

Behavioral vs. Traditional Corporate Finance: An Unabashed Critical Review

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Abstract

Research in behavioral corporate finance has accumulated to the point that it may now be a viable contender as an alternative to traditional corporate finance. This review consists of three parts. First, I discuss the foundations behind these two competing theories. I clarify concepts such as rational versus irrational behaviors of managers contrasted with those of the investors. Second, I make side by side comparisons and a critical examination of the two theories in the main topic areas of dividends, capital structure, and investments. Part three gives practical suggestions on how practitioners may use behavioral finance in their dealings as well as avoid known behavioral biases.

1. Introduction

One of the most enduring and vexing question in corporate finance is the existence of dividends in the presence of completely avoidable personal income tax^{1,2}. Are taxable investors irrational in their willingness to receive less? Are firms irrational to make choices that result in destroying a portion of firm value? Is the stock market irrational in expecting that less is more? For example, the market is observed to bid up the price of dividend paying stocks upon the announcement of a dividend increase, in spite of increased dividends increasing investor's tax burden. Perhaps it is more complicated; firms are rational, but investors are not. Firms simply pay dividends because investors demand it. That is, firms are rational in making a seemingly irrational decision; i.e., it is a case of rationally irrational firms.

I use this example for two reasons. One, there are situations in corporate finance for which we have to resort to non-standard or non-rational explanations; the so-called "behavioral." Two, a behavioral explanation is not necessarily a temporary patch; the phenomenon could persist, as it has in this case for over a hundred years since the introduction in 1913 of the personal income tax.³ Because of the progress made by researchers in this area,⁴ many now view behavioral theories as viable alternatives to traditional corporate finance theories. Although behavioral corporate finance as an area has not yet reached the same level of development as traditional corporate finance, there are enough new ideas and insights that have surfaced in recent years such that we may now make a critical comparison of the two.

This paper is consisting of three parts. The first part provides a very brief background of the theoretical behavioral economics foundation with a particular emphasis on corporate finance. It also clarifies some seemingly interchangeable concepts such as rationality, behavioral, and irrationality. The second part provides a critical comparison of the traditional versus behavioral corporate finance theory in the three main topics of: capital structure, dividends, and investment policies. The third part discusses practical implications of behavior finance for the practitioners – corporate financial managers and investment bankers. It includes situations where the applications of behavioral finance are beneficial to the firm and their investors, as well as those that are not. My final thoughts on the future prospects and directions of this topic conclude.

2. Foundation of Behavioral Finance: Theory, Extensions, and Evidence from Corporate Finance

The foundation of behavioral corporate finance comes from two strands. The first is based on the more formal theoretical behavioral economics as developed by the Nobel Prize winners and their associates, Kahneman and Tversky (1979, 1997), and Thaler (1999, 1980, 1985). The second are the group of strategic responses to irrational actions or behaviors by the opposing party, including timing strategy to exploit misvaluation and catering to fads and fashion⁵. Not

¹ This question was originally raised by Black (1976).

² Apparently, many investors do not avoid tax on dividends, see the scope and amount of tax paid on dividends from individuals' actual tax returns as reported in Peterson, Peterson, and Ang (1985).

³ The origin of the income tax on individuals is generally cited as the passage of the 16th Amendment. It was passed by the Congress on July 2, 1909, and ratified on February 3, 1913.

⁴ Baker and Wurgler, along with their co-researchers, have made the largest number of contributions in this area. See their very extensive reviews of this topic (2008, 2012). My review here is critical but not comprehensive.

⁵ For the uninitiated, there are several surveys of behavioral finance that appeal to different levels, including Barberis and Thaler (2003), Hirschleifer (2015), Cronqvist and Jiang (2017), and Statman (2017).

emphasized are the collection of human behaviors from folk psychology, sociology, anthropology, and the like⁶.

2.1 Prospect Theory in a Capsule

Figure 1 gives the familiar Prospect Theory value function. Tversky and Kahneman's intention is not only to make the point that the value of a loss is much greater than the value of a gain of the same magnitude, but to show the role of reference point and framing⁷. Although the standard utility function also exhibits the property of risk aversion, it is different from the Prospect Theory function in several ways. First, one may consider the standard utility function to anchor at (zero wealth, zero utility); the reference point under the Prospect Theory is the current wealth level. At any significant level of wealth, the difference in the utility of gain versus the utility of similar loss around current wealth in the standard utility curve is far, far less than the same difference at the reference point of the Prospect Theory value function where there is a kink. Second, the reference point may not stay fixed. For the finance practitioners, framing and reference point serve two purposes. Take the case of negotiations, for example, the terms of financing with lenders and venture capital firms, and on terms of offer in a merger, one can frame his or her own reference point before the negotiation starts, or the same person may use framing to influence the other party's reference point. An interesting result in Prospect Theory as applied to negotiations is that when both parties share the same reference point, a slightly higher demand made by one party and thus requiring a concession by the opposite party will be rejected. This is because at the shared reference point, any utility gain to the same dollar/value demanded by one party would result in a far greater loss of utility to the other party under the Prospect Theory value function. In other words, agreement is possible when the two opposing parties can see eye to eye, or on the same wavelength. Of course, getting to the same reference point may depend on how a party can use framing to induce and maneuver the opposing party to see the 'target' reference point as desirable. An example of using framing to influence negotiation is telling the other party. "If you walk out tonight, you would lose all the gains you have negotiated up to this point." A third feature of the Prospect Theory value function, is that it is portrayed as concave in gains and convex in loss. The graph (Figure 1) is the familiar fat bottom S curve. It captures the very plausible notion that around the reference point, value from a loss is greater than the value from an identical gain. In the entire gain region, the increasing value function that is flatten out is the same in shape as the familiar utility function. However, it is in the entire loss region that

⁶ Studies in these areas are generally also under the rubric of behavioral finance. Their practical values in corporate finance are quite limited. For instance, there have been many studies on the risk taking attitudes and characteristics of CEOs and other top management involving their background (family history, childhood experience and trauma, race, gender, and education, for example), physical characteristics (height, age, attractiveness), personality, and affiliations (religion, political party, social and charitable organizations). Knowing the risk taking attitude of CEOs is only of second order of importance in corporate finance. They do not enter as a parameter in the traditional corporate finance theory. After all, the traditional model starts with maximizing shareholders' wealth. Although they do not enter the behavioral corporate theory in the formal sense, they may nevertheless affect the likelihood that CEOs may commit some behavioral biases. For example, low risk aversion in managers may be related to the tendency to be overconfident or overoptimistic, while high risk aversion may lead to herd behavior in order to hide among the crowd. Knowing the linkage between managers' traits, background and behavior, may help the board of directors choose as CEOs those that come closest to exhibiting the desired characteristics. The unfortunate consequence to the Board is that their own bias would likely lead them to choose as CEOs those who most resemble them, and thus perpetuate existing behavioral weaknesses of the Board.

⁷ See Kahneman (2003) for examples in psychology and economics.

demands closer examination. It says that people care relatively less for large loss than for small loss. This is opposite to observations on human choice; witness the demand for insurance against large losses, and that most people are self-insured for small losses, which reveals an aversion to ruin.

Another peculiar property of the Prospect Theory value function is that it predicts the individual or manager would not take small risks around her (his) reference point. Losses from small risk is far too steep. It also predicts that risk aversion is decreasing as the size of payoff (gain and loss) increases⁸.

2.2 Empirical Evidence on the Existence of the Prospect Theory Value Function in Corporate Finance

Since utility is not observed, to test Prospect Theory in its most basic form – that utility is a function of gains and losses around reference point, but is decreasing at a greater rate for losses than it is increasing for gains –researchers need to make assumptions to provide justification for the validity of the proxy measure used. In particular, since researchers would often find it convenient to use change in share prices (increase/ decrease) to proxy for change in investors' utility for a given change in corporate policy, this measure warrants more thoughts. This seemingly simple transformation would necessitate several assumptions: 1) The reference point for all the investors prior to the announcement of the change in a financial policy is the current share price. 2) To make the theoretical linkage between utility and stock price change, the concept of 'revealed preference' is invoked⁹. Although we could not measure change in investors' utility, we can observe what they do or choose. Investors' utility is assumed to increase (decrease) with positive (negative) change in stock prices. 3) Investors are assumed to have enough similarities in their valuation of the change in a given financial policy such that aggregation of their utilities as a single one day (or three days) change in stock price around the announcement is meaningful. Although, as we shall show later, there are behavioral finance equivalents of all major financial decisions, there are only a few topics with large enough sample

⁸ In fact, in order to induce individuals to take small risks around the reference point, the payoff in dollar at the breakeven value gain has to be relatively large:

For gambles (investment) with payoff near the reference point, given the shape of the value function,

Breakeven value: $u(\$gain) = u(\$loss) \Rightarrow \$gain \ggg \$loss$.

