

Lifetime Earnings^{*}

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Abstract:

Using realized earnings over long periods of time, we investigate errors in earnings expectations implied by stock prices of firms. We compute realized lifetime earnings for each firm starting at the IPO date and the beginning of each subsequent year and compare it to stock price on that date. Of the 16,386 firms examined, only 17% survived till 2019, 42% merged with other firms and the rest were delisted for other reasons. While the average lifetime earnings at the aggregate level slightly exceeds first day price, the results are driven by roughly 33% of the firms in the sample. Mergers account for most of success in recovering the first day stock price and appear to be the best way to generate enough earnings to justify valuations. Even among firms that survived, over 46% have yet to generate enough earnings to justify their first day valuations even though they have been in business between 15 and 45 years. Aggregate free cash flows over the lifetime of all firms are lower than the lifetime earnings and justify 80% of the first day trading price. We relate our paper to Bessembinder (2018) by examining the link between lifetime earnings (as a measure of fundamental wealth creation) and stock returns-based wealth creation. We find that lifetime earnings are positively associated with future returns-based wealth creation while current returns-based wealth created itself is negatively associated with future returns-based wealth creation. These results point to a disconnect between returns-based wealth creation and fundamental wealth creation in the short to medium term that eventually corrects.

Keywords: lifetime, earnings, stock returns, wealth creation, mergers, IPOs

JEL: G11, G12, G23, G32, M41

Data availability: Data are available from public sources described in the text.

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1. Introduction

The popular press and the academic literature have long recognized publicly traded stocks as the engine of wealth creation for individual investors and pension funds. However, stock markets go through times when valuations seem stretched and untethered from fundamentals. Hence, it is instructive to assess whether the valuations ascribed by the stock market to individual stocks are corroborated by the actual value created based on fundamental operating data.

A fundamentals-based value of a firm at time t is the profits it is expected to generate, discounted back to time t using a risk adjusted discount factor. Expectations, by definition, are subjective. The innovation in this paper is the replacement of expected earnings with realized earnings that firms generate over long periods subsequent to time t with the benefit of hindsight (but taking care to avoid any hindsight bias by examining firms that get delisted or were taken over). We document the lifetime earnings of a firm starting at any point t and benchmark that to the stock price at t as this helps us provide evidence on the expectational error in earnings, defined as the disconnect between earnings expectations and the ultimate realization of earnings, over long periods of time.¹

Given that earnings and cash flow expectations are key to many streams of literature (work on market efficiency, stock market based wealth creation as in Bessembinder (2018), equity duration literature as in Dechow et al. (2004) and Weber (2018), analysts' forecasts work such as La Porta (1996), Chan, Karceski and Lakonishok (2003) among others) and in practitioner and classroom settings (most obviously in firm valuation using earnings and cash flow models), our study provides evidence on the calibration of earnings expectations.

¹ Over long periods of time, total earnings should approximate total cash flows. We extend our analysis to cash flows and observe similar disconnect.

The average lifetime earnings to first day stock price is one suggesting that in the aggregate the market valuation is consistent with realized future earnings discounted at the Treasury bill rate plus equity risk premium, i.e., market expectations are borne out by realizations in the aggregate. However, at the individual firm level we document significant variation. We find that 67% of the firms do not earn enough earnings over the lifetime to justify their first day stock price. Mergers account for most of the 33% of firms that generate enough earnings to warrant their original price. This is primarily attributable to the merger payout rather than actual earnings generated. Among survivors, almost half (46%) of the firms in existence as of 2019 for more than 15 years haven't generated enough earnings to justify their first day stock price, even though they have been in existence for an average of 25 years. Lifetime earnings as a measure of fundamentals-based value creation is positively associated with future returns-based wealth creation while past returns-based wealth creation is negatively associated with future returns-based wealth creation. Overall, these results suggest the following: (a) in the aggregate, earnings expectations are accurate and are consistent with realized earnings, while there is considerable variation at the individual stock level; and (b) stock prices may differ from a fundamentals-based value in the short to medium term but they revert towards fundamentals-based value in the long term.

Our sample consists of 20,097 firms for the years 1975-2019 out of which 3,711 firms started trading before 1975 (hereinafter referred to as “pre-1975 firms”). We flag these pre-1975 firms because they are special in terms of their lifetime earnings performance. Consider only the 16,386 firms that start trading after 1/1/75 for now.² We aggregate discounted earnings per share reported by each firm over its lifetime and compare that number to the prevailing market price.

² We do not limit our sample to IPOs. The IPOs after 1/1/1975 are just a subset of the firms which started trading after 1/1/1975. Firms may get listed on the exchanges by way of spin-offs, acquisitions, or direct listings.

The discount rate is assumed to be the 10-year Treasury bill rate plus a market risk premium.³ We use implied equity risk premium for the S&P500 firms each year as the market risk premium. In using the varying market risk premium for each year, we treat each firm as if it carried a beta of one.⁴ This discount rate is conservative at the individual firm level and is hence likely to overstate the discounted value of lifetime earnings. This is because 16,386 of the 20,097 firms examined began trading for the first time since 1/1/75 and we would expect newer firms to be riskier than the market as a whole. A lifetime earnings to stock price ratio of one at time t would suggest that the firm has generated enough discounted earnings over its life (including its terminal value/merger value/delisting operating return) to justify its market price at time t , *assuming that the firm has the same riskiness as the market*. A number exceeding (less than) one indicates fundamentals-based performance in excess (short) of stock market expectations.

While seemingly simple, the actual execution of the calculations is complex because of the several nuanced methodological design choices that need to be made. The one common theme in our choices is that we are conservative and choose the alternative that is likely to yield the highest lifetime earnings number. Our numbers could be therefore viewed as the upper bound of realizations i.e., realizations of an optimistic scenario. As an example, for acquired firms, the acquisition price paid by the acquirer to the target firm's shareholders, is treated as the liquidating dividend. The downside to this approach is that it conflates market prices with earnings and the literature on mergers and acquisitions suggests that acquirers overpay for targets. This, in turn, suggests that the acquisition price would significantly overstate a perpetuity of earnings at the time

³ Using S&P 500 firms, implied equity risk premiums based on FCFE model are computed annually by Aswath Damodaran and annual average implied equity risk premiums since 1960 have been provided on his website. https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/implpr.html

⁴ The discount rate varies from a high of 20.44% in 1981 to a low of 4.46% in 2013. Weber (2018) and Dechow et al. (2021) use a fixed discount rate of 12% when calculating the duration of equities.

of acquisition. As an alternative approach, in the main analysis, we calculate the terminal value as a perpetuity of earnings at the time of acquisition. The acquisition price approach yields the highest aggregate realized earnings while the perpetuity of earnings approach is likely to yield a lower number.

The liquidating dividend paid to the last set of shareholders is assumed to be the terminal dividend for delisted firms. We compute the lifetime earnings ratio at the per share level and not at the firm level. The per share focus helps us (a) allocate the earnings of the firm in future years towards the capital outstanding at time t when the lifetime earnings are being calculated; and (b) adjusts for repurchases and new share issues after time t . Lifetime earnings includes the implied return that a shareholder can earn by reinvesting dividends in the stock market. For firms that survive till 2019 we compute a terminal value as 2019 earnings per share divided by discount rate at time t to allow firms at least 15 years after they start trading to “grow” into their valuations. We also categorize surviving firms that came to the public markets before 2006 into a separate bucket. Fifteen years is reasonable because prior work (Chan, Karceski and Lakonishok 2003) shows that abnormal growth in earnings for most firms barely last 10 years, on average.

Consider the case of Amazon.com. If an investor had purchased a share of Amazon on the first trading day in 1997, she would have recovered 29.8 times her investment in discounted future earnings including terminal value. However, terminal value, measured as 2019 earnings capitalized at the discount rate of 8.0% (discount rate in the year of IPO), accounts for 85% of the 29.8X recovery rate. Perhaps more interesting is the observation that most of these earnings occurred in the last two years. If the investor had bought the stock in the year after the IPO, she would have recovered 8.3 times her investment in discounted future earnings including terminal value. These are both healthy returns. However, the ratio of lifetime earnings (including terminal

value) to stock price per share drops to 0.8 had she purchased the stock during the peak of the internet bubble in 2000. All the actual realized earnings from 1999-2019 plus a perpetuity of the 2019 earnings barely accounts for half of the year 2000 market price of Amazon. Stated differently, buying Amazon's stock on January 1, 2001, would have returned 6.4X the investment via future earnings relative to just 0.8X had the investor purchased the stock a year earlier, on January 1, 2000. Incidentally, around 80% of the 6.4X and the 0.8X ratio is accounted for by terminal value of 2019 earnings assumed to repeat till perpetuity.

The average data, comprising other stocks, is different from that of Amazon. The lifetime earnings ratio of 29.8 at the time of IPO for Amazon is in fact above the 99th percentile in our sample. The average ratio of lifetime earnings per share, including terminal value, for the 16,386 firms that start trading after 1/1/75, assuming 2019 earnings accrue to perpetuity for surviving firms, to first day stock price per share is 1.1. To be clear, a ratio of one implies no return in fundamentals over the firm's lifetime incremental to the Treasury bill rate plus a market risk premium. The median ratio is 0.3, which suggests significant right skewness in the distribution of the ratio. The 6,963 firms that eventually merged, on average, generated 1.9 times their first day stock price per share in earnings per share. That return is much higher than the average of the payback for the overall sample. As expected, the 6,666 firms that were delisted by exchanges did not return their initial investment as their average lifetime earnings per share to first day stock price per share is 0.1.

Fu, Lin and Officer (2013) show that overvalued firms overpay to acquire their targets. Similarly, Harford, Humphery-Jenner and Powell (2012) find that entrenched managers make value-destroying acquisitions by overpaying for their targets. The higher lifetime earnings ratio attributed to the acquisition price could be driven by this takeover premium.

There appears to be no excessive fundamentals-based return when we consider first day stock prices. If we considered stock prices as of the first day of every year in the sample then the stock prices are more justified relative to fundamentals, in the aggregate. Specifically, the average ratio of lifetime earnings to the stock price as of the first day of the year in our sample is 1.24 using acquisition price for merged firms (and 0.9 using earnings perpetuity) suggesting a 24% lifetime return in earnings over and above the Treasury bill rate plus a market risk premium. Of the 1.24, terminal value accounts for 1.05 of the 1.24, implying that realized earnings only justifies 16% of the stock price.

The average ratio of lifetime earnings to beginning year stock price for firms that got acquired is 2.0. Most of this multiple is attributable to the purchase price rather than the actual earnings generated prior to the acquisition. Two additional features ensure that investors, whose firms get acquired, are handsomely rewarded: (a) acquisitions account for 42% of the sample; and (b) acquired firms pay off more than survivors even though their actual life in terms of years is shorter (8 versus 15 years, on average in Table 2). Among the firms that do not get acquired, few justify their valuations in the form of actual future earnings. Almost half of the firms that survive are unable to even recoup their first day stock price despite staying listed for an average of 25 years.⁵

Firms perform worse when lifetime free cash flows are used as the fundamental attribute instead of lifetime earnings. The average ratio of lifetime free cash flows to beginning year stock price is 0.8 including terminal value and -0.2 excluding terminal value. In other words, at the

⁵ The ratio is dependent on four components: (a) discount rate (b) earnings (c) stock price and (d) valuation model. We carry out several robustness tests including sensitivity to discount rate, using last month's average stock price instead of beginning year stock price, using residual income valuation model and capitalizing R&D cost. Results are qualitatively similar to the main analyses.

aggregate level, firms have generated 80% of the beginning year stock prices via free cash flows. Surprisingly, realized free cash flows excluding terminal value is negative at an aggregate level suggesting that there has been a net cash outflow in the period between 1975 and 2019. Similar to lifetime earnings, firms which get merged perform the best and delisted firms do not generate any cash flows over their lifetime.

Although the average lifetime free cash flows to beginning year stock price ratio is 0.8, we observe time-series variation in that ratio. In particular, we focus on two market correction events – (a) the 2000-2002 technology crash; and (b) the 2008 financial crisis. The average ratio before the crash at the beginning of 2000 (2007) is 0.6 (0.3). This ratio rises to 1.5 (2.2) after the market correction at the beginning of 2003 (2009). These findings suggest over-optimism in lifetime free cash flow expectations embed in stock prices before such market corrections.

Bessembinder (2018) studies lifetime returns-based wealth creation. Lifetime returns-based wealth is a function of current stock prices and our analysis thus far shows that a large portion of the firms are not able to justify their stock prices in terms of fundamental value creation (earnings). We evaluate the relation between the lifetime earnings and future returns-based wealth creation and document two findings. First, returns-based wealth creation is ephemeral in that, at any point in time, past returns-based wealth creation is negatively correlated with subsequent returns-based wealth creation. Second, lifetime earnings is positively associated with the future returns-based wealth creation. Overall, these results confirms that even though stock prices and fundamentals may diverge in the short to medium term, stock prices revert towards fundamentals-based value in the long term.

Chan, Karceski and Lakonishok (2003) find "no persistence in long-term earnings growth beyond chance." Our work builds on Chan et al. (2003) by following the lifetime earnings of a

firm from the beginning of its life after it starts trading to its eventual fate as a survivor, takeover target, or as a delisted firm. In studying equity duration, Weber (2018), building on Dechow et al. (2004) and a series of forecasts and assumptions, estimates the average cash flow payoff horizon, priced into the stock market valuation of a firm, at 19 years. Our results contribute to this literature by providing greater insight into the distribution of duration across firms as well as by providing parameter estimates to better calibrate these duration models. Moreover, the analyst or student who forecasts expected cash flows or earnings for an individual firm might want to explicitly account for the differential longevity and payoffs of eventually merged and delisted firms, based on the historical survival rates and fundamental payoffs documented in this paper.

