Reconsidering Returns*

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Abstract

While returns are central throughout academic finance, we show that data on returns for most assets is difficult to obtain and investors display confusion about what performance measure they are shown. Major market indices are price indices without dividend reinvestment, as they pre-date the academic consensus in favor of returns from the mid 20th century. This leads to predictable drops when their constituent stocks go ex-dividend, which markets fail to price. On index ex-days newspaper articles about financial markets are more negative, and betas on Fama-French portfolios track market price changes more than market dividends leading to predictable future market returns. Investors discontinuously reward mutual funds with inflows if they "beat the S&P 500," by comparing the price-only index with the fund's change in net asset value (another non-return measure).

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Of all the concepts in asset pricing, perhaps the most important and least controversial is the definition of an investor's measure of performance, namely a return:

$$return_{[t-1,t]} = \frac{p_t - p_{t-1} + d_t}{p_{t-1}}$$

At the risk of belaboring the obvious, an investor's profits come from two sources - the capital gain, or change in price of the asset, and the cash flows, such as dividends or coupons, which the investor receives. Outside of complicating factors such as liquidity or tax considerations, these two sources of profit are considered so obviously equivalent that their combination into a single returns variable is typically done by finance academics almost without thought. Implicit in every asset pricing model is the assumption that agents understand and observe performance as returns, a necessary condition to subsequent steps, such as calculating covariances, to value an asset.

In this paper we examine how performance is measured, and find that the actual display of information differs considerably from the economic metrics that best capture the total profits to an investor. As we show in a related paper (Hartzmark and Solomon 2016), many investors do not appear to actually aggregate price changes and dividends into a single number for trading purposes. Rather they consider each variable as a separate and largely independent measure of stock performance, an effect we find is mirrored in the display of performance. While Hartzmark and Solomon (2016) explore the behavioral reasons why investors may act in this way, we consider another aspect of the problem - how are investors' actions affected by the way information about performance is displayed? The confusion created by the discrepancies between how an investor should track performance and what is actually displayed is of considerable practical importance, affecting outcomes as varied as the market betas of major portfolios, flows to mutual funds, how journalists report market performance and the predictability of short term market price movements.

We begin with a simple observation. Data on returns are not easy to obtain, and are rarely displayed by default. A skeptical reader is invited to check for himself how easy it is to find returns (as CRSP defines them) for the various stocks in his portfolio using only publicly available data sources. In both typical brokerage statements, newspapers and finance websites, the standard

information shown is price changes, either in dollar terms or percentage terms. On portfolio display screens, dividends are often not shown at all, are rarely assigned to a particular stock from which they came, and are almost never aggregated to a single returns number that assumes reinvestment on the ex-dividend day. We have verified this across a range of data outlets and brokerages. This motivates the tests that follow. It seems quite possible that most investors do not think or trade in terms of returns if they *never see returns.*[1]

We review the historical academic literature in finance and economics from the early 20th century to document that the consensus that returns should be the fundamental unit of analysis that investors care about is actually quite modern.[2] Academic articles from this period generally considered the object under inquiry to be stock *prices* or dividends. Even when something approximating returns was calculated, authors made a variety of non-standard assumptions, and did not have an agreed upon term for what they were calculating. Indeed, we show that the first article in a major finance or economics journal to contain the words "stock" and "return" in its title was in 1958 (with the most famous codification being in Miller and Modigliani 1961), whereas by this time there had been 31 articles with a title including "stock" and "price." In other words, the early academic literature mirrors the mindset described in Hartzmark and Solomon (2016) where prices and dividends are considered separately.

This confusion is evident in the design of market indices, many of which date from this era. In particular, both of the most widely reported measures of US stock market performance – the Dow Jones Industrial Average (DJIA) and the Standard and Poor's S&P 500 Index – as well as most commonly reported indices of international markets, compute only price changes for their underlying securities, and do not adjust for dividend payments. The failure of these indices to reinvest dividends leads to predictable decreases on ex-dividend days. When index constituent stocks have greater ex-dividend amounts, both the Dow Jones and the S&P 500 underperform the

[1] It is hard to know whether investor attention to returns drives the lack of data or the reverse - both would be consistent with the effects we observe. At a minimum, it would not be particularly difficult or costly for a brokerage to display data on returns by default, suggesting that there is not a large amount of demand for this information.

[2] In the early 20th century, the term "return" was a general concept akin to "performance," and had a variety of different meanings, almost none of which corresponded to the modern definition. The most frequent use referred to receiving dividend or interest income.

CRSP Value-Weighted Return index (which reinvests dividends). This decrease does not contain any information (as the dividend amount is announced a number of days prior to the ex-day), so it simply represents a pre-specified ad-hoc split of a day's return into two components, shifting the price change component by the inverse of the dividend yield.

While the lack of dividend reinvestment in major indices can be ascertained from examining their underlying documentation, we show that the effects of dividends do not seem to be properly taken into account by market participants. We examine the tone of New York Times articles written about the previous day's market performance (used in Garcia 2013), and examine how it varies with past price changes and dividends. These columns largely reflect market performance, and reporters may simply take "the market" to be these indices that fail to adjust for dividends. We find that, for a given level of returns, newspaper coverage is predictably more negative when the dividend yield is higher. This is consistent with price changes driving journalists' perceptions of stock performance, as would be expected if they take the reported values of the market indices at face value.

If investors generally use such indices as their measure of market performance, stocks will not have a single covariance with market returns. Rather, stocks will covary more with market-wide price change measures than with market-wide dividend yields, even though both parts contribute equally to returns. We show that empirically this is indeed the case. All of the Fama French 25 portfolios sorted on size and value have a positive beta on the S&P 500 (which uses only price changes). However, for 17 out of 25 Fama French Portfolios, we cannot rule out a beta of zero (or negative) on the S&P 500 dividend yield after including both the dividend yield and price change in a regression. Even when the beta on dividends is positive, it is considerably lower than the price change beta - on average the beta on the S&P 500 Index is triple that of the S&P 500 dividend yield. In 10,000 simulations of a placebo dividend yield, we do not find a difference of this magnitude, suggesting that the effect is not driven by the moments of the variables themselves, but rather by a neglect of the day's dividends. A lower beta on market dividends implies that these portfolios have time-varying betas on overall market returns, and that these betas shift with the uninformative split of the market return between dividends and price changes. This is consistent with a general

neglect of the dividend component of returns, but puzzling under most other theories.

If the beta on the dividend yield component is too low, this implies that when dividends are higher, there will be an underreaction of stock returns to the market information that should have been incorporated into the price. Higher dividend yields lead to a lower percent price change conditional on a level of returns, so this underreaction should lead to positive returns in the future as prices properly reflect fundamentals. We show that when the dividend yield the previous day was high (and thus a positive component of returns, namely the dividend yield, may have been ignored due to the low dividend beta) that the market return is systematically higher. A one standard deviation increased in the dividend yield the prior day is associated with higher returns today of 2.6 basis points value weighted, implying a market return roughly 60% higher than the unconditional average of 4 basis points.

Next, we consider how the performance metric impacts the perceived performance of mutual funds. In particular, many funds are benchmarked to the price based S&P 500. While some websites, such as Morningstar, compare the total returns of funds with an S&P 500 Total Returns Index (that is, the much less common version that reports a total return), most, like Yahoo! Finance, compare only price change versions of both. We find that mutual fund flows are discontinuously allocated to funds that "beat the S&P 500" (that is, the price change version), and that investors evaluate funds by their percentage change in Net Asset Value, rather than the fund's return. This is the fund equivalent of a price change, but it fails to correct not only for dividends, but other distributions like realized capital gains and returns of capital. Funds whose NAV change exceeds the S&P 500 receive additional fund flows of 0.56% per month over the subsequent year. This effect survives controlling for a large number of alternative measures of fund performance in both relative and absolute terms. Investors are thus reacting discontinuously to fund out performance based on the metrics that are popularly disclosed but relatively uninformative, consistent with information display affecting flows.

The paper contributes to the literature examining how deviations from rational behavior can impact asset prices. Our paper focuses on how the visual display of information increases the salience

of certain pieces of information and impacts entire markets. Related papers include Benartzi and Thaler (1999) and Shaton (2017) who show that the duration of returns displayed leads to different investment choices and impacts marketwide flows. Levi (2016) shows that priming people to view their net worth in terms of potential consumption rather than potential investment value reduces consumption and increases savings. Bazley et al. (2017) shows that color display of past performance impacts decisions. Hartzmark and Sussman (2017) show that the visual display of information shocks perceptions of sustainability and has a significant impact on mutual fund flows. Our paper shows that the performance information displayed often differs from the optimal benchmark of returns, and that this has a significant market-wide impact.

This paper also contributes to the literature on how investors psychologically frame dividends and price changes separately. Shefrin and Statman (1984) build a model whereby an investor often decides to frame these two quantities separately. Baker et al. (2007) show that investors seem to treat dividends separately and consume out of them. Hartzmark and Solomon (2016) argue that much of this literature can be explained by investors viewing price changes and dividends as disconnected attributes, leading them to wrongly view dividends as a source of free income and leading to time-varying demand for dividends (Baker and Wurgler 2004b; Baker and Wurgler 2004a). The psychology of how dividends are viewed is linked to the visual display of dividends, but the fact that investors struggle to ever see performance measures based on returns clearly exacerbates the issues associated with not properly linking prices and dividends together psychologically as the proper performance metric.

