way, we point out that developing our understanding of the equity market is impossible without uncovering key features of the Treasury market, so we share our findings on this as well.

1.2. Summary of the nine key findings

In this series we introduce a new tool, the Holistic Market Model, or HMM, which represents two major breakthroughs. First, the model explains more accurately than any other to date why stock prices (and to a lesser degree Treasury prices) have behaved the way they have over the past century and half. Second, it provides a powerful new paradigm to deal with future uncertainty[4]. Exhibit 4 shows the excellent fit of our equity model. In short, the reasons for the past behavior of stock prices are now clear.

Exhibit 4: Oliver Wyman HMM-based model of S&P 500 real price per share

2020 $, January 1871–June 2021[5]



Source: S&P, Cowles Commission, Oliver Wyman

[4] Prof. Shiller's price per share, earnings per share, and dividends per share series start in 1871.

[5] 1871–1912, 2020 and the first half of 2021 use only the OW re-engineered CAPM model because the data underpinning the OW Supply/Demand Balance Model are available only for the period between 1913 and 2019.

The process of modelling the past 150 years'[6] worth of market behavior has led to nine major findings. The first eight are sequential steppingstones to the ninth, which is the ultimate goal of this work: framing future uncertainty in a better way.

1. **Based on cyclically adjusted price/earnings (CAPE) multiples, market valuations just before COVID-19 were elevated but not extreme**. We find that the history of earnings is riddled with problems, which we have corrected to create a consistent earnings track record. As a result of developing an accurate data set, using the "owner earnings" concept championed by Warren Buffett, and allowing for variations in index dispersion[7] and investor personal taxation, we conclude that CAPE-based valuations before COVID-19 were merely elevated rather than extreme.[8] By contrast, mid-2021 CAPE-based valuations were very high, but we show that they were broadly commensurate with unprecedentedly low interest rates and below-average risk aversion.
2. **Corporate profit margins are near a 100-year high.** We note that profit margins (earnings per share divided by sales per share) among S&P 500 companies were unknown for the period before the modern era because the sales per share data do not exist. We reconstruct the sales per share of the index back to 1871. We conclude that secular profit margins before corporate taxes are near an 80-year high, the combined corporate and investor personal tax rate is near an 80-year low, and the secular post-all-tax margins are near a 100-year high. We explain why this is the case.
3. **Markets react more to perceived earnings than to actual earnings.** We re-engineer the P/E valuation metric by basing it on the new concept of "perceived earnings."[9] This metric is more timely than a traditional P/E ratio, and yet is also less volatile than a 10-year CAPE. The metric shows that earnings are a stronger guardrail to valuation than is commonly believed. The market, in other words, is more efficient than it is given credit for.
4. **The Capital Asset Pricing Model, or CAPM, has issues, and we re-engineer it.** We confirm what many have noted: the CAPM works in theory but not in practice. The reason for the empirical failure of the CAPM stems from execution deficiencies rather than a fundamental conceptual issue. Most practitioners use the long-term Treasury rate as a proxy for the risk-free rate, despite the fact that the Treasury rate is nominal rather than real and is not truly risk-free. We find that the CAPM works only if one re-engineers it by subtracting inflation expectations and using the real truly risk-free rate (RTRR) as its root. The latter requires developing the concept of the "Treasury risk premium," or TRP.[10] Using this root, we define a new True North equity risk premium (ERP) that has differed from the traditional ERP over time.
5. **Variations in this new True North ERP are driven by one cyclical factor and three secular factors.** We build a four-factor model to explain the variations in the True North ERP. The model has a single structure covering the 150-year period. This indicates that the rules that govern stock prices

[6] We exclude from the model the two World Wars and their immediate aftermaths because peacetime rules do not apply to wartime economies.
[7] Dispersion is a fundamental concept, which we introduce in Section 2.2 and address extensively in the second white paper.
[8] Other valuation metrics, such as the price/sales ratio, show more extreme outcomes.
[9] This is also a fundamental concept that we introduce in Section 2.
[10] This is a different concept from the Treasury term premium, which has been exhaustively studied in the literature.

have been surprisingly stable despite the massive changes in the structure of the US economy. We also explain qualitatively the drivers of the Treasury risk premium.

6. **The laws of supply and demand provide an alternative paradigm to the CAPM.** We find that the tools of modern finance are unnecessary to explain the behavior of equity prices at the aggregated index level.[11] There is an alternative to thinking of price as the multiplication of earnings times P/E. We solve for price (in fact market capitalization) directly by using the laws of supply and demand and we introduce a simple Supply/Demand Balance Model. It also explains annual[12] equity prices well, using only the tools of 19th century classical economics.
7. **The Holistic Market Model is the combination of the re-engineered CAPM and the Supply/Demand Balance Model**. We find that our CAPM and Supply/Demand Balance Model, despite their fundamentally different starting points, can work together. We integrate them to create an expanded CAPM, which we call the Holistic Market Model. The HMM answers three questions simultaneously, rather than just one: First, how do we quantify the forces that determine demand for financial assets in aggregate (whether equities, cash, or bonds)? Second, what are the drivers of portfolio allocation and "market share" across these three competing asset classes? And finally, what are the drivers of the True North ERP?
8. **Equity prices in recent years have been elevated because of a set of highly favorable structural conditions**. The HMM has multiple secular drivers, all of which have been at levels conducive to high prices in recent years. We use the model to quantify the impact of each and show that the model has a powerful "what-if" capability. We also use the HMM to highlight why Treasury yields have been low.
9. **The HMM's "what-if" capability provides a superior way to frame future uncertainty**. We pose the question of the future path of equity prices in the face of uncertainty. We test the concept of mean reversion, or the belief that market activity coalesces around a long-term average over time, and find it wanting. It is not, as some have suggested, the most powerful force in finance – rather, it could be the most dangerous one. Instead, we use the HMM to frame future uncertainty. We conclude that some of the secular drivers of high prices appear unlikely to change over the medium term, but the others could.

Each of these points is a significant finding on its own. Taken together, we find that these nine points bring the financial community's understanding of US markets to the next level.

[11] They are, however, essential at the individual company level.

[12] The Supply/Demand Balance Model operates at the annual frequency, in contrast to the re-engineered CAPM model, which operates at the monthly frequency.

1.3. Structure of the series

This series consists of five installments.

This is Paper One: Here we provide an overview of the entire work, focusing on the overall approach and findings. We present supporting evidence for these findings, along with much more detail, in the four subsequent papers. The second paper is published at the same time as this one, in order to demonstrate the depth of supporting evidence that underpins all of our findings.

Paper Two: This paper is organized into two parts, the first and longer part focusing on CAPE-based valuations and the second, shorter part focusing on corporate margins. In the first part, we improve the quality of S&P 500 price and earnings data[13] and we recast accounting practices, which have changed radically since 1871, to a single consistent standard. We then adjust for dispersion (see Section 2: Approach, for a brief description) and we replace earnings based on generally accepted accounting principles, or GAAP, with what Warren Buffett calls owner earnings, because these are a more economically relevant concept. Finally, we subtract investor personal taxes. After those necessary adjustments, we conclude that CAPE-based valuations just before COVID-19 were elevated but not extreme.[14] We also reconstruct the sales per share record before 1992, which is when Standard & Poor's started publishing the data. This reconstruction is the gateway into our analysis of historical profit margins in the second part of this paper, where we conclude that post-all-tax profit margins in recent years are near a 100-year high. We explain why this is the case.

Paper Three: We introduce a low-volatility, yet zero-lag, valuation metric based on the concept of perceived earnings. We confirm that the CAPM does not work well in practice and we re-engineer it. The re-engineering involves creating an alternative formulation for the CAPM and developing a four-factor explanatory model of the equity risk premium. We show that the re-engineered CAPM explains the last century and a half well. We also introduce the Treasury risk premium concept[15] and quantify its components.

Paper Four: We model the supply/demand balance for financial assets in aggregate, as well as the drivers of the portfolio allocation to equities. We conclude that modern valuation tools are unnecessary to explain aggregate equity prices such as the S&P 500 index at the annual level.

Paper Five: We integrate our re-engineered CAPM with our Supply/Demand Balance Model to build the HMM. The HMM encompasses not only equities but also bonds and cash. We show that mean reversion is a dangerous force to rely on, and instead use the HMM to frame questions about the future. We conclude that some of the secular factors of elevated equity (and bond) prices are unlikely to change in the medium term. However, we also conclude that others could reverse course, and we set out the conditions under which they would be likely to do so.

[13] The S&P 500 index before 1957 is reconstructed after the fact.

[14] By contrast, CAPE-based valuations in mid-2021 were very high, but we show that they were commensurate with unprecedentedly low interest rates and below-average risk aversion.

[15] As mentioned earlier, this is a different concept from the Treasury term premium, which has been exhaustively studied in the literature.

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Section 2. Re-examining the earnings track record and bringing to light the corporate margin record

This section provides a high-level summary of the second white paper.

2.1. The rationale for recasting earnings

A core element of our work is to recast earnings to allow for a consistent historical comparison. Accounting practices clearly have changed over the last 150 years. In fact, the concept of accounting standards, as we currently understand them, didn't emerge until the late 1930s, and were implemented only after World War II. Pre-war accounting practices were variable, both over time (the Supreme Court disallowed depreciation way back in 1878) and across companies. For instance, some companies used historical cost accounting, as GAAP does today, but others used current cost accounting.[16] Yet the earnings relied on in the literature follow the practices of the time rather than a consistent set of standards.

2.2. Approach

In order to recast earnings consistently to allow for a true 150-year comparison, we answer three questions.

Which accounting standard should be chosen to measure earnings? We choose to use Warren Buffett's conception of owner earnings rather than GAAP earnings. Owner earnings represent the surplus that can be distributed to shareholders after the reinvestments required to maintain the health of the business have been met. It is generally agreed that owner earnings are a more conceptually sound definition of the true economic earning power of a company than GAAP earnings, despite the difficulty of making the judgments required to assess the appropriate level of reinvestment. We concur with that thinking, for two reasons. First, it is a discretionary cash flow concept that fits well as an input to the discounted cash flow-based valuations routinely used by equity analysts. Second, it controls for the deficiencies in GAAP when inflation is either high or very negative.

Accordingly, we extend Warren Buffett's owner earnings concept, originally devised for a single company, to make it work at the aggregate level of the overall index (the S&P 500 since 1957, and its reconstructed predecessors between 1871 and 1957). We also adjust owner earnings for dispersion (see below) and, finally, subtract investor personal taxes.

In what follows, we refer to the fully adjusted owner earnings as the Buffett earnings. We also refer to the P/E and the earnings yield (EY)[17] based on these earnings as the Buffett P/E and the Buffett EY, respectively. Finally, we refer to this version of the CAPE as the Buffett CAPE, which we calculate on a total return basis.[18]

[16] For a brief period in the 1980s, accounts were prepared on both a historical cost accounting basis and a current cost accounting basis.