Or, the required rate of return, Γ , from taking small risk must be large:

$$\Gamma = \{(\$gain - (-\$loss)) / \$ invested at the reference point\} \ggg 0.$$

However, due to the shape of the kinked value function that is tapering off for larger dollar amount, for the same value function, the required return is decreasing as the gamble (investment) gets larger, or:

$$\Gamma (\$gain2, \$loss2) < \Gamma (\$gain1, \$loss2), \text{ if } (\$gain2, \$loss2) > (\$gain1, \$loss2).$$

The decreasing Γ implies a decreasing risk aversion as the size of payoff from the gamble (investment) gets bigger.

Of course, die hard proponents of the Prospect Theory can argue that the steep portion of the value function can flexibly enlarge to accommodate large gambles. This expediency, however, could produce contradiction when comparing investments of different sizes.

⁹ Samuelson (1938, 1948) suggests to use what people choose or are willing to pay as measure of the unobservable utility.

sizes to conduct rigorous empirical tests. For instance, there are many cases of negotiations between the firms' financial managers and their bankers, venture capital providers, merger target or acquirers, labor unions, suppliers, and customers for which, unfortunately, there is no public data on the successful and unsuccessful offers and counteroffers. In fact, the public may not even know there was a negotiation. Given these challenges for large scale empirical investigation, changes in dividends appear to be the best of the available choices – there is a large sample that can cover many years, and the observations include both increases and decreases and hence are on both sides of the reference point.

Baker, Mendel, and Wurgler (2016) use a sample of 327,816 dividend changes from the period 1926 to 2009. When stock returns are plotted against change in dividends, they show the resulting curves at above and below the previous pre dividend level do resemble the shape of the value function as depicted in the Prospect Theory. Ang and Wang (2018) replicated similar result from a sample of 47,863 dividend increases and 2,212 decreases from 1926-2016 collected for a different purpose (to be reported below).

2.3 Three Extensions of Prospect Theory

There are still many cases that the simple Prospect Theory fail to cover. To remedy this, I shall present three extensions of the Prospect Theory that aim to extend the applicability of Prospect Theory.

2.3.1 Cumulative Prospect Theory. Kahneman and Tversky (1997) expands the authors' original Prospect Theory to Cumulative Prospect Theory. Previously, Prospect Theory would have a hard time explaining why a good number of people like 'lottery' type of investments; i.e., very low probability events but with extraordinary payoffs. A similar concern, as pointed out earlier, is the lack of allowance for personal and business failure/bankruptcy. In Kahneman and Tversky (1999), the authors realize that they have to make the Prospect Theory more general by being able to include the probability of a rare event/payoff state, as well in a jump in utility from winning the lottery. They use a rank dependent expected utility in which cumulative probabilities are transformed instead of probabilities. This allows overweighing of only rare events rather than all small probability events. Here, a very large payoff and the corresponding high utility can also be incorporated to help explain gambling and insurance. This extension makes the Prospect Theory more versatile.

2.3.2 Compound Prospect Theory. Would a person prefer to receive a certain amount of total gain in one lump sum or in two parts? Similarly, how about experiencing a onetime loss versus two losses totaling the same amount? Thaler (1999, 1980, 1985) proposes in his Compound Prospect Theory that in the former case involving gains, individual prefers to receive two separate instances of gains (separating gains), while they would instead prefer taking the same total loss all at once rather than at two separate times (integrating losses). The idea could be shown using the original Prospect Theory with reference point/framing (see Figure 2 and 3, taken from Ang & Wang, 2018). When gains and losses are divided to be doled out in two parts, after the first part is given, a new reference point based on the first part's gain or loss is reestablished. The new second reference point resets the orientation of the receiver. Thus, at the reset reference point gain or loss in the second part gain or loss would just have as much value effect as if to occur from the first reference point, including the kink. In other words, the value from the second part of the gain or loss is not as large as it would have been, had it been given at

the same time as the first part gain or loss. In practice, it says, for example, that target shareholders want or expect a second offer to sweeten the deal, whereas employees would rather experience a one-time 10% pay cut (or 10% layoff of the work force) than a 5% cut now, and a 5% cut later. Ang and Wang (2018) conduct possibly the only empirical test of this proposition with corporate finance data. They collected 47,863 cases of dividend increases in two consecutive time periods and 2,212 cases of dividend consecutive decreases. They then match these increases or decreases against similar firms that make single increase or decrease dividends of the same amount¹⁰. Their empirical results confirm Thaler's proposition with corporate finance data: the aggregate market response to two dividend increases is greater than the one dividend increase of the same amount, but the aggregate market return is less negative in the onetime dividend cut than the two cuts of the similar amount (see Figure 4).

2.3.3 Conditional Prospect Theory. Individuals in many cases make choices and derive their utility relative to *how* they get to where they are. There are many such examples. For instance, many individuals would prefer to receive bad news first before good news (vs. good news first to be followed by bad news), though these individuals understand the news content or utility values of these two pieces of news are exactly the same if valued in isolation in the absence of time ordering. In other words, they have exhibited a conditional preference:

$$u(\text{bad news/good news}) < u(\text{good news/bad news})$$

where $u(\text{bad news/good news})$ stands for value of receiving bad news after receiving good news earlier; $u(\text{good news/bad news})$ is the value to receive bad news first and good news later. Interpreting from a Prospect Theory viewpoint, we can see that although these two materially identical sequence of presenting information are the same in their net monetary sum, the difference in sequencing creates different frames. Good feelings from good news and bad feelings from bad news reset and thus condition the receiver into two different reference points, possibly altering the shapes of their value functions. Thus, with different reference points for the second piece of news and a subtle change in the shapes of the Prospect Theory value functions, it would be possible to demonstrate these predictions:

$$u(\text{gain given a previous loss}) > u(\text{gain alone});$$

$$u(\text{loss given a previous gain}) < u(\text{loss alone}).$$

In layman's terms, it says a gain is sweeter if it is to wholly or partly recover a previous loss. And, a loss is more painful if it means coming from a previous gain; i.e., to fall from a higher place¹¹.

There are several situations where the Conditional Prospect Theory may be relevant. We have the case of managers who are hesitant to make decision mindful of how they got into the present situation/predicament; e.g., sunk costs. We also find that because individuals readily prefer the choice of 'give me the bad news before good news,' firms making use of this well-known preference among individuals also executive a strategy of releasing bad news first and

¹⁰ We use a matching procedure to control for other reasons some firms would spread dividend increase over two periods, such as uncertainty concerning the permanence of earnings increase to support higher dividends (Lintner, 1956) and concern to maintain dividend paying record and thereby to avoid having to cut dividends later.

¹¹ There are those who think the proposition should be in the opposite direction. Take this quote from Alfred Lord Tennyson, "Tis better to have loved and lost than never to have loved at all." Detractors may point out that this romantic notion is negated by the much larger number of those who thought, "I should not have fallen in love and married him (her)," and end up in divorce or live unhappily ever after.

good news later. This practice is known as low balling management's forecasts. It occurs most especially in situations when the managers expect a disappointing result. They then condition analysts and investors by releasing an even gloomier forecasts (walk down expectations) and let the eventual announced earning be a positive surprise, even with the same net decrease in earnings as in the no low balling case. Alexander and Ang (1998, 1999) provide empirical evidence in support of low balling and the Conditional Prospect Theory.

3. Behavioral vs. Traditional Corporate Finance

3.1 A Taxonomy of Managers' and Investors' Behaviors

For the purpose of this discussion, I shall label as traditional corporate finance theories those that are derived from the principle of maximizing firm value. In contrast, managers operating under behavioral corporate finance are not necessarily non-maximizers. The latter may not consciously act to sub-optimize; i.e., destroy firm value; but the consequence of their choice could be considered ex post as not rational. I shall adopt Baker and Wurgler's classification of rational vs. irrational managers or investors as a starting point. I then extend my taxonomy from their focus on rational managers exploiting irrational investors, and rational (sophisticated) investors taking advantage of irrational managers, to include the rational managers/rational investors, and irrational managers/irrational investors pairs to complete the 2x2 classification.

Table 1 presents the 2x2 classification. In the northwest corner is the realm of the traditional model. Since both parties are assumed rational, variations found in the traditional finance theories are basically derived from: self-serving behaviors by the managers, frictions in the capital market, and from entities such as governmental agencies, and other sources of leakage such as employees, suppliers, customers, competitors, and activist investors. In the traditional theory, self-serving managers are rational to use their position and control of information to maximize their own wealth and well-being. Investors are rational to demand better governance, or to take into account of agency costs in their pricing of these firms' shares.