The remainder of the paper is as follows. Section 2 describes the computation of lifetime earnings per share. Section 3 presents the data and the main analyses. Section 4 presents distribution of lifetime free cash flows ratio. Section 5 compares returns-based and fundamentals-based wealth creation. Section 6 shows the robustness tests. Section 7 concludes.

2. Background

2.1. Computing lifetime earnings per share

We compute the discounted lifetime earnings per share as the sum of the discounted actual earnings per share in each year plus a perpetuity of the most recent earnings. We discount the earnings using the 10-year Treasury bill rate plus an average market risk premium. The average market risk premium is the implied equity risk premium computed for S&P 500 firms by Aswath Damodaran annually based on FCFE model.⁶ Reliance on the market risk premium assumes that the beta of the firm at the time of computing the lifetime ratio is one. If we were to assume a riskier profile with a higher beta (as is almost certainly the case), we would end up with higher discount

⁶ https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/implpr.html

rates which, in turn, would lower the discounted lifetime earnings to price ratio. To err on the side of caution, we opt for a lower discount rate. We use the rate as of the last day of the calendar year, for which the results are presented, to discount all the future earnings in order to avoid look-ahead bias in unknown future interest rates. Reliance on a single rate also ensures that the difference between the discounted lifetime earnings and the first trading day price is attributable to the gap between expected earnings and actual earnings. The following expression depicts the definition of lifetime earnings per share we use throughout the paper:

$$\text{Lifetime earnings per share}_{i,t} = \frac{\sum_{n=1}^{T-t} EPS_{i,t+n}}{(1+DiscRate_{t+1})^n} + \frac{FVPS_i}{(1+DiscRate_{t+1})^{T-t+1}} \dots \dots \dots (1)$$

In equation (1), i , t and T denote firm, year at the beginning of which the ratio is computed, and last year of the firm i depending on whether the firm survived or was delisted or merged, respectively. $EPS_{i,t}$ represents earnings per share of the firm i earned in year t . Earnings in each period is divided by equivalent shares to compute earnings per share. Equivalent shares are computed using stock-split adjustment factor from CRSP. $DiscRate_t$ is the average 10-year Treasury bill rate for the year t plus implied equity risk premium.⁷ $FVPS_i$ is (a) acquisition price per share in case of merged firms; (b) delisting price per share in case of delisted firms; or (c) an estimated terminal value in case of surviving firms. The terminal value for surviving firms is estimated as the 2019 EPS divided by the discount rate of the year for which the ratio is being computed.

Appendix A illustrates how we compute the ratio of discounted lifetime earnings per share to beginning year stock price per share for a hypothetical firm. We calculate this ratio from the perspective of an investor buying one share. Consider a hypothetical company that starts trading

⁷ When we assume a fixed equity risk premium of 5%, we find that all results in the paper are consistent and qualitatively similar.

on December 31, 1980 and is quoted at \$1,280 and \$1,536 at the beginning of 1982 and 1983 respectively.

Assume that the firm reports earnings per share of \$30 and \$36 for the years 1980 and 1981 respectively. Also, assume that the firm was acquired in 2010 for \$4,000 a share. That purchase price is the liquidating dividend used to compute discounted lifetime earnings. Alternatively, if the firm is a going concern, \$4,000 can be thought of as the terminal value, computed as 2010's earnings expected to be earned into perpetuity at the discount rate prevalent in 1981. Hence, the sum total of discounted earnings per share till year ended 2010 is \$1,262 per share.

A practical consideration is the role of dividends. Ignoring dividends will bias our calculation of lifetime earnings because firms that retain earnings can reinvest them to report higher earnings in the future. Following Easton, Harris, and Ohlson (1992), we assume that the investor receiving the dividends reinvests those at the prevailing market rate (Treasury + implied risk premium) at the beginning of the year to avoid look-ahead bias with discount rates. In the illustration above, assume that the firm pays dividends of \$15 and \$20 per share respectively in 1981 and 1982. The present value, at the beginning of the year, of the *return* on those two dividend payments amounts to \$20 and \$24 respectively. Hence, the lifetime earnings of this firm aggregates to \$1,308 (\$1,262+\$21+\$25). The ratio of lifetime earnings to beginning year stock price in the hypothetical example is 1.02 (\$1,308/\$1,280).

Another concern relates to stock splits. The earnings per share number is computed using the number of equivalent shares at the time of calculating the lifetime earnings ratio. The number of equivalent shares is computed by dividing the shares outstanding by the split adjustment factor of the focal year and by multiplying the split adjustment factor of earnings year. For instance, a split adjustment factor of 64 in the focal year implies that one share would have converted to 64

shares as at the end of 2019. For analytical convenience, we anchor on the stock price at the time of computing the lifetime earnings ratio.

Using the same calculation approach, we obtain a ratio of 0.9 at the beginning of 1983. The change in the ratios over time primarily reflects changes in the stock price of the firm. The numerator, discounted lifetime earnings, is far less volatile, by definition, relative to the stock price.

2.2 Computing lifetime earnings per share for Amazon.com

Moving to the realm of the practical, consider the case of Amazon.com, data for which is reported in Table 1. Amazon went public in 1997. Column 2 shows total earnings reported by Amazon till 2019. As can be seen, earnings have not been substantial, except for the last four years in the sample (2016 - 2019), when Amazon reported income of \$2.371 billion, \$3.033 billion, \$10.073 billion, and \$11.588 billion respectively. Columns 3 and 4 present the number of shares outstanding and the split adjustment factor to compute equivalent number of shares at any point. The number of shares to compute per share figures is calculated as the number of shares outstanding in millions (shrout in COMPUSTAT/1000) divided by split adjustment factor (cfacshr in COMPUSTAT) multiplied by split adjustment factor on the first day of year for which the ratio is being computed. The number of IPO equivalent shares has increased by 67% since Amazon went public, changing from 24 million shares to 41 million shares (498/12). This increase is primarily driven by seasoned equity offerings as well as employee stock compensation plans.

The market price at the beginning of each year is shown in column 5. As we can see, Amazon reports losses for the first six years before generating modest profits for several years. During its lifetime of 23 years, Amazon earned 73% of its undiscounted earnings in the last two years and 91% in the last four years. The company earned only 9% of its undiscounted lifetime

profits in the first 19 years. Consistent with the internet bubble of the late nineties, Amazon's stock price rose quickly from a modest \$24 on the first trading day in 1997 to \$914 (IPO equivalent price – $76 \times 12/1$) in 2000 before experiencing a severe decline in the post bubble period. Since then, an IPO equivalent share's stock price has risen to \$18,024 (IPO equivalent price – $1502 \times 12/1$). Column 6 reports the cost of capital which is 10-year Treasury bill rate plus an equity risk premium. Column 7 reports *LTEPS* or lifetime earnings per share, which is explained in section 2.1, except that it does not include estimated terminal value. To illustrate, the \$105 LTEPS reported in 1997 represents the present value of all earnings from 1997 to 2019 at the per share level. Similarly, the \$14 shown in 1999 represents the present value of all earnings per share from 1999 to 2019.

Column 8 to 10 provides information on the terminal value per share which is the perpetuity of 2019 earnings discounted using the cost of capital for that year. Column 8 provides the number of equivalent shares each year considered for computing terminal value per share. Column 9 shows the terminal value at the firm level discounted at the cost of capital for that year. For example, \$596 is a perpetuity of \$24,754 (Amazon's 2019 earnings) calculated using the 1997 cost of capital discounted back to 1997 at the rate of 8.0% (1997 cost of capital). Column 10 provides the terminal value at the per share level. Column 11 provides the sum of lifetime earnings and the terminal value (sum of columns 7 and 10). The next two columns provide the ratio between the columns 7 and 11 and the price at the beginning of each year (column 5). As can be seen from column 13, an IPO investor would have recovered 4.4 times the IPO price-based investment in lifetime earnings. This implies that 22 years of actual earnings generated a return of 120% on the IPO market price over and above Treasury bill rate plus a market risk premium. However, an investor who bought the stock on December 31, 1999 close to the peak of the internet bubble would have barely

recovered 0.8 or 80% of her investment based on earnings over the next 20 years. In other words, based on actual earnings over 20 years, an investor in 1999 has not recovered all of her investment. That number increases to 7.1 or 610% if the investor had fortuitously timed her purchase on December 31, 2008 after the stock market meltdown following the financial crisis. Ratios of lifetime earnings to stock price subsequent to 2016 range between 0.2 and 0.5.

Skeptics can claim that the above calculations ignore Amazon's future potential. We counter that 20 years is a long time to wait for an investment's value to be recovered in actual earnings and cash flows. However, to partially accommodate that criticism, we estimate a terminal value at each point of time assuming that 2019's earnings perpetuate. We deliberately stay away from speculating the expected growth rate in 2019's earnings while calculating such terminal value. A comparison of column 12 with column 13 highlights the overwhelming importance of terminal value to Amazon (even in the early years with 20 years of future actual earnings). Column 14 quantifies such dependence. Terminal value, consisting of 2019 earnings into perpetuity, accounts for 85.1% of the lifetime earnings at the IPO in 1997. An IPO investor would have recovered 29.8 times the IPO price-based investment in lifetime earnings including terminal value as compared with only 4.4 times based on earnings over the next 23 years.

Is Amazon an outlier? Is the ratio of Amazon's lifetime earnings (excluding terminal value) to share price exceptionally lower or higher than average? It turns out that the average and the median statistics are much worse compared to those of Amazon, as explained in subsequent sections of the paper.

3. Data and Analyses

3.1. The sample

For the formal analysis, we start with the firms with CRSP and COMPUSTAT data available during the period 1975 to 2019. We exclude American Depositary Receipts (ADRs) and

arrive at 20,097 firms and 208,085 firm-years out of which 3,711 firms started trading before 1975 (hereinafter referred to as “pre-1975 firms”). Due to the special payoff characteristics of the pre-1975 firms, all subsequent tables identify these firms separately.

Consider the 16,386 firms that started trading between 1975 and 2019 in panel A of Table 2. The data are analyzed by year but presented in blocks of five years to facilitate parsimonious interpretation. Out of 16,386 firms, 6,171 (38%) firms survived for at least ten years. Of the 6,171 firms, 2,757 firms survived till the end of 2019. The five-year period 1995-1999 is the most productive in terms of number of public firms as 3,385 firms started trading in the technology bubble spanning that window. As documented by Doidge, Karolyi and Stulz (2017), the number of IPOs has dropped precipitously since then. During 2015-2019, only 920 firms started trading. Firms that started trading in 1995-1999 are also less likely to survive their tenth-year anniversary (1,172 firms of 3,385) relative to the 2000-2005 window (568 of 1,285 firms) which overlaps with the aftermath of the dot com crash in 2001.

The non-survivors can either get acquired or delisted. Out of 16,386 firms, 6,963 firms merged (42%) with other firms eventually and 6,666 firms (41%) were delisted for other reasons. Panel B of Table 2 presents the average age of all categories of firms discussed here. The average life of a merged (delisted) firm is much smaller at eight (seven) years respectively relative to 15 years for survivors. The pre-1975 firms are systematically different. Not only do they stay public for longer before a merger or a delisting event (around 14 years), the survival rate of the pre-1975 firms is significantly different from the other firms. Nearly 86% of the pre-1975 firms survived at least 10 years while only 38% the post-1975 firms endured for 10 years. The pre-1975 firms look much healthier than the other firms.

3.2. Lifetime earnings per share to market price

In Table 3 and 4, we report the descriptive statistics of the ratio of a firm's lifetime earnings per share to the stock price. The objective of this analysis is to assess the portion of the market value of the firm is repaid to the investor in terms of earnings. In particular, we consider two versions of that divisor. In Table 3, lifetime earnings are scaled by the first-day stock price of the firm. In Table 4, lifetime earnings is computed every year and scaled by the beginning year stock price. All continuous variables are winsorized at 1st percentile and 99th percentile throughout the paper.

3.2.1. First day stock price

3.2.1.1. Overall trends

For the pre-1975 sample, the first-day stock price is set to that as of 1/1/75. The average lifetime earnings ratio of pre-1975 firms is 7.7 suggesting that such firms generated earnings that amounted to 8.4 times the stock price at the beginning of 1975. This is similar to Bessembinder (2018) who finds that “the percentage of stocks that generate lifetime returns less than those on Treasury bills is larger for stocks that entered the CRSP database in recent decades. This finding is consistent with evidence reported by Fama and French (2004), who saw a surge in new listings after about 1980 that included increased numbers of risky stocks with high asset growth but low profitability, and low ex post survival rates.”

Excluding the pre-1975 firms, the mean lifetime earnings to first day stock price ratio, including terminal value, is 1.1 using acquisition price of acquired firms as terminal value and 0.7 using a perpetuity of earnings. This ratio falls to 0.3 when we exclude terminal value. In other words, only 30% of the first day stock price is realized in annual earnings for all firms while the rest of investment payback comes from the terminal dividend received at the time of merger/delisting or from an estimated terminal value based on 2019 earnings. This is an important finding

in that firms that start trading after 1/1/75 have yielded no return incremental to the Treasury bill rate plus market risk premium. Recall that we have applied a discount rate equivalent to the Treasury rate prevalent as of the first year of trading plus market risk premium. Hence, we have conservatively assumed that newly public firms are individually valued at the same risk profile as the overall market. Using a higher discount rate would significantly lower the discounted lifetime earnings to first day stock price ratio to below one.

Focus on the average ratio masks significant variation and skewness, both across firms and across time. Column 5 of Panel A suggests that a median firm only realizes 29% in lifetime earnings. The disparity between the mean and the median suggests that a small proportion of firms generates significantly high earnings relative to expectations while most under perform. Un-tabulated data reveals that we need to get to nearly the 67th percentile (89th percentile excluding terminal value) before this ratio rises to one implying that about 67% of firms that started trading in the last 45 years have not generated enough earnings over their lifetime to warrant their first day stock price.