[17] The EY is the inverse of the P/E.

[18] The Total Return Shiller CAPE, while not widely used, corrects for the distorting impact of share buybacks on the Shiller CAPE. See Bunn and Shiller (2014). We have used a similar methodology to Prof. Shiller to calculate the Total Return Buffett CAPE.

Once the choice of accounting standard is made, how do we apply it? To start with, we note that price and earnings data before 1957 have issues, so we switch to a more accurate data set. One of its characteristics is that we use the second edition of the Cowles Commission common-stock indexes rather than the first.[19]

Our approach to the period after World War II needs to be different from the period before. It is possible to use GAAP earnings as the root of the adjustment process after World War II, but not before (see below for pre-World War II). For the post-World War II period, we convert GAAP-of-the-day earnings into consistent Buffett Earnings via three adjustments.

First, we address myriad accounting inconsistency issues, including changes in the treatment of goodwill and stock options, and the impact of mark-to-market on the volatility of earnings. This creates a GAAP standard that is consistent over time.

Then, we account for variations in index dispersion. At any point in time, each constituent of the index has its own idiosyncratic performance, and there are always winners and losers.

High-dispersion environments correspond to periods in the historical track record with outsized differences between winners and losers, whereas low-dispersion environments are associated with more muted performance differentials. We show that, as a result, index P/E ratios cannot be compared across low- and high-dispersion environments or, indeed, compared across high-expected-growth and low-expected-growth periods. We calculate the correction factors that are required to make different periods comparable.[20] We note that dispersion is higher under mark-to-market accounting, and when the index is dominated by winner-takes-all, high P/E, large-capitalization companies, as has been the case in recent years.

In the end, we calculate correction factors to convert the consistent dispersion-adjusted GAAP earnings into owner earnings. Owner earnings emphasize the importance of the reinvestment requirements that are necessary to maintain a business on an even keel. In a zero-inflation environment, depreciation charges are a good approximation of those requirements, particularly when aggregated up to the level of the index. By contrast, it has long been known that historical cost depreciation (on which GAAP is based) systematically understates reinvestment requirements in inflationary conditions and does the opposite in deflationary conditions.[21]

In contrast, we recalculate pre-World War II earnings from dividends because the pre-World War II earnings track record is based on undocumented accounting practices that are inconsistent both with each other and over time. Given that we know both dividends and consistent owner earnings[22] since

[19] The Cowles Commission was created in 1932 to develop logical, mathematical, and statistical methods of analysis in economics and related fields. To portray the average experience of those investing in the US stock market from 1871 to 1938, it created the Cowles Commission common-stock indexes.

[20] The calculation normalizes all periods to zero dispersion and zero real growth to ensure consistency. Normalizing to zero real growth also allows us to use a simple CAPM structure in which the ERP is simply the difference between the earnings yield and the risk-free rate.

[21] The issue first flared up when the SEC was created in the deflationary 1930s and flared again in the opposite direction in the inflationary 1970s.

[22] Adjusted for GAAP inconsistency issues and dispersion, but not investor personal taxes.

World War II, it is possible to build a model that quantifies the relationship between these two variables. We apply this model to pre-World War II dividends to convert them into owner earnings. As well as creating a fully consistent earnings track record over 150 years, the approach has the added advantage of addressing the fact that the market focused on dividend yield rather than P/E before World War II.

Finally, we account for the impact on valuations of the variations in investor personal taxes. Given that dividend and capital gains taxes are an integral part of investor decisions,[23] we subtract these taxes from owner earnings. This is an important part of the exercise because personal taxes on equity have varied significantly throughout the period, with a peak in the post-World War II era when the top dividend tax rate bracket briefly exceeded 90%. It is an arduous calculation because, for every year starting with the advent of dividend taxation in 1913,[24] we have to ascertain the various dividend and capital gains tax rates of the multiple tranches of investors who collectively own the index (as well as the taxable proportion of the index). This is the final step in calculating the Buffett earnings.[25]

[23] The price premium of municipal bonds is caused by their federal tax-exempt status.

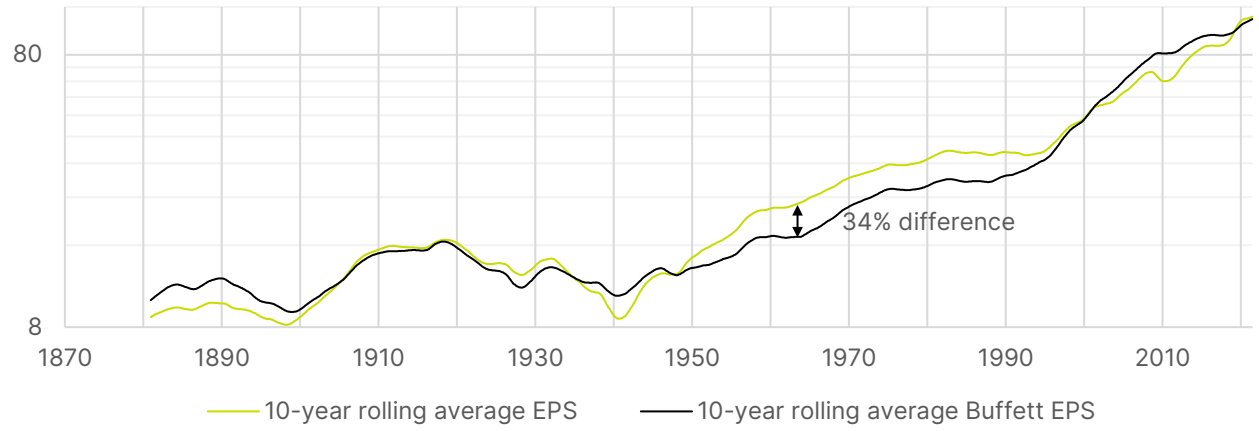
[24] The 1913 dividend tax was soon repealed, and dividend taxes started in earnest in the 1950s, apart from a brief period in the late 1930s.

[25] In summary, the calculation is a five-step process. The first two steps provide us with the best dataset possible, based on consistent hybrid GAAP. The third step adjusts the earnings for dispersion. The fourth implements the Warren Buffett Owner Earnings concept, originally devised for individual companies, at the aggregate level of the index. The fifth and final step subtracts investor dividend and capital gains taxes, and completes the conversion of the initial earnings into what we call Buffett earnings.

2.3. Results

We show that the perception of the historical track record must be re-evaluated. Earnings are higher than commonly realized at the beginning and end of the 150-year period, and lower from the late 1940s to the early 1990s, as Exhibit 5 shows.

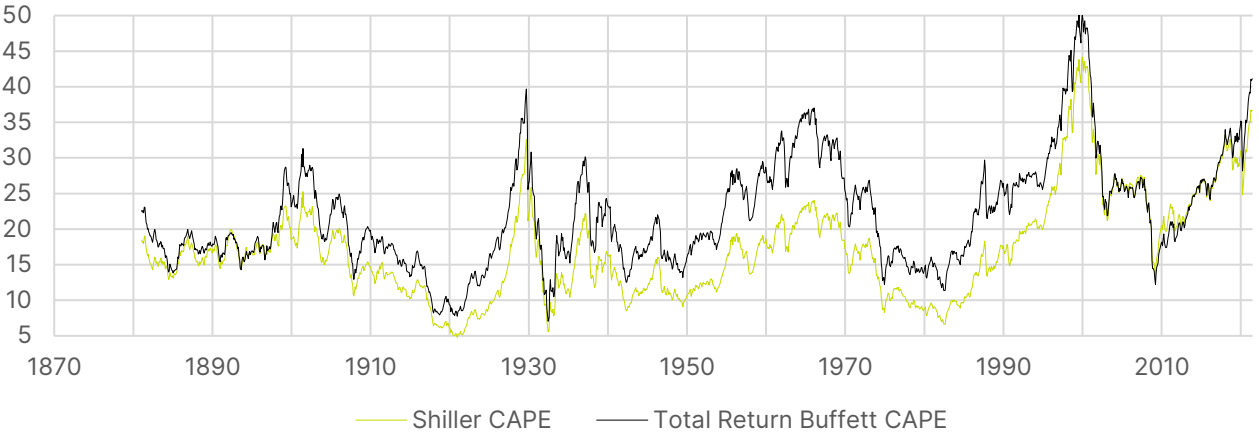
Exhibit 5: 10-year rolling average earnings per share and Buffett earnings per share of the S&P 500
2020 $, January 1881–June 2021



Source: S&P, Cowles Commission, Oliver Wyman

We establish that pre-COVID-19 valuations, while clearly elevated, were not twice their historical average. Exhibit 6 and Exhibit 7 compare the Shiller CAPE with the Total Return Buffett CAPE. (Both CAPEs are based on 10-year average real earnings, but the earnings series differ.)

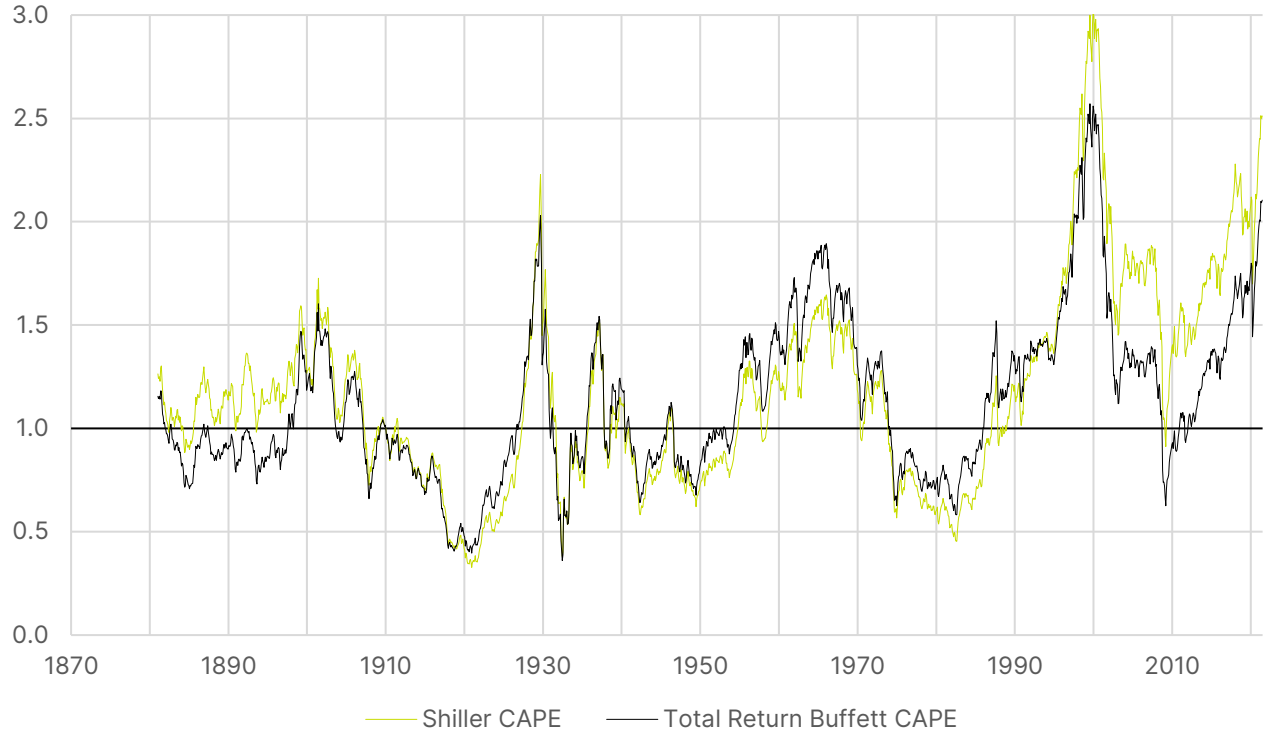
Exhibit 6: Shiller CAPE and Total Return Buffett CAPE of the S&P 500
January 1881–June 2021