The northeast (investors are rational but managers are not rational) and southwest (investors are not rational but managers are rational) corners are the focuses of Baker and Wurgler's analyses. In the latter, investors irrationally sway with market sentiments for expected growth or for high dividends, chasing fads and fashion as in the dot com episode; or hold ingrained cultural and social biases such as favoring nicer sounding names, regarding anything associated with 'A' is of higher quality than 'B'¹², or believing 'preferred' shares imply overall superiority to 'common' shares. Rational managers¹³ could exploit the resulting temporary misvaluation by issuing new shares or buy back their stocks; i.e., gain through market timing. Examples of market timing acquisitions can be found in Dong, Hirshleifer, and Teoh (2006) and Ang and Cheng (2006), of timing equity issues in Hirshleifer and Jiang (2010), and of financing in Baker (2009). They may also react to longer term change in preference by 'catering'; i.e., changing their financial policy such as switching to higher (lower) dividend payout to meet the greater demand for high (low) dividend paying shares, as evidenced in Baker and Wurgler (2004). A manager's choice in response to market mispricing could be of either short term or

¹² Ang, Chua and Jiang (2010) show that ingrained cultural and social bias for A over B,C, D,.. enables issuers of dual class voting share to market and price the inferior voting right shares (e.g., one share, one vote) higher by labeling them as A shares, while label the superior voting right shares (e.g., one share, ten votes) as B shares.

¹³ Baker and Wurgler require that the managers be 'smart' to identify these opportunities.

long term duration. For instance, if underpricing of the firm's shares is due to undervaluation of the firm's existing line of business or asset in place, the repurchase of shares at the low current price could yield results in a relatively short duration. However, if undervaluation of shares is due to the market undervaluing the firm's investment opportunity (or growth asset), it may not only take a long duration to resolve, but also pose a difficult practical problem for the managers and even for most owners. The dilemma here is that in order to deal with this problem the manager needs to be willing to place a large bet via a sizable new investment financed with borrowed funds (as equity issue would not be the financing choice for underpriced shares). The managers may decide not to face this double jeopardy, increasing both asset and financial risks. In both the real and behavioral world, managers may not really know better; some may just think they do due to overconfidence and over optimism, thus adding risk to a 'timing' strategy.

I shall give two examples of irrational investors in corporate finance that, inexplicably has staying power. The first, mentioned in the introductory paragraph, is the case of investors in high marginal tax brackets buying high dividend paying shares and paying a not insignificant amount of tax on the dividends received. The tax is completely avoidable as they could have bought a similar stocks that do not pay cash dividends. If apologists for investors demanding cash dividends and paying taxes on them would argue that somehow cash dividend is different (e.g., in different compartment), the next example is even more challenging. Many companies offer their shareholders the option to use the cash dividend declared to buy more shares; i.e., the dividend reinvestment plan¹⁴. In this case, investors do not actually receive any cash, and thus the argument for preference for dividends does not apply. Compared to the case of a stock dividend of the same number of shares, under the 'dividend reinvestment plan (DRIP)' investors are worse off by the amount of personal income tax paid on a cash dividend that they did not actually receive¹⁵. It would indeed be irrational if these investors reasoned that they received two items: one is cash dividend and two is extra shares¹⁶. That would be double counting, as these are not separate items; they offset each other. This behavior is irrational or ignorant, or both.

In the opposite case of rational investors but irrational managers, we find the similar case of managers who fail to accept their own limitations; i.e., are too confident, too optimistic, or unwilling to accept failure, manifested as a form of ex post risk aversion. Since these behaviors would eventually lead to reducing firm value, rational investors may be able to profit by avoiding them or betting against them.

At the other extreme, we have cases in which both sides (e.g., managers vs. investors, suppliers vs. demanders, buyers vs. sellers) are not rational. An example in corporate finance is the high valuation of so called 'Unicorn' companies. These are companies receiving very high valuations despite having not reported any profit and bleeding substantial cash flows in the past and expectedly through the near future. Although the much advertised valuation is known to be

¹⁴ For a partial list of about 80 companies offering dividend reinvestment plan, see the website of Computershare <https://www-us.computershare.com/investor/3x/plans/planslist.asp?bhjs=1&fla=0&styp=drip>. The list runs from A (Abbott, American Express) to X (Xerox).

¹⁵ Investors will receive a 1099 DIV at year end from the company to pay tax on the cash dividends they do not receive.

¹⁶ Observe carefully that in spite of what the company declared as having paid in dividends, there is no net cash paid by the company – accounting wise, the supposed cash dividends return to the company's treasury for issuing more shares. The investors never see the cash; only a statement from the company (via outfits such as Computershare that handle the transactions and record keeping for companies) that the dividend declared is used to buy more shares.

inflated as it is based on the value imputed from the last round of financing¹⁷, in most of these cases positive cash flow is nowhere in sight. There is no plausible scenario that could yield a properly discounted sum of eventual dividend streams equal to the imputed valuation. Thus, we have a case of sophisticated investors, such as venture capital and private equity funds, irrationally supporting these valuation, while some would be entrepreneurs mistook market's overvaluation as opportunity, irrationally supplying more of the same type of companies by putting up their wealth and careers. Note that I am not saying all sophisticated investors are irrational; the rational ones just cannot bet against the imputed valuation of these 'Unicorns' because of the difficulty of arranging a short sale on large unlisted companies¹⁸. The day of reckoning; i.e., bubble bursting; is going to be sooner than most people expect because these cash deficit firms will have to periodically raise new funds from outside sources. The valuation can hold up as long as these fund providers are willing to put up more money. They are like 'the Emperor's new clothes'; they are worth the valuation only as long as people are willing to believe and reluctant to cry out what their eyes see. In a bubble, not all participants are irrational or, at least, do not start out that way. However, once a bubble gets started, the rational ones who know prices are inflated cannot help but observed that they are being left behind by those who follow the bubble. Unfortunately, they cannot ignore them, because in an industry where their performance are being ranked periodically, they appear to underperform those who are chasing the bubble. Thus, many cannot stand on the sidelines as they face withdrawals and lose investors. As they join the crowd, they remind themselves that they are aware it is a bubble, but that they are smart enough to know where to get off, which will prove to be illusory for most investors. In most bubbles, when they burst, most smart investors are caught holding the now empty bag, and their en masse withdrawal and liquidation would exacerbate the collapse. One can say, at first, these investors are rational to stay away from overpriced securities. However, as they get swept up by the crowd, they may still think their investing at inflated price may appear irrational, but, they reason, they are 'rationally' aware that they have committed what appears to be an irrational act; i.e., a case of 'rationally irrational' behavior (see below). In the end, when the bubble finally bursts, the behavior is revealed to have simply been irrational, after all.

Finally, there are two complex cases that would challenge our simple concept of rational vs. irrational choices. These are rationally irrational and irrationally rational behavior.

3.2 Rationally Irrational

Consider the following scenario. Managers of firms realize that the investors in the stock market overvalued their shares. According to the prescription in the previously discussed case of rational managers and irrational investors, the managers are to issue more stocks at the now inflated price; i.e., market timing share issues. However, this is only half the story. After the firms issue new stocks to investors and receive funds in return, then what? Could these firms simply hold on to the cash as free cash flow? If so, what would the investors think? Recall, the basis behind investors overvaluing these firms' stocks is that they expect these firms to have many

¹⁷ The imputed valuation is inflated as in the typical downward sloping demand curve for shares. The price paid for the first 5% in the latest round of fund raising represents the price paid by the investors who would value it most. For example, the price paid by venture capital firm Softbank for the next 20% of Uber was less than the latter's previous valuation of almost \$70 billion that was based on a far smaller transaction.

¹⁸ Those who have seen the movie, *The Big Short*, could be convinced that some investment bankers may eventually figure out a way to short against these unlisted unicorns.

opportunities to invest at great profit; i.e. growth. Holding on to the new funds and not investing could lead to the opposite inference that these firms simply do not have the real growth opportunities expected by the market. As a consequence, stock price would fall due to a downward revision of these expectations. The question is: What can the firms do *once they have chosen this path* – pretending by issuing more new shares that they have growth opportunities they do not have? At this point, not wanting to be revealed as overvalued, these firms may decide not to be exposed and by playing along. As a result, they will have to get into this charade deeper in order to buy a few more years of time since results from long term investments take time to completely harvest or fail, and may take even longer if these funds were invested in growth assets such as R&D. Understanding the advantage to them of the time delay, these managers may invest in new investments or in R&D the funds received from stock issued. Observe that managers who invest the funds fulfill the market's expectation that they have investment opportunities. But in truth, since these firms do not really have the opportunities to invest, they can only invest in inferior projects; i.e., those with a negative NPV.