There is also considerable variation in the ratios, depending on the year in which the shares of the firms started trading. Column 2 of panel A indicates that the average ratio of lifetime earnings to first day stock price for firms that started trading between 1980 and 1984 at 0.6 is lower than 2.4 for 1975 to 1979 probably on account of the bull markets after 1982. The overall average lifetime ratio for our sample is one in column 2, without considering the pre-1975 sample, suggesting that an investor will earn no returns in terms of earnings on the first day stock price over and above the Treasury bill rate plus market risk premium. We observe a systematic decline in the median ratios over 1990-1994, 1995-1999 and 2000-2004 at 0.9, 0.3 and 0.2 respectively.

The 836 new firms that started trading between 1975 and 1979, on average, generated the highest lifetime earnings over the entire sample period (ratio of 2.4 in column 2).

The 3,385 firms that started trading between 1995 and 1999 have yet to generate enough earnings to justify their valuations with an average ratio of 0.1 (0.9 including terminal value) even though they have been in business for 20 years. These are startling numbers suggesting that the firms, on average, take decades to generate enough profits to justify their first day stock price and that the payback period varies considerably depending on when the firm starts trading.

3.2.1.2. Survivors, merged and delisted firms

Next, we partition firms into three groups based on survivorship characteristics. The sample in Panel A of Table 3 is the average of three types of firms: (a) firms that survive till 2019 (panel B); (b) firms that got acquired (panel C); and (c) firms that delisted for other reasons (panel D). One would expect the lifetime earnings of the first group to exceed that of the second and the third. Moreover, we would expect the lifetime earnings of the acquired group of firms to dominate those of firms that delisted.

Column 2 in panel B of Table 3 shows that the average lifetime earnings per share relative to first day stock price of 1.5 for surviving firms is slightly higher than the overall average of 1.1. We further divide these firms into firms which started trading before and after 2005. The first group has had the chance to stay in business for at least 15 years. Prior work shows that firms rarely generate high growth rates in earnings and revenue after 10 years (Chan et al. 2003) as reversion in growth rates in revenue and earnings occur within that time horizon. Relying on the 2005 cutoff allows for an additional five years for a firm to realize its growth potential. The unconditional average lifetime earnings to first day stock price ratio of 1.5 is driven by the firms

which have been in existence for more than 15 years. The number of firms that started trading before 2006 and survived until 2019 is much smaller at 1,269 (less than 10% of our sample).

The mean ratio for firms that started trading after 2005 is 0.5 whereas the median ratio is zero. One possible explanation is that many of these firms are still in the process of realizing their full growth potential. Therefore, a skeptic could argue that terminal value is not a good measure of the future earnings potential. However, the findings in Table 2 and Table 3 suggest that many of these firms will not survive and those that do will not generate enough lifetime earnings to justify the stock price. Hence, the best potential hope for these firms is to get acquired by another firm.

The 6,963 firms that merged, as shown in panel C, on average, returned 1.9 times their first day stock price in lifetime earnings. That payback is higher than the average payback for the overall sample. The higher payback is attributable to the discounted acquisition price the investor gets at the time of merger. On an average, we observe that more than 82% of the lifetime earnings is attributable to the merger price the investor receives at the point of merger. Remarkably, even the median ratio of 1.1 in column 5 is the best of all groups examined and points to merger as the best way to generate payback for all firms. We find that the higher payback in lifetime earnings by merged firms is driven by the higher acquisition price paid by acquirers. The average ratio falls from 1.9 to 0.9 based on a perpetuity of earnings suggesting that on an average, a merged firm does not earn enough fundamental earnings to justify its first day stock price.

As expected, the 6,666 firms that delisted did not return their initial investment as the median lifetime earnings to first day stock price is 0.1 in column 2 of panel D.

3.2.1.3. Histograms for ratio cutoffs less than one

Histograms plotting the ratio of lifetime earnings ratio, including terminal value, to first day stock price are presented in Figure 1. We have excluded surviving firms with less than 15 years of existence for the histograms. We focus on a ratio of one as a natural cutoff, even though one could argue that the cutoff should be higher given our conservative (i.e., lower) discount rate. Of the 16,386 firms we study, 5,349 or 33% of firms end up with a lifetime earnings to price ratio of more than one. Mergers account for an overwhelming 71% of ratios above one. Further, many of these firms did not have to actually generate earnings to justify their first day stock price. In fact, almost 33% of firms that were acquired had negative earnings at the time of their acquisition. But all merged firms are not uniformly productive for the investor. Of the firms with a ratio of lifetime earnings to first day stock price of less than one, 29% are accounted for by mergers and 55% by delisted firms. More sobering, lifetime earnings per share (including a terminal value) of about 50% of the present firms which have survived at least 15 years is less than their first day stock price. As mentioned earlier, pre-1975 firms performed much better than the rest of the sample with a large portion of firms crossing the cut-off ratio of one.

3.2.2. Beginning of year stock price

In Table 4, we scale the lifetime earnings of firms by the stock price at the beginning of every calendar year, instead of the first day stock price. That is, we allow for inter-temporal variation in stock prices over the life of the firm, as opposed to concentrating only on the first day stock price. The lifetime earnings to beginning year stock price ratio is slightly better at 1.2 in Column 2. Again, terminal value accounts for more than 84% of the ratio. The other results and the relevant histogram reported in Figure 2 are qualitatively similar to those discussed in section 3.2.1.

In sum, the results in Table 3 and 4 have important implications for calibrating expectations when carrying out valuation exercises and for evaluating the future of the newly listed firms. The analyst or student who forecasts expected cash flows or earnings for an individual firm might want to explicitly account for the historical survival rates and performance documented here. In particular, our results suggest that around 42% of the new firms get acquired and many of them are bought out prior to generating meaningful earnings. Around 41% of them go out of business and generate cumulative earnings of almost zero. Finally, about 17% survive and many are unable to generate cumulative earnings to justify their valuation even with significant time (more on this in the next section).

3.2.3. Survivors in existence for more than 15 years

In this section we examine the lifetime earnings ratio of the survivors at the end of each year which have been in existence for more than 15 years. Extant research (Dechow et al. 2004 and Weber 2018) relies on cross-section of firms at a point in time to compute implied equity duration using forecasted cash flows and a terminal value. Hence, they implicitly assume that all firms in a particular section will survive. In part A of Figure 3, out of 2,757 surviving firms, 583 firms (approx. 25%) have been in existence for more than 15 years and still do not generate enough earnings and terminal value to justify the first day stock price. The percentage of such surviving laggards, whose lifetime earnings to first day stock price is less than one, has increased from around 9% in 2001 to around 26% in 2019.

Part B of Figure 3 depicts the age of such surviving laggards. At the end of 2019, the average age of such surviving laggards is 25 years. These results shed light on the extent of patience needed on the part of investors to recover their investments in terms of fundamental earnings.

4. Lifetime Free Cash Flows

4.1. Lifetime free cash flows per share to market price

As mentioned earlier, we assumed the lifetime earnings to be approximately equal to lifetime cash flows. Prior literature (Francis, Olsson and Oswald, 2000) uses free cash flows for fundamental valuation models. We examine the lifetime free cash flows to beginning year stock price ratio and evaluate if the results are persistent. Listed firms were required to report cash flow statements from the year 1988. For firm-years with cash flow statement requirement, we define free cash flows as sum of operating cash flows (compustat: oancf) and investing cash flows (compustat: ivncf) (Ball and Nikolaev 2022). For firm-years before 1988, we compute the free cash flows as an adjusted model specified by Copeland, Koller and Murrin (1994) and Francis, Olsson and Oswald (2000):

$$FCF = NI + Depn - \Delta WC - Capx \dots\dots\dots(2)$$

In equation (2), *FCF* is free cash flows. *NI* is net income before extraordinary items (compustat: ib); *Depn* denotes depreciation (compustat: dp); ΔWC is change in working capital; Working capital is defined as current assets (excluding cash) less current liabilities (compustat: act – che – lct). *Capx* represents capital expenditure during the year (compustat: capx and capxv, if capx is missing). If the operating cash flow or investing cash flow number is missing, we compute the free cash flow using equation (2). To compute lifetime free cash flows to beginning year stock price, we follow the method and computation mentioned in the section 2.1 and replace earnings with free cash flows.

Table 5 present the distribution of lifetime free cash flows to beginning year stock price. First, the sample size is slightly smaller due to the definition of free cash flows for firm-years before 1988. Free cash flows involve computing change in working capital which requires prior

year's working capital, a number not available for the firm's first year in Compustat. Second, similar to Table 3 and 4, lifetime free cash flows ratio is higher for pre-1975 firms as expected.

Compared to overall average of lifetime earnings ratio of 1.2, lifetime free cash flows is much lower at 0.8. This lower ratio may be attributable to the capital expenditure being deducted from the operating cash flows. Although maintenance capital expenditure is accounted for as depreciation in the earnings number, the capital expenditure to expand the business would result in lower free cash flows and ultimately in a lower lifetime free cash flows to beginning year stock price ratio.

Column 2 of Table 5 presents the lifetime free cash flows to beginning year stock price ratio for all firm-years. When we include the merger or delisting price as the terminal value, the average lifetime free cash flows ratio is 0.8, suggesting that only 80% of the beginning year stock price is recovered in free cash flows. Using the perpetuity of free cash flows as the terminal value, we find that the ratio drops to 50% i.e., if the firm keeps bringing in free cash flows as it made in the end of its life as of 2019, the firms will only recover 50% of the price in free cash flows.

Surprisingly, lifetime free cash flows are negative when we exclude the terminal value. This suggests that there has been a net outflow of free cash flow over the lifetime in the whole market. The median firm recovers only 40% of the beginning year stock price in free cash flows. After including the merger or delisting price as the terminal value, the median firm recovers only 40% of the beginning year stock price in free cash flows.

Similar to lifetime earnings, mergers contribute the most to the number of firms with lifetime free cash flows to beginning year stock price ratio above one. Even for mergers, the lifetime free cash flows are negative excluding the merger price (Column 4, Panel C). These results

confirm our findings in the lifetime earnings section that there is a disconnect between market expectations and fundamentals.

4.2. When do the expectational errors correct?

The results thus far point to significant earnings cash flows expectation errors in the pricing of equities. The stock prices of many firms embed higher expected cash flows as compared with the actual realizations of free cash flows over long periods of time (i.e., lower lifetime free cash flows to market price ratio). These expectational errors are related to various factors such as initial valuations, market sentiment and initial profitability. It is natural to ask why these errors are not arbitrated away by informed investors. Consistent with Keynes (1936) and Shleifer and Vishny (1997), we suggest that limits to arbitrage is a contributing factor. We focus on the distribution of the ratios of lifetime cash-flows to prevailing stock prices before and after two market corrections: (a) 2000-2002 technology stock crash; and (b) the 2008 financial crisis. The results are provided in Table 6.

The average ratio of lifetime free cash flows to beginning year stock price for all firms as of 1/1/2000 is 0.6 in column 2 of panel A. That ratio rises to 1.5 at the beginning of 2003. By the beginning of 2007, the average ratio of lifetime earnings to stock price was 0.3 but had risen to 2.2 at the beginning of 2009. Surviving and merged firms also follow the same pattern. The pattern holds even after including pre-1975 firms. This data suggests over-optimism in cash flow expectations before each of the market corrections.

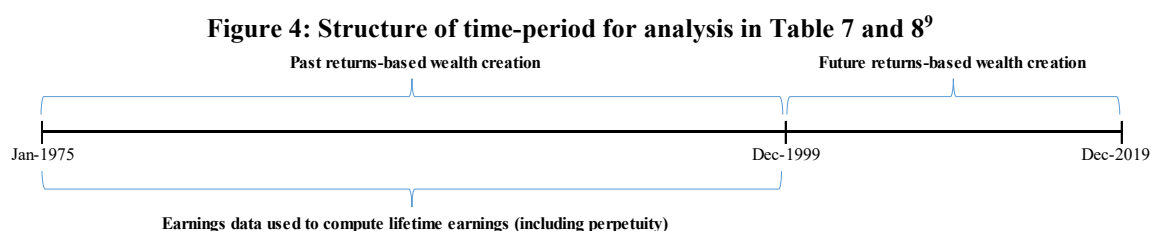
5. Fundamental value creation and stock market wealth creation

Bessembinder (2018) computes returns-based wealth creation for US companies from 1926 to 2016 and finds that approximately half the firms do not generate returns, in excess of treasury

yields. Most of the returns-based wealth creation is concentrated in the top few stocks. The study highlights the positive skewness in lifetime returns-based wealth creation in the US equity markets.

It is useful to understand whether returns-based wealth lines up with fundamentals-based wealth such as lifetime earnings. To examine the relation between lifetime earnings and future returns-based wealth creation, we need a cut-off point to divide the historical period into two, so that we can compute lifetime earnings till the cut-off point and future wealth creation after the cut-off point.

We start our analysis by fixing 31 December 1999 as the cut-off point. As shown in the figure below, we choose the end of 1999 as our focal point for two reasons – (a) the tech-boom will magnify the difference between the stock market value creation and fundamental value creation; and (b) recent media reports suggest that a new tech bubble might be about to burst.⁸ We hasten to reassure the reader that our results are not sensitive to the actual cut-off date used, as shown later in the paper.



The figure presents the break-up of our sample period to examine past returns-based wealth creation, lifetime earnings and future wealth creation. Tables 7 and 8 use the cutoff date of 1999. Past returns-based wealth creation uses stock returns from 1975 to 1999 and future wealth creation is computed using stock returns from 2000 to 2019. Lifetime earnings includes actual earnings from 1975 to 1999 and an estimated terminal value computed as perpetuity of 1999 earnings.