Source: Prof. Shiller, Oliver Wyman

Exhibit 7: Shiller CAPE and Total Return Buffett CAPE of the S&P 500 relative to their long-term harmonic averages

January 1881–June 2021



Source: Prof. Shiller, Oliver Wyman

The exhibits show that, between 2017 and 2019, correctly assessed valuations were 1.6 times their historical average. Using the traditional method of the Shiller CAPE, they would be 2.0 times their historical average.

However, it is not appropriate to compare valuations in recent years with the ones of more than a century ago. A more relevant approach is to compare valuations with a historical average starting after the regime shift that the US economy experienced in the mid-1950s.[26] Many observers, including us, see this time as the beginning of the post-World War II era from the financial markets' perspective. With 1956 as the starting point, pre-COVID-19 valuations would be 1.3 times their post-1955 historical average. Using the Shiller CAPE, they would be 1.7 times their post-1955 historical average.

By contrast, June 2021 valuations were 1.7 times the post-1955 historical average using the Total Return Buffett CAPE and 2.1 times using the Shiller CAPE – near extreme levels. However, we show in Section 3 below that they were broadly commensurate with unprecedentedly low interest rates and below-average risk aversion.

[26] This is the time at which the US economy experienced a radical reduction in the volatility of the business cycle, and at which inflation started becoming persistent.

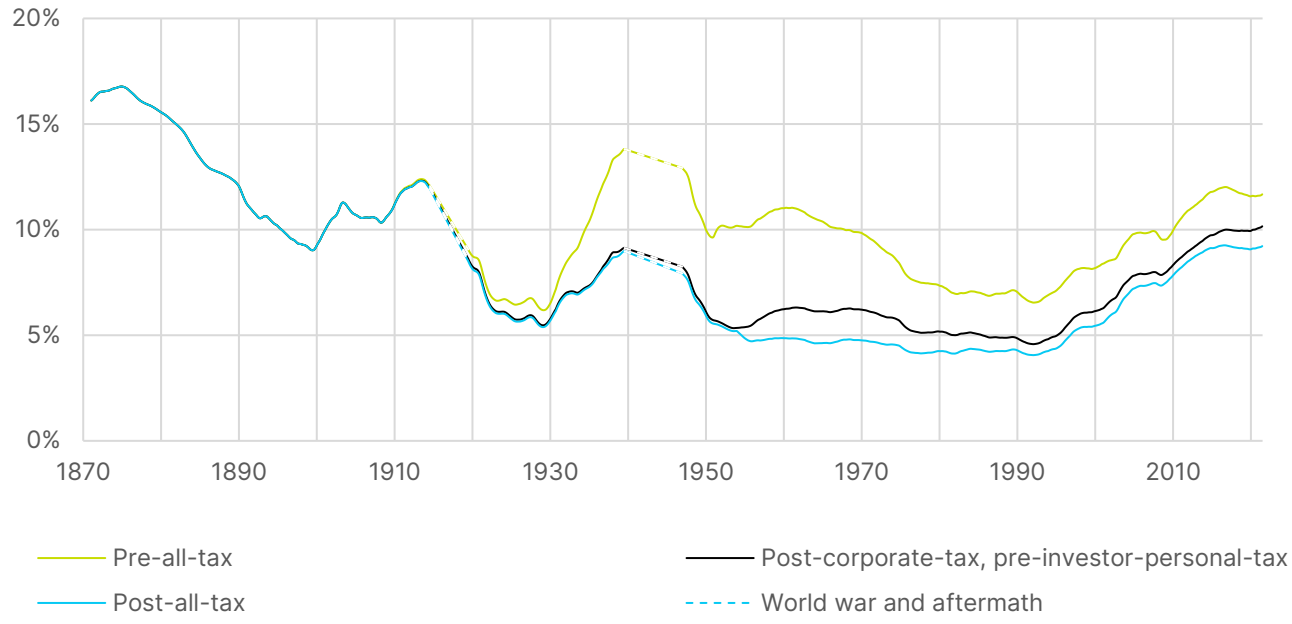
2.4. Bringing to light the corporate margin record

Corporate profit margins are simply earnings divided by sales. Official S&P 500 sales per share are not readily available before 1992. So reconstructing sales per share going back to 1871 is the gateway to quantifying historical margins. Between 1929 and 1991, we do this by bridging data from the IRS and the National Income and Product Accounts (NIPAs) with the S&P 500.[27] Between 1871 and 1928, we build a model of sales per share growth, which we then triangulate with academic research on margins in the 19th century.

Exhibit 8 shows the corporate margins based on the sales reconstruction and the work on Buffett earnings. The margins are shown at three levels: pre-all taxes, post-corporate tax and pre-investor-personal taxes, and post-all taxes, with the third being the most relevant to explaining price per share.

Exhibit 8: Secular pre-tax and post-tax S&P 500 profit margins

January 1871–June 2021



Source: S&P, Cowles Commissions, BEA, Oliver Wyman

We note three striking facts about the level of margins in recent years: First, secular margins before corporate tax are near an 80-year high;[28] second, the combined corporate and personal tax rate is near an 80-year low; and third, the margins after all taxes are near a 100-year-high.

[27] Bridged to the extent possible based on Hodge (2011).
[28] Margins including cyclical components peaked in 2019.

We assess the dynamics of the rise of pre-all-tax secular margin qualitatively. The results are not surprising. The main drivers are the increased concentration of key industries, the favorable regulatory environment, the benign labor market cost pressures in recent decades, the positive commodity supercycle environment, and the improvement in management quality.

The combined corporate and investor personal taxes are driven by the amount of tax to be collected and the progressivity of the tax system. We note that beliefs about appropriate taxation policy have varied widely over time.

In conclusion, the debates about the sustainability of the current level of the stock market should focus as much on the corporate profitability side (after investor taxes) as on the P/E side. The reason this is not currently the case is because the level of margins is often taken for granted. The second white paper documents the work that led to these findings.

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Section 3. Introducing an improved valuation metric and re-engineering the CAPM to make it work in practice

This section provides a high-level summary of the third white paper.

3.1. A zero-lag, perception-based valuation metric

Markets are forward-looking, so the most conceptually sound valuation metrics should use future expected earnings whenever available. The problem: analyst estimates of expected earnings are not fully available for all S&P constituents until 2001 from our data vendor. So any long-term historical study has to use backward-looking actual earnings until 2000, and switch to the preferred approach only for the last 20 years.

This switch has the advantage of making use of the best available data, but it creates a consistency issue because actual earnings are available on a GAAP basis, whereas forward- looking earnings are on an operating basis. Further, analyst estimates of forward operating earnings a few months into the future suffer from an upward bias. We apply correction factors to resolve these two discrepancies and make the two historical periods comparable.

The two most commonly used valuation metrics are the P/E and the 10-year CAPE. Earnings volatility makes the first timely, but erratic. The second metric solves the short-term volatility of the earnings by averaging them over 10 years but introduces a significant lag in doing so. For instance, the 10-year average earnings went up mechanically in 2019 because the very low earnings of the fourth quarter of 2008 and the first quarter of 2009 dropped out of the calculation window.

We introduce "perceived earnings," a new valuation metric that is even more timely than a traditional P/E, while being less volatile than a 10-year CAPE. Calculating perceived earnings requires switching from an accounting-based logic to a market-based logic. In other words, we want to determine which part of the earnings the market perceives and reacts to the most. So we are seeking the formula that transforms earnings to maximize their explanatory power as a price driver. We find this formula by solving for the transformation of earnings that maximizes the power of changes in earnings to explain price changes.

Specifically, we first empirically determine how far ahead the market has been able to peer through the fog of future uncertainty. Not surprisingly, the work confirms that the market does not, in fact, see far ahead at all.

Second, we split earnings into three parts: the part that is clearly driven by the business cycle, the part that is clearly secular, and a residual tranche that is neither clearly cyclical nor clearly secular. This residual tranche, which is difficult for the market to interpret given the lack of clarity of its provenance, is heavily discounted. We find that this discount is well in excess of 50%.

Third, we note that companies' share prices behave like out-of-the-money call options when their profitability is very low or negative.[29] We also account for this effect.

[29] In such situations, company share prices are worth more than the multiple of their very low or negative earnings.

The double advantage of this approach over the traditional CAPE method of stabilizing earnings by using a 10-year moving average is that it does not suffer from lag while still being less volatile than a CAPE. We run the transformation formula on the Buffett earnings to obtain the perceived Buffett earnings.

Exhibit 9 documents the progress we make in improving the explanatory power of earnings in valuations, improving both the data and the metric through the steps of the transformation process.

- Step one: P/E based on a traditional data set
- Step two: 10-year CAPE based on a traditional data set
- Step three: 10-year total return CAPE based on Buffett earnings
- Step four: P/E based on perceived Buffett earnings

The reduction in high-low range and standard deviation[30] as we go through the steps shows that once properly defined and adjusted, earnings are a stronger guardrail to valuations than is commonly believed. In other words, the market is more efficient than it is sometimes given credit for.