By consciously investing in value destroying negative NPV projects, it may appear that the managers are making an irrational choice. However, once they made the rational decision to exploit underpricing by issuing new shares, the decision to perpetuate the illusion of growth by investing in long life negative NPV project is also a rational choice; i.e., a rationally irrational choice.

3.3 Irrationally Rational

Could there be circumstances where managers that make rational decision according to traditional finance theory produce results that would ultimately be considered as irrational? Consider this fairly standard application of the traditional capital structure theory in the multiperiod. The prediction of the dynamic capital structure model is an adjustment of the current capital structure toward the theoretical optimum. To simplify analysis, I consider only adjustments made through a change in equity¹⁹. Specifically, firms are to issue more stocks to increase equity and reduce the leverage ratio if the current leverage is above the optimum, and to repurchase shares to reduce equity and increase leverage ratio if the current leverage is below the optimum.

As stock prices can fluctuate, either due to random noise or mis-valuation, a firm's leverage ratio can deviate from the optimal even if it was previously at the optimal²⁰. If the deviation is large enough, according to the traditional capital structure theory, managers adjust the leverage ratio to move toward the optimum.²¹ If stock price moves up, the leverage ratio will be below the optimum. To move back to the previous optimum, the firm will need to reduce equity by repurchase of stocks, as all adjustments are to be made by the equity account. On the

¹⁹ In fact, this is a better choice than to adjust with debt at the margin. For instance, in the case of a leverage ratio that is too high, to adjust via debt is to buy back debt by issuing stocks. Thus, we are back to using stocks to make adjustment at the margin.

²⁰ The stock market need not be irrational to have periods of over- or undervaluation of shares. One form of an efficient market is that stock prices are correct on the average (i.e., rational expectation). In this most plausible case of efficient stock market, versus the not-so-realistic requirement that stock price be correct at every point of time, large random fluctuations in leverage ratio could occur causing large deviations from the optimal capital structure.

²¹ Actually, when stock prices rise or decline, some lenders may see the firms as having increased or decreased debt capacity, thus moving the optimal leverage ratio and mitigating some, but not all, of the need to adjust capital structure.

other hand, if stock price moves down, the leverage ratio will be above the optimum, and firm will need to issue more shares to reduce leverage ratio. So far, so good. But take a closer look. Allow the managers to ‘rationally’ follow the traditional capital structure theory’s multiperiod adjustment model, and they would be buying back stock to increase leverage when the stock price is high, and selling stock to reduce leverage when the stock price is low. In other words, they would have to follow a ‘buy high, sell low’ trading strategy. It would be so obviously irrational that most managers in the real world would not want to follow it. To sum up, we have shown a case of, had the manager follow a ‘rational’ financial policy, they would produce ‘irrational’ results.

4. A Comparison of Traditional vs. Behavioral Corporate Finance Theory: Dividends, Capital Structure and Investment.

4.1 Dividend Theory

4.1.1 Traditional dividend theory. The simple traditional version of dividend theory no one seems to recall anymore is that firms pay dividends from cash flows it could not invest, after setting aside funds for contingencies. Instead, these days, it is the peripheral issues taking center stage. These issues include:

4.1.1.1 Agency issues. Managers, not having good investment opportunities but still the desire to hold on to the excess cash for personal use and to buy influence, would rather not distribute excess cash as dividends. Although this issue is not a part of a dividend theory in explaining why firms do not pay dividends (in the normative sense), it does explain some empirical observations of companies holding on to too much cash and making poor investments with the excess cash. Empirically, however, it is difficult to test, because it is confounded with behavioral explanations that managers were simply too optimistic and/or too confident *ex ante*; both instances would also produce poor investment outcome *ex post*.

4.1.1.2 Asymmetric information and signaling. Managers of some firms may have information of superior investment opportunities in the future that are not reflected in current stock prices. The managers’ challenge is to find a way to convince the stock market to give the firm higher valuation, without having to disclose the information to the market (and competitors). One such solution involves an increase in dividend payout, as an attempt by the firm to ‘signal’ a superior investment opportunity in the future. The reasoning appears plausible: the market should consider a dividend increase (that is not from higher current earnings and is thus a borrowing from future earnings) as a deliberate, confident, and thoughtful action by the management to make a statement about the sustainability of borrowing from future earnings to pay dividends. Unfortunately, this line of analysis misses a crucial point concerning the credibility of the signaler when making a statement. In a credible signaling scenario, the receiver of the signal (i.e., investors) should not suffer adverse consequences if the signal turns out to be

false²², or else, they should not and would not believe in the signal and commit (money, time, reputation, etc.)²³. Consider the following conversation:

Manager: Believe me.

Investor: Why?

Manager: I am going to declare a significant dividend increase to ‘signal’ we are going to have higher than expected growth opportunities. Our higher dividend is coming out of higher future earnings; I would not have increased the dividend were I not confident we could sustained it in the future.

Investors: Your reasoning seems persuasive, I am almost convinced that the stock price should be worth more.

Manager: You can see the soundness of the reasoning. You are indeed an intelligent investor.

Investor: By the way, one more question.

Manager: Go ahead.

Investor: What if we all believe in your ‘signal,’ give the company higher value and even go out and buy more shares at higher price, and when future finally arrives, there is no greater (perhaps, even less) profit? I, as well as all investors believing your signal, could lose money as stock prices fall.

Manager: Too bad.

Manager: In any scenario, I come out ok. I will take my bonus and exercise my options due to current and near future higher stock prices. By the time future arrives, I will be long gone – to another job, or retired.

Investor: What about us believing in your ‘signal’?

Manager: Frankly, I don’t give a damn.

As the above ‘conversation’ shows, investors and researchers who believed in the ‘signaling’ explanation simply do not or could not work out the fuller analysis²⁴. If ignorance could be regarded as a cause of irrational behavior, we may designate dividend signaling (*willing to believe in the non-credible*) as an example²⁵.

To take stock of the traditional dividend theory, we do have two plausible explanations²⁶ for investors to receive dividends while paying tax on them²⁷.

²² More precisely, to be truly believable, 100% of the cost or adverse consequence of signaling if discovered not to be true later should fall squarely on the managers. This situation is one of deciding how credible is the person claiming to be telling the truth. Imagine if a car salesman that you meet for the first time said, “Trust me that this is a great car. You have the car manufacturer and car dealership behind the car.” After the sale, the salesman receives the commission, and you can get stuck with a lemon for which the salesman bears no personal financial responsibility.

²³ Baker and Wurgler (2016) criticize the extant signaling model as suffering from two questionable assumptions: full rationality under standard preferences, and destruction of firm value as a credible signaling mechanism.

²⁴ Dividend signaling is thus an example of “Generosity at other people’s expense” (from an old Chinese phrase).

²⁵ This lack of correspondence between the person making the signal and the parties to bear the consequence in case of false signal was first pointed out in Ang (1987).

²⁶ There are minor explanations of why firms pay dividends: 1) Dividends save transaction costs for those who need to consume out of stocks; e.g., the proverbial old ladies in tennis shoes living in south Florida clipping dividend coupons. 2) They may pay stock dividends, which should not be confused with cash dividends. 3) Dividend payments can be required by a corporate charter, government edict, etc. 4) Some dividend paying shares are bond like, as in preferred stocks.

²⁷ Strictly speaking, the net tax disadvantage due to dividends is $(tp - tg)$, or personal income tax rate net of capital gain tax rate, assuming income not distributed will be eventually taxed at the capital gain tax rate. tg can be made infinitely small. For instance, the company can skip all dividend payments and pay a single distribution as a

- a. If value destroyed from investing the excess cash in poor investment by the managers exceeds the marginal personal tax rates of investors, or
- b. If the value of the firm destroyed by the management, due to self-interest decisions (agency costs) exceeds investors' personal tax rate. For instance, partners in small partnerships, or descendants of family businesses who are non-controlling members would rather receive dividends and pay tax on them than not to see any payout from the managing partners or family members under the guise of 'reinvesting the profit back into the business.'

What is in common in these two explanations for dividends with taxes is that they both regard dividends as remedy after the fact; i.e., to make the best out of bad circumstances.