If an investor confuses price changes with returns, it is not obvious how quickly such a mistake would be corrected. Most stocks do not pay dividends on most days, and the price change component is considerably more volatile than the dividend component. Percentage price changes are thus a reasonable, if quite naive, approximation for actual returns, especially over short horizons. As a result, if someone were using a percentage price change instead of a return, there will not usually be glaring signs to indicate this fact (even though the differences cumulate to large effects over time). Our findings suggest the odd possibility whereby both academics and market participants

have talked about "returns" for a long time without realizing that they were often not considering the same variables.

1 Data

1.1 Return Definitions

To clarify the terms used in the paper, we reserve the term "return" for the holding period return that includes both price change and dividends, i.e.

$$Return_{[t-1,t]} = \frac{p_t - p_{t-1} + d_t}{p_{t-1}}$$

This can be decomposed into two terms - the (percentage) price change, or capital gain:

$$PriceChange_{[t-1,t]} = \frac{p_t - p_{t-1}}{p_{t-1}}$$

and the dividend yield:

$$DividendYield_{[t-1,t]} = \frac{d_t}{p_{t-1}}$$

Unless otherwise noted, we consider dividend timing based on when the stock goes ex-dividend. For price changes, we adjust for corporate events like stock splits, but do not reinvest dividends. This corresponds to the "returns excluding dividends" variable used by CRSP.

The term "performance" is meant to capture the subjective sense that an investor has about how their trades are doing. This may take a number of forms. It may include returns as defined above, price changes, dividends, or some combination of the above. It also captures variables like the percentage change in indices that do not reinvest dividends. Colloquially, many measures of performance are often referred to as the "return," notwithstanding that they do not correspond to the definition of holding period return above. When it is necessary to discuss such usages by others which may not conform to our definitions, we use the term "return" in quotation marks.

1.2 Data Sources

Information about prices, returns, dividends and market-wide indices are all from CRSP. Information about institutional holdings and mutual funds holding are taken from Thompson Reuters with the filters described in Hartzmark (2015). Information on the market return and the S&P 500 index is taken from Wharton Research Data Services (WRDS). For the dividend yield on the S&P 500 we use the value weighted dividend yield calculated as the difference between the value weighted index "returns" with and without dividends from WRDS. Information on stocks in the Dow Jones Industrial over time is also taken from WRDS. To calculate the dividend yield for the Dow Jones we take individual stock dividends calculated as ret minus retx from the CRSP database. The Dow Jones is price weighted, so we weight this by the price of stocks on the previous trading day.[3]

1.3 Summary Statistics

From 1926 through 2015, the average monthly price change on the value weighted market is 0.6% while the average monthly dividend yield is 0.3%, leading to an average monthly return of 0.9%. Figure 1 Panel A graphs the cumulative value of a $1 investment in the CRSP value weighted index with and without dividends (cumulated monthly). Including dividends, the $1 from 1926 is turned into roughly $5,000 today, while with price changes alone it has grown to roughly $150. One way of thinking about this magnitude is that the S&P 500 index was at about 12 in 1926 and is now at roughly 2,000, but would be closer to 65,000 if it included dividend reinvestment. The dividend yield itself represents a substantial portion of returns. Figure 1 Panel B graphs the cumulative return to an investment in price changes versus dividend yields. Through 1990s the two were roughly equal, though price changes became a larger component of returns subsequently.

[3] These are estimates of the dividend yield of the the indices as the S&P periodically changed its weighting scheme and our DOW estimate does not include the "multiplier" term used to deal with non-dividend changes.

2 Display of Performance

One reason to doubt that investors treat returns as the proper measure of performance is that they are rarely displayed. In this section we systematically search a number of common data sources and find that in most instances returns are not displayed by default.[4]

The results of this search are displayed in Table 1. We first examine brokerage statements from various brokerages. Specifically we viewed sample brokerage statements from Charles Schwab, Fidelity, Interactive Brokers, Merrill Lynch, TD Ameritrade and Vanguard. None of these brokerage statements displayed a total return. Column 2 shows that all of the brokerage statements displayed some version of a price change - either the price change itself, a percentage price change or a change in total value (price multiplied by number of shares held). The next column shows that each brokerage statement displayed some dividend information, though this was a short term measure, typically the dividend earned since the last statement, but in a few instances an annual dividend yield. Note, that this is not the information necessary to compute the total return, which would be the aggregate dividend received from a position, as well as the timing of each dividend for reinvestment purposes. The last column indicates that none of these portfolios had this information.

As an example, in Figure 2 we display relevant portions from Charles Schwab's sample brokerage statement on their website. Panel A shows the overall portfolio position section which is at the beginning of the brokerage statement, and Panel B shows the subsequent detail section on individual stocks. Several points are noteworthy. Firstly, there is no returns variable included in either section, nor is there enough information provided to allow one to calculate a return. In the overall position section, dividends are combined with interest, but are separate from a "change in value of investments" that is presumably a price change. Dividend information is only given for the past year. In the detail section, the "gain/loss" information is based only on price changes. There is very little detail on the historical dividends received, only an ambiguous estimate of *future* dividend income, included as a yield. An investor hoping for a simple measure of the overall returns received

[4]The description is true as of the time of writing, and we have documentation supporting these claims. Given the fluid nature of website design, it is hard to say how long these patterns have been true for, or will be in the future.

on their stock would only be able to receive a crude approximation of this number, and this would require him to do the manual calculations himself. While other brokerages differ in the exact detail of what is presented and how, the general pattern is similar, and the overall conclusion about the difficulty of finding or calculating a return holds for all of them.

Brokerage statements are long and detailed, so perhaps investors today are more likely to receive information from the online portal of their brokerage. We are in the process of obtaining access to more online brokerage portals, but we have seen a number. In all of the cases the default view includes only price or value change information. Those that had dividend information listed an aggregate number of dividends, not directly linked to a stock. In most cases dividends simply resulted in an increase in the cash or money market position without attribution.

We also examine a number of sources as to how the performance of individual securities is displayed. Perhaps the longest consistent time-series available to us is the daily display of information from newspapers. To examine how the display of performance has evolved over time we sampled the Wall Street Journal's reporting of performance of individual stocks on the New York Stock Exchange from 1890 through 2016. Prior to 1928, prices were reported, but there was no information about dividends. After 1928 dividend information began to be reported, but separately from price information. This information was simply the annualized version of the last dividend paid.[5] At the time of this writing, at no point did the Wall Street Journal ever report a textbook return measure for the performance of individual stocks.

Next we examine standard sources of information available online. To keep a consistent benchmark, we examine the landing page from a ticker search for GE. We chose GE as it is an established blue chip ticker that every site covers and it pays dividends. We searched nine common sources for financial information that are listed in Panel B. In Column 1 we show that none of the websites displayed a total return. All of the websites displayed some information about recent price based performance, and most separately displayed some recent dividend information.

We wish to emphasize that we are not claiming that it is impossible to ascertain a total return,

[5] E.g., if a firm last paid a quarterly dividend of \$1.00, a value of \$4.00 was reported, while if a firm last paid a semi-annual dividend of \$1.00 a value of \$2.00 was reported.

but rather the value is rarely displayed by default. Bloomberg is an interesting example of this as it likely has a portion of its user base that is more sophisticated than some of the other sources of data that we are exploring. When doing a ticker search, the base menu contains various options for research, the most relevant for this paper being the Graph Price function (GP) which yields a line graph of the recent price changes of GE. A more sophisticated investor may be aware of the total returns analysis function (TRA) which displays both the percentage price change and the total return with dividend reinvestment, but this is not one of the default options that appears after a ticker search. Even in Bloomberg, which caters to a more sophisticated group of investors, the default from a ticker search is the price change graph rather than total returns. Investors need to actively search out a return measure, and it is not the default option.

Among the various financial portals that we have examined, even those that do incorporate some sort of "return" measure often do so in ways that are different from the academic measures. Yahoo! Finance, for instance, on their base stock summary page reports a daily change and percentage change measure (without identifying exactly what percentage change this is). Bizarrely, this measure is not the same for all stocks. For NYSE stocks that have an ex-dividend day, the measure approximately reinvests dividends leading to a returns-like number (as described below), but for NASDAQ stocks dividends are not accounted for, and the "percentage change" number is just a price change without any dividend adjustment. This fact is not noted on the website, and took considerable investigation to uncover the pattern in the variation.

In addition, even for the NYSE stocks on Yahoo! Finance, the "returns" measure is subtly different from CRSP numbers, as the price adjustment is done by subtracting the dividend from all previous day's prices, rather than adding it to the current day, leading to the denominator being different. So while CRSP calculates a return as:

$$CRSPReturn_{[t-1,t]} = \frac{(p_t+d_t)-p_{t-1}}{p_{t-1}}$$

Yahoo! calculates theirs as:

$$YahooReturn_{[t-1,t]} = \frac{p_t-(p_{t-1}-d_t)}{p_{t-1}-d_t} = \frac{(p_t+d_t)-p_{t-1}}{p_{t-1}-d_t}$$

Other platforms make different reinvestment assumptions. Interactive Brokers, for instance, calculates total returns by assuming that dividends are reinvested on the payment date, rather than the ex-dividend date. In all cases, finding out these facts took considerable effort, including detailed examination of stocks around their ex-dividend days. The details of the calculations are rarely explained on the websites. It seems likely that very few investors will be exposed to information about the returns of stocks in their portfolios, at least in the way that academics tend to calculate these numbers.