Exhibit 9: Historical variations of valuation metrics relative to their long-term harmonic averages
January 1881–June 2021

	P/E	Shiller CAPE	Total Return Buffett CAPE	Perceived Buffett P/E
High	9.5x	3.0x	2.6x	2.5x
Low	0.4x	0.3x	0.4x	0.4x
High-low range	9.1x	2.7x	2.2x	2.1x
Standard deviation	0.78x	0.48x	0.38x	0.32x

Source: Professor Shiller, Oliver Wyman

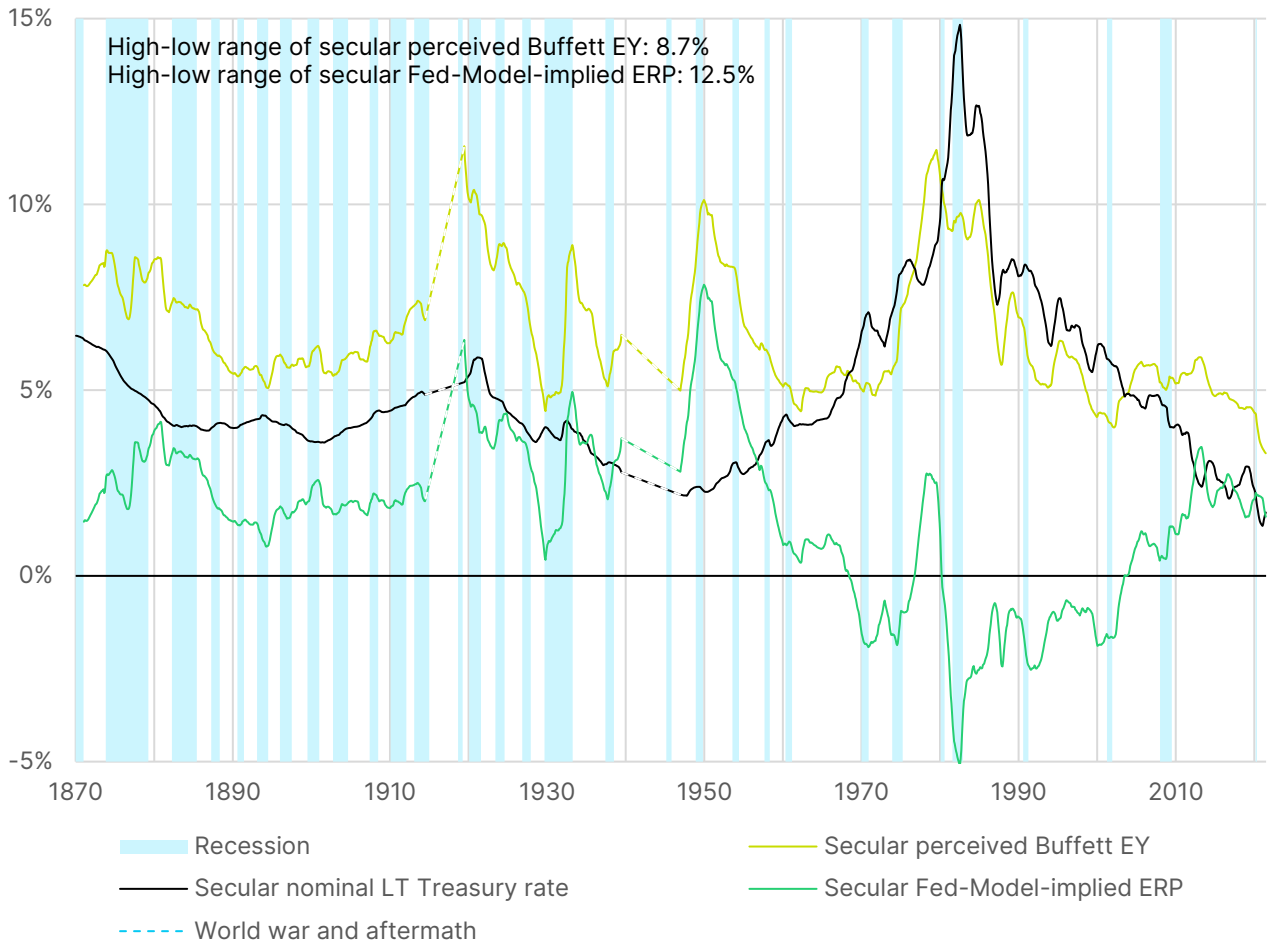
[30] The stronger the explanatory power of the metric, the less volatile it will be. More specifically, if X is a metric that seeks to explain Y, the better the metric, the less volatile Y/X will be.

3.2. The failings of traditional CAPMs

Capital asset pricing models provide an explanatory framework for valuations because they connect the equity earnings yield (or EY, which is the inverse of the P/E), with the risk-free rate via the ERP. The so-called Fed Model is a popular version of the CAPM and makes this connection in a simple fashion because the ERP in the Fed Model is the difference between the EY and the long-term nominal Treasury rate, which the Fed Model uses as a proxy for the risk-free rate. In other words, in the Fed Model, price is simply earnings divided by the long-term Treasury rate plus a constant ERP. If the Fed Model worked, the implied ERP would be roughly constant.

Exhibit 10 compares the perceived Buffett EY with its ERP counterpart in the Fed Model. We do this by subtracting the Treasury rate from the perceived Buffett EY.

Exhibit 10: Secular perceived Buffett EY, Nominal Long-Term Treasury Rate, and the Fed Model ERP
January 1871–June 2021



Source: NBER, Federal Reserve Board, Oliver Wyman

We draw two observations from this exhibit. First, not surprisingly, earnings yields and ERPs are higher in times of stress, particularly recessions. Second, the earnings yield is less volatile than the ERP. This means the Fed-based CAPM[31] underperforms the most simplistic valuation model conceivable, which would be simply to set the perceived Buffett earnings yield at its long-term average of 6.8%.[32] Adding the extra parameter of the ERP brings no additional value.

The Fed Model calculation of the ERP suffers from ignoring the role of growth in equity valuations. Yet more sophisticated approaches that account for growth generate similar results. So, we conclude that while there are strong conceptual reasons for the CAPM to work in theory, in practice the model disappoints. We determine why this is the case: The current CAPM does not work well because of the way it is applied rather than because of a fundamental conceptual failing.

Nearly all practitioners use the long-term nominal Treasury rate as a proxy for the risk-free rate in calculating the ERP. But this proxy suffers from two deep flaws. First, it uses a nominal bond rate even though equities are real assets,[33] so the Fed Model operates in a conceptually awkward "hybrid" space.[34] Second, the long-term Treasury rate, while effectively default- risk-free, is not truly risk free. It carries numerous other, subtle risks (as well as long-term inflation expectations since the 1960s). We add up these risks and refer to the total as the Treasury risk premium, or TRP.

[31] Nominal long-term Treasury rate plus long-term average ERP of 1.9%.

[32] Fair value under this highly simplistic model would be perceived Buffett earnings divided by 0.068 (that is, 14.7× perceived Buffett earnings).

[33] They empirically do poorly in extremes of inflation or deflation, but this does not make them nominal assets.

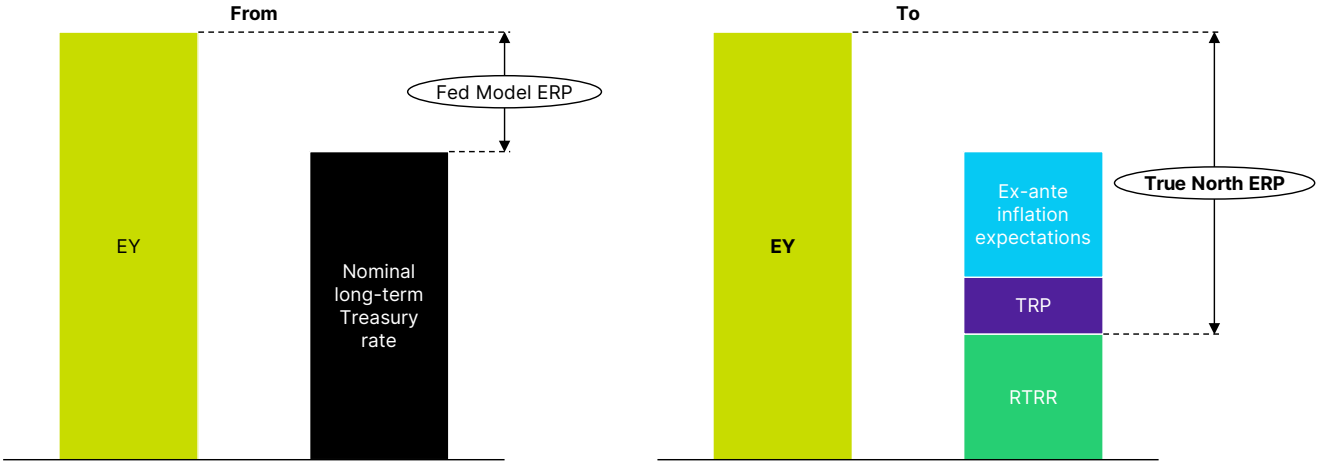
[34] The more sophisticated counterparts of the Fed Model include nominal growth, but our work on dispersion shows why this superficial fix does not work well at the index level.

3.3. The way forward

We find that the key conceptual step required to make the CAPM work in practice is to replace the nominal default-free long-term Treasury rate with the real truly risk-free long- term rate. We abbreviate the real truly risk-free long-term rate as the RTRR.[35] The RTRR is calculated by subtracting long-term inflation expectations and the components of the TRP from the 20-year Treasury rate.[36] Note that we put fluctuations in risk aversion on the TRP side of the ledger, rather than the RTRR side, because we have conceptualized the RTRR to be low-volatility, to be set at constant risk aversion, and to change slowly, except in the case of regime change.

Exhibit 11 highlights the differences between the Fed Model ERP and the recast ERP. We call this ERP the True North ERP.

Exhibit 11: Fed Model ERP vs. True North ERP



Replacing the Treasury rate with the RTRR as the root of the CAPM solves the two key flaws highlighted above. The True North ERP is calculated in the real space rather than in a hybrid space of nominal Treasury bonds and real equities, and its anchor becomes truly risk-free rather than simply default risk-free.

Given that this approach is clearly superior from a conceptual point of view, why hasn't it been done before? It hasn't been done because the process of subtracting inflation expectations and the components of the TRP from the Treasury rate is complex at the best of times, and particularly challenging for the 127-year period before the advent of Treasury inflation-protected securities, or TIPS, in 1997.

[35] The RTRR has similarities with the natural rate of interest, R*. Both rates are non-observable and both are anchors of their respective systems — the ERP for the risk-free rate and the Taylor rule for R*. Yet the two rates are far from identical.
[36] Reconstructed using long-term US bond yields before 1953.

To solve the problem, we focus on two questions. First, what have been the long-term inflation expectations going back to 1871?[37] (It is not particularly difficult to assess short-term inflation expectations going back in history because of the existence of commodity futures, but long-term inflation expectations are another matter.)