4.1.2 Behavioral dividend theory. Lintner's (1956) modeling of dividends is the earliest known contribution to behavioral corporate finance. His insight, that the consequence from a dividend decrease or cut is worse than a similar increase, describes Prospect Theory's prediction and preceded Kahneman and Tversky (1979). Later researchers failed to appreciate this important contribution, and instead gave more attention to the partial adjustment empirical models that many later papers replicated²⁸. This was a lesser contribution, as the exponentially declining partial adjustment model (the popular Koyck version at the time), although often used in empirical studies, completely fails to describe actual changes in dividends other than the first lag term. The actual dividend adjustment process is infrequent but not smooth and decaying. Baker and Wurgler (2016) provide empirical support for the behavior Lintner showed: in a sample of dividend increases and decreases, share price responses do follow the non-symmetric S curve as predicted in the Prospect Theory. They formalize the behavioral foundation from Lintner and present a formal representation as a behavioral signaling model. Investors will infer that a dividend increase signals the permanence of higher earnings that is based on the following behavioral argument: Assuming the current dividend level is the Tversky and Kahneman first reference point, increasing the dividend would move this reference point to a higher second reference point. Managers are fully mindful that if the firm could not maintain the higher dividend and is to return to the previous dividend level, there would be no consequence if the firm stays at the first reference point (i.e., chooses not to increase dividends). On the other hand, if the firm chooses to be at the second higher reference point due to a previous dividend increase, returning to the previous dividend is perceived as a decrease (back to reference point 1) from the current higher reference point 2 and would hence involve a much greater loss of value (now in the loss region of the Prospect Theory value function)²⁹. Therefore, only increases that can be sustained are made.

The pioneering work in introducing behavioral economic theories to a topic in corporate finance is Shefrin and Statman (1984). They offered several new explanations at the time for why investors want to receive dividends, applying the theories of Kahneman and Tversky, and Thaler. However, they do not show whether these reasons – facilitate self-control, segregation of dividends from capital gain, regret avoidance (vs. sale of like amount of stocks), and risk

liquidating dividend after an infinitely long period, where the taxable portion is the liquidated value minus the investor's basis, or purchased price.

²⁸ For example, Ang (1975) estimated the partial adjustment model in the frequency domain; i.e., differentiate between short and long run components of the model.

²⁹ Baker and Wurgler avoid the problem of manager not being responsible for the consequence of their signal by assuming the interests of the manager and investors are aligned; i.e., the manager cares about the long term welfare of investors.

aversion – could generate monetary benefits large enough to offset the tax on dividends. Thus, these are to be classified as *behavioral demand* for dividends in which some firms may decide to cater to all or some of these needs.

As an example of rational managers exploiting irrational investors seduced by fads and fashion, Baker and Wurgler (2004a, 2004b) provide evidence that relative market pricing for high vs. low dividend paying stock peaks and ebbs. They further propose that firms change dividend policy to cater to investors' preference for high versus low dividends at the time. In practice, a dividend payout policy based on catering to the market's preference for dividends at the time is not simple to implement. First, most firms with a known and established dividend paying record would find it difficult to switch payout in respond to the current market valuation of high versus low dividend paying stocks. Second, in a multiperiod context, a constantly shifting dividend payout that is catering to the equally shifting dividend clientele, based on whatever is the current popular dividend policy, would not be consistent with the notion of stable dividend clientele in the multiperiod. Many investors who have reasons to demand dividends value firms that have a predictably stable dividend policy.

It is important to point out that a catering dividend policy based on market mis-valuation (over or under valued dividend paying stocks) is a rational response (value maximizing, at least in the single period model). However, there could be potential costs to a company committing to a dividend policy in the multiperiod setting, where maintaining a stable dividend policy is often expected by the firm and its investors.

4.1.3 A parting shot at the M&M's homemade dividend strategy. Finally, I would like to point out a little known fact that the classic M&M dividend irrelevant model implies irrational investor behavior, not only under a regime where market timing prevails, but also in the standard efficient market of the rational expectation variety. Recall M&M's dividend policy is based on the construction of the homemade dividend policy, its *deus ex machina*³⁰. Investors do not care whether the firms pay high or low dividends, even if each investor has different desired payout. An investor can achieve the desired dividend payout by either: a) selling shares if the firm's payout is less than desired; or b) buy more shares with the unwanted funds if the payout is more than desired. Now, even in a rational expectation efficient market where stock prices may fluctuate around their true values; i.e., prices average out to their true values; for investors to go to the market means they would have to pay the market price at the time. Since firms increase payout when their profits are high and decrease payout when profits are low, stock prices will be high in the former case and low in the latter. For investors to follow M&M's trading strategy, they will have to buy shares when prices are high (as firms with high earnings would be paying high dividends, in excess of investors' desired payout) and sell shares when prices are low (as firms with lower earnings would pay low dividends). In other words, investors would have to act irrationally by buying high and selling low³¹!

4.2 Capital Structure Theory

³⁰ We shall give credit to where credit is due. J.B. Williams (1938) originated the technique of 'homemade' payout and leverage, in which he developed the theories of dividend and leverage irrelevance. He is also credited for the discounted dividend valuation model. He derived the dividend constant growth valuation known as the Gordon model. His book lists almost all the parameters of the option pricing model. His 1938 book was reissued in 1956, two years before M&M (1958).

³¹ See Ang and Ciccone (2009) for a discussion of this issue.

4.2.1 The traditional capital structure theory. It is based on trading off benefits versus costs of debt³². The tradeoff model is often preferred if an optimal solution is presumed to exist; i.e. there is a pre-conceived bias to have a neat optimal leverage³³. Thus, this model would list benefits of leverage, which is principally the tax deductibility of debt³⁴, against cost of debt such as cost of financial distress (value destroyed and expense to third parties), costs of agency, and controlling agency costs. In the multiperiod setting, it may be described as a case of chasing a moving target; i.e., optimal capital structure may change due to changes in the inputs of the model from period to period or, on the other hand, if there are frictions to move from one optimum to another. This basic tradeoff model may be further augmented with finer details such as strategic concerns; e.g., to have excess debt capacity to counter and meet competitors' threat of expansion, to acquire higher leverage to reduce financial slack or make room to compromise to the labor in a collective bargaining negotiation; to consider the effect of a managerial compensation plan on risk-taking including too little or too much debt, to have political connection to gain access to debt, and to lower risk of default. The model is considered rational, as they are derived under the objective of maximizing firm value.

4.2.2 The Behavioral Capital Structure Hypotheses. I shall categorize behavioral capital structure hypotheses into two groups, depending on whether it is the managers or the investors who are not rational. In the first case, the managers' personal background (psychological, sociological, anthropological, geographical, ethnicity) may partly influence their willingness to take risks, ability to suffer setbacks, and willingness or lack thereof to assume more or less debt than the rational or traditional leverage ratio. Below are examples of influencing factors that induce managers or a board of directors to take more or less risk, which in turn translate to taking on more or less debt:

- Over optimism;
- Over confidence, self-attribution bias, hubris;

³² Prior to the tradeoff theory, capital structure may be partly described as having been 'clienteles based' or marketing based (market segmentation, niche product). Investors preferring the safety of principal and yield versus returns were offered preferred versus common stocks. There were institutional factors at the time favoring preferred over bonds that explains the much greater role played by preferred stocks. Bond interest was taxed in several New England states but preferred dividends were not. Manufacturing plants had to be kept free of mortgages. Institutional factors also played a larger role in explaining cross sectional variations in leverage: mining companies were unable to issue bonds, insurance companies and some banks had a hard time altering their equity structure and thus ability to raise additional funds, and small manufacturing plants were today's restaurants and had a hard time getting bank loans. On the common stockholders 'clienteles,' I found that par value of new stock issues were not low. Specifically, par of \$25 to \$100 per share a hundred years ago would be worth 12 times as much, or \$400 and \$1,200 per share respectively. We can surmise that these corporations target wealthier rather than small investors. See Dewing (1918).

³³ Leverage ratio for a firm was evolved, not designed. Early railroads (1840s) were financed entirely by stock subscription, at least initially. As the work progressed toward completion, the railroads found themselves needing more funds for assets and working capital, and would then use its assets (i.e., completed segments) as collateral for loans. See Dewing (1918). Later (1890s), there were cases of companies issuing more preferred stocks than assets, while common shareholders claimed even larger par without actually contributing funds. In the next century, debt policy was quite conservative; most firms took on debt if they could expect earnings to cover debt obligations with some margin of safety.

³⁴ A major defect of the tradeoff theory is that it cannot explain why businesses borrowed before there was tax on corporate profits. Corporate tax in the U.S, initiated in 1909, was a mere 1% with a \$5,000 income exemption.

- Loss aversion (once invested and realizing loss, a manager's unwillingness to call it quits and cut losses could mean sending good money after bad via more debt);
- Demographics: age, sex, race, education, birth order, political inclination, religion, parents' demographics;
- Life experiences: childhood, having had traumatic experiences, natural disasters;
- Wealth and consumption comparison with social peers.

Although many observers and researchers of corporate policies acknowledge the influence of some of these factors, few are willing to say outright that for management to let their personal background and life experiences influence their risk taking choice, they could be shortchanging their shareholders. After all, these are just different forms of agency costs in disguise.