Returns-based wealth creation in a month is defined by Bessembinder (2018) as the sum of the future value of the monthly product of (a) monthly stock return less Treasury bill rate, and (b) the

⁸ 'Tech wreck' looks more like another dotcom bubble bursting <https://www.ft.com/content/74171839-0892-4270-b4b4-abea037ea0c4>; SoftBank's Tech Boom Goes Bust—Again <https://www.wsj.com/articles/softbanks-tech-boom-goes-bustagain-11652357244>

⁹ The other three figures can be found later in the paper along with the tables.

beginning month market capitalization. To be consistent with Bessembinder (2018), we compute lifetime earnings at the firm level and not at the per share level. However, we use a modified version of returns-based wealth creation to be consistent with our research question and methodology used in prior sections. We do not deduct the Treasury bill rate from returns because we are not interested in examining whether the stocks outperform Treasury bill rate. Further, we use the Treasury bill rate plus equity risk premium for computing future value of both returns-based wealth and lifetime earnings. We rely on the following definition of wealth creation:

Returns – based wealth creation_i

$$= \sum_{m=1}^M (BMC_{i,m} * Ret_{i,m} * FV_m) \dots \dots \dots (3)$$

In equation (3), $BMC_{i,m}$ is the market capitalization of firm i at the beginning of the month m ; $Ret_{i,m}$ is the monthly stock return of firm i for the month m ; FV_m is the future value factor of month m based on treasury bill rate plus equity risk premium discussed earlier in the paper.¹⁰ M is total number of months the firm survives till it either delists or merges or we encounter the end of our cut off data at the end of 1999.

After excluding pre-1975 firms, our sample for this analysis includes 5,428 firms which survived till the end of 1999. Table 7 shows that 5,428 firms created returns-based wealth of \$6.6 trillion dollars from the time they got listed till the end of 1999. Panel A shows that out of the 5,428 firms in existence as of 1999, 32% or 1,725 firms subsequently go out of business (delist), 48% or 2,633 firms eventually merged and the remaining 20% survived till the end of 2019. Firms which ultimately got delisted in future, had created wealth of \$388 billion (column 6 of Table 7)

¹⁰ Our results and inferences hold even if we use excess stock return over Treasury bill rate as used by Bessembinder (2018).

till 1999. These firms go on to eventually destroy \$2.84 trillion of wealth, resulting in a net lifetime wealth destruction of approximately \$2.5 trillion (\$2.84-\$0.39).

To investigate the relationship between past returns-based wealth creation, lifetime earnings and future returns-based wealth creation, we divide the sample into quintiles of past returns-based wealth creation using 1999 as a cutoff. We further partition each returns-based wealth quintile into two groups based on the median lifetime earnings. To reduce the impact of firm size on groupings, we scale past returns-based wealth creation and lifetime earnings by the initial market capitalization at the time of listing of the firm.

In Table 8, we report future returns-based wealth creation associated with each group of past returns-based wealth creation and lifetime earnings. Panel A shows the number of firms in each group. By construction, we find an equal number of firms in each of the quintiles and above and below median groups. However, 1,063 firms with below median lifetime earnings as of 1999 delisted subsequently as compared with only 666 firms with above median lifetime earnings. In contrast, above median lifetime earnings firms are more likely to be survivors (666 firms) as compared with below median firms (404 firms). These results suggest that lifetime earnings is associated with (a) the likelihood of future survival; and (b) future returns-based wealth creation.

Panel B of Table 8 reports the future returns-based wealth creation associated with each group. Columns 1 to 4 and 5 to 8 report the total and mean future returns-based wealth creation from 2000 to 2019 for each quintile group, respectively. Although subsequently delisted firms destroy wealth, we were surprised to find that firms which merged after 1999 destroyed 74% (\$1.9 trillion) of the returns-based wealth created till 1999. This is probably because these firms were acquired after a significant correction in their stock prices. As expected, the firms which survive till 2019 contribute the most to the future returns-based wealth creation.

Column 1 of Panel B shows that future returns-based wealth creation for all above median lifetime earnings firms is \$8.24 trillion while below median firms destroyed \$0.84 trillion. We observe a similar pattern across all quintiles of current returns-based wealth generation. It is particularly interesting to note that even in the quintile of firms with the highest wealth generation as of 1999, below median lifetime earnings generators end up destroying returns-based wealth over the subsequent 20 years (-\$1.77 trillion). Columns 9 to 12 suggest that the mean future returns-based wealth creation of above median lifetime earnings firms at \$2.2 billion dollars is more than that of below median lifetime earnings firms at \$-0.2 billion. Overall, these indicate that lifetime earnings ratio is informative about the future returns-based wealth creation in the stock market, even after controlling for past returns-based wealth generation.

To show that this result is robust and persists for other years, we compute lifetime earnings, past wealth creation and future wealth creation for each firm at the end of each year from 1995 to 2004. This exercise resulted in a sample of 48,759 firm-years from 1995 to 2004. In Table 9, we report a regression of future wealth creation on lifetime earnings and past wealth creation and several control variables. We report standardized coefficients for ease of comparison and interpretation. Consistent with Tables 7 and 8, we find that lifetime earnings determined at a given point in time is positively correlated with subsequent returns-based wealth creation. Furthermore, past returns-based wealth creation is negatively associated with future returns-based wealth creation.

Overall, these results suggest that lifetime earnings (both including and excluding perpetuity based on latest earnings) contain information about future returns-based wealth creation in the stock market. This analysis is consistent with the hypothesis that the long-term stock prices ultimately converge towards fundamental value creation of the firm.

6. Robustness tests

6.1. Discount rate

Dechow et al. (2004), Weber (2018) and Dechow et al. (2021) use a fixed discount rate of 12% to calculate the duration of equities. To compute lifetime earnings, our paper assumes a discount rate of Treasury bill rate plus implied market risk premium. To ensure that our reported results are not sensitive to the discount rate estimates, we use different discount rates and compute average lifetime earnings ratio, median ratio and proportion of firms which could not justify their stock price on first day stock price. Figure 5 presents the sensitivity of lifetime earnings to first day stock price ratio to the discount rate. Part (a) of Figure 5 shows the numbers at equity risk premiums incremental to Treasury bill rate ranging from 2% to 8% at intervals of 1%. Part (b) reports the numbers at fixed discount rates ranging from 9% to 15% at intervals of 1%. As expected, the lifetime earnings to first day stock price ratio decreases with equity risk premium and discount rate. Considering the extreme equity risk premiums, the average (median) ratio is 1.43 (0.34) at 2% and this ratio is 0.75 (0.22) at 8% equity risk premium. Surprisingly, even at a very conservative estimate of discount rate of Treasury bill rate plus 2%, 64% of the firms could not justify the first day stock price in terms of fundamental earnings.¹¹ This proportion goes up to 73% when we consider the discount rate of Treasury bill rate plus 8%. These results suggest that reasonable ranges of discount rate do not alter our inferences.

6.2. Stock price

The beginning year stock price we use for computing the lifetime earnings ratio is the average of the previous year's *last day* (December 31) stock price. We instead use previous year's *last month* (December month of previous year) average stock price to remove the year-end effect

¹¹ Distribution of lifetime earnings is similar when we examine beginning year stock prices.

on lifetime earnings ratio. Columns 2 to 4 of Table 10 present the average ratio, median ratio and proportion of laggards. The results suggest that the statistics are not sensitive to the year-end stock price. Prior research suggests seasonality in stock prices and in particular that stock prices are temporarily depressed in December (Dyl 1977, Givoly and Ovadia 1983). Despite lower prices in the month of December, we find that 60% of the stocks do not justify their stock price in terms of earnings. The average (median) lifetime earnings scaled by the beginning year stock price is 1.3 (0.6) which is close to our baseline results.

6.3. Valuation model

In all our analyses, we use the discounted cash flow (DCF) method to find the intrinsic value of the stock and scale it by the stock price to find the lifetime earnings ratio. As a sensitivity check, we recomputed the lifetime earnings ratio using the residual income valuation model (Ohlson, 1995):

$$\text{Lifetime earnings per share}_{i,t} = BVPS_{i,t-1} + \frac{\sum_{n=1}^{T-t} ((EPS_{i,t+n} - (BVPS_{i,t+n-1} * DiscRate_{t+1})))}{(1+DiscRate_{t+1})^n} + \frac{FVPS_i}{(1+DiscRate_{t+1})^{T-t+1}} \dots \dots \dots (4)$$

In equation (4), i , t and T denote firm, year at the beginning of which the ratio is computed, and last year of the firm i depending on whether the firm survived or was delisted or merged, respectively. $BVPS_{i,t}$ is the book value per share of firm i at the end of year t . $EPS_{i,t}$, $DiscRate_t$ and $FVPS_i$ are the same as defined in equation (1) except the estimated terminal value ($FVPS$) for surviving firms which is estimated as the 2019 residual income ($EPS - DiscRate \times BVPS$) divided by the discount rate of the year for which the ratio is being computed.

Columns 5 to 7 present the statistics. We find that residual income valuation method results in much lower average (median) ratio at -0.3 (0.0) as compared to the average at 1.1 (0.7) using

discounted cash-flow valuation method. The proportion of laggards is also similar to that in discounted cash-flow valuation model. These results suggest that the choice of the valuation model does not materially alter the inferences.

7. Conclusions

In this paper, we ask how the lifetime earnings of a firm compares with the firm's stock price at the end of each year. We analyze a list of 20,097 domestic firms for the years 1975-2019. Of these, 3,711 firms started trading before 1975. Of the remaining 16,386 firms, 17% firms survived, 42% firms merged with other firms eventually and rest were delisted. On average, for the first year of our sample, the aggregate earnings over their lifetime are roughly equal to the first day stock price. However, the average ratio masks significant variation and skewness, both across firms and across time. About 64% of firms that started trading in the last 45 years have not generated enough earnings over their lifetime to justify their first day stock price. The average ratios of lifetime earnings to first day stock price for the time windows 1975-1979, 1985-1989, 1995-1999 and 2000-2004 are 2.4, 0.6, 1.0 and 1.9 respectively.

An eventual merger is the best outcome in terms of payback for the investor. Merged firms, on average, returned 1.9 times their first day stock price in lifetime earnings and that higher ratio is driven by the acquisition price the investor gets at the time of merger. Delisted firms did not return their initial investment as the average lifetime earnings to stock price is 0.1. Lifetime earnings per share (including a terminal value) of about 50% of the present firms which have survived at least 15 years is less than their first day stock price. We find such firms have been in existence for around 25 years and yet have not performed well enough in terms of earnings to justify their first trading day price.

We also examine free cash flows instead of earnings. We find that firms perform worse in lifetime free cash flows as compared to lifetime earnings. Finally, we investigate the role of

lifetime earnings in future stock returns-based wealth creation (Bessembinder (2018)). We find that lifetime earnings are positively associated with the future stock returns-based wealth creation. Our findings confirm that market prices ultimately move towards the value based on fundamentals. Our results have implications for analysts and students interested in valuation and forecasting of fundamentals. At the very minimum, they may want to explicitly calibrate future expectations of earnings for stocks in general using the historical data we present in this paper.

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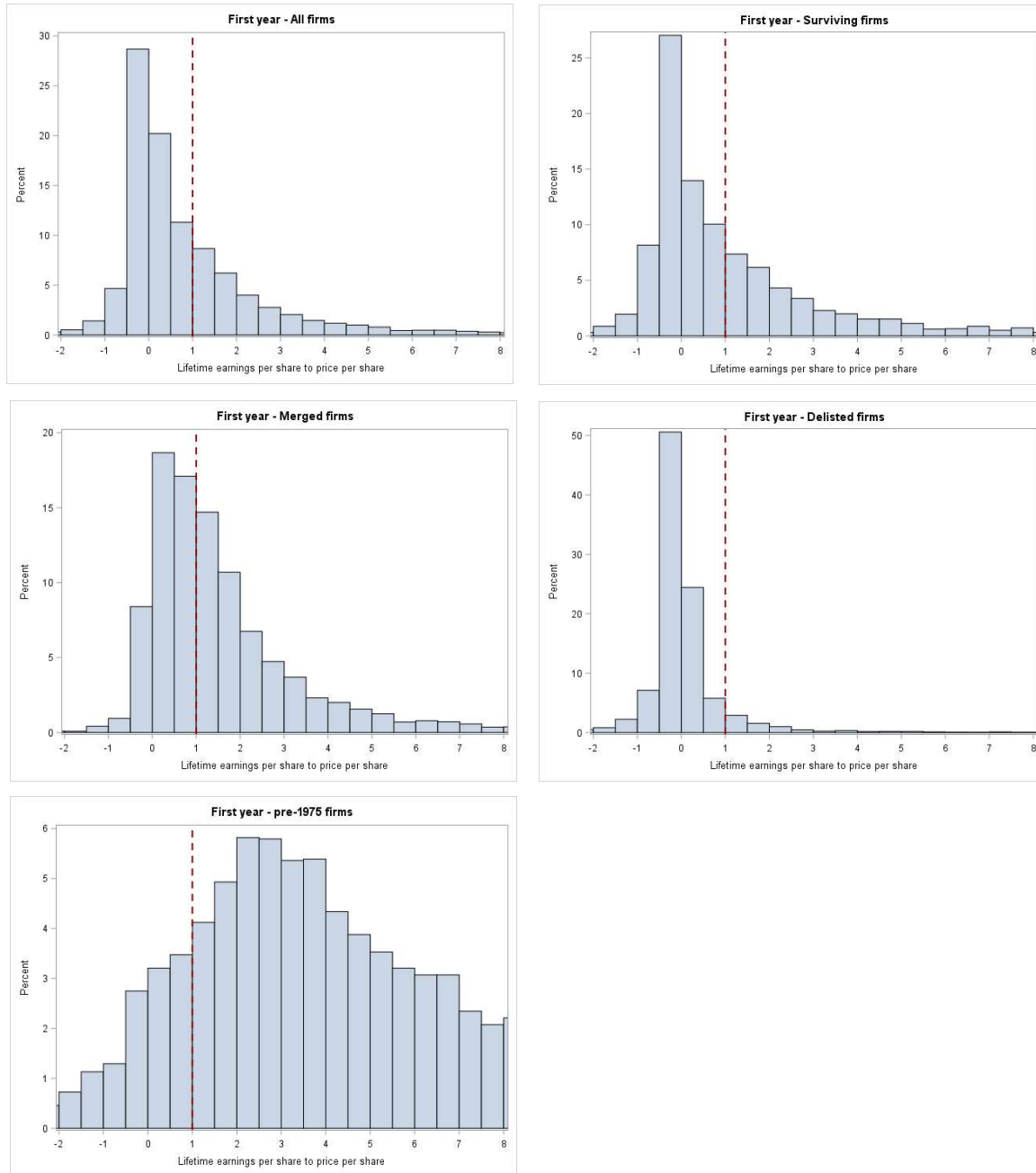
APPENDIX A