2.1 A brief history of returns

To many an academic reader that has been taught that returns should be the fundamental unit of performance of interest to an investor, using or displaying some other crude approximation or disaggregated measure may seem to be an exceedingly naive mistake. To understand its source, we briefly discuss the history of thought on the general concept of performance.[6] We do so in part to demonstrate that until fairly recently, academic finance was similarly confused with how an investor should view performance. This demonstrates that it is plausible that many investors do not realize that they should be focusing returns and also helps to understand the historical legacy of various financial metrics that were standardized prior to this understanding and persist to this day in a similar format.

The modern concept of returns is a surprisingly recent one. In the early 20th century, the quantity under investigation was either "stock prices" or "dividends," but not "stock returns." The terminology and focus very much resembles the argument in Hartzmark and Solomon (2016) that dividends and prices were largely considered as separate objects of inquiry, and alternative ways to profit from a position. Rarely were the two combined into a single overall profit measure. For example, Hardy (1923) classifies different ways of securing a return on one's capital, and lists as distinct categories

[6]This section summarizes a general literature review we conducted of early papers on investment performance in the *Quarterly Journal of Economics, Journal of Political Economy, American Economic Review, Journal of Business* and *Journal of Finance* between 1892 and 1960. The papers cited are not meant to be exhaustive, but rather representative of the views we encountered.

-"Purchase of securities with a view to obtaining income from interest or dividends"

-"Purchase or sale of securities ... with a view to profit from price changes."

-"Gambling transactions"

These are notably discussed as *alternative* ways to profit, rather than components of a combined profit measure. The category of "gambling transactions," while unusual in a modern taxonomy, was not atypical at the time. Morrison (1949) gives an excellent review of the history of investment thought up to 1949, and describes how before 1924 it was a serious question whether common stocks were even an investment at all, or whether they were just gambling and speculation. This changed with Smith (1924), who, in the words of Morrison (1949), "revolutionized investment thought" by showing that stocks earned more in total than bonds - in other words, he roughly discovered the equity premium. As Smith notes in his introduction, this came as a surprise:

"These studies are the record of a failure - the failure of facts to sustain a preconceived theory. This preconceived theory might be stated as follows: While a diversity of common stocks has, without doubt, provided a more profitable investment than high-grade bonds in the period from 1897 to 1923, during which dollars were depreciating, yet with the upturn in the dollar, bonds may be relied upon to show better results than common stocks, as they did in the period from the close of the Civil War to 1896, during which the dollar was constantly increasing in purchasing power."

Nor was this conclusion immediately accepted. Harold (1934) conducted a similar follow-on study to refute what he claimed was the common conception that the crash of 1929 had overturned the claim that stocks secured more profits in the long run.

The emphasis in Smith (1924) on inflation (or "changes in the value of the dollar," as he puts it) as the expected primary determinant of stock and bond price changes follows the "common stock theory" of Fisher (1912), who provided theoretical arguments supporting common stock as an investment.[7] Finding that the price of stocks generally increased over each of the periods studied was

[7]As Smith notes on p43., discussing stock performance between 1866 and 1885, *"[W]e find, after the greatest increase in the purchasing power of the dollar that this country has ever experienced or is ever likely to experience,*

sufficiently surprising to Smith that he formulated his "fundamental principle of sound investment"

> *In the selection of securities for investment, we must consider more than the expected income yield upon the amount invested, and may quite properly weight the probability of principal enhancement over a term of years without departing from the most conservative viewpoint.*

While it may seem incredible to a modern reader that it needs to be stated that one should consider both expected capital gains *and* expected income, there did not seem to be a consensus that stock prices warranted consideration as a potential source of profit, much less rose on average.

This analysis of Fisher (1912) mirrors the piecemeal nature of Smith's analysis - he discussed the "superiority" of stocks by considering income and capital appreciation as separate tests, and the nominal amounts (without reinvestment) were added together. The term "return" is generally paired as "income return" to refer only to dividends and interest, while the returns-analogue he computes is described as the "total advantage of stocks over bonds." The closest to an actual holding period return he calculates involves reinvesting only the excess of dividends over bond income, in tests which were labeled as supplementary to the main analysis. Notably, risk features very little as an explanation of his findings. In ascribing stocks in the long run as having a "definite increase in principal," Smith (1924) mostly favors the view that common stocks actually provided *more* safety than bonds, rather than the modern conception of having higher returns due to having higher risk. In the case of Harold (1934), the word "risk" does not even appear in the article.

There were some authors who did compute quantities closer to the modern idea of returns. For instance, Jackson (1928) compares the performance of common and preferred stock by computing numbers that are close to the annual holding period returns of each type of stock. This exercise was undertaken, he notes, in response other academic positions at the time such as Dewing (1922) that advocated that "[p]referred stocks of all descriptions should be avoided." But notably, even in articles such as this which compute something akin to a modern return, the term "return" tends to be used in a general sense to refer to profits, rather than the modern idea of a holding period

his holdings in 1885 [of a hypothetical $10,000 initial investment in 1866] have a market value of $10,936, an actual increase, where, if no other factor than the appreciating dollar were in force, a drastic decrease was to be expected"

return. Indeed, this is one of the more striking facets of papers of this era - that the word "return" gets used loosely, and can refer to a wide variety of different concepts.

The concept of "returns" in these early papers seems to track closer to a generalized sense of being a way to profit off an investment, and is usually not a primary overarching focus of the paper in question. For instance, a number of early papers use "return" to mean something akin to a dividend yield or an income yield (e.g. Scott 1910 and Robinson 1930). Even more oddly to a modern reader, these dividend-yield style "returns" were often quoted as a percentage of the stock's par value, rather than its market value, (as in Mitchell 1910b and Matherly 1923).[8] Sometimes, return refers to any method of profiting from a trade, such as in Hardy (1923). And other times, it seems to refer to something similar to a modern holding period return, as in Jackson (1928).

Part of the reason for the lack of a concrete focus on a concept of returns is that when discussing changes in the performance of stocks, the focus was either on prices or dividends. To depict this quantitatively, in Figure 3 we compare the number of articles referring to "stock prices" versus "stock returns" over time. We examine articles in the *Quarterly Journal of Economics, Journal of Political Economy, American Economic Review, Journal of Busies* and *Journal of Finance,* for each decade beginning in 1900. For each of the pairs (("stock" and "price") versus ("stock" and "return")) we consider four variants: if the two words appeared in the title, if they appeared in the abstract (data on which only becomes common starting in the 1960s), if they appeared within 10 words of each other in the full text, and if they appeared together as an exact phrase in the full text. We plot the number of "price" entries versus the sum of "price" and "return" entries in each case. No matter which metric is used, the graphs show that the terminology of "stock returns" only become widespread starting in the 1970s. Indeed, the first article to use the words "stock" and

[8] From Scott (1910): *"He compares the purchase price and the yearly income to find what will be his rate of return from the investment."* The possibility of selling at a higher future price is not considered anywhere in the article.

Similarly, from Robinson (1930): "*[T]he comfortable spread they have enjoyed between the cost of capital obtained at fixed rates on their debentures and preferred stocks and the return to be normally expected from interest and dividends on their holdings has permitted the payment of satisfactory dividends....*"

From Matherly (1923): "*As illustrative of this point, the Standard Oil Company of New York in I913 declared a stock dividend of 400 per cent, or an increase in its formal capitalization from $I5,000,000 to $75,000,000.' The rate of cash dividends was changed from 6 per cent to 8 per cent. To the public, this rate might have seemed perfectly reasonable, since 8 per cent is not an unfair return on an industrial security.*" Similarly, Table VI in Mitchell (1910b) lists preferred stock as having the same percentage dividend in each year.

"return" in its title is Dirks (1958). By comparison, there had been 31 articles with "stock" and "price" in their title up to this point. Given the above discussion of how the concept of "returns" was historically used, the full text graphs included actually *understate* the extent of the change - many of the modern articles referring to "stock prices" in fact exclusively study stock returns, and many of the old references to "returns on stocks" were not about modern returns at all.[9]

This brief history of investment thought helps to explain the odd way that many stock indices are constructed. Early academic papers at the time which constructed such indices, and companies which did the same, did not think they were constructing indices of returns. They thought they were constructing indices of *prices*. Adjustments that would seem obvious to us, such as reinvesting dividends, were not nearly so obvious when the subject specifically was prices. This can be seen in early academic papers that attempted the task of index construction.

For instance, Mitchell (1910a) attempts to build an index to track how US stock prices have changed over time. Not only are dividends not added, but even more odd choices are made. Stock level price changes are not even considered in percentage terms. Rather, the first step is to average the price of the stocks in question, and then compute the percentage change in this average. There seems to be no sense that the price level itself is arbitrary, or whether it makes sense to overweight high priced stocks. Indeed, the level of the index is further altered in some years when quotations are unavailable for certain stocks, meaning that the level of average prices is thus changed.