Second, how to quantify the components of the TRP? This is particularly difficult, since each component has its own challenges. For example, one component is what economists call the convenience yield. In recent decades, Treasuries have gained characteristics they did not have before. The motivation for their purchase has become broader than simply making a good risk-adjusted return relative to other US assets. Foreign actors — both sovereign and private — buy them for prudential and other reasons (for example, attractive yield relative to other government bonds, low dollar). US financial institutions hold them because of their regulatory advantages. The Fed uses them as a major ingredient of its quantitative easing and quantitative tightening programs. Private actors use them as a key component of balanced portfolio construction, taking advantage of the generally negative Treasury-equity correlation since 2000. This broader range of motivations has skewed the meaning of the price signal of Treasury bonds, and this effect needs to be accounted for, so that the modern era can be compared with the periods in the past when these motivations did not exist.

We find that both questions can be answered satisfactorily, albeit without absolute precision. We show that between 1871 and World War I, the RTRR is lower than the long-term nominal Treasury rate because the United States was an emerging market until the mid-1880s, and the US dollar was not the reserve currency until shortly after World War I. Then the RTRR is relatively similar to the long-term nominal Treasury rate until 1960 because long-term inflation expectations were zero or very low until that time, the Fisher Effect had not yet taken hold, and the TRP was generally modest until then. (Irving Fisher was the early 20th century American economist who first posited that nominal rates were the sum of real rates and inflation expectations, and that increases in inflation expectations should pass through to the nominal rate.) From 1960 onward, the nominal long-term Treasury rate and the RTRR diverge again because these three conditions change. The first two start changing in the mid-to-late 1950s ad complete their transformation by the late 1960s. In contrast, the third changes more progressively as the TRP adds components over time.

Finally, we assess the effect of investor personal taxes on both the long-term nominal Treasury rate and the RTRR, so that all calculations are done on a post-personal tax basis. This is particularly important in the 1970s and early 1980s because both inflation and personal taxes were high at that time. For instance, consider a nominal Treasury bond investment that yields 13% in a 10% inflation environment; its real pre-tax yield is 3%. If the investor bears a 50% tax rate, its tax will be 6.5%, so the real after-tax return is minus 3.5%. This shows how the combination of high inflation and high personal tax rates transmogrifies attractive pre-tax real returns into highly negative post-tax real returns.

[37] We also assess the time at which the Fisher Effect takes hold, because before that time long-term inflation expectations did not pass through to the nominal rate. (Irving Fisher was the early 20th century American economist who first posited that nominal rates were the sum of real rates and inflation expectations, and that increases in inflation expectations should pass through to the nominal rate.)

3.4. A CAPM structure that works in practice

We find that the True North ERP calculated on the basis of the RTRR rather than the Treasury rate is much more stable. It is also more stable than the EY. Accordingly, unlike the traditionally calculated ERP, it adds value.

Further, the variations in the True North ERP can be explained. We build a four-factor model to do so. The first factor is cyclical/sub-cyclical; the latter three are secular. They quantify often-referenced[38] valuation drivers:

- **Business cycle and sub-cyclical variations in economic and financial risk.** We build a quantitative risk-aversion indicator to capture the effect. Extreme spikes in this indicator correspond to market crashes.
- **Inflation outside of the Goldilocks zone.**[39] Extremes of inflation and deflation are known to be associated with poor equity performance. We quantify the effect and hone the understanding of the boundaries of the Goldilocks zone. We also find that the boundaries were different in the gold-standard era from where they are today.
- **Intergenerational increases in risk aversion driven by long secular bear markets.** For instance, the Great Depression is known to have turned the next generation away from equities as they saw their parents suffering in the 1930s. We model the effect with a reflexive factor, a la George Soros.
- **Somewhat imperfect risk arbitrage between equities and Treasury bonds.** For instance, we show that the ERP is likely slightly higher when the RTRR is low, as in recent years, and that the risk arbitrage, while efficient, may not be 100% efficient.

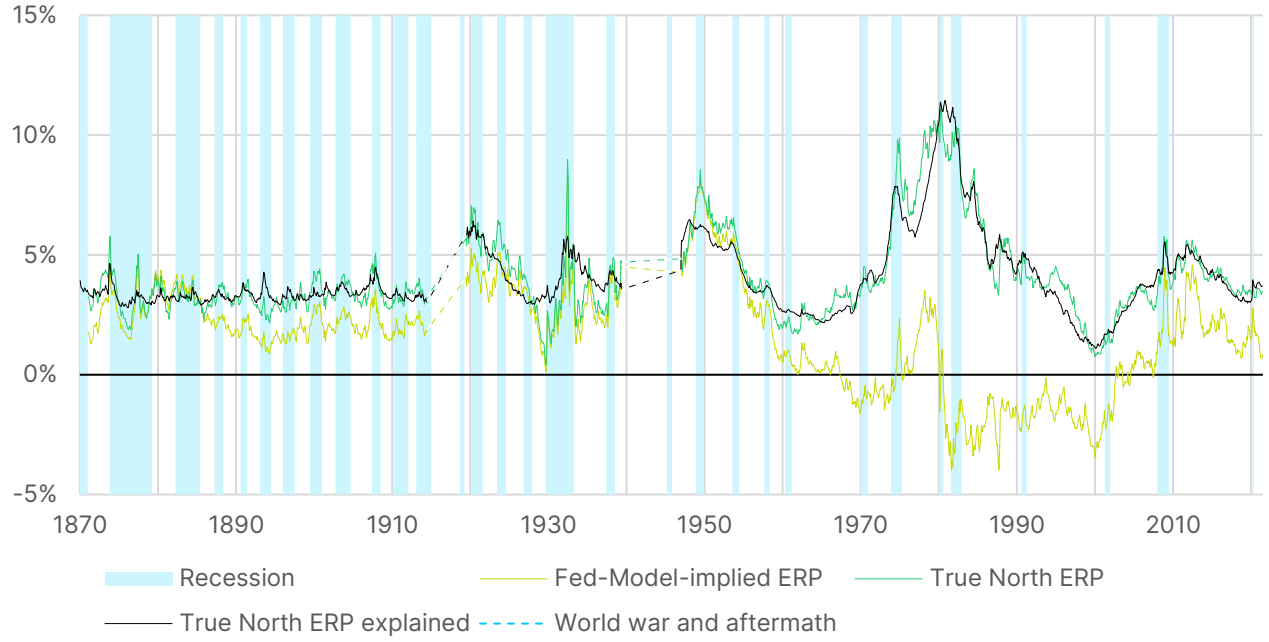
To summarize, the CAPM, recast with the RTRR and the four-factor ERP model, is a powerful explainer of the True North ERP (see Exhibit 12) and, in turn, of equity valuations (see Exhibit 13).

[38] Albeit factors four and five are less commonly discussed.

[39] We show that investors are sensitive both to past realized inflation and to long-term inflation expectations. The balance between the two factors evolves over time, with inflation expectations becoming more prominent.

Exhibit 12: ERPs and the Oliver Wyman model of True North ERP

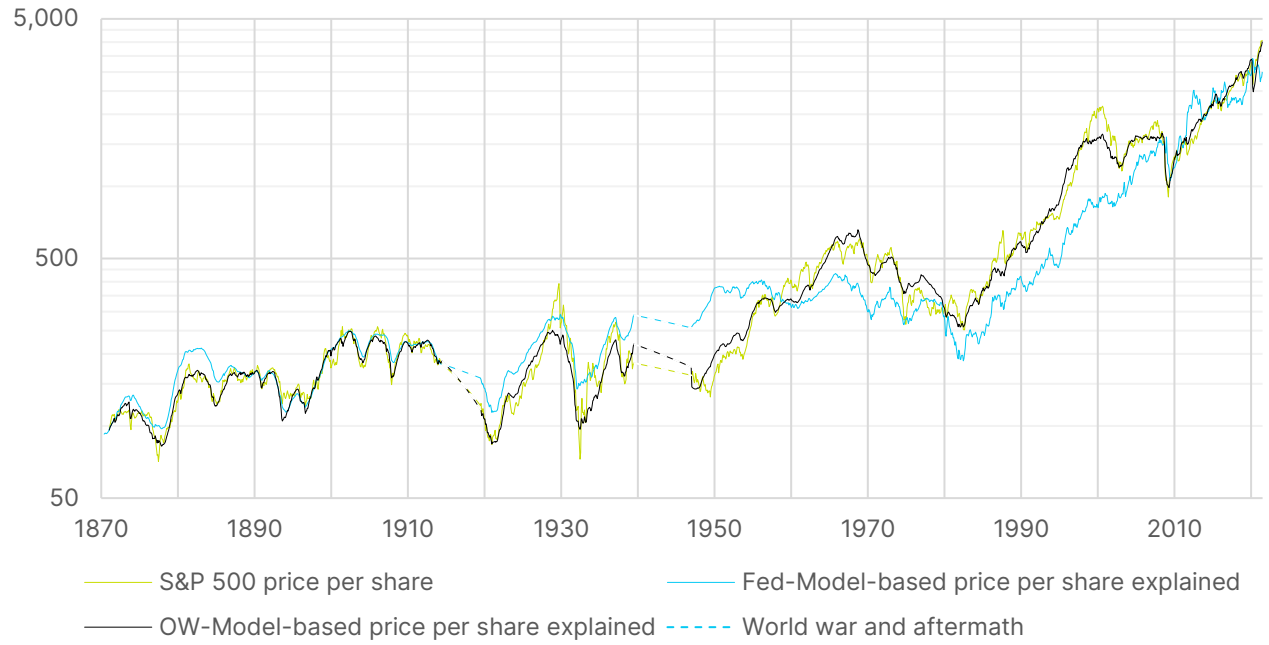
January 1871–June 2021



Source: NBER, Oliver Wyman

Exhibit 13: S&P 500 real price per share explained based on Fed Model and Oliver Wyman Model

2020 $, January 1871–June 2021



Source: S&P, Cowles Commission, Oliver Wyman

We draw three lessons from Exhibit 13. First, the rules that govern equity prices have been sufficiently stable over a century and a half, so that a single model explains them well.

Second, the model also explains equity prices in recent years, both before and after COVID-19. Elevated prices are the result of a confluence of three historically rare favorable conditions. The RTRR has been at an all-time low. What is more, inflation has been in the Goldilocks zone. And the Buffett earnings are unusually high: Corporate pre-tax margins are near an 80-year peak and the combined corporate and personal taxes have been near an 80-year low.[40]

Third, the model satisfactorily captures market crashes, such as 1929–1933 and 2008–2009. This is because the first factor of our four-factor model quantifies risk aversion. As mentioned, market crashes simply correspond to spikes in the quantitative risk aversion indicator. By contrast, the model misses speculative peaks, such as the late 1920s and the late 1990s. This is because it currently lacks a quantitative speculation indicator, which will become the fifth factor of the ERP model in due course.

The third white paper documents the work that led to these findings.