Computing ratio of lifetime earnings per share to beginning year stock price for a hypothetical firm

Lifetime earnings per share to price per share in subsequent years																						
31 December	1980	1981	1982	1983	1984	1985	1986	1987								2005	2006	2007	2008	2009	2010	
Price per share		1,280	1,536	1,690	1,521	1,825	2,190	2,628								5,255	5,781	6,359	5,723	5,151		
Firm Value (merger/ delisting) per share																					4,000	
31 December	1980	1981	1982	1983	1984	1985	1986	1987								2005	2006	2007	2008	2009	2010	
Earnings per share		30	36	43	52	62	75	90								3870	200	320	352	422	465	4,000
Dividends paid to investors			15	20																		
Discounted earnings per share 1981			30	30	30	30	30	30								744	16	23	23	26	27	222
Total discounted earnings per share 1981			1,262																			
Market return on dividends 1981		3	3	3	3	3	3	3								53	3	3	3	3	3	3
Discounted market return on dividends 1981		2	2	2	2	1	1	1								10	0.2	0.2	0.2	0.2	0.2	0.2
Total discounted value of market return 1981			21																			
Market return on dividends 1982			4	4	4	4	4	4								71	4	4	4	4	4	4
Discounted market return on dividends 1982			3	2	2	2	2	1								14	0.3	0.3	0.3	0.2	0.2	0.2
Total discounted value of market return 1982			25																			
Discounted earnings per share 1982			37	39	40	42	44									806	19	27	27	31	32	265
Total discounted earnings per share 1982			1,410																			
Market return on dividends 1982			4	4	4	4	4	4								71	4	4	4	4	4	4
Discounted market return on dividends 1982			3	3	3	3	2	2								15	0.4	0.3	0.3	0.3	0.3	0.3
Total discounted value of market return 1982			30																			
Discounted earnings per share 2006																		291	292	329	344	2,821
Total discounted earnings per share 2006																		4,078				
Lifetime earnings per share		1,308	1,440															4,078				
Lifetime earnings per share to price per share		1.0	0.9															0.7				
31 December	1980	1981	1982	1983	1984	1985	1986	1987								2005	2006	2007	2008	2009	2010	

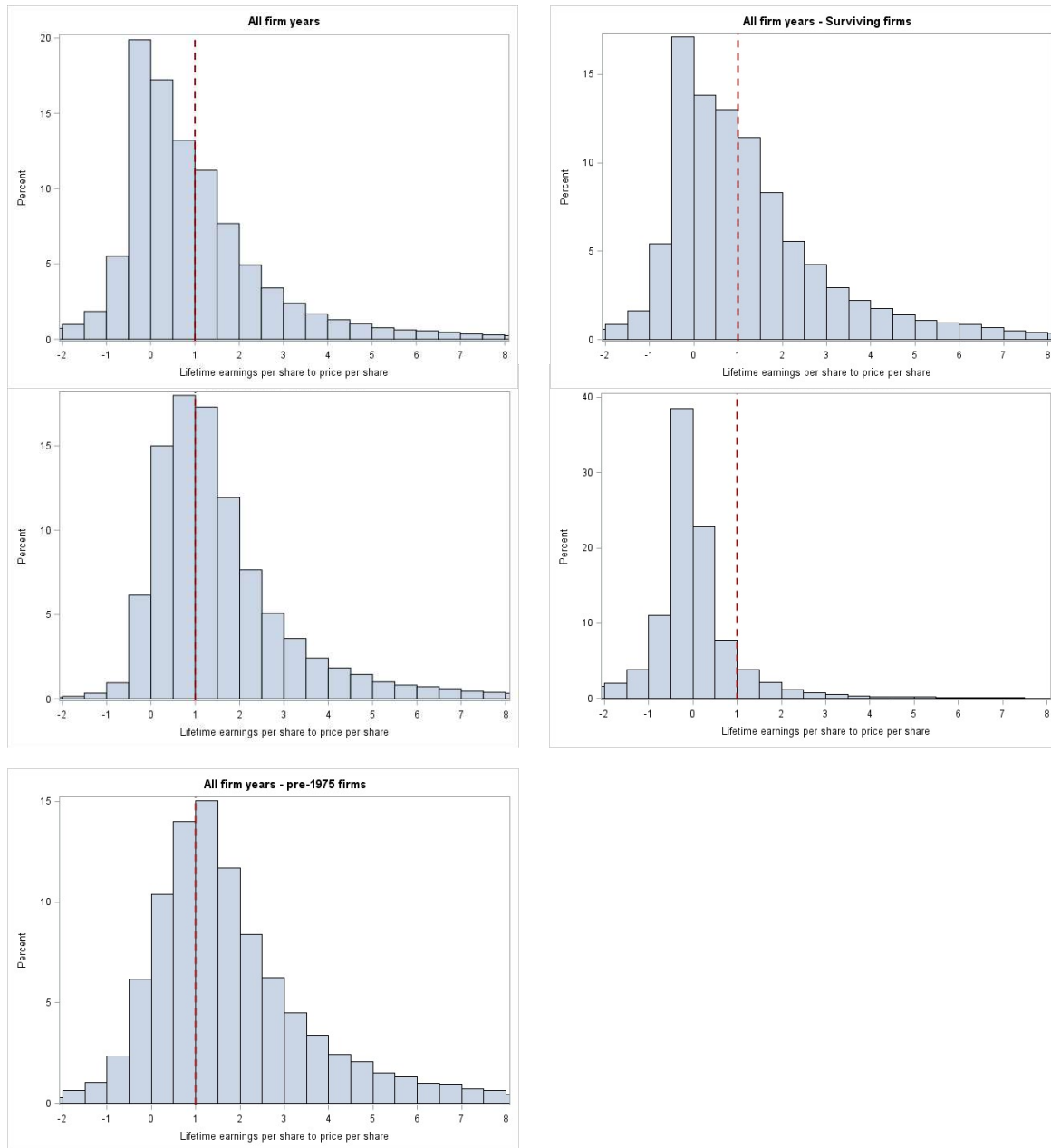
The timeline above shows how the ratio of the lifetime earnings per share to beginning year stock price is computed every year. We obtain earnings per share and dividends paid from COMPUSTAT. We obtain stock price per share and firm value per share from CRSP. Discounted earnings per share is computed using an expected rate of return which is estimated at the 10-year Treasury bill rate at the end of respective year plus implied equity risk premium. Market return on dividends is computed using the same expected return on each dividend paid to investors for the years from the time it was paid till the end of the life of the firm. Lifetime earnings per share is sum of total discounted earnings per share, total market return on dividends and discounted value of firm value per share.

FIGURE 1
Histogram of the ratio of lifetime earnings to first trading day price



The histograms present the ratio of lifetime earnings per share to first trading day stock price per share for all firms, surviving firms, merged firms, and delisted firms. The ratio is computed the same way as explained in the section 2.1 including estimated terminal value for the surviving firms. The survived firms include only those firms which have at least 15 years of life. The histograms have bins of 0.5, lower limit of -2 and upper limit of 8. Ratios outside these limits are considered for computing the percentages in the histogram.

FIGURE 2
Histogram of the ratio of lifetime earnings to beginning year stock price

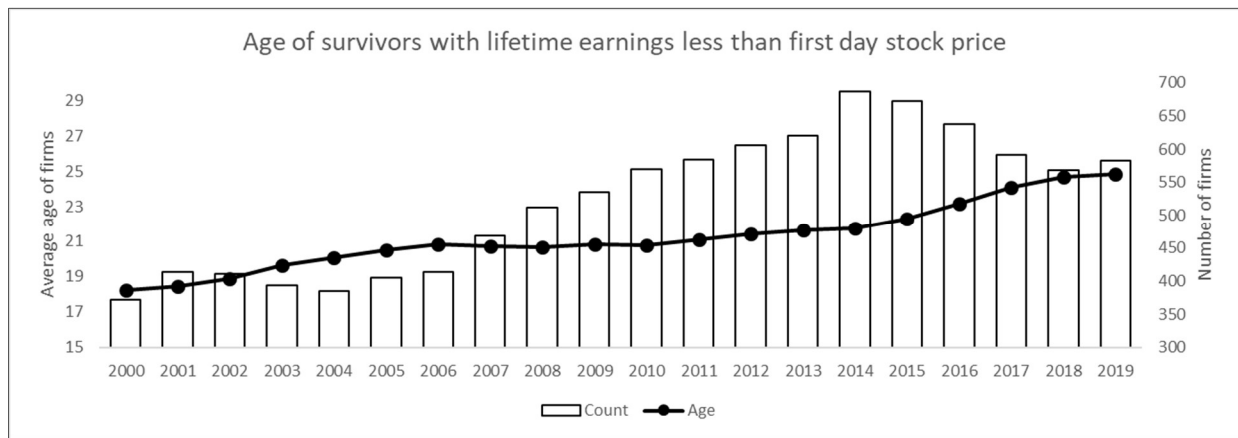


The histograms present the ratio of lifetime earnings per share to market price per share for all years for all firms, surviving firms, merged firms, and delisted firms. The ratio is computed the same way as explained in the section 2.1 including estimated terminal value for the surviving firms. The survived firms include only those firms which have at least 15 years of life. The histograms have bins of 0.5, lower limit of -2 and upper limit of 8. Ratios outside these limits are considered for computing the percentages in the histogram.

FIGURE 3
Survivors with lifetime earnings to first day stock price ration less than 1



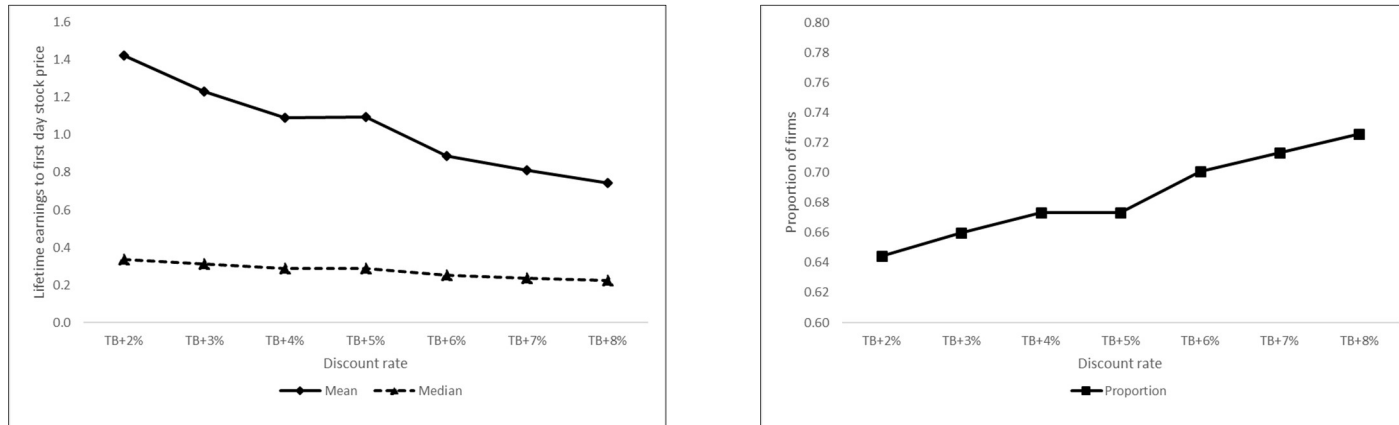
(a) Survivors with lifetime earnings less the first day stock price



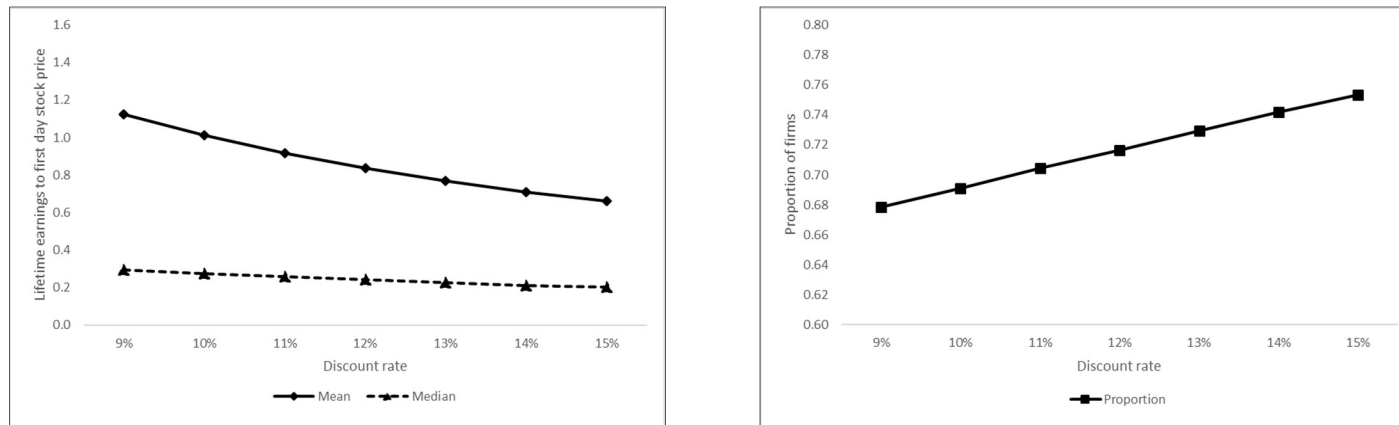
(b) Age of survivors with lifetime earnings less the first day stock price

Figures above show the number of survivors from 2000 to 2019 without look-ahead bias about the future of the firm. These survivors have been listed for more than 15 years and have lifetime earnings lower than their first day stock price. %Surv15 represents the percentage of number of such survivors to number of survivors in existence for more than 15 years and %Surv represents the percentage of number of such survivors to number of all survivors. The bars represent the number of survivors which have been in existence for more than 15 years and the lifetime earnings is less than their first day stock price. Age represents the average number of years the firm has been listed till the end of the year.