Another early attempt at index construction is Cover et al. (1930). There the authors make adjustments for a wider range of corporate events. They adjust for "extra dividends," but not regular dividends, though they acknowledge that they ought to adjust for regular dividends too if they were being careful. More strikingly, they make a number of other unusual adjustments - subtracting off stock-specific trends in price changes, for instance, and stripping out seasonal variation in prices. While these seem odd if one is computing stock returns, when the object is prices, it is less clear exactly what adjustments should be made. If the mental model is something like the price of wheat, stripping out a seasonal component seems less crazy.

[9]Cochrane (2011) observed something similar in his AFA presidential address. As he asks, "[w]hen did our field stop being "asset pricing" and become "asset expected returning?"

The point of this long discussion is twofold. First, it is important to understand exactly what the state of financial thought really was at the time these indices were constructed. The problem of the curse of knowledge (Camerer et al. 1989) means that modern readers are apt to think that the things we know and take for granted must have always been obvious to everybody. This is simply not so. The Dow Jones Industrial Average was constructed in 1896. The "Composite Index," the precursor to the S&P 500, was constructed in 1923. Both of these occurred before finance even had a clear concept of returns. Even the S&P 500 itself, starting in 1957, was from a period where the concept of returns had not fully crystallized. What perhaps *is* striking is how these early, naive concepts are still visible a century later in widely quoted economic numbers. This shows in part how sticky institutional norms are, despite the odd and counterintuitive nature of the indices relative to modern ideas of returns. Second, the whole idea of a holding period return is generally less obvious than it is likely to seem to modern academics. Given how long it took academia to coalesce around the idea, it seems quite likely that many people still think in hazy or intuitive terms about performance, and do not compute exact return numbers.

3 Market Impact

3.1 Dividends and Measures of Market Index Performance

While academics tend to measure market returns using value-weighted portfolios of the universe of publicly traded stocks, these are not the most commonly quoted measures of market performance. Rather, media accounts tend to emphasize the performance of other market indices, such as the the S&P 500 and the Dow Jones Industrial Average. Neither of them reinvests dividends, but simply aggregates the price changes of the individual companies (after adjusting for splits and other corporate events, but not dividends).[10] The same is true for most major indices for international

[10] See http://us.spindices.com/documents/methodologies/methodology-sp-us-indices.pdf?force_download=true for the S&P 500 Index, and
https://www.djindexes.com/mdsidx/downloads/meth_info/Dow_Jones_Industrial_Average_Methodology.pdf for the Dow Jones Industrial Average. The list of corporate events for which the index gets adjusted does not include dividends in either case. This conclusion is reinforced by the presence of alternative index products for both companies (introduced at much later dates) that do reinvest dividends.

markets. Table 2 lists 17 country specific indices that are reported daily in the Financial Times and the type of index that it is. With the exception of Germany and Brazil, all the most commonly cited indices are price indices rather than total return indices.[11]Market performance both in the US and abroad, is typically reported based on price changes excluding dividends, not total returns.

Because stock prices predictably drop on ex-dividend days, the value of these indices will also predictably drop on days when their constituent stocks pay more dividends.[12] We show that this is indeed the case for major US indices in Table 3. As dependent variables, we consider the difference between the performance of the index in question, minus the return on the CRSP value-weight index (which uses daily returns, and thus reinvests dividends). In columns 1 and 2, we consider the difference between the S&P 500 and the CRSP VW, and in columns 3 and 4 we consider the difference between the DJIA and the CRSP VW. The independent variable is the daily dividend yield on stocks in the the relevant index, weighted in the same way as the index (value-weighted for the S&P 500, price-weighted for the DJIA).

For the S&P 500, the coefficient on dividend yield is -74.05, statistically significantly at the 1% level. Adding in extra controls for the daily dividend yield at other lags shows that these other lags produce much weaker and generally insignificant effects, suggesting that the main result is not merely due to the general time period around dividend payment. The results for the DJIA, in columns 3 and 4, are similar - the coefficient on dividend yield is -60.77 in a univariate setting, and -61.37 when additional lags for the dividend yield on two days either side are included.

These results reinforce the practical importance of an effect suggested by the mechanics of index construction - namely, that ignoring dividends causes both the S&P 500 and the DJIA to predictably drop relative to the CRSP index on days when their constituent stocks pay dividends. It seems unlikely that this is driven by relevant information effects. In particular, the index dividend yield

[11]We are not claiming that it is impossible to find total returns, but merely that the main index that investors focus on is typically a price index. For example, the DAX performance index is a return index, but the DAXX price index is also reported. The S&P 500 is a price index, but S&P also reports an S&P 500 total return index, the SP500TR.

[12]See, for instance, Elton and Gruber (1970). The stock price does not usually drop by the full amount of the dividend, which is often interpreted as meaning that the marginal investor pays taxes on dividends. Unless the marginal investor faces a 100% tax rate on dividends, however, there should be *some* drop in price.

is calculated using stocks which have a dividend ex-day, not a dividend announcement. As a result, any information content in the size of the dividend (or any other aspects) was already released at an earlier time, and thus should have been incorporated into prices in an efficient market. In other words, the ex-day does not have an obvious effect on the information content of the day's returns.

3.2 Aggregate Dividends and Stock Betas

If indices like the S&P 500 and the DJIA are systemically reduced by dividends, this may affect the pricing of other securities. Anecdotal observation suggests that these indices tend to be quoted in the media much more frequently than measures like the CRSP value-weighted return. As a result, the daily price changes for approximate market indices are frequently displayed, whereas the daily dividend yield for the same stocks is considerably less prominent.

If investors are aware of what these indices actually represent, then they should easily be able to undo any effects due to dividends not being included. However, if investors are not aware of the nature of these indices (or if they are, but still ignore dividends), then this should be evident in stock prices. One place where these differences may be evident is in the market betas of stocks. In particular, consider a standard CAPM regression:

$$R_{i,t} - R_F = \alpha_i + \beta_i[R_{M,t} - R_F] + \varepsilon_{i,t}$$

Since the return is simply the combination of the percentage price change and dividend yield, $R_{M,t} = PC_{M,t} + DY_{M,t}$, where $PC_{M,t} = \frac{P_{M,t} - P_{M,t-1}}{P_{M,t-1}}$ and $DY_{M,t} = \frac{D_{M,t}}{p_{M,t-1}}$, the CAPM regression can be re-written as:

$$R_{i,t} - R_F = \alpha_i + \beta_{i,PC}[PC_{M,t}] + \beta_{i,DY}[DY_{M,t}] - \beta_{i,F}[R_F] + \varepsilon_{i,t}$$

In other words, the overall beta on market returns can be split into a beta on price change and a beta on the dividend yield (with the beta on the risk-free rate dropping out if the risk-free rate is constant over the period).

If investors care only about the total market return as the measure of overall economic information that day (as under the CAPM), and do not distinguish between dividends and price changes, then the betas on these two components will be the same. It is possible for assets to have differ-

ent betas on price changes and dividends for other reasons, although this would be puzzling under standard asset pricing models. In particular, it would imply that the asset has an overall market beta that is time-varying according to the amount of dividends accruing to the market portfolio on that day. Recall that this is not the amount of dividends announced that day, which may have information content, but the amount of dividends with an ex-day which was announced a good deal beforehand. This will cause the overall market return that day to have a different split between price changes and dividends, but does not change the information content of the overall market return. On the other hand, if investors are inattentive to the dividend component, then there may be a lower beta on the dividend yield component than on the price change component.

To test this hypothesis, we examine whether commonly used representative portfolios have betas that are different for market price changes and market dividend yields. Because the S&P 500 is one of the most largely followed measure of market performance, we take as independent variables the daily percentage change in the S&P 500 index (corresponding to a percentage price change, which excludes dividends) and the dividend yield for stocks in the S&P 500, weighted in the same way as the S&P 500.[13] As dependent variables, we consider the daily returns to the Fama French 25 portfolios sorted on market capitalization and book-to-market ratio, available from Ken French's website. We run each portfolio regression separately, and examine the betas on price changes and dividend yields.

The results are reported in Table 4 in Panel A. For the Fama French 25 portfolios, the average beta on price changes is 0.7865, compared with an average beta of 0.2395 for dividend yields. If the portfolio-by-portfolio differences in betas are calculated, the average difference between the two betas is 0.547 with a t-statistic of 7.94, indicating a highly statistically significant difference. Another way of showing this result is that all 25 portfolios have positive and significant betas on market price changes, compared with only 8 portfolios that have positive and significant betas on dividend yields (with one actually being significantly negative). For 16 out of the 25 portfolios, we cannot reject the null hypothesis that investors ignore the dividend yield completely and only

[13] We obtain similar results if we use as independent variables the CRSP value-weighted Index to construct average price changes and average dividend yields.

focus on the price change, and in one portfolio investors actually respond significantly negatively to higher dividends.[14]

Because the distribution of price changes and dividend yields is different, we wish to make sure that this difference in betas is not due to a mechanical effect. To this end, we conduct a series of placebo regressions. We take the actual returns and dividend yields for the S&P 500, but randomly assign the dividend to a different day's index return, and compute a pseudo-price change (corresponding to the percentage change in the S&P 500 Index) by subtracting the randomly assigned day's dividend yield from the actual day's S&P 500 return. We then regress the portfolios on the two components as before, and repeat the process 10,000 times.