[40] Typically, when practitioners discuss prices, the focus is more on the P/E than on the earnings. We show that price per share is high not only because of elevated P/Es, but also because of elevated margins both before and after combined corporate and personal taxes.

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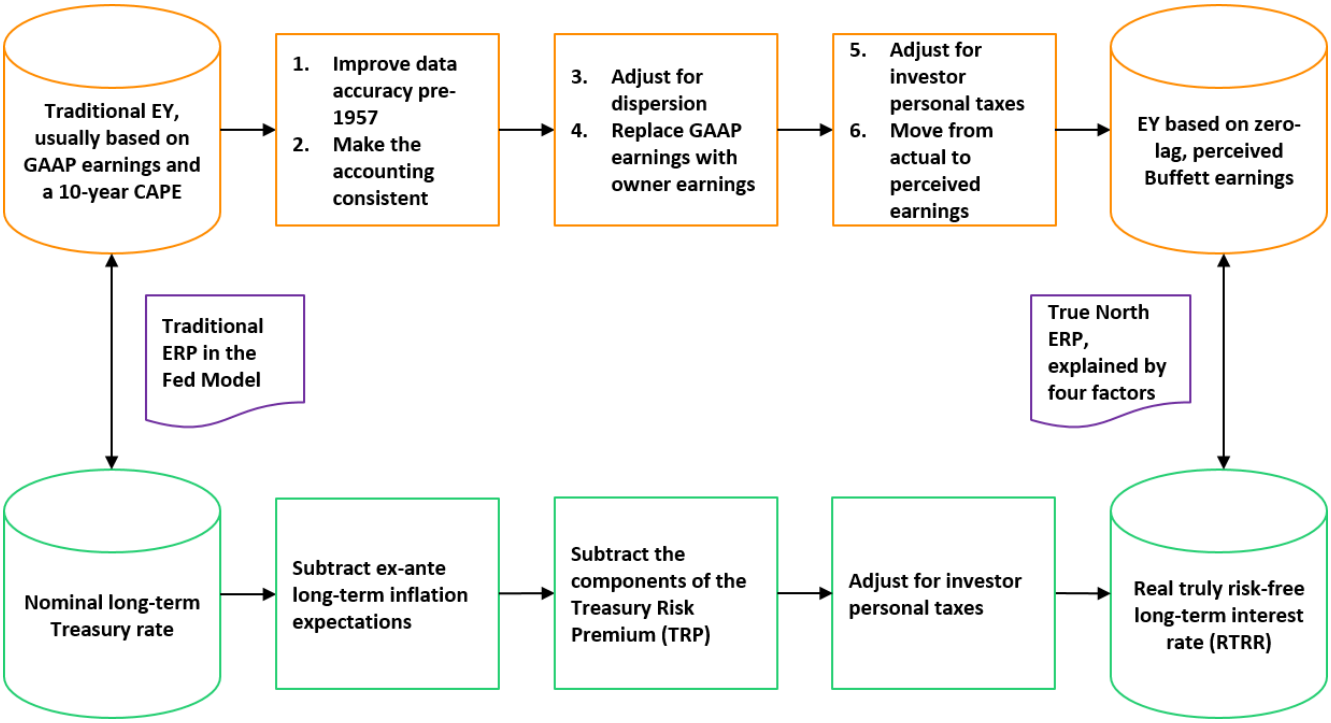
Section 4. Valuing the equity market with 19th century economic tools

This section provides a high-level summary of the fourth white paper.

4.1. Why a different approach

The findings above show that it is indeed possible to explain the behavior of equity prices over the last one and a half centuries with a CAPM logic. Achieving this has been a complex undertaking, both with respect to ensuring the consistency over time of the Buffett earnings and with respect to re-engineering the CAPM. The latter requires meticulously calculating the elusive RTRR and unearthing the subtle relationship between inflation and equity prices, as well as addressing a raft of other issues. Exhibit 14 summarizes the process described in Sections 2 and 3 of this paper.

Exhibit 14: The complex process of recasting the earnings track record and re-engineering the CAPM



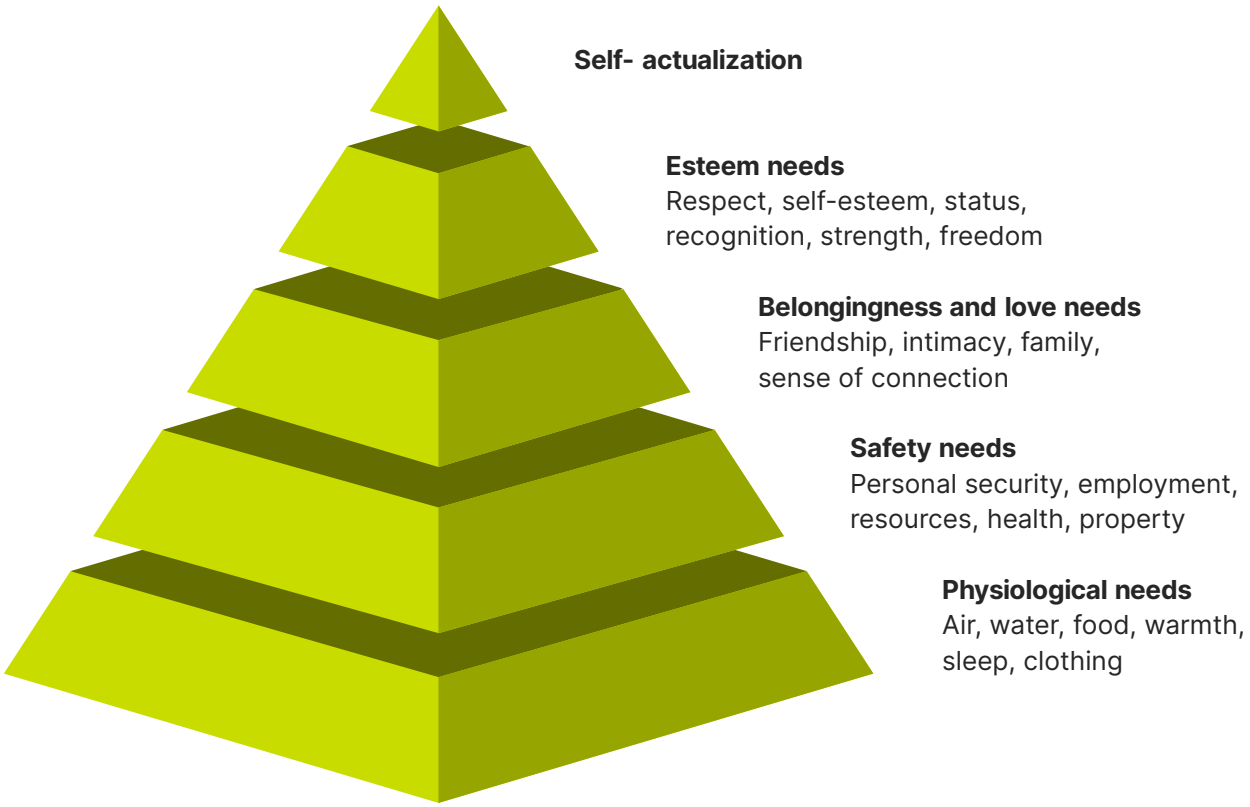
The complexity of the undertaking raises the question of whether there is another, simpler way. The answer is yes, provided one is willing to consider alternative approaches to modern valuation concepts and dial back to the 19th century, when tools such as discounted cash flows, risk premia, betas, and so on, had not yet been developed.

So how would we explain asset prices by using only the tools of classical economics? Rather than decomposing price into earnings and P/E, we would solve for price directly using the laws of supply and demand.

4.2. The dynamics of supply and demand

Starting with demand, we focus on the fundamental human needs that financial assets fulfil. Abraham Maslow's Hierarchy of Needs (Exhibit 15) is useful in this regard. Seen from this perspective, financial assets help enable the higher levels of the hierarchy.

Exhibit 15: Maslow's Hierarchy of Needs



Source: Maslow

As economies develop, and GDP per capita grows, the percentage of GDP taken up by the lower levels of the pyramid naturally diminishes. For instance, food consumption is a much lower percentage of consumer expenditures now than in 1871. So growth in GDP per capita tends to create headroom for financial assets. Because of this, one would naturally expect demand for financial assets (and equities) to grow at least at the rate of GDP, and we find that this is generally the case.

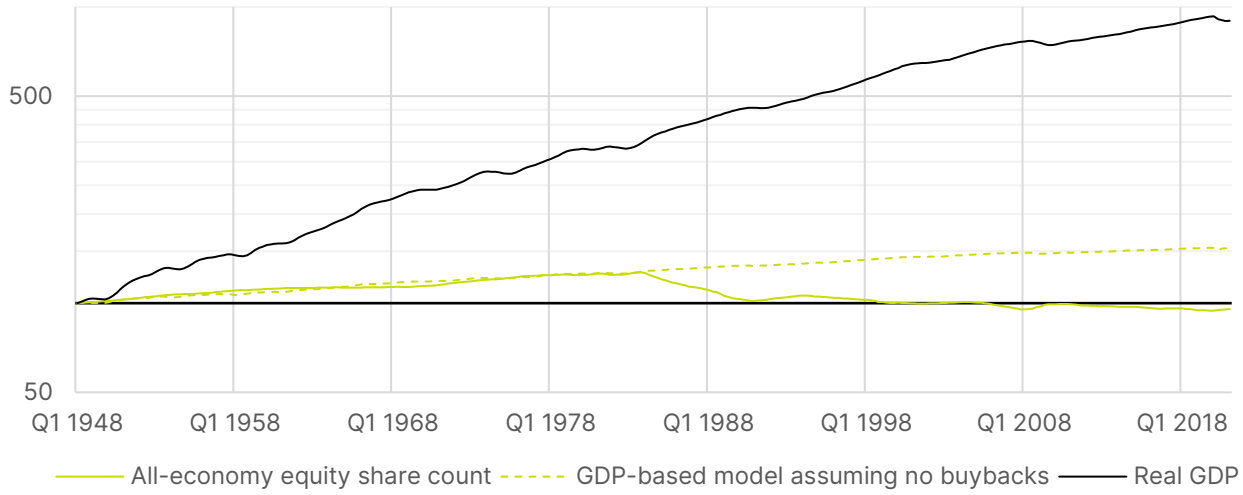
This effect has been reinforced by a societal shift away from the extended family as a source of safety and security for one's old age, at the same time as that need has increased as a result of rising life expectancy (particularly for natural owners of financial assets). As a result, pensions have become an increasingly important source of demand for financial assets. The effect is particularly marked for equities, as the pension industry has become more comfortable with higher levels of equity allocation in pension plans as time has passed.