Of more theoretical importance is the second case, where rational managers exploit the mispricing in the stock market due to irrational investors. Here we have two important classes of non-traditional capital structure models. When managers perceive stock to be overvalued, they would take advantage of outside investors' willingness to overpay for the shares and issue stocks. This is the market timing based capital structure of Baker and Wurgler (2002) and Baker, Hoeyer, and Wurgler (2017). Similarly, when managers perceive stocks to be undervalued, they would refrain from issuing shares and instead use retained earnings/excess cash, if any. This is the Pecking Order model of Myers and Majluf (1984). Readers may be surprised to find that I classify Pecking Order as under behavioral and under not the traditional capital structure model. As one can see from the discussion above, these two models are part of the single timing model; one half makes a prediction when shares are overvalued, and the other half is concerned with undervalued shares. In either case, managers are assumed to know or think they know firm value more accurately than outside investors, whether one attributes it to managers having superior information, being overconfident or over optimistic, or investors make a gross miscalculation. Note that behavioral biases such as overconfidence and over optimism could generate the prediction of pecking order hypothesis; see Heaton (2002). Baker, Hoeyer, and Wurgler (2017) incorporates equity price mis-valuation into the tradeoff theory of capital structure.

4.2.3 Is the traditional capital structure model truly rational? The static/one period traditional capital structure model is rational by construction. It is derived from the rationality principle of maximizing net value gain from choosing the best mixture of debt and equity. However, the multiperiod or dynamic version that depicts convergence to the time and state dependent optimal over time in various manners may not be³⁵. Due to the lumpiness of debt financing and complications from debt contracts, I choose a simpler adjustment process to allow firms to change leverage ratios: firms sell new shares to reduce the leverage ratio and buy back existing shares/repurchase to increase the leverage ratio. Consider a firm that is initially at its optimal capital structure, but external shocks and noise (in the sense of rational expectation, in which all shocks and noise converge to the firm's fundamental value) affect the parameters of the capital structure model as well as stock price.

First, let us consider the case of favorable shocks resulting in a higher stock price and increase in the firm's equity base, but also a higher optimal leverage ratio. The behavioral model would prescribe firms to sell new shares. As a result, equity increases further – from higher valuation of existing equity and from new equity, leverage ratio is further *reduced*, and, most importantly, reducing leverage moves the firm's leverage *further away* from the optimum. On

³⁵ The first empirical estimate of the intertemporal capital structure adjustment model was reported in Ang (1976).

the other hand, firms operating under the traditional model in their effort to increase leverage due to higher share prices that caused a lower leverage ratio and higher optimum, would reduce equity by buying back shares.

In the opposite case of unfavorable shocks and lower stock price, firm equity decrease and leverage ratio increase. Everything will just be the opposite. The behavior model will expect the firm to buy back shares at a low price, resulting in further increases in the leverage ratio and moving them further away from the optimal again³⁶. In contrast, firms under the traditional capital structure model, wanting to return to the optimal or target leverage ratio, would reduce leverage by issuing new shares.

I ask you to take a closer look at these predictions: firms under the traditional model are actually buying back shares when the firm's stock price is high, and selling (issuing) new shares when the firm's stock price is low. In short, the traditional model in the multiperiod with noisy stock prices are in effect buy high, sell low! Thus, the firms operating under the traditional 'rational' model could be behaving irrationally. More precisely, these firms are 'irrationally rational' – following the traditional capital structure theory is considered rational; however, the result is irrational. In practice, we would not expect managers to exhibit this type of value destroying behavior, and may indeed expect them to act in the opposite direction. Unwittingly, they would 'rationally' follow the behavioral model instead. Empirical researchers, dealing with numbers and estimated parameters involving large samples, but not put under the particular circumstances of managers having to make decisions, would blame the poor or non-supporting empirically estimated results as reflecting frictions in the adjustment process.

4.2.4 M&M's homemade leverage revisited. The basic idea behind the notion of homemade leverage is to let the investors make all the leverage adjustments in their personal account; firms can then have any amount of leverage. For an individual investor with preference for debt, those preferring higher debt can buy stocks with any amount of debt and use it as collateral to borrow at the personal level up to the desired amount of combined leverage. For those preferring lower debt, they could also buy stocks with corporate leverage in excess of their desired personal leverage, and de-lever by lending out funds (as in negative debt). Implicit in this scheme is the unusual integration of the investor's portion of the company's debt and equity and the investor's personal account of debt and equity. Now, if stock price decreased and corporate leverage increased by construction, to rebalance the investor's combined leverage, an increase in corporate leverage requires a corresponding decrease in personal leverage. This means that the investor needs to reduce leverage by paying off personal debt. Given the investor's personal balance sheet, she would have to sell shares to raise funds to pay off personal debt. Here, homemade leverage means selling share when the price is low, which a rational investors will not do³⁷. There are many other scenarios that can be derived from the need to maintain a certain personal leverage when adjustment is mainly at the personal level. Some would require the investors to act 'behaviorally.'

³⁶ Leverage ratio may further increase if share repurchase is financed by new debt instead of free cash flow.

³⁷ "Behavioral" investors would certainly not sell shares at below their reference points such as original purchase price or previous high.

4.3 Investments

The traditional investment model is the normative rational rule that says only investments that could create value/wealth; i.e., positive net present value; are to be made. Refinements of this rule include adding: the value of flexibility (or real option), other asset class (R&D, intangibles, goodwill,) other externalities (on environment, on local community, on other stakeholders), and strategic concerns (in anticipation of competitions).

Behavioral concerns are known to affect firms' investment decisions, by causing managers to either over- or underinvest, according to the traditional investment rule. Managers are prone to overinvest, including making poor acquisitions, when they: are overconfident in their own ability to manage larger or different investments; are overly optimistic about their odds of success; commit hubris to build empire; believe in hot hands; refuse to cut losses (divest) due to sunk cost bias; experience loss aversion after investment is made; attach outsized odds for small probability but extreme payoffs (preference for lottery); and invest in fads and fashion.³⁸ Under behavioral investing, there is a fine line that divides rational versus irrational choices. Taking advantage of market mispricing to achieve a one-time gain with no after effects is rational; buying a target that is truly temporarily underpriced is rational, and to be able to turn around and sell it to another company at a profit, or to make a spinoff is definitely rational. However, to commit funds to make long term investments; e.g., build plants, buy equipment, invest R&D in hot areas; with adverse long term consequences; i.e., these investments, responding to a temporary mispricing, do not deliver; is *not* rational and is a misapplication of the behavioral investment timing policy.

Certain behavioral bias may cause some managers to underinvest. A list would include: loss aversion before investment is made; memories of previous failures (once bitten, twice shy); shortsightedness; using the payback rule or avoiding long payoff (hyperbolic discounting); conservatism bias (due to short remaining tenure to retirement, etc.); or even cultural and religious biases against risk taking and entrepreneurship.

In the following, I shall revisit a case of investment choice that is a hybrid of rational and irrational decisions which is discussed earlier under earlier under, "Rationally irrational".

There are two parts. In the first part chronologically, managers perceived their stocks are overpriced by the market and they issue more shares (in hot market) or make acquisitions³⁹. So far, we have the market timing model of Baker and Wurgler. This is only half of the story. Overvaluation of a stock means the investors overestimated the firm's growth opportunities. Now, for the firm that just received a sizable amount of new money from new stock issues, hoarding the cash would reveal the firm's hand – it does not have the growth opportunity the market expects, and the stock price mini bubble would pop. The alternative is to go along and pretend it has good project and invest the money raised. Since the firm does not really have any positive NPV projects, if it chooses to invest, it has to be investing in negative NPV projects. Summarizing, although investing in negative NPV projects appears to intentionally make an irrational choice, given the circumstances, for the firm to exploit market's mispricing, it is a

³⁸ There are numerous papers that discuss the relevance of behavioral finance in various aspects of corporate finance. See, for example, Gider and Hackbarth (2010) on financing decisions, Gervais (2010) on investment decisions, Ben-David (2010) on dividend policy, Dong (2010) on mergers and acquisitions, Derrien (2010) on IPOs, Gervais (2010) on investment decisions, and Morck (2010) on governance.

³⁹ Ang and Cheng (2006), and Dong, Hirshleifer, and Richardson (2006) present evidence support market timing in mergers; i.e., mis-valuation of acquirers' shares.

rational decision once new stocks are issued at the inflated price (rationally irrational). After all, it may take years for the market to find out that some projects are negative NPV. By that time, the stock price is a function of something else, another fad, and the manager may be long gone or retired.