Table 4 Panel B shows that the results are not driven by a mechanical effect from the difference in distributions. The mean difference between the pseudo-price changes and pseudo-dividends is close to zero with a t-statistic of -0.03. This result reflects the intuition above - returns are the overall economic measure of the day's news, and if the return is arbitrarily split into two components, both parts retain the same significance. This reinforces that the difference in betas is not a mechanical artifact of the dividend yield having a different distribution of values. Instead, stock betas only load less for *that particular day's dividends,* consistent with the explanation of dividend neglect. Indeed, when we compare each of the placebo differences in betas, the value observed in the actual data of 54.7 is higher than the maximum placebo difference from 10,000 simulations, which was 41.43. In other words, the observed data shows a highly unusual difference between the beta on price changes and the beta on dividends, with dividends being responded to much less than price changes. This result is consistent with investors displaying less attention to marketwide dividends than marketwide price changes.

3.3 Dividends and Market Predictability

A low beta on the dividend yield suggests that markets are underreacting to the fundamentals released on a given day. In other words, all else equal, if more of the market return comes through

[14] In untabulated results, when the portfolios tested are the Fama French 48 industry portfolios, the results are similar.

dividends there will tend to be underreaction to that component of returns. This suggests that there will be excess returns in the future as the market incorporates this information.

Table 5 shows that this is indeed the case - a high dividend yield on the market today implies higher market returns occurring the next trading day. Column 1 regresses the CRSP value weighted market return today (trading day t) on the dividend yield on the CRSP value weighted market on day $t-1$. The coefficient is 1.081 with a t-statistic of 3.81. When the dividend yield was high yesterday, the market is predictably higher today. This implies that a one standard deviation increase in the value weighted dividend yield (0.00024) is associated with an increase in returns of roughly 2.6 basis points. The unconditional expectation of market returns is 4 basis points, so the market is 65% higher in expectation after a one standard deviation increase in the dividend yield.

One possible concern is that this regression is not picking up something related to the dividend yield, but rather an aspect of market performance the previous day. Column 2 repeats the analysis including a control for the market the previous day. The coefficient on the dividend yield is roughly unchanged at 1.039 with a t-statistic of 3.67. Finally, it could be that this regression is simply picking up periods of time when the market performs well or poorly. To control for such a possibility, column 3 includes a year by month fixed effect. If anything the results are slightly stronger, with a coefficient of 1.406 and a t-statistic of 4.56. Columns 4 through 6 repeat the analysis using the equal weighted market index and the equal weighted dividend yield and finds similar results.

The market is predictably higher the day after dividend yields are high. This is consistent with the beta results, suggesting that investors are underreacting to the information contained in the dividend yield. When this subsequently reverts to fundamentals the market return is predictably higher or lower than it would be otherwise.

3.4 Aggregate Dividends and Newspaper Tone

The results in section 3.2 are consistent with stock market investors underweighting market dividends when estimating how stocks are affected by market returns. If this is due to a general neglect of dividend information at the expense of price change information, then this should be reflected

in the behavior of other market participants. In this section, we examine the behavior of financial journalists. As shown in Tetlock (2007), Garcia (2013), and Garcia (2014), the tone of articles summarizing financial market news tends to both reflect immediate past market returns and also predict future returns. If journalists are relying on indices like the the S&P 500, the tone of their articles may reflect only market price changes and not dividends.

To test this, we take as the dependent variable the measure of New York Times article tone used in Garcia (2013), available from Diego Garcia's website. This takes articles in the New York Times 'Financial Markets' column from 1905 to 2005, and measures tone as the number of positive words minus the number of negative words, divided by the total number of words. Positive and negative word definitions are taken from Loughran and McDonald (2011). If journalists are only paying attention to price change information, such as the S&P 500, then after controlling for the effect of market returns, article tone should be more negative following days when the aggregate market dividend yield is higher (that is, for articles describing the previous day's events). We take the S&P 500 as our set of stocks for measuring dividends and returns, although the results are similar if the CRSP value weight index is used instead. We include as independent variables the return on the S&P 500 from the previous day (that is, the weighted average holding period return for S&P 500 stocks, not the percentage change in the index), and the weighted average dividend yield on the S&P 500 from the previous day. We also include year fixed effects to control for overall economic conditions and slow moving trends in the tone of financial markets coverage.

The results are presented Table 6. In column 1, the positive and significant coefficient on the S&P 500 return shows that the better the market performed the previous day, the more positive the news coverage. For the dividend yield on the S&P 500, we see a negative and significant coefficient. This indicates that, conditional on the level of total return on the index the previous day, the higher the dividend yield, the more pessimistic the tone. Because the coefficient on dividend yield is actually larger than (and of opposite sign to) the coefficient on the S&P 500 return, this implies that each unit of dividend yield results in a more than one-to-one reduction in the response to the day's returns. That said, the noise in the estimate of the dividend yield coefficient means

that we cannot reject a null hypothesis that the dividend yield coefficient is -0.386, which would correspond to complete neglect of the dividend component. In any event, there is no evidence that a market dividend yield causes a positive response in terms of tone, even though it contributes to market returns. Column 2 includes dummy variables for each quintile of dividend yield and we see a monotonic relation, with each quintile being larger and more negative than the prior. These results are consistent with reporters neglecting the dividend component of market returns, and focusing on the price change component of market indices.

3.5 Return Display and Mutual Funds

We next turn to the implications of how mutual fund performance information is displayed, and how this affects the behavior of investors and mutual fund managers. This covers both the question of what benchmarks are being used, and how the performance of the fund itself is measured. The S&P 500 is the most common benchmark that mutual funds benchmark themselves against, with 44% of funds and 61% of fund assets were benchmarked against the S&P 500 between 1994 and 2004 according to Sensoy (2009). In that paper, almost a third of funds were found to be using benchmarks that didn't accurately represent the fund style, and investors react to the performance of the fund relative to the inaccurate self-reported benchmark.

If benchmarks matter, then how do investors respond to the fact that even a correctly chosen benchmark may not accurately represent the total performance of its underlying stocks due to design problems in the index itself? For the reasons described above, this seems especially possible for the case of the S&P 500. However, it is important to note that funds which specify that they are benchmarked to "the S&P 500" may not specify whether they are referring to the base S&P 500 Index (which S&P on its website labels as its "Price Return Index"), or the S&P 500 Total Returns Index. In this sense, it is unclear how many funds make a distinction between these two concepts in their marketing materials, and how investors interpret this performance. To the extent that Sensoy (2009) provides suggestive evidence that funds might be deliberately choosing benchmarks that are easier to beat, this would incentivize them to choose the base S&P 500 Index, as this will always

have lower performance if there are any dividends.

Importantly, however, this issue is broader than just fund self-reported benchmarks, as investors may be using information from other platforms to evaluate funds, and they may have their own methods of performing comparisons. In particular, both Yahoo! and Morningstar allow benchmark comparisons, but while Morningstar graphs both the fund's style benchmark (from Morningstar itself) and the S&P 500 Total Return Index, Yahoo! by default graphs only the fund itself, and the options for comparison include the S&P 500 (which is the base "price return" index), the Dow Jones (which also excludes dividends) and the NASDAQ. To make matters worse, Yahoo! does not display fund returns, but fund changes in Net Asset Value. This fails to correct for any distributions, including dividends, realized capital gains distributions, and returns of capital. In other words, the fund's uncorrected change in Net Asset Value is an especially uninformative measure of fund performance, but one which is prominently displayed. As noted, Morningstar displays more relevant information, but it is an empirical question as to what information investors are actually using. This is especially the case for earlier time periods before the internet was the standard way of finding information about funds, as there likely was more variation in what was displayed.

To test the impact of such comparisons, we examine whether mutual fund flows respond to a fund outperforming the relatively uninformative S&P 500 base index which does not include dividend reinvestment. Because there are many reasons why investors might in general respond positively to funds outperforming benchmarks, we instead try to isolate the response due to the index itself. The regression equation is:

$$Flow_{i,t} = a + b_1 * BeatS\&P500NAV_{i,t} + b_2 * BeatS\&P500Ret + b_3 * Controls_{i,t} + e_{i,t}$$

The dependent variable is the monthly flows to the mutual fund, defined as

$$Flow_{i,t} = \frac{NAV_{i,t} - NAV_{i,t-1} * (1 + R_{i,t})}{NAV_{i,t-1}}$$

The two main variables of interest are *BeatS&P500NAV* and *BeatS&P500Ret.* These are both dummy variables for whether the fund performance in the previous calendar year exceed the S&P 500 base index over the same period. *BeatS&P500Ret* uses the fund's returns over the previous calendar year as the metric of performance, whereas *BeatS&P500NAV* uses the fund's percentage

change in NAV as the metric of performance when deciding if the fund beat the S&P 500. We choose to examine annual changes (e.g. the variable from December 31, 2006 to December 31, 2007 is matched to all monthly observations of fund flows in 2008), as this is how marketing materials are usually quoted. Since both our main variables are dummy variables, in a univariate setting each one captures the difference in average flows according to whether the fund beat the S&P 500 or not. More importantly, we test whether this difference survives after adding a very large number of alternative measures of fund performance, captured in the term *Controls*. These include 72 lags of monthly fund returns, 72 lags of monthly fund returns minus the S&P 500 (that is, the level of the difference with the index, not the dummy for beating the index), 72 lags of squared monthly fund returns, 72 lags of the square of monthly fund returns minus the S&P 500, 72 lags of the percentile of monthly fund returns, date fixed effects, date by fund objective fixed effects, and fund fixed effects. All returns variables and fund flows are winsorized at the 1% level. If the addition of all the other permutations of past performance is unable to drive out the effect of beating the S&P 500, this suggests that investors are paying attention to the specific question of whether the fund's returns exceeded the S&P 500 Index.