Finally, and most important, financial assets are held disproportionately by the highest-income members of the population. Accordingly, for a given average GDP per capita, a more unequal distribution of incomes will naturally generate a higher aggregate level of demand for financial assets (including equities) than a less unequal one will. To take an extreme example, we find that the demand for financial assets from a single household with an annual income of $1 million per year is more than 10 times the demand from 20 households each with an annual income of $50,000 per year.

In summary, we show that, in recent decades, the trifecta of GDP-plus growth, increased pension demand (particularly for equities), and increased inequality[41] have provided tailwinds for equities. At the same time, the supply of shares has not kept pace. Net share issuance has not matched GDP growth before buybacks and has in fact been slightly negative since the SEC began allowing buybacks in 1982, as shown in Exhibit 16.

Exhibit 16: All-economy equity share count[42] vs. GDP-based model assuming no buybacks[43] and real GDP[44]

Index Q1 1948 = 100, Q1 1948–Q1 2021



Source: Federal Reserve Board, Oliver Wyman

Classical economics provides a straightforward answer with respect to a good whose ex-ante demand rises at a higher rate than its supply: The real price of the good must rise.

[41] Increased inequality is the strongest of the three drivers and GDP-plus growth is the weakest.

[42] For domestic corporate equities, based on Federal Reserve Board Financial Accounts of the United States.

[43] Between Q1 1948 and Q4 1983 — that is, before the advent of buybacks — the all-economy equity share count grew at one-fifth the growth rate of the real GDP. Hence, the GDP-based model of the share count, assuming no buybacks, grows at one-fifth the growth rate of the real GDP.

[44] We have used a logarithmic scale to accommodate the range of the real GDP while maintaining visibility of the share count.

4.3. A simple supply/demand model

Based on these principles, we build a simple Supply/Demand Balance Model to explain annual equity prices since 1913.[45] The model has only a few drivers:

Average income per capita by tranche of income. This factor captures both the impact of productivity growth and of inequality.

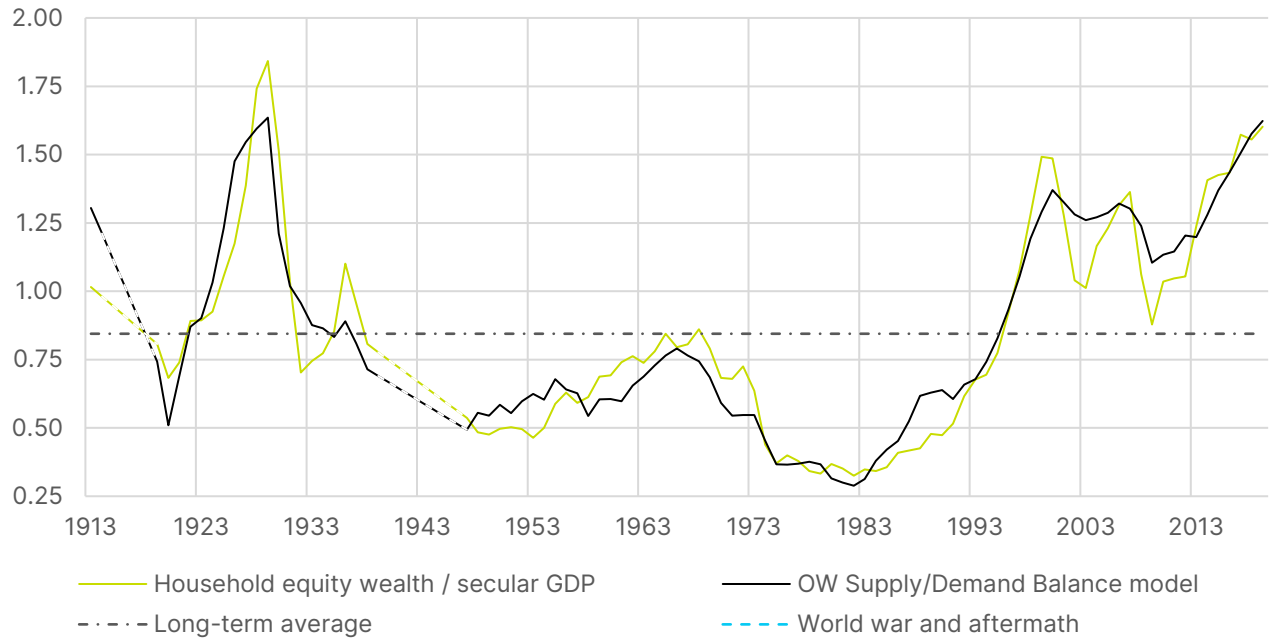
Inflation and unemployment. This part of the model is inspired by the "misery index" — the sum of inflation and unemployment.[46]

Natural equity/bond allocation. This is driven by secular shifts in the behavior of both direct investors and pension managers.

Perhaps more interesting than what the model contains is what it does not. It has neither earnings/margins, nor dividends, nor interest rates, nor tax rates. Yet, as Exhibit 17 shows, it explains more than a century's worth of equity prices very well.

Exhibit 17: Household equity wealth as a multiple of secular GDP and its Oliver Wyman Supply/Demand Balance Model[47]

1913–2019

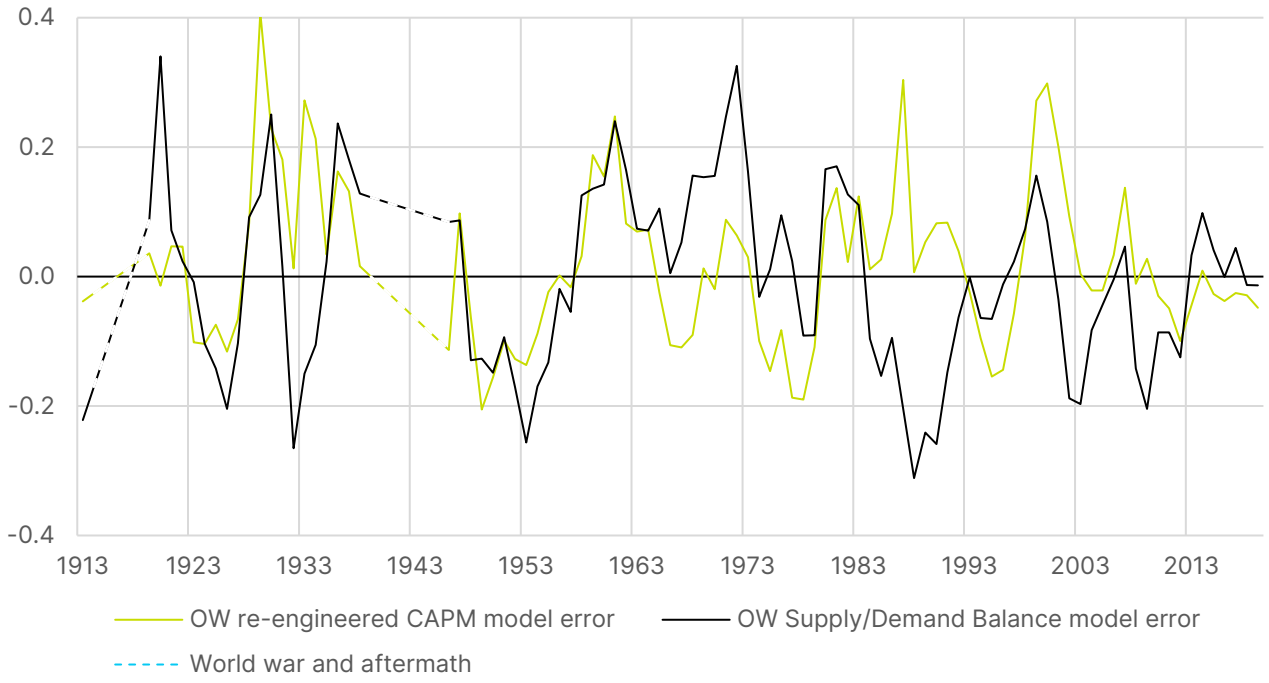


Source: Distributional National Accounts [Piketty, Saez, and Zucman (2018)], Oliver Wyman

[45] The data necessary to build the model are not available before that.
[46] A high value of the misery index has long been known to be associated with low equity prices.
[47] This model is semi-secular.

In fact, we find this simple model works similarly well to our complex CAPM-based model at the annual level. Exhibit 18, which compares the errors of the two models, shows this result.

Exhibit 18: Errors[48] of the Oliver Wyman re-engineered CAPM and Supply/Demand Balance Models
1871/1913–2020



Source: Oliver Wyman

In a nutshell, modern valuation tools are largely superfluous to explain the aggregate[49] secular behavior of equity prices over the last century. We believe it is worth reflecting on this iconoclastic result.

The fourth white paper documents the work that led to these findings. It is based on a more advanced form of the Supply/Demand Balance Model presented here.

[48] Calculated as actual price minus explained price, then divided by actual price.
[49] In contrast, they are essential to assess the value of individual projects and companies.

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Section 5. Building the HMM and using it to better frame future uncertainty

This section provides a high-level summary of the fifth white paper.

5.1. Bringing the strands of work together

We integrate the work from the re-engineered CAPM and the simple Supply/Demand Balance Model to introduce a new model that extends the CAPM's reach. We call it the Holistic Market Model. The HMM solves for three questions in an integrated fashion:

Taking financial assets as a whole, what are the supply/demand balance forces that drive the pricing of equities, and also of bonds and cash?[50]

Which secular and cyclical forces drive the portfolio allocation and market share variations between the competing asset classes of equities, bonds, and cash?

And which secular and cyclical forces drive the price differential between equities and Treasury bonds (also known as the traditionally defined ERP) as well as the price differential between them and the RTRR (the True North ERP and the TRP plus inflation expectations, respectively)?

5.2. The three aspects of the HMM

The forces driving the financial assets multiple: In classical terms, the core supra-secular force has been the roughly 400 basis point decline in RTRR over the last century and a half. In supply/demand balance terms, there have been three corresponding effects: productivity growth (which drives demand for financial assets at a slightly faster rate than GDP growth); the rise of pension demand; and tight supply.[51]

Other forces have exhibited long-term oscillations. These oscillations can be viewed through the classical lens of inflation[52] and corporate profit margin cycles, or alternatively, through variations in inequality.[53]

The market share of the competing asset classes: We analyze the determinants of the market share between equities, bonds, and cash. The findings are twofold. At the business cycle and sub-cyclical levels, the market share is primarily driven by relatively short-term variations in economic and financial risk. At the secular level, the market share is driven by the combination of the secular rise in pensions and the change in portfolio equity allocation (close to 100% bonds initially and 50/50 stocks/bonds now) as the pension management industry has become more comfortable with equities over time.