5. Behavioral Corporate Finance for the Practitioners

Confirming that investors and managers are observed not to act rationally some of the time (thus, behaviorally) is a mixed blessing for the astute corporate financial managers. They present opportunities and pitfalls that are discussed below.

5.1 Opportunities: How Corporate Financial Managers Can Take Advantage of Others' Behavioral Missteps

5.1.1 Negotiation. Negotiation plays a vital role in some of the most important corporate events, including: mergers as acquirer and as target; seeking new financing from banks, venture capital, private equity funds, and other lenders; dealing with investment bankers; in collective bargaining with the labor union; negotiating long term supplier and customer contracts; or, closer to home, top management negotiating its own compensation package with the board of directors.

As in war, part of the key to winning in a negotiation is 'to know thy enemy, and to know thyself (Sun-Tsu (500-600 BC), *The Art of War*, various translations.) Specifically, the first objective in a negotiation is to know the other party's behavioral 'reference point.' In a negotiation, the opposing side may have more than one reference point.

As early as possible, probe and discover your opponent's reference points in the negotiation. They are variously referred to as: the bottom line, taking off point for negotiation, first line of defense, second line of defense, reservation price, walk away price, second best offer from another, etc. It would be a monumental mistake in negotiations to make a first offer that is far less than the opponent's lowest reference point, which will be considered as an insult, or to offer far more in the final deal, which is akin to the winner's curse.

Use Prospect Theory, framing what the opponents stand to lose, reminding them of successive small gains. At the same time, do expect your opponents to do the same; they will probe your reference point(s) both in pre-negotiation intelligence gathering and during negotiation. It is your job not to reveal your reference point too early, and if possible use deception (again, from Sun Tzu). Judicious use of misrepresenting one's reference point and creating framing could yield negotiation advantage under the right set of circumstances and choice of opponents.

One negotiation strategy that is behavioral is to create sunk costs in the mind of opponents who are susceptible to them. Sunk costs to a negotiating party could include: actual cost incurred by the opponents (e.g., investment bankers' fees, legal fees for lawyers, court costs, proxy solicitation expense, and investment in information gathering); time spent in negotiation thus far; and concern for reputation, as the press often labels acquirers as winners of losers⁴⁰. Those who suffer from or could be induced to have sunk cost bias are susceptible to being

⁴⁰ Although many apparent 'losers', after receiving large windfall gains from their toehold investment in the targets are crying all the way to the banks.

manipulated into staying in the negotiation longer and, possibly, conceding better terms to the opponents.

Not recommended are negotiation tactics that yield short term advantage but damage one's reputation as a negotiator. Examples include: shifting own reference points as in making escalating demand after preliminary agreement; making small change in reference point just before the deal is signed in order to gain concession to marginal demand; and reneging on accepted offer to recalibrate opponent's reference point ('If you could agree to these terms, you must be prepared to give up more').

5.1.2 Exploiting investors' behavioral bias: short term. Investors often mispriced stocks due to irrational reasons (when looking back). Their sources of behavioral bias include: chasing fads and fashion; herd instinct to follow the crowd; chasing bubbles; expecting continuation of recent returns; putting too much weight on rare events with high returns; and, once something occurs, expecting a repeat. A prime example is the case of the stock market responding positively to companies adding .com to their corporate names during the dot com bubble⁴¹, and also positively when companies removed the dot com tag after the bubble burst.

Firms issuing more stocks in periods of share overvaluation (the market timing hypothesis of capital structure discussed earlier), and responding to changing tastes in the valuation of high dividend paying shares (catering hypothesis) are examples of firms responding to short term mispricing. Managers should be wary of making long term commitments under the guise of behavioral timing. For instance, actually investing new funds in 'hot' technology that is the fad and fashion (flavor of the month) due to favorable market sentiment at the time is not recommended. The relatively small one time gain would not be worth the loss of firm value from eventual correction. The principle behind market timing investment is to take advantage of fads with eyes open; it should only be regarded as a temporally window of opportunity. In short, you should take the 'money and run' and 'don't stick around to pay the price.'

5.1.3 Exploiting ingrained behavioral bias. Less recognized is the existence of behavioral bias among investors that have staying power over time. They are ingrained as they are part of the cultural and sociological bias, which astute managers can exploit. A case of such ingrained bias is the preference for items that are labeled as 'A' versus 'B,' 'C,' 'F,' etc., from report cards to bond ratings to the grading of product quality. This preference leads many companies with dual voting rights shares to designate the class with inferior voting rights; e.g., one share one vote; as 'A,' and the otherwise identical but superior voting right shares; e.g., one share ten votes; as 'B.' Ang, Chua, and Jiang (2010) investigate the pricing of these dual class shares and find that the inferior but 'A' designated shares are priced no less if not higher than the superior but 'B' designated shares.

5.1.4 Manipulating investors' expectations. Some firms with few scruples may not hesitate to attempt to manipulate investors' expectations, from accounting fraud and earnings manipulation, to recycling old news and creating fake news by company-hired public relations firms or bloggers. One behavioral bias among investors is that, due to the paucity of real significant corporate events (average of less than half a dozen per year, for a typical firm), investors tend to attribute the presence of 'news' out of 'no news.' In one laboratory experiment

⁴¹ Cooper, Dimitrov, and Rau (2001).

reported in Ang and Schwarz (1985), traders who were conditioned in the previous rounds of the experiment to the existence of traders (other persons or themselves) with inside information, would actually assume the existence of informed traders even if none existed by the experiment's design. That is, having been conditioned (i.e., manipulated), traders expected information when there was none. The experiment shows traders could be manipulated without resorting to fraud by exploiting their behavioral bias.

5.2 Self-Examination to Minimize the Pitfalls or Costs of Committing Behavioral Biases

Behavioral finance to the corporate managers is a double edged sword. Not only might it enable managers to exploit investors and other managers' behavioral biases; it may also expose the manager's own behavioral biases. This is the 'know thyself' part of the 'know thyself, know thy enemy' discussed above. I shall list some of the behavioral caution signs and, if available, means to mitigate their adverse influence.

Do not set an unrealistic reference point in approaching a negotiation or making a financial decision. While setting a low bar is meaningless, a very high reference point unnecessarily raises the odds of failed negotiation. For instance, target managers and investors are known to use a high bar at 52 weeks high price (Baker, Pan, and Wurgler, 2012), which is more appropriately an aspiration level than a reference point for negotiation. Final offer price is likely to be less than the high bar in a year of volatile market and in which acquirers would also time when to initiate an offer. Refusing less than the high bar represents a loss in the value function and could lead to failed deal.

Realize the limitations of exploiting other's behavioral biases. Occasional one time timing gain may be acceptable. Frequent use of market timing may dull its effectiveness ('Fool me once, shame on me; fool me twice, shame on you.').

Avoid making choices that give immediate short term gain but culminate in long term harm; see the example on the 'rationally irrational investment choice' discussed earlier.

However, when it comes to nurturing entrepreneurship in an economy, there is a role for potential innovators to take long odds (lottery type investments); see Ang (2018).

Since one can always find a behavioral bias to explain every outcome, do not use it to find excuse for failure.

The toughest behavioral biases are dealing with managers who are too confident of one's ability and/or too optimistic of favorable outcome. Ex ante, there is no solution. These managers could not be differentiated from those who possess truly superior ability or information. For instance, when presenting their business plans before banks or venture capital providers, overconfident and overoptimistic managers are just as willing as the truly capable managers to make promises and even pledge their personal assets. Within a corporation, at least in theory, there is the board of directors who can hold back the aggressiveness of these overconfident and overoptimistic managers.

6. Concluding Remarks

Does behavioral corporate finance have a role in corporate finance theory and practice? As I have shown in this paper by comparing the traditional and behavioral corporate finance, the latter does fill in several important gaps. However, there is still much work to be done – more

theoretical work, more meaningful empirical studies, and the gaining of more insights from field and laboratory controlled studies.

Behavioral corporate finance needs more formal theory in the caliber of Nobel Prize winners, Tversky and Kahneman, and Thaler. Rigorous empirical and experimental testing could only start from a foundation of rigorously developed theory. In this respect, behavioral corporate finance is ahead of behavioral investment finance. While the basis for most empirical studies in behavioral investments are from folk psychology, sociology, or anthropology, or just ‘interesting,’ as reported in this paper, there are empirical studies testing the predictions and implications of the theories of Tversky and Kahneman, and Thaler with corporate finance data. There exists support for the Prospect Theory value function in the single period dividend increase and decrease in Baker and Wurgler (2016) and Ang and Wang (2018). In the multiperiod, support is found for Conditional Prospect Theory in the study of accounting low balling in Ang and Alexander (1998), and for Thaler’s hypothesis of preference to segregate gains and aggregate loss, as reported in Ang and Wang (2018).