These results are represented in Table 7. They show that in all specifications, there is a significant effect to beating the S&P 500. In column 1, beating the S&P 500 in terms of NAV changes shows a strong positive effect on fund flows, after controlling for all the permutations of past returns. The effect of beating the S&P 500 is equal to 56 b.p. per month in additional flows, with t-statistic of 10.96 when clustered by fund and date. In column 2, beating the S&P 500 in terms of fund returns also shows a positive and significant effect on future flows, equal to 28 basis points per month with a t-statistic of 5.11. However, in column 3, when we include both dummy variables (NAV outperformance and return outperformance) in the same regression, we find that the effect of outperformance in terms of NAV gets slightly stronger, while the effect of outperformance in terms of returns is now statistically insignificant and directionally negative. These effects are fairly similar when date fixed effects area added (column 4) or fund fixed effects (column 5), and also survive adding date by fund objective fixed effects in column 6. Even with all these additional controls,

beating the S&P 500 in NAV terms still discontinuously matters for future fund flows, whereas beating the S&P 500 in returns shows no significant effects.

To ensure that the above results are not simply due to the particular way we have controlled for returns, we also consider a non-parametric version of the above question. We begin by regressing monthly fund flows on the lagged returns variables other than those that involve the S&P 500 - that is, monthly fund returns, squared returns, and percentile returns. We then take the residuals of this flow regression, and average them into bins according to the amount by which the fund's NAV change exceed the S&P 500. This essentially captures how the effect of beating the S&P 500 varies around zero.

The result, in Figure 4, shows that fund flows jump considerably at just above zero, and the 95% confidence intervals (using standard errors clustered by fund and date) for just below zero and just above zero do not intersect. In untabulated results, fitting a polynomial function to these residuals shows a similar jump at zero. All 10 of the bins for funds that fell short of the S&P 500 have negative point estimates for flows and 8 of 10 of these is significant at the 95% level. All 10 of the bins for funds that beat the S&P have positive point estimates of flows and all 10 are significant.

These results are consistent with investors responding discontinuously to the idea of "beating the index," even when the index has problems in its construction, and even when the measure of "beating" does not map clearly to the total return of the fund. Discontinuously beating an index is not an especially important economic metric, but measuring outperformance in terms of NAVs is arguably even less informative. While both parts of the calculation now exclude dividends, the NAV change also does not adjust for distributions of realized capital gains, returns of capital, and other fund distributions which will also lower the NAV. Nonetheless, if actual returns numbers are not the primary object of inquiry, as they would not be to someone on Yahoo! Finance, then investors may discontinuously care about whether the fund's NAV exceeded the S&P 500. This reinforces the importance of differences in performance information in affecting investor behavior.

4 Conclusion

In this paper, we present a basic stylized fact not widely considered - that the presentation of performance information is often very different from the standard returns variable used in academic finance. Many of these discrepancies relate to not properly accounting for dividends and capital gains distributions. Major indices of market performance do not reinvest dividends, and investors seem to be confused about the implications of this. Financial journalists write more negative articles when dividend ex-days cause prices to drop, and important stock portfolios respond strongly in terms of betas to market price changes, but often do not respond at all to market dividends.

Our results raise a number of open and interesting issues. If the actions of market participants do not appear consistent with distinguishing between price changes and returns, is this because they do not understand the returns concept itself, or because they are confused about what data is being displayed and think that the price change number they are being shown is actually a return? There is an important policy issue about why the main market performance indices do not reflect actual returns. It seems likely that the data providers are aware of this discrepancy, as both Standard and Poor's indices and Dow Jones indices have versions where dividends are reinvested (in the case of the Dow, introduced only in 2012). However, because of the historical use of the past numbers, there may be a reluctance to recalculate all the old indices and admit to the counterintuitive manner of the current construction. Investors would seem to be much better served using market indices that reinvest dividends, such as the CRSP value-weighted index, as these do not have predictable mechanical drops from dividend exclusion.

More broadly, our results show the importance of the curse of knowledge. The concept of a return seems so straightforward from an academic perspective that it is rare to explicitly re-examine whether everyone else uses the same definition. Either through inattention, hassle of collecting additional data on distributions, the potential for confusion by naive investors, or other issues, many data sources in finance display different performance metrics, usually without explicitly noting that they are doing so. Our findings illustrate the importance of checking exactly what the

definition is of seemingly standard variables in datasets.

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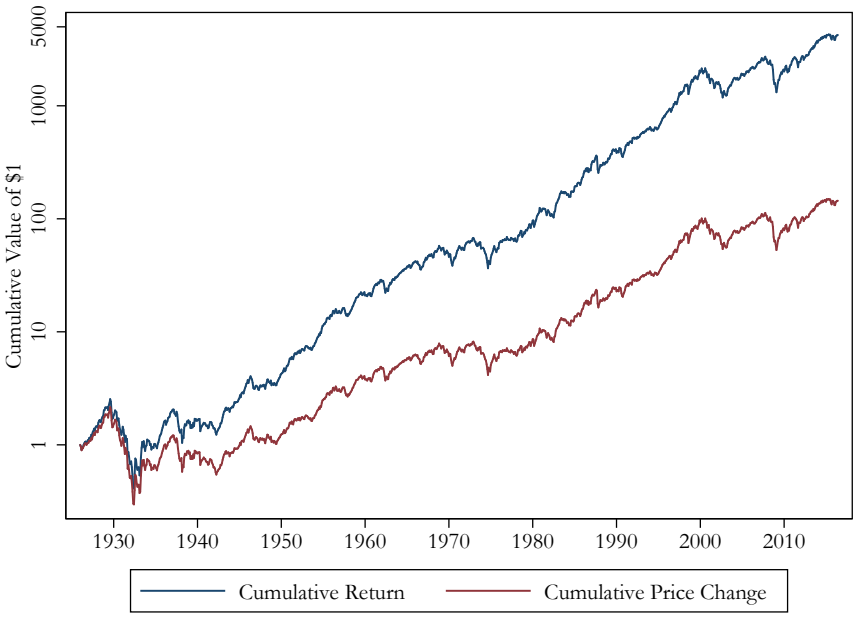
Figure 1

Cumulative Returns to CRSP Value Weighted Index and Dividend Yields

This graph shows the cumulative performance from holding the market return (the CRSP value weighted index, or vwretd), the market price change (the CRSP value weighted index without dividends, or vwretx) and the market dividend yield (the dividend yield of the CRSP value weighted index, or vwretd-vwretx).

Panel A: Market Return and Market Price Change



Panel B: Market Price Change and Market Dividend Yield

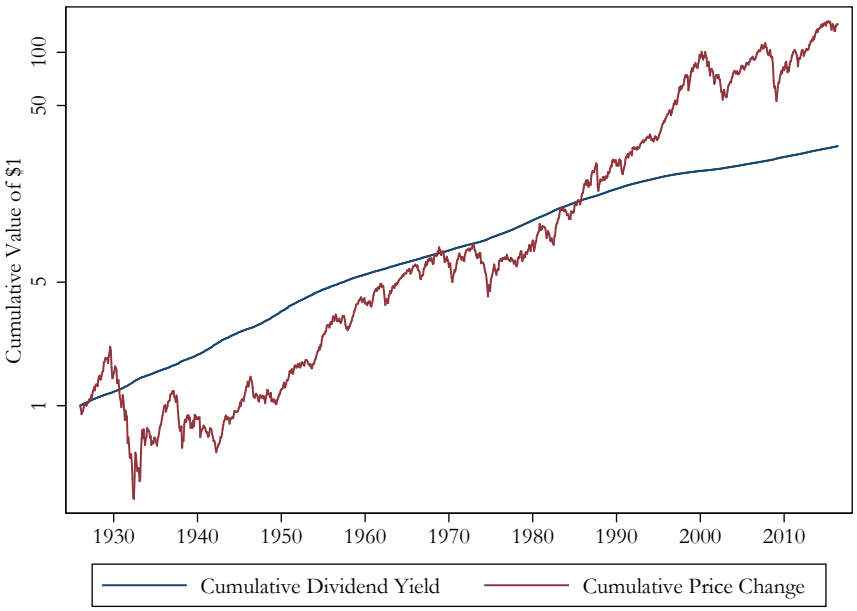


Figure 2

Example Brokerage Statement Fields from Charles Schwab

These figures include below sections of the example brokerage statement provided by Charles Schwab on their website. We have focused on the parts most relevant for an investor trying to calculate the return on stocks in their portfolio. In Panel A, we show a portion of the summary "Change in Account Value" section at the beginning of the statement. In Panel B, we show a portion of the "Investment Detail" section for individual securities.