FIGURE 5
Sensitivity to discount rates



(a) Sensitivity to equity risk premium



(b) Sensitivity to fixed discount rates

The figures above present sensitivity of lifetime earnings ratio to equity risk premium and discount rates. They present the mean and median of lifetime earnings to first day stock price ratio along with the proportion of firms which could not justify the first day stock price in lifetime earnings. Part (a) presents the sensitivity to equity risk premium where the ratio is computed at Treasury bill rate plus equity risk premium ranging from 2% to 8% at intervals of 1%. Similarly, part (b) presents the sensitivity to fixed discount rates where the ratio is computed at fixed discount rates ranging from 9% to 15% at intervals of 1%.

TABLE 1
Lifetime earnings per share to stock price for Amazon.com

Year	Earnings	Shares outstanding	Split adjustment factor	Beginning price	Cost of capital	LTEPS	Equivalent shares (Term Val)	Terminal Value (2019 Earnings capitalized)	TVPS	LTE	LTE ratio	LTE ratio (excluding Term Val)	Term Val%
	\$ mil	mil		\$		\$	mil	\$ mil	\$	\$			%
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1997	(28)	24	12	24	8.0	105	42	24,754	596	701	29.8	4.4	85.1
1998	(125)	53	6	60	7.1	71	83	35,841	432	503	8.3	1.2	85.8
1999	(720)	341	1	321	6.7	14	498	43,851	88	102	0.3	0.0	86.0
2000	(1,411)	357	1	76	8.8	12	498	24,667	50	61	0.8	0.2	80.9
2001	(557)	373	1	16	7.5	20	498	39,713	80	100	6.4	1.3	79.8
2002	(150)	388	1	11	5.8	29	498	73,671	148	177	16.4	2.7	83.5
2003	35	403	1	19	4.7	36	498	112,509	226	262	13.8	1.9	86.4
2004	588	410	1	53	4.9	37	498	111,988	225	262	5.0	0.7	86.0
2005	333	416	1	44	7.1	29	498	58,992	118	147	3.3	0.7	80.4
2006	190	414	1	47	9.0	25	498	38,901	78	103	2.2	0.5	75.8
2007	476	416	1	39	9.0	27	498	41,708	84	110	2.8	0.7	75.9
2008	645	428	1	93	8.0	30	498	57,116	115	145	1.6	0.3	79.1
2009	902	444	1	51	4.5	42	498	160,777	323	365	7.1	0.8	88.5
2010	1,152	451	1	135	5.3	39	498	129,714	260	299	2.2	0.3	87.0
2011	631	455	1	180	6.1	37	498	112,890	227	263	1.5	0.2	86.1
2012	(39)	454	1	173	5.8	38	498	126,008	253	291	1.7	0.2	87.0
2013	274	459	1	251	5.0	42	498	165,590	333	375	1.5	0.2	88.7
2014	(241)	464	1	399	5.8	42	498	142,451	286	328	0.8	0.1	87.2
2015	596	471	1	310	6.1	44	498	140,102	281	326	1.0	0.1	86.4
2016	2,371	477	1	676	5.9	46	498	156,485	314	360	0.5	0.1	87.2
2017	3,033	482	1	750	5.9	44	498	166,031	333	377	0.5	0.1	88.4
2018	10,073	489	1	1,169	7.8	39	498	128,408	258	297	0.3	0.0	86.8
2019	11,588	498	1	1,502	7.3	22	498	147,079	295	317	0.2	0.0	93.2

The table above shows the lifetime earnings per share to stock price per share for Amazon Inc over its life. We obtain earnings, number of shares outstanding and book value per share from COMPUSTAT. We obtain share price, number of shares outstanding, first trading day stock price and adjustment factor from CRSP. *Earnings* is income before extraordinary items available to common shareholders (ib) from COMPUSTAT annual dataset. Shares outstanding (shROUT) is the number of shares outstanding in millions and split adjustment factor (CFACPR) is the factor used to find adjusted shares outstanding. Beginning price is the stock price at the start of year and for the first year, it represents the first trading day stock price from CRSP. *COC* is the cost of capital or expected rate of return estimated at 10-year Treasury bill rate at the end of each year plus an equity risk premium. We use this rate for discounting earnings per share, and terminal value per share. *LTEPS* is lifetime earnings per share which is explained in section 2.1 except that it does not include estimated terminal value. Equivalent shares (Term Val) is the number of shares outstanding at the end of 2019 adjusted for stock splits. Terminal value is the estimated terminal value at the firm level discounted at the cost of capital. The estimated terminal value is computed by capitalizing 2019 earnings at the cost of capital of that year. *TVPS* is the discounted value of terminal value divided by equivalent shares (Term Val). *LTE* is lifetime earnings per share including a discounted value of an estimated terminal value per share (Term Val) as explained in section 2.1. *LTE ratio* is the ratio of lifetime earnings per share (excluding terminal value) to stock price per share (Beginning price). *LTE ratio (excluding Term Val)* is the ratio of lifetime earnings per share (excluding discounted terminal value) to stock price per share (Beginning price). *Term Val%* is the percentage of estimated terminal value to price per share.

TABLE 2
Number of firms in our sample and their age group

	Firms that were listed for at least				Firms that		
	# firms	10 years	20 years	30 years	Survived	Merged	Delisted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Number of firms							
Before 1975	3,711	3,187	2,021	1,260	369	2,283	1,059
1975-1979	836	463	214	98	36	374	426
1980-1984	2,275	984	398	202	93	872	1,310
1985-1989	2,407	1,116	406	210	142	925	1,340
1990-1994	3,290	1,318	580	28	306	1,804	1,180
1995-1999	3,385	1,172	508	-	362	1,723	1,300
2000-2004	1,285	568	94	-	264	605	416
2005-2009	1,058	483	-	-	298	387	373
2010-2014	930	67	-	-	490	231	209
2015-2019	920	-	-	-	766	42	112
Total	20,097	9,358	4,221	1,798	3,126	9,246	7,725
Total (excluding pre-1975 firms)	16,386	6,171	2,200	538	2,757	6,963	6,666
Panel B: Average life of firms							
Before 1975	17	20	26	32	45	14	15
1975-1979	13	20	28	36	40	13	10
1980-1984	10	19	28	33	36	11	8
1985-1989	10	17	26	31	32	10	7
1990-1994	10	18	25	29	27	8	8
1995-1999	8	16	22	-	22	6	6
2000-2004	9	15	19	-	18	6	6
2005-2009	8	12	-	-	13	6	5
2010-2014	6	10	-	-	7	4	5
2015-2019	3	-	-	-	3	2	2
Overall average	10	18	25	32	18	10	8
Overall average (excluding pre-1975 firms)	9	17	25	33	15	8	7

The table above presents the number of firms and their life in years for different groups based on their listing year and their status. We have divided the firms in our sample into 9 groups of 5 years. Panel A shows the total number of firms in our sample, number of firms that were merged before the end of 2019, delisted for reasons other than merger before the end of 2019 and that are surviving as at the end of 2019. It also presents the total number of firms that were listed for at least 10 years, 20 years, and 30 years. Panel B reports the life of these firms in the above groups mentioned.

TABLE 3
Distribution of lifetime earnings to first day stock price ratios

Mean				Median				Proportion of firms (LTE < 1)		
				Excl. TV			Excl. TV			Excl. TV
#firms	Merg/Del Prc	Perpetuit y			Merg/Del Prc	Perpetuit y		Merg/Del Prc	Perpetuit y	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
Panel A: All firms										
Before 1975	3,711	7.7	6.1	4.3	4.4	3.7	2.0	0.15	0.19	0.32
1975-1979	836	2.4	1.7	1.1	1.0	0.7	0.3	0.50	0.58	0.72
1980-1984	2,275	0.6	0.4	0.2	0.1	0.0	(0.0)	0.78	0.86	0.91
1985-1989	2,407	1.0	0.6	0.3	0.2	0.1	(0.0)	0.71	0.81	0.89
1990-1994	3,290	1.9	1.2	0.4	0.9	0.4	0.1	0.53	0.65	0.85
1995-1999	3,385	0.9	0.4	0.1	0.3	0.0	(0.0)	0.68	0.81	0.92
2000-2004	1,285	1.0	0.7	0.1	0.2	(0.0)	(0.0)	0.69	0.76	0.89
2005-2009	1,058	0.7	0.4	0.1	0.4	0.1	0.0	0.75	0.84	0.94
2010-2014	930	0.7	0.5	(0.1)	0.2	(0.0)	(0.0)	0.68	0.77	0.96
2015-2019	920	0.2	0.2	(0.1)	(0.0)	(0.0)	(0.0)	0.84	0.86	0.98
All	20,097	2.3	1.7	1.0	0.6	0.3	0.1	0.58	0.66	0.79
Excl. pre1975	16,386	1.1	0.7	0.2	0.3	0.1	(0.0)	0.67	0.77	0.89
Panel B: Surviving firms										
Before 1975	369	15.0	14.1	12.9	9.4	9.4	9.0	0.04	0.04	0.04
1975-2005	1,269	2.6	2.4	1.5	1.3	1.3	0.9	0.46	0.46	0.54
After 2005	1,488	0.5	0.5	(0.0)	(0.0)	(0.0)	(0.0)	0.77	0.77	0.95
All	3,126	3.1	2.9	2.1	0.7	0.7	0.2	0.56	0.56	0.67
Excl. pre1975	2,757	1.5	1.4	0.7	0.4	0.4	0.1	0.63	0.63	0.76
Panel C: Merged firms										
Before 1975	2,283	8.1	5.8	3.8	4.8	3.8	2.0	0.06	0.12	0.29
1975-1979	374	3.8	2.3	1.5	2.2	1.4	0.7	0.24	0.41	0.59
1980-1984	872	1.3	0.6	0.4	0.7	0.3	0.1	0.60	0.80	0.86
1985-1989	925	2.0	0.9	0.5	1.2	0.5	0.2	0.45	0.70	0.86
1990-1994	1,804	2.6	1.5	0.4	1.6	0.9	0.2	0.31	0.53	0.86
1995-1999	1,723	1.4	0.5	0.1	0.9	0.2	0.0	0.52	0.79	0.96
2000-2004	605	1.3	0.7	0.1	0.7	0.0	(0.0)	0.59	0.74	0.95
2005-2009	387	1.0	0.4	0.0	0.8	0.1	0.0	0.60	0.84	0.98
2010-2014	231	1.5	0.6	(0.0)	1.2	0.1	(0.0)	0.41	0.76	0.99
2015-2019	42	1.2	0.2	(0.2)	1.2	0.2	(0.0)	0.43	0.83	1.00
All	9,246	3.4	2.1	1.2	1.6	0.8	0.2	0.36	0.55	0.74
Excl. pre1975	6,963	1.9	0.9	0.3	1.1	0.4	0.1	0.46	0.69	0.89
Panel D: Delisted firms										
Before 1975	1,059	4.2	4.1	2.5	2.1	2.1	1.0	0.38	0.38	0.50
1975-1979	426	1.1	1.1	0.5	0.1	0.1	(0.0)	0.73	0.73	0.85
1980-1984	1,310	0.1	0.1	(0.1)	(0.0)	(0.0)	(0.1)	0.93	0.93	0.97
1985-1989	1,340	0.1	0.1	(0.1)	(0.1)	(0.1)	(0.1)	0.93	0.93	0.96
1990-1994	1,180	0.2	0.2	(0.1)	(0.1)	(0.1)	(0.2)	0.90	0.90	0.94
1995-1999	1,300	(0.0)	(0.0)	(0.2)	(0.1)	(0.1)	(0.2)	0.94	0.94	0.97
2000-2004	416	(0.0)	(0.0)	(0.1)	(0.1)	(0.1)	(0.2)	0.94	0.94	0.95
2005-2009	373	0.0	0.0	(0.1)	(0.1)	(0.1)	(0.1)	0.96	0.96	0.97
2010-2014	209	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	0.97	0.97	1.00
2015-2019	112	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	0.98	0.98	0.99
All	7,725	0.7	0.7	0.3	(0.0)	(0.0)	(0.1)	0.84	0.84	0.89
Excl. pre1975	6,666	0.1	0.1	(0.1)	(0.1)	(0.1)	(0.1)	0.92	0.92	0.95

The table above presents the mean and median of lifetime earnings per share (including and excluding terminal value) to first day stock price per share for different firm groups based on first year and survivorship status of the firm as at the end of 2019. We have divided the firms into 9 groups of 5 years. Firms in the '1975-1979' group are the firms which started trading between 1st January 1975 and 31st December 1979. Panels A, B, C and D show these descriptive statistics about all firms, surviving firms, merged firms, and delisted firms in our sample. Surviving firms are the firms which exist on December 31, 2019. Merged firms are the firms which were acquired or merged before the end of 2019. Delisted firms are the firms which were delisted before the end of 2019 for reasons other than merger. Columns 2, 3, 5 and 6 present the statistics for the ratio of lifetime earnings (including terminal value) to first day stock price while columns 4 and 7 present the ratios excluding terminal value. The terminal value in Columns 2 and 3 is the actual merger price paid by the acquirer to the shareholders while in Columns 3 and 6, the acquisition price for mergers is estimated to be discounted value of perpetuity of earnings at the time of acquisition. Columns 2 to 4 present the averages and Columns 5 to 7 present the median numbers. Columns 8 to 10 present the proportion of firms with lifetime earnings less than the first day stock price. All continuous variables are winsorized at 1st percent and 99th percent levels.