To gain new insights into behavioral corporate finance, researchers need to collect and generate original data from field studies, including questionnaire surveys and interviews⁴², as well as conduct well designed laboratory studies. At the same time, researchers need to be aware of the pitfalls in these studies; e.g., it is difficult to get participation from busy executives and if they or their assistants do agree, it is difficult to get meaningful and thoughtful responses. On the other hand, students as subjects are convenient but have no experience as financial executives⁴³. Summarizing, what can practitioners get from the emergence of behavioral corporate finance? First, it provides a better understanding of some seemingly non rational or behavioral actions taken by other managers and investors. Second, there exist corporate strategies that exploit these behavioral mistakes, from negotiations to timing securities issuance. Third, disciplined managers may develop ways to avoid committing harmful behaviors. Fourth, since there are behavioral biases, such as overconfidence and over optimism, among managers who lack the self-awareness to avoid them, another responsibility of the board is to step in and restraint managers.

⁴² Linter’s insight came from his communications with top executives while at the Harvard Business School.

⁴³ A defect in laboratory experiments, and has implication for testing Prospect Theory on subjects, is that participants in laboratory study do not face actual loss, as they are given a small monetary reward for completing the experiment and for their relative performance. Ang, Davitopulus, and Schwarz (2014) remedy that in one of their experimental designs, in which participants recruited in Las Vegas used their own money in a stock market experiment involving bubbles.

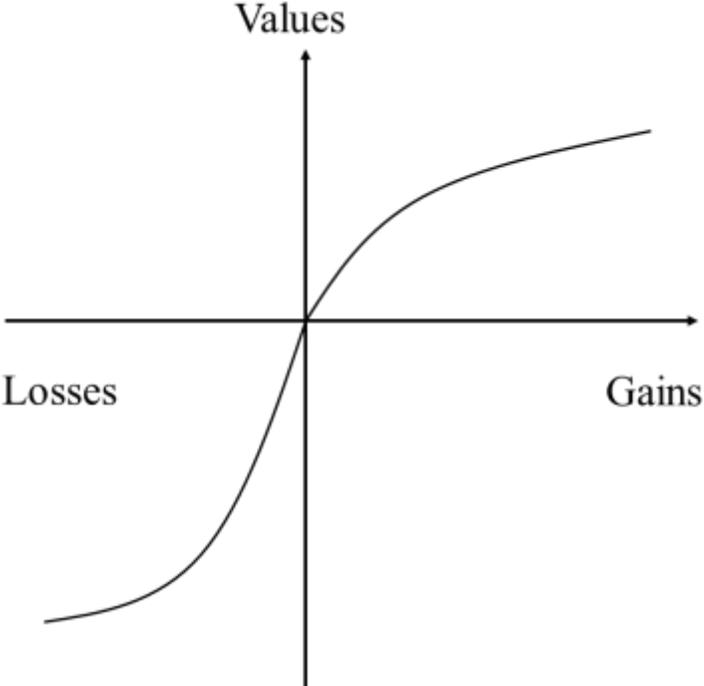


Figure 1: The Prospect Theory Value Function

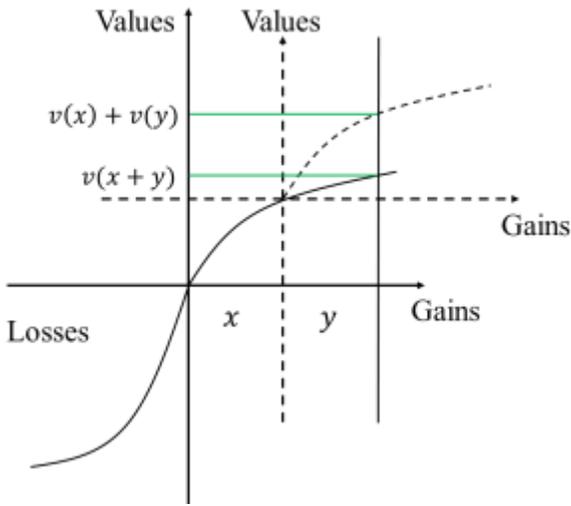


Figure 2: Segregating gains:

If two gains (x, y) are integrated as one gain $(x + y)$, the value to the individual is $v(x + y)$. However, if separated, the first gain $v(x)$ moves the reference point such that the second gain $v(y)$ is worth more, as it is closer to the new reference point, the portion of the curve with the largest increase.

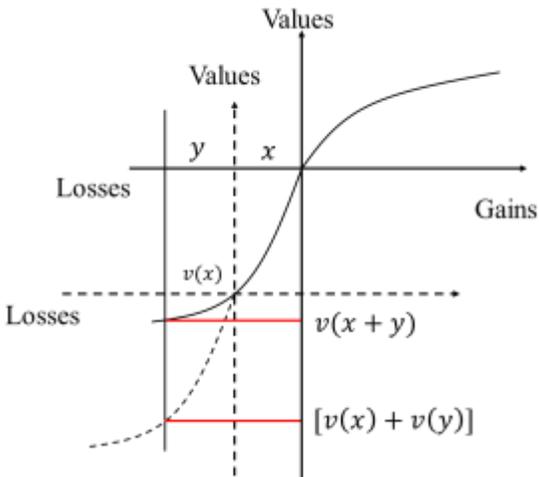
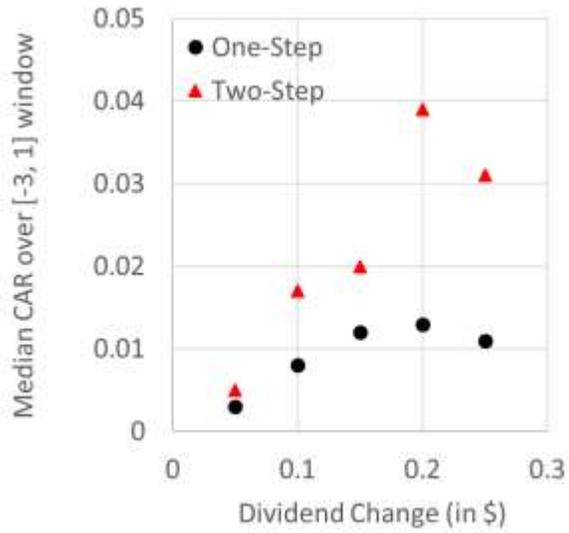


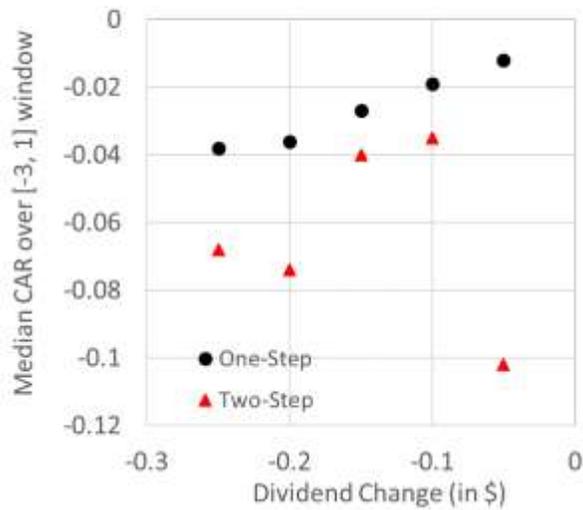
Figure 3: Integrating losses:

If two losses (x, y) are integrated as one loss $(x + y)$, the value to the individual is $-v(x + y)$. However, if separated, the first loss (x) moves the reference point to $-v(x)$, at which point the second loss $-v(y)$ is just as large, as it is closer to the new reference point where value loss is greater.

Figure 4: Empirical evidence from multiple change in dividends:
Panel A: Segregating gains: one vs. two consecutive dividends increase.



Panel B: Integrating losses: one vs. two consecutive dividends decrease.



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Table 1:

Panel A: A 2x2 Classification of Managers and Investors based on whether they are rational or not rational.

	Managers are rational	Managers are not rational
Investors are rational	<p>Traditional, or standard value maximization, trading off costs and benefits</p> <p>Key variables: imperfections at the market, managerial and regulatory levels (agency issues, asymmetric information, taxes, transaction costs, incomplete contract)</p> <p>Key concepts: Fundamental value, tradeoff, adjustments</p>	<p>Managers have biases and fail to accept own limitations</p> <p>Investors' response: Smart money can exploit profitably; dumb money follows 'smart' looking managers and loses</p> <p>Key concepts: bounded rationality, overconfidence, overoptimistic, loss aversion</p>
Investors are not rational	<p>Investors suspend calculation, take short cuts, follow others, rely on rumors and other unreliable