Panel A: Overall Portfolio Summary

Schwab One® Account of
DANA JONES TTEE
JONES CHARITABLE TRUST
U/A DTD 08/22/1973 FBO R JONES

Change in Account Value	This Period	Year to Date
Starting Value	**$3,295,752.51**	**$3,280,045.42**
Cash Value of Purchases & Sales	(6,814.30)	(75,500.00)
Investments Purchased/Sold	6,814.30	75,500.00
Deposits & Withdrawals	(889.90)	10,102.40
Dividends & Interest[Z]	982.45	5,500.00
Fees & Charges	(70.15)	(384.71)
Transfers	4,480.00	10,580.52
Income Reinvested	(347.97)	(895.65)
Change in Value of Investments	45,927.86	40,886.82
Ending Value on 6/30/2014[Δ]	**$3,345,834.80**	**$3,345,834.80**
Accrued Income[d]	*5,477.94*	
Ending Value with Accrued Income[dΔ]	***$3,351,312.74***	
Total Change in Account Value		
Including Deposits and Withdrawals	$50,082.29	$65,789.38
Including Deposits, Withdrawals, and Accrued Income[d]	*$55,560.23*	

Panel B: Individual Security Detail

Investment Detail — Equities

Equities	Quantity Units Purchased	Market Price Cost Per Share	Market Value Cost Basis	% of Account Assets Acquired	Unrealized Gain or (Loss)	Estimated Yield Holding Days	Estimated Annual Income Holding Period
NATIONAL COMPUTERS[(M)]	**2,000.0000**	**125.3846**	**250,769.20**	**7%**	**52,769.20**	**0.49%**	**100.00**
SYMBOL: NCM	2,000.0000	99.0000	198,000.00	05/20/05	52,769.20	41	Short-Term

Figure 3

Relative Frequency of Journal Articles on "Stock Prices" versus "Stock Returns"

This graph shows the relative frequency over time of academic journal articles in finance and economics which include terms related to the phrase "stock prices" versus "stock returns". For "price," we compute four different totals - whether "stock" and "price" appear in the title, whether "stock" and "price" appear in the abstract (with abstract information only being widespread starting in the 1960s), whether the full text contains the words "stock" and "price" within ten words of each other, and whether the full text contains the exact phrase "stock price" or "stock prices." We compute analogous measures replacing "price" with "return." For each of the categories, we compute the fraction [# Stock Price / (# Stock Price + # Stock Return)], each decade. We use a search on JSTOR for publications in *American Economic Review, The Journal of Political Economy, The Quarterly Journal of Economics, The Journal of Business,* and *The Journal of Finance.* Counts are generated for each decade ending in the year noted (so "1910" means articles between 1901 and 1910 inclusive, "1920" is 1911 through 1920, etc, with the final incomplete decade being 2011-2017).

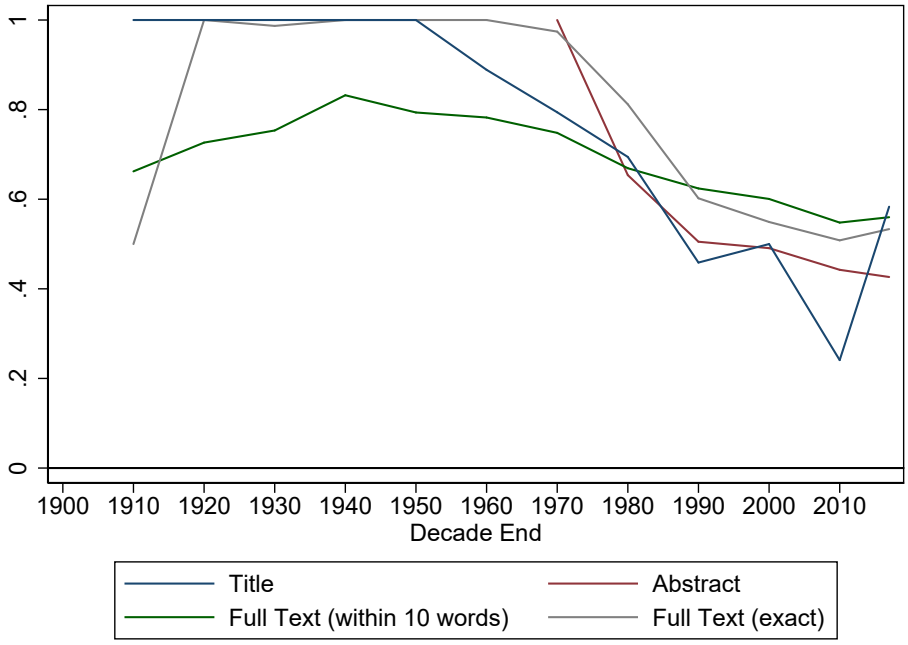


Figure 4

Non-Parametric Tests of the Effect of Beating the S&P 500 on Fund Flows

This graph shows the monthly residual fund flows that a mutual fund receives according to how close its annual percentage NAV change was relative to the S&P 500 index. We begin by regressing monthly fund flows on 72 lags of monthly fund returns, squared returns, and percentile returns. We then take the residuals of this flow regression, and average them into bins of 1% according to the amount by which the fund's NAV change exceeded or fell short of the S&P 500 over the previous calendar year. To compute standard errors, we regress the fund-month residuals from the initial regression on dummy variables corresponding to these 1% bins, and cluster the standard errors by fund and date. Red bars correspond to residual fund flows when the fund's NAV change was less than the S&P 500, and blue bars are when the fund's NAV change was more than the S&P 500. Grey bars indicate the 95% confidence interval on each of the estimates using the clustered standard errors.

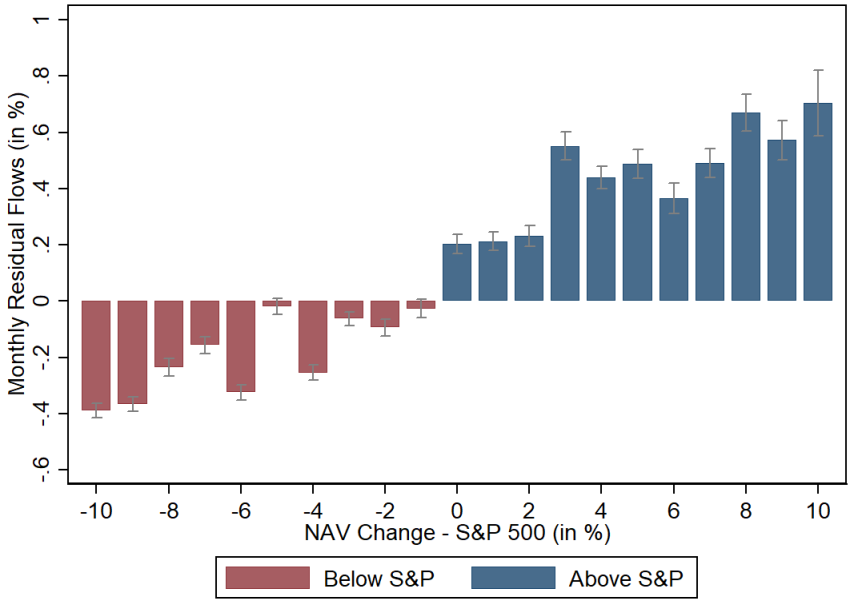


Table 1
Display of Dividend and Returns Information on Common Financial Platforms

This table explores the information contained in a brokerage statement as well as that which is displayed in a web search. Yes means the source documents the indicated information and no means it does not. Return means that the return is displayed. Price/Value change indicates that the holding period change in price or change in total value (excluding dividends) is displayed. Dividend [Short Term] indicates there is dividend information in the report over the recent past, either since the last brokerage statement or in some cases over the prior year. Dividend [Holding Period] indicates that the total dividend received since purchase is displayed. In Panel A we examine a brokerage statement from the indicated brokerage. In Panel B we conducted web searches for the ticker "GE" on the indicated financial websites in August 2016.

Panel A: Brokerage Statement

	Return	Price/Value Change	Dividend[Short Term]	Dividend[Holding Period]
Charles Schwab	No	Yes	Yes	No
Fidelity	No	Yes	Yes	No
Interactive Brokers	No	Yes	Yes	No
Merril Lynch	No	Yes	Yes	No
TD Ameritrade	No	Yes	Yes	No
Vangaurd	No	Yes	Yes	No

Panel B: Ticker Search

	Return	Price/Value Change	Dividend
CNN Money	No	Yes	Yes
Fidelity	No	Yes	No
Google Finance	No	Yes	Yes
Marketwatch	No	Yes	Yes
Morningstar	No	Yes	Yes
NASDAQ	No	Yes	Yes
NYSE	No	Yes	No
WSJ	No	Yes	Yes
Yahoo Finance	No	Yes	Yes

Table 2
Display of Market Performance in Major Country Indices

This table explores the major market specific indices. Indices listed are those that the Financial Times highlights in their market data section as of September 2017. Return Index indicates that the measure of market performance reinvests dividends, while Price Index indicates that the index does not reinvest dividends.