TABLE 4
Distribution of lifetime earnings to beginning year stock price ratios

Mean				Median				Proportion of firms (LTE < 1)		
#firms	Merg/Del Prc	Perpetuit y	Excl. TV	#firms	Merg/Del Prc	Perpetuit y	Excl. TV	Merg/Del Prc	Perpetuit y	Excl. TV
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
Panel A: All firms										
Before 1975	64,235	2.4	2.0	1.3	1.5	1.2	0.6	0.35	0.45	0.63
1975-1979	10,718	1.5	1.1	0.6	0.8	0.5	0.2	0.55	0.65	0.79
1980-1984	23,548	1.3	0.8	0.3	0.5	0.2	0.0	0.63	0.74	0.86
1985-1989	24,010	1.4	0.9	0.3	0.6	0.3	0.1	0.60	0.70	0.85
1990-1994	31,500	1.4	1.0	0.2	0.8	0.5	0.1	0.55	0.66	0.87
1995-1999	26,869	1.2	0.8	0.1	0.6	0.2	0.0	0.60	0.71	0.90
2000-2004	11,158	1.0	0.7	(0.0)	0.5	0.2	0.0	0.64	0.72	0.92
2005-2009	8,120	0.9	0.7	(0.1)	0.5	0.2	0.0	0.65	0.73	0.94
2010-2014	5,418	0.4	0.3	(0.2)	0.1	(0.0)	(0.0)	0.73	0.78	0.98
2015-2019	2,509	0.1	0.1	(0.2)	(0.0)	(0.0)	(0.1)	0.86	0.87	0.99
All	208,085	1.6	1.2	0.5	0.9	0.6	0.2	0.53	0.63	0.80
Excl. pre1975	143,850	1.2	0.8	0.2	0.6	0.3	0.1	0.60	0.70	0.88
Panel B: Surviving firms										
Before 1975	16,647	2.9	2.9	2.2	1.8	1.8	1.2	0.27	0.27	0.46
1975-2005	14,048	2.6	2.4	1.3	1.4	1.4	0.9	0.42	0.42	0.53
After 2005	26,091	1.1	1.1	0.2	0.8	0.8	0.2	0.58	0.58	0.92
All	56,786	2.0	1.9	1.0	1.1	1.1	0.4	0.46	0.46	0.69
Excl. pre1975	40,139	1.6	1.5	0.5	0.9	0.9	0.2	0.54	0.54	0.78
Panel C: Merged firms										
Before 1975	31,881	2.8	1.9	1.2	1.7	1.1	0.6	0.25	0.45	0.66
1975-1979	4,896	2.2	1.3	0.7	1.4	0.8	0.3	0.37	0.59	0.77
1980-1984	9,893	2.2	1.0	0.4	1.2	0.5	0.2	0.42	0.68	0.86
1985-1989	9,544	2.4	1.2	0.4	1.4	0.7	0.2	0.37	0.62	0.86
1990-1994	13,841	2.1	1.1	0.3	1.4	0.7	0.1	0.36	0.61	0.91
1995-1999	11,093	1.7	0.8	0.1	1.1	0.4	0.1	0.46	0.73	0.95
2000-2004	3,905	1.5	0.7	(0.1)	1.0	0.2	0.0	0.50	0.76	0.97
2005-2009	2,194	1.4	0.6	(0.0)	1.0	0.2	0.0	0.48	0.76	0.98
2010-2014	854	1.4	0.6	(0.1)	1.2	0.1	0.0	0.41	0.76	1.00
2015-2019	74	1.4	0.2	(0.2)	1.2	0.2	(0.0)	0.39	0.84	1.00
All	88,175	2.3	1.3	0.6	1.4	0.8	0.2	0.35	0.59	0.81
Excl. pre1975	56,294	2.0	1.0	0.3	1.3	0.5	0.1	0.41	0.66	0.90
Panel D: Delisted firms										
Before 1975	15,707	1.2	1.2	0.7	0.5	0.5	0.2	0.64	0.64	0.75
1975-1979	4,373	0.5	0.5	0.2	0.0	0.0	(0.1)	0.80	0.80	0.88
1980-1984	10,298	0.1	0.1	(0.2)	(0.1)	(0.1)	(0.2)	0.89	0.89	0.94
1985-1989	9,928	0.1	0.1	(0.2)	(0.1)	(0.1)	(0.2)	0.88	0.88	0.93
1990-1994	9,406	0.0	0.0	(0.2)	(0.1)	(0.1)	(0.2)	0.90	0.90	0.93
1995-1999	7,703	(0.1)	(0.1)	(0.3)	(0.1)	(0.1)	(0.2)	0.92	0.92	0.96
2000-2004	2,509	(0.2)	(0.2)	(0.4)	(0.2)	(0.2)	(0.2)	0.95	0.95	0.96
2005-2009	1,958	(0.2)	(0.2)	(0.4)	(0.1)	(0.1)	(0.2)	0.95	0.95	0.97
2010-2014	972	(0.2)	(0.2)	(0.3)	(0.1)	(0.1)	(0.1)	0.98	0.98	0.99
2015-2019	270	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	0.99	0.99	1.00
All	63,124	0.3	0.3	0.0	(0.0)	(0.0)	(0.1)	0.83	0.83	0.89
Excl. pre1975	47,417	0.1	0.0	(0.2)	(0.1)	(0.1)	(0.2)	0.89	0.89	0.94

The table above presents the mean and median of lifetime earnings per share (including and excluding terminal value) to beginning year stock price per share for different firm groups based on first year and survivorship status of the firm as at the end of 2019. We have divided the firms into 9 groups of 5 years. Firms in the '1975-1979' group are the firms which started trading between 1st January 1975 and 31st December 1979. Panels A, B, C and D show these descriptive statistics about all firms, surviving firms, merged firms, and delisted firms in our sample. Surviving firms are the firms which exist on December 31, 2019. Merged firms are the firms which were acquired or merged before the end of 2019. Delisted firms are the firms which were delisted before the end of 2019 for reasons other than merger. Columns 2, 3, 5 and 6 present the statistics for the ratio of lifetime earnings (including terminal value) to beginning year stock price while columns 4 and 7 present the ratios excluding terminal value. The terminal value in Columns 2 and 3 is the actual merger price paid by the acquirer to the shareholders while in Columns 3 and 6, the acquisition price for mergers is estimated to be discounted value of perpetuity of earnings at the time of acquisition. Columns 2 to 4 present the averages and Columns 5 to 7 present the median numbers. Columns 8 to 10 present the proportion of firms with lifetime earnings less than their beginning year stock price. All continuous variables are winsorized at 1st percent and 99th percent levels.

TABLE 5
Distribution of lifetime free cash-flows to beginning year stock price ratios

Mean				Median				Proportion of firms (LTE < 1)		
			Excl. TV				Excl. TV			Excl. TV
#firms	Merg/Del Prc	Perpetuit y		Merg/Del Prc	Perpetuit y			Merg/Del Prc	Perpetuit y	
(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)
Panel A: All firms										
Before 1975	64,235	1.8	1.3	0.7	1.1	0.7	0.3	0.47	0.59	0.75
1975-1979	9,882	0.9	0.5	0.0	0.5	0.1	(0.0)	0.65	0.77	0.88
1980-1984	21,274	1.0	0.5	(0.1)	0.4	0.1	(0.0)	0.66	0.79	0.90
1985-1989	21,895	1.0	0.6	(0.1)	0.5	0.1	(0.0)	0.66	0.77	0.90
1990-1994	30,822	0.9	0.7	(0.2)	0.5	0.1	(0.1)	0.64	0.74	0.91
1995-1999	26,451	0.8	0.5	(0.3)	0.3	0.0	(0.1)	0.68	0.77	0.93
2000-2004	11,017	0.7	0.5	(0.4)	0.3	0.0	(0.1)	0.70	0.78	0.94
2005-2009	8,108	0.5	0.4	(0.4)	0.1	(0.0)	(0.1)	0.73	0.79	0.95
2010-2014	5,410	0.3	0.2	(0.4)	0.0	(0.0)	(0.1)	0.78	0.82	0.98
2015-2019	2,491	0.3	0.2	(0.3)	(0.1)	(0.1)	(0.1)	0.85	0.86	0.99
All	201,585	1.1	0.8	0.1	0.6	0.2	0.0	0.61	0.72	0.86
Excl. pre1975	137,350	0.8	0.5	(0.2)	0.4	0.1	(0.1)	0.67	0.77	0.92
Panel B: Surviving firms										
Before 1975	16,647	1.9	1.9	1.3	1.2	1.2	0.6	0.45	0.45	0.62
1975-2005	13,618	1.0	0.9	(0.1)	0.4	0.4	0.1	0.63	0.63	0.77
After 2005	31,274	0.7	0.7	(0.2)	0.3	0.3	0.0	0.70	0.70	0.95
All	56,339	1.1	1.1	0.2	0.5	0.5	0.1	0.62	0.62	0.81
Excl. pre1975	39,692	0.8	0.7	(0.3)	0.2	0.2	(0.0)	0.69	0.69	0.89
Panel C: Merged firms										
Before 1975	31,881	2.2	1.3	0.6	1.4	0.6	0.2	0.36	0.61	0.78
1975-1979	4,522	1.5	0.5	0.0	1.0	0.1	0.0	0.50	0.76	0.89
1980-1984	9,021	1.8	0.6	(0.1)	1.1	0.2	0.0	0.48	0.76	0.92
1985-1989	8,721	2.0	1.0	0.0	1.2	0.3	0.0	0.43	0.71	0.91
1990-1994	13,282	1.7	1.2	(0.1)	1.1	0.3	(0.0)	0.45	0.68	0.93
1995-1999	10,826	1.4	0.9	(0.2)	0.9	0.1	(0.0)	0.53	0.74	0.95
2000-2004	3,835	1.3	0.7	(0.2)	0.9	0.1	(0.0)	0.53	0.76	0.95
2005-2009	2,191	1.2	0.7	(0.2)	0.9	0.1	(0.1)	0.54	0.77	0.97
2010-2014	853	1.2	0.5	(0.3)	1.0	(0.0)	(0.1)	0.52	0.81	0.99
2015-2019	72	1.4	0.4	(0.2)	1.2	(0.1)	(0.1)	0.42	0.84	1.00
All	85,204	1.8	1.0	0.1	1.2	0.3	0.0	0.44	0.69	0.87
Excl. pre1975	53,323	1.6	0.9	(0.1)	1.1	0.2	(0.0)	0.48	0.73	0.93
Panel D: Delisted firms										
Before 1975	15,707	0.7	0.7	0.2	0.3	0.3	0.1	0.69	0.69	0.81
1975-1979	3,947	0.2	0.2	(0.1)	0.0	0.0	(0.1)	0.84	0.84	0.91
1980-1984	8,989	0.1	0.1	(0.2)	(0.0)	(0.0)	(0.1)	0.88	0.89	0.93
1985-1989	8,761	(0.0)	(0.0)	(0.4)	(0.0)	(0.0)	(0.1)	0.89	0.90	0.94
1990-1994	9,352	(0.1)	(0.1)	(0.3)	(0.1)	(0.1)	(0.2)	0.89	0.89	0.93
1995-1999	7,618	(0.2)	(0.2)	(0.4)	(0.1)	(0.1)	(0.2)	0.92	0.91	0.95
2000-2004	2,482	(0.3)	(0.3)	(0.5)	(0.1)	(0.1)	(0.2)	0.93	0.92	0.95
2005-2009	1,952	(0.4)	(0.4)	(0.6)	(0.1)	(0.1)	(0.2)	0.95	0.95	0.97
2010-2014	967	(0.3)	(0.3)	(0.4)	(0.1)	(0.1)	(0.1)	0.97	0.97	0.98
2015-2019	267	(0.1)	(0.1)	(0.2)	(0.1)	(0.1)	(0.1)	0.98	0.98	0.99
All	60,042	0.2	0.1	(0.2)	(0.0)	(0.0)	(0.1)	0.84	0.85	0.91
Excl. pre1975	44,335	(0.0)	(0.1)	(0.3)	(0.1)	(0.1)	(0.1)	0.90	0.90	0.94

The table above presents the mean and median of lifetime free cash flows per share (including and excluding terminal value) to beginning year stock price per share for different firm groups based on first year and survivorship status of the firm as at the end of 2019. We have divided the firms into 9 groups of 5 years. Firms in the '1975-1979' group are the firms which started trading between 1st January 1975 and 31st December 1979. Panels A, B, C and D show these descriptive statistics about all firms, surviving firms, merged firms, and delisted firms in our sample. Surviving firms are the firms which exist on December 31, 2019. Merged firms are the firms which were acquired or merged before the end of 2019. Delisted firms are the firms which were delisted before the end of 2019 for reasons other than merger. Columns 2, 3, 5 and 6 present the statistics for the ratio of lifetime free cash flows (including terminal value) to beginning year stock price while columns 4 and 7 present the ratios including terminal value. The terminal value in Columns 2 and 3 is the actual merger price paid by the acquirer to the shareholders while in Columns 3 and 6, the acquisition price for mergers is estimated to be discounted value of perpetuity of earnings at the time of acquisition. Columns 2 to 4 present the averages and Columns 5 to 7 present the median numbers. Columns 8 to 10 present the proportion of firms with lifetime free cash flows less than their beginning year stock price. All continuous variables are winsorized at 1st percent and 99th percent levels.