[50] When modelling supply/demand balance dynamics, the model amalgamates Treasury bonds and bills, corporate bonds, and cash into a single bonds/cash asset class. This is simply because disaggregated data do not exist before the modern era.
[51] This tight supply is driven by the equity side. Indeed, the equity supply has been negative in the buyback era; in contrast, the cash/bond supply to the household sector has been growing at the rate of GDP over the last 25 years.
[52] Inflation was well outside the Goldilocks zone in the 1970s, and its subsequent taming has also been a tailwind, particularly in the 1980s and 1990s.
[53] Reductions in inequality from the 1930s through the 1970s were a headwind for financial assets; since then, increases in inequality have been a tailwind.

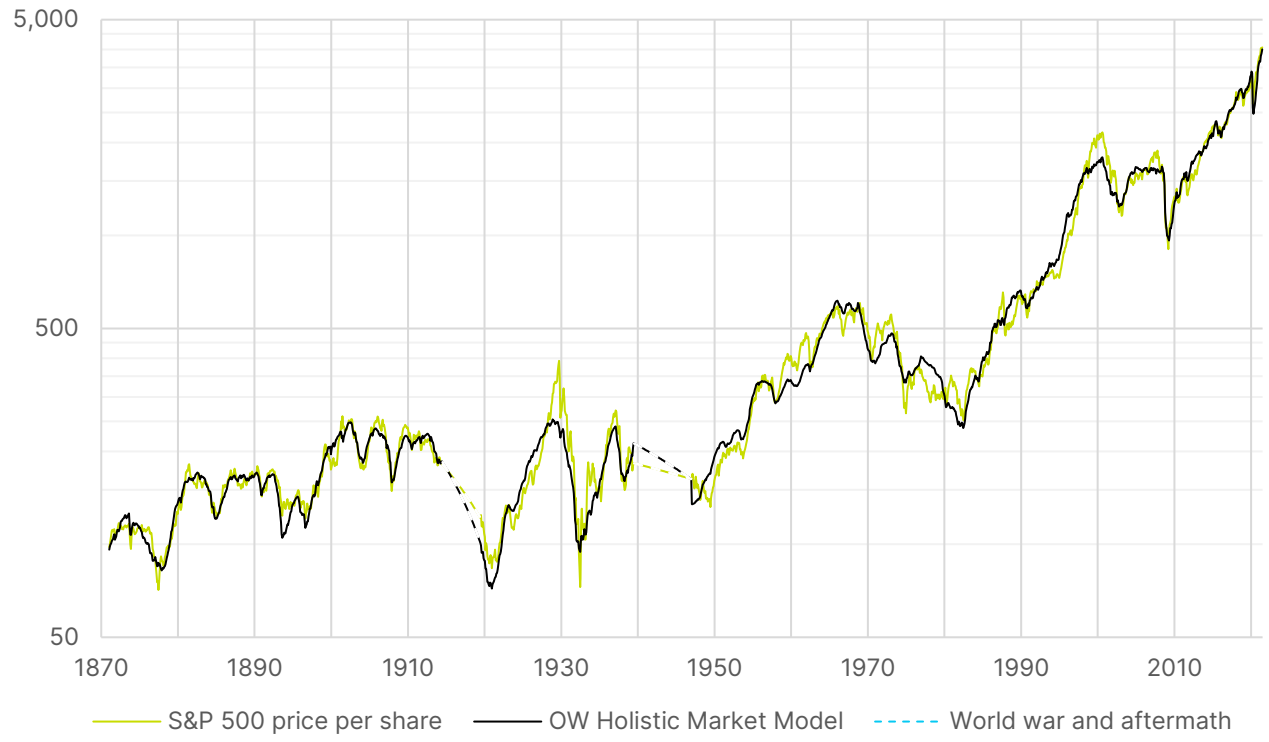
The price differential between the asset classes: We have already described how the CAPM can be improved by quantifying the elusive RTRR. The third component of the HMM is our re-engineered CAPM. As discussed earlier, it solves the pricing questions by, first, assessing long-term inflation expectations[54] and revealing and analyzing the components of the TRP; second, by revealing the elusive RTRR; and third, by quantifying the drivers of the True North ERP with a four-factor model.

5.3. Results over the past century and half

We can now go back full circle to Exhibit 19 shown at the beginning of this paper (reproduced below). It is created by leveraging the HMM's full capabilities.[55]

Exhibit 19: Oliver Wyman HMM-based model of S&P 500 real price per share

2020 $, January 1871–June 2021[56]



Source: S&P, Cowles Commission, Oliver Wyman

As Exhibit 19 shows, the HMM explains the stock market ups and downs over the last 150 years more accurately than anything before it.

[54] And the time at which the Fisher Effect takes hold.

[55] Albeit using a basic form of the Supply/Demand Balance Model.

[56] As mentioned earlier, 1871-1912, 2020, and the first half of 2021 use only the OW re-engineered CAPM model because the data underpinning the OW Supply/Demand Balance Model stop in 2019.

5.4. Using the HMM to frame the future

Relying on mean reversion as an investment strategy can be dangerous. The main issue is that the more an investor is incorrect in his or her assessment of what drives the market, the stronger the mean reversion signal will be — leading the investor to take the opposite position to what should be taken. In contrast, we note that trend-following strategies do not share the same defect.

We empirically test a simple long/short strategy based on mean reversion of the CAPE. Going back to 1900, for every month we compare the actual CAPE of that month to the average of the CAPE until then. The approach has no forward-looking bias because we consider only the knowledge available at the time. If the CAPE of the month is below the average CAPE up to that time, we go long the index; otherwise we go short. We test the strategy over the following 120 years and find that it delivers poor financial performance. In fact, its real return is slightly negative versus 6.6% for the simple buy-and-hold strategy.[57]

We show that the HMM can be used to move the debate away from fretting about whether and when mean reversion will occur, and toward the sustainability (or lack thereof) of the drivers of the current prices. Cyclically, COVID-19 caused a deep but short recession that has been cushioned by the Fed. So the question of the long-term health of the market can focus on the sustainability of its secular drivers.

We consider that productivity growth and pension tailwinds are relatively secure[58] for the foreseeable future, so the long-term future of financial asset prices hinges on three questions:

Will the near-40-year decline in the RTRR be reversed? This question is framed in the context of the CAPM but can be re-framed in a supply/demand balance context by asking whether the tight supply/demand balance in recent years for financial assets will loosen up. Such a loosening would mechanically drive the RTRR up, and the prices of all financial assets down.

Will inflation remain in the Goldilocks zone, or will it escape at one end or the other?[59]

And will secular changes in the regulatory regime put pressure on pre-tax margins[60] and/or will changes in the tax regime put pressure on the combined corporate and personal tax rate? In supply/demand balance terms, this could be re-framed as asking whether and when the inequality cycle that started in the late 1970s and early 1980s will turn.[61]

[57] Both are calculated before investor personal taxes.
[58] But not particularly strong.
[59] We consider the risk of secular demand-crushing deflation to be low because modern central banks have the tools to avoid it. On the inflationary side, there are two clear risks: large-scale imported commodities inflation and the Fed losing control of domestic inflation. History suggests that the latter would likely reduce inequality.
[60] A reversal of the commodities supercycle would also put pressure, but to a lesser extent because the S&P 500 is much less commodity sensitive than it was in the 1970s.
[61] High post-all-tax margins are linked to income inequality because their benefits naturally flow to the top of the income pyramid.

In short, the HMM provides an alternative to thinking the future will mean-revert to the past, particularly given that we find that simple valuation-based mean reversion signals can easily fail. We note that the answers to the three questions above are inextricably linked to the way the United States will choose to organize itself in the future.[62] The ballot box will largely determine the outcome.

The fifth white paper documents the work that led to these findings.

[62] And to a lesser extent, the evolution of the commodity supercycle.

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Section 6. Summary of overall findings

The core of this work has been to explain why equity prices have behaved the way they have over the past one-and-a-half centuries. But its purpose is broader, and the nine key findings go well beyond the explanation of the past one and half century:

1. We show that, once earnings are recast on a consistent and appropriate basis, pre-COVID-19 CAPE-based valuations were elevated rather than extreme. We also show that mid-2021 valuations, whilst historically extreme, were broadly commensurate with the unprecedentedly low interest rates and below-average risk aversion of the period.

2. In contrast, we show that corporate profit margins after accounting for combined corporate and personal taxes are near a 100-year high. They are at least as important a driver of the high prices in recent years as the elevated valuations. The question of their sustainability in the long term is rarely if ever posed in the literature, yet is a highly important one.

3. We introduce a new valuation metric based on perceived earnings. This metric has less volatility than the CAPE and no lag. This is an important achievement because it is rare to be able to separate static from signal without introducing a lag into the process. Using the metric, we show that earnings are a stronger guardrail to valuations than is generally realized. Thus, the market is more efficient than it is sometimes given credit for.

4. We re-engineer the CAPM to make it work empirically as well as theoretically. In doing so, we develop a method to assess inflation expectations and the Treasury risk premium (TRP), as well as to infer the elusive, non-directly observable, real truly risk-free rate (RTRR). We substitute the RTRR for the nominal default-free rate, which allows us to calculate the True North equity risk premium (ERP).

5. We build a single four-factor model to explain the True North ERP. The high quality of the model fit has profound implications: Despite massive changes in the size and structure of the US economy throughout the period, the rules governing collective investor behavior have been remarkably stable.

6. We also show that Occam's razor, or the principle that the simpler explanation is usually the better one, applies here: We build a simple Supply/Demand Balance Model that only uses 19th century classical economics. The model solves for price directly, rather than splitting it between earnings and P/E, and works well. In other words, the apparatus of modern finance is unnecessary to explain the medium- and low-frequency behavior of equity prices at the aggregated index level.

7. We introduce the Holistic Market Model to broaden the scope of the CAPM. The HMM encompasses not only equities but also bonds and cash. It simultaneously answers three critical questions. Whilst the single CAPM question of the price differential between assets of different risk profiles is important, so is the question centered around the demand for all financial assets and the one of the drivers of the market share of equities and bonds.

8. The HMM shows that equity prices have been elevated in recent years because of a set of highly favorable structural conditions, rather than because of speculation. It also provides insights as to why bond yields have been low. The work set the scene for a review of the future sustainability of the currently favorable drivers of high equity prices.

9. We show why mean reversion is perhaps the most dangerous force in finance, from both a conceptual and an empirical point of view. Instead of relying on mean reversion to frame the future, we rely on the HMM for guidance. We show that, while some of the secular factors that underpin elevated asset prices in recent years are relatively secure for the foreseeable future, the fate of the others is uncertain and highly dependent on the outcome of the future democratic process and, to a lesser extent, the evolution of the commodity supercycle.[63]

Each of the nine findings is significant on its own. Taken together, they bring our understanding of US markets to the next level.

The next four white papers provide the evidence for the findings described here.

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[63] The two are not independent because a strong rise in commodity prices is likely to reverberate by increasing the demand for change in the democratic process.