	Index	Ticker	Type
Brazil	Bovespa	IBOV	Return Index
Canada	SP-TSX Comp	SPTSX	Price Index
China	Shanghai Composite	SHCOMP	Price Index
France	CAC 40	CAC	Price Index
Germany	Xetra Dax	DAX	Return Index
Hong Kong	Hang Seng	HSI	Price Index
India	BSE Sensex	SENSEX	Price Index
Italy	FTSE MIB	FTSEMIB	Price Index
Japan	Nikkei 225	NKY	Price Index
Korea	Kospi	KOSPI	Price Index
Mexico	IPC	MEXBOL	Price Index
Singapore	FTSE Straits Times	STI	Price Index
Spain	IBEX 35	IBEX	Price Index
United Kingdom	FTSE 100	UKX	Price Index
USA	SP 500	SPX	Price Index
USA	Nasdaq Composite	IXIC	Price Index
USA	Dow Jones Industrial	DJIA	Price Index

Table 3
Index Performance of S&P 500 and Dow Jones Industrial Average Based on Underlying Dividends

This table explores the daily performance of the Dow Jones Industrial Average and S&P 500 indices, based on whether the underlying shares comprising the index go ex-dividend on that day. The dependent variable is the difference between the change in the S&P 500(Columns 1 and 2) or the Dow Jones Industrial Average (Columns 3 and 4) and the CRSP Value-Weight Index. The main independent variable is the daily weighted average dividend yield of all stocks in the index, with yields being calculated for all stocks that had went ex-dividend on the day in question. The weights are the same as those used in the index, meaning value-weighting for the S&P 500 and price-weighting for the Dow Jones. The dividend yield is measured on the day of the return, as well as two days on either side of the return. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	SP - CRSP		DJ - CRSP	
	(1)	(2)	(3)	(4)
Dividend Yield on t	-74.05***	-67.64***	-60.77***	-61.37***
	(-11.01)	(-9.48)	(-8.47)	(-8.48)
Dividend Yield on t-1		-13.33*		6.775
		(-1.86)		(0.93)
Dividend Yield on t-2		-6.961		8.660
		(-0.98)		(1.19)
Dividend Yield on t+1		-2.676		-1.592
		(-0.37)		(-0.22)
Dividend Yield on t+2		-12.14*		-4.053
		(-1.72)		(-0.56)
Constant	-0.00220	0.00134	0.00211	0.000547
	(-1.39)	(0.69)	(0.70)	(0.15)
R^2	0.00893	0.00975	0.00350	0.00363
Observations	13467	13465	20397	20394

Table 4
Betas on S&P and Dividend Yield

This table examines the betas of stock portfolios on the S&P 500 average percentage price change and the S&P 500 average dividend yield. The stock portfolios are the Fama French 25 portfolios sorted on size and book-to-market ratio. Daily returns to each portfolio are regressed on both the daily S&P 500 weighted average price change and the daily S&P 500 average dividend yield (based on ex-dividend days). In Panel A, these 25 observations of betas on price change and dividend yield, the "Mean" row gives the average beta for each variable, and the average difference between the two. The "t-stat" on difference takes the t-statistic for the test that the difference is zero computed from the distribution of the 25 difference observations. "Num. Positive and Significant," "Num. Insignificant" and "Num. Negative and Significant" refer to the number of betas (out of 25) for the variable in question that are significantly positive, insignificantly different from zero, and significantly negative, respectively. The remaining rows show different percentiles of the distribution of betas. Panel B show a placebo version of the same regression using a placebo price change and dividend. This takes an actual S&P 500 return and subtracts off an actual S&P 500 dividend yield from a randomly chosen day to create a placebo price change and placebo dividend yield. We then run the same regressions and compute the mean difference and t-statistic, and repeat the simulation 10,000 times. The Placebo Difference column shows statistics from the mean difference of the 10,000 simulations while the Placebo t-stat column shows the distribution of t-statistics that the differences are zero for each of the 10,000 simulations. The row marked "Num Greater than Data" lists the count of the number of observations out of 10,000 where the simulated value was above what was observed in the data. The remaining rows list the summary statistics indicated in the left hand column.

Panel A: Beta Estimates for Fama French 25

	Price Change Beta	Div Yld Beta	Difference
Mean	78.65	23.95	54.7
t-stat on difference	.	.	7.94
Num. Positive and Significant	25	8	.
Num. Insignificant	0	16	.
Num. Negative and Significant	0	1	.
10th Percentile	59.41	-40.92	.
25th Percentile	68.12	7.52	.
50th Percentile	76.95	26.16	.
75th Percentile	87.21	51.37	.
90th Percentile	101.44	79.32	.

Panel B: Placebo Estimates Based on 10,000 Simulations

	Placebo Difference	Placebo T-Statistic
Mean	-.16	-.03
Num Greater Than Data	0	8
Min	-40.08	-8.84
10th Percentile	-12.84	-3.62
25th Percentile	-6.84	-1.97
50th Percentile	-.14	-.04
75th Percentile	6.45	1.88
90th Percentile	12.45	3.63
Max	41.43	9.24

Table 5
Market Returns Based on past Dividend Yield

This table examines how the market return varies based on the dividend yield the previous trading day. The market is measured as the CRSP value weighted returns in columns 1 through 3 and equal weighted in columns 4 through 6. Columns 3 and 6 include year by month fixed effects. t-statistics are in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Value Weighted Return			Equal Weighted Return		
	(1)	(2)	(3)	(4)	(5)	(6)
Dividend Yield [t-1]	1.081***	1.039***	1.406***	1.315***	1.376***	1.933***
	(3.81)	(3.67)	(4.56)	(3.38)	(3.61)	(4.70)
Mkt[t-1]		0.0681***	0.0227***		0.190***	0.127***
		(10.55)	(3.44)		(29.96)	(19.41)
Year Month FE	No	No	Yes	No	No	Yes
R^2	0.000607	0.00524	0.0500	0.000479	0.0366	0.0900
Observations	23910	23910	23910	23910	23910	23910

Table 6
Newspaper Tone Based on S&P 500 Returns and Dividend Yield

This table examines how the tone of the New York Times financial markets column varies with the returns and dividend yield of the S&P 500. The dependent variable is taken from Garcia (2013), and computes the number of positive words minus the number of negative words, divided by the total number of words. Positive and negative word classifications are taken from Loughran and McDonald (2011). The independent variables are the value-weighted return on stocks in the S&P 500 from the previous day, and the value-weighted average dividend yield on S&P 500 stocks on the previous day (in column 1). In column 2, dummy variables for each quartile of the S&P 500 dividend yield are included instead (with zero dividend yield omitted). Fixed effects are included for each year and t-statistics are in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
SP 500 VW Return	0.386***	0.386***
	(43.88)	(43.84)
SP 500 Dividend Yield	-1.137***	
	(-2.92)	
First Quartile of dividend Yield		-0.000474
		(-1.56)
Second Quartile of dividend Yield		-0.000593*
		(-1.92)
Third Quartile of dividend Yield		-0.000752**
		(-2.41)
Fourth Quartile of dividend Yield		-0.00130***
		(-3.88)
Year FE	Yes	Yes
R^2	0.223	0.224
Observations	10945	10945

Table 7
Fund Flows and Beating the S&P 500 in Returns and Net Asset Values

This table examines whether mutual fund flows respond to whether the fund beat the performance of the S&P 500 (Price) Index, both in terms of the fund's returns and the fund's percentage change in net asset values (which do not correct for any distributions the fund made). The dependent variable is monthly fund flows, the percentage increase in NAV in excess of the fund's returns over the month. The main independent variables are a dummy variable for whether the fund's returns exceeded the S&P 500 Index performance in the past calendar year, and a dummy variable for whether the fund's percentage change in NAV exceeded the S&P 500 in the past calendar year. Additional controls include 72 lags of monthly fund returns, 72 lags of monthly fund returns minus the S&P500 (that is, the level of the difference, not the dummy), 72 lags of squared monthly fund returns, 72 lags of the square of monthly fund returns minus the S&P500, 72 lags of the percentile of monthly fund returns, date fixed effects, date by fund objective fixed effects, and fund fixed effects. All returns variables and fund flows are winsorized at the 1% level in each tail. The top entry in each row is the coefficient, the t-statistic is below in parentheses (with standard errors clustered by fund and date). *, ** and *** indicate statistical significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Beat SP500 in NAV (y-1)	0.00563***		0.00594***	0.00581***	0.00446***	0.00544***
	(10.96)		(10.41)	(10.53)	(7.71)	(10.73)
Beat SP500 in Returns (y-1)		0.00278***	-0.00057	-0.00057	-0.00030	-0.00085
		(5.11)	(-0.95)	(-0.95)	(-0.55)	(-1.47)
Returns [m-1, m-72]	Yes	Yes	Yes	Yes	Yes	Yes
SP500 Adj Ret [m-1, m-72]	Yes	Yes	Yes	Yes	Yes	Yes
Returns^2 [m-1, m-72]	Yes	Yes	Yes	Yes	Yes	Yes
SP500 Adj Ret^2 [m-1, m-72]	Yes	Yes	Yes	Yes	Yes	Yes
Return Percentiles [m-1, m-72]	Yes	Yes	Yes	Yes	Yes	Yes
Date FE	No	No	No	Yes	No	No
Fund FE	No	No	No	No	Yes	No
Date by Objective FE	No	No	No	No	No	Yes
R^2	0.020	0.019	0.020	0.024	0.079	0.051
Observations	1,241,882	1,241,882	1,241,882	1,241,882	1,241,882	1,241,882