TABLE 6
Distribution of lifetime free cash flow to stock price ratios pre- and post-crisis

Year	All firms			Surviving firms			Merged firms			Delisted firms		
	#firms	Mean	Median	#firms	Mean	Median	#firms	Mean	Median	#firms	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Lifetime free cash flows to beginning year stock price ratio (excluding pre-1975 firms)												
2000	5,114	0.6	0.2	975	0.3	0.2	2,318	1.2	0.8	1,821	(0.0)	(0.0)
2003	3,898	1.5	0.9	1,077	1.7	0.8	1,779	2.5	1.6	1,042	(0.1)	(0.1)
2007	3,744	0.3	0.3	1,377	0.2	0.2	1,345	0.8	0.7	1,022	(0.1)	(0.0)
2009	3,324	2.2	1.1	1,451	2.4	0.8	1,123	3.1	2.1	750	0.5	0.1
Panel B: Lifetime free cash flows to beginning year stock price ratio (including pre-1975 firms)												
2000	5,963	0.7	0.3	1,345	0.5	0.4	2,620	1.2	0.9	1,998	0.0	(0.0)
2003	4,630	1.6	1.0	1,446	1.9	1.0	2,014	2.4	1.6	1,170	(0.1)	0.0
2007	4,354	0.4	0.3	1,746	0.3	0.3	1,485	0.8	0.7	1,123	(0.1)	(0.0)
2009	3,893	2.3	1.2	1,823	2.6	1.1	1,238	3.0	2.1	832	0.6	0.2

The table above presents the mean and median of lifetime free cash flows per share (including terminal value) to beginning year stock price per share for different firm groups based on status of the firm. The number of firms, the mean ratio and the median ratio are computed at the beginning of the years mentioned. Rows '2000' and '2007' present the pre-crisis periods and '2003' and '2009' present the post-crisis periods. Panels A and B show the lifetime free cash flows to beginning year stock price ratio excluding and including pre-1975 firms respectively. All continuous variables are winsorized at 1st percent and 99th percent levels.

TABLE 7
Returns-based wealth creation from 1975 till 1999

Quintile	Number of firms				Total returns-based wealth creation (till 1999) (\$ billion)				Future wealth creation (2000 to 2019) (\$ billion)			
	All firms	Delisted	Merged	Surviving	All firms	Delisted	Merged	Surviving	All firms	Delisted	Merged	Surviving
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Top	1,085	190	580	315	6,169	396	2,627	3,145	(140)	(1,705)	(3,508)	5,072
2	1,086	247	573	266	718	113	318	287	4,191	(453)	413	4,232
3	1,086	302	610	174	83	13	44	26	1,376	(373)	428	1,320
4	1,086	388	520	178	(138)	(38)	(64)	(36)	970	(176)	394	752
Bottom	1,085	598	350	137	(250)	(97)	(91)	(62)	995	(140)	327	809
	5,428	1,725	2,633	1,070	6,582	388	2,834	3,360	7,392	(2,847)	(1,946)	12,185

This table presents the summary of returns-based wealth creation from 1975 to 1999 and future returns-based wealth creation from 2000 to 2019 of the firms existing as of 31 December, 1999. Quintiles are based on scaled past returns-based wealth from the time the firm was listed till the end of 1999. Past returns-based wealth is scaled by the initial market capitalization at the time of listing. Columns 1 to 4 report the number of firms in each quintile and each group based on whether the firm will survive, get merged or get delisted by the end of 2019. Columns 5 to 8 present the total returns-based wealth creation till 1999 and columns 9 to 12 present the future returns-based wealth creation from 2000 to 2019 for each quintile and each group.

TABLE 8
Lifetime earnings till 1999 and future wealth creation from 2000 to 2019

Panel A: Number of firms below and above median lifetime earnings

Quintile	Below median lifetime earnings				Above median lifetime earnings			
	All firms	Delisted	Merged	Surviving	All firms	Delisted	Merged	Surviving
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Top	543	131	301	111	542	59	279	204
2	543	161	284	98	543	86	289	168
3	543	195	288	60	543	107	322	114
4	543	235	235	73	543	153	285	105
Bottom	543	341	140	62	542	257	210	75
	2715	1063	1248	404	2713	662	1385	666

Panel B: Differences in future wealth creation for below and above median lifetime earnings

Quintile	LTE Ratio	Future returns-based wealth creation (2000 to 2019) (\$ billion)				Mean returns-based future wealth creation (2000 to 2019) (\$ billion)				Differences in Mean (t-test) Above vs Below Median			
		All firms	Delisted	Merged	Surviving	All firms	Delisted	Merged	Surviving	All firms	Delisted	Merged	Surviving
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Top	Below median	(1,768)	(1,033)	(2,010)	1,275	(2.1)	(6.0)	(3.0)	5.0	6.4***	2.6*	3.4**	6.8***
	Above median	1,627	(672)	(1,497)	3,797	4.3	(3.3)	0.4	11.8	(<.0001)	(0.0653)	(0.0024)	(0.0075)
2	Below median	673	(384)	131	926	0.5	(2.0)	0.2	5.8	1.8***	1.2**	0.8***	0.5
	Above median	3,519	(69)	281	3,306	2.3	(0.8)	1.0	6.3	(0.0019)	(0.0047)	(0.1741)	(0.7979)
3	Below median	(65)	(322)	(21)	277	0.0	(1.4)	(0.0)	4.6	2.2***	0.9**	1.4***	2.5
	Above median	1,441	(51)	449	1,043	2.2	(0.5)	1.4	7.1	(<.0001)	(0.0116)	(0.0002)	(0.2343)
4	Below median	82	(139)	42	179	0.1	(0.6)	0.2	1.7	1.3***	0.4**	0.7**	3.1**
	Above median	889	(37)	353	573	1.4	(0.2)	0.9	4.8	(<.0001)	(0.0046)	(0.0169)	(0.0347)
Bottom	Below median	235	(94)	98	231	0.4	(0.3)	0.7	3.3	0.6*	0.1	0.4	1.4
	Above median	760	(46)	229	578	1.0	(0.2)	1.1	4.7	(0.0422)	(0.2860)	(0.2902)	(0.4770)
All firms	Below median	(844)	(1,971)	(1,760)	2,888	(0.2)	(1.5)	(0.6)	4.3	2.5***	0.9***	1.5***	3.5***
	Above median	8,236	(876)	(185)	9,297	2.2	(0.6)	1.0	7.7	(<.0001)	(0.0007)	(<.0001)	(<.0001)

This table reports the future wealth creation from 2000 to 2019 of the firms existing as at 31 December, 1999. Quintiles are based on scaled past returns-based wealth from the time the firm was listed till the end of 1999. Past returns-based wealth is scaled by the initial market capitalization at the time of listing. Each quintile is further divided into above and below median scaled lifetime earnings. Lifetime earnings is scaled by the initial market capitalization at the time of listing. Panel A presents the number of firms below and above median scaled lifetime earnings in each quintile and each group based on whether the firm survives, get merged or get delisted by the end of 2019. Panel B shows the summary of future wealth creation from 2000 to 2019 for below and above median lifetime earnings. Columns 1 to 4 show the total future returns-based wealth creation and columns 5 to 8 present the mean future returns-based wealth creation. Columns 9 to 12 report the t-test results for differences in mean between above and below median scaled lifetime earnings for each quintile group. Parentheses in columns 9 to 12 report the p-value for the t-test results. Future returns-based wealth creation is winsorized at 1st percent and 99th percent levels to compute averages.

TABLE 9
Relation between lifetime earnings and future lifetime creation

Dependent variable =	Future returns-based wealth creation (2000 to 2019)			
	(1)	(2)	(3)	(4)
Lifetime earnings	0.024*** (2.96)	0.028*** (3.21)	0.070*** (4.62)	0.073*** (4.70)
Past returns-based wealth	-0.296*** (-13.00)	-0.278*** (-10.81)	-0.412*** (-14.96)	-0.397*** (-13.75)
Size		-0.064*** (-4.14)		-0.087*** (-7.80)
Leverage		0.011** (2.24)		0.003 (0.81)
Book to market		-0.002 (-0.55)		-0.001 (-0.46)
Loss indicator		0.004 (1.06)		0.011*** (3.03)
Fixed effects	Year, Firm	Year, Firm	Year, Firm	Year, Firm
N	48,759	48,759	48,759	48,759
adj. R-sq	0.888	0.889	0.909	0.911

This table presents the results of the model specified in equation (3). Variable of interest, lifetime earnings is unscaled in columns 3 and 4 and, is scaled by initial market capitalization at the time listing in columns 1 and 2. Lifetime earnings is computed at the firm level as the sum of earnings, market return on dividends and a terminal value (delisting value/ merger value/ perpetuity of earnings) all adjusted for time value of money. Past returns-based wealth is the wealth creation from the time the firm was listed till the delisting or merger or till the end of 1999 if the firm survives. Past returns-based wealth is scaled by the initial wealth in columns 1 and 2. Size is the log of market capitalization. Leverage is the sum of long term debt and short term debt scaled by total assets. Book to market is the ratio of the book value of equity to the market value of equity of the firm. Loss indicator is an indicator variable equal to one if the firm earned negative profits in the year. All regressions include year and firm fixed effects. Standard errors are clustered at the firm-level. T-statistics are presented in the parentheses. The signs *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. All continuous variables are winsorized at 1st percent and 99th percent levels.

TABLE 10
Robustness tests – Stock price, and valuation model

	# firm-years	Last month's average stock price			Residual income valuation model		
		Mean	Median	Prop	Mean	Median	Prop
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: All firms							
1975-1979	10,653	1.6	0.8	0.55	0.2	0.0	0.70
1980-1984	23,446	1.3	0.5	0.62	0.0	(0.1)	0.73
1985-1989	23,915	1.4	0.6	0.60	(0.1)	(0.0)	0.72
1990-1994	31,703	1.5	0.8	0.54	0.0	0.3	0.67
1995-1999	26,904	1.2	0.6	0.60	(0.4)	0.1	0.72
2000-2004	11,127	1.0	0.5	0.63	(0.7)	(0.1)	0.77
2005-2009	8,291	1.2	0.5	0.64	(1.0)	(0.0)	0.76
2010-2014	5,412	0.5	0.1	0.73	(1.9)	(0.4)	0.83
2015-2019	2,525	0.2	(0.0)	0.86	(2.4)	(0.9)	0.93
All firms	143,976	1.3	0.6	0.60	(0.3)	0.0	0.72
Panel B: Surviving firms							
Before 2006	14,222	2.7	1.5	0.41	0.5	0.3	0.70
After 2005	26,377	1.2	0.7	0.59	(0.8)	0.1	0.82
All surviving firms	40,599	1.7	0.9	0.53	(0.3)	0.2	0.78
Panel C: Merged firms							
1975-1979	4,880	2.3	1.4	0.37	1.5	0.9	0.53
1980-1984	9,876	2.2	1.3	0.41	1.5	0.8	0.55
1985-1989	9,534	2.4	1.4	0.37	1.8	1.1	0.48
1990-1994	13,812	2.1	1.4	0.35	1.6	1.2	0.45
1995-1999	11,058	1.7	1.1	0.46	0.9	0.8	0.56
2000-2004	3,892	1.5	1.0	0.50	0.5	0.5	0.60
2005-2009	2,193	1.5	1.1	0.47	0.6	0.7	0.59
2010-2014	854	1.5	1.2	0.40	0.5	0.8	0.56
2015-2019	74	1.4	1.2	0.38	(0.5)	0.7	0.59
All merged firms	56,173	2.0	1.3	0.40	1.3	0.9	0.52
Panel D: Delisted firms							
1975-1979	4,334	0.5	0.0	0.80	(1.3)	(0.7)	0.90
1980-1984	10,222	0.1	(0.1)	0.89	(1.5)	(0.7)	0.93
1985-1989	9,864	0.1	(0.1)	0.88	(2.0)	(0.9)	0.93
1990-1994	9,379	0.0	(0.1)	0.89	(2.2)	(1.0)	0.91
1995-1999	7,707	(0.1)	(0.1)	0.92	(2.8)	(1.2)	0.93
2000-2004	2,501	(0.2)	(0.2)	0.95	(3.2)	(1.3)	0.93
2005-2009	1,955	(0.2)	(0.1)	0.95	(3.7)	(1.0)	0.91
2010-2014	972	(0.2)	(0.1)	0.97	(3.1)	(1.1)	0.91
2015-2019	270	(0.1)	(0.1)	0.99	(2.0)	(0.9)	0.94
All delisted firms	47,204	0.1	(0.1)	0.89	(2.1)	(0.9)	0.92

This table presents the statistics about lifetime earnings to beginning year stock price ratio for different firm groups based on first year and survivorship status of the firm as at the end of 2019 using different measurement of stock price and earnings and using residual income valuation model. We have divided the firms into 9 groups of 5 years. Firms in the '1975-1979' group are the firms which started trading between 1st January 1975 and 31st December 1979. Panels A, B, C and D show these descriptive statistics about all firms, surviving firms, merged firms, and delisted firms in our sample. Surviving firms are the firms which exist on December 31, 2019. Merged firms are the firms which were acquired or merged before the end of 2019. Delisted firms are the firms which were delisted before the end of 2019 for reasons other than merger. Columns 2, and 5 present the average lifetime earnings to beginning year stock price ratio. Columns 3, and 6 present the median lifetime earnings to beginning stock price ratio. Columns 4, and 7 present the proportion of firms which could not justify the stock price in earnings. Columns 2-5 compute the ratio using last month's average stock price instead of beginning year stock price. Columns 5-7 use residual income valuation model instead of discounted cash-flow valuation model to compute the ratio. All continuous variables are winsorized at 1st percent and 99th percent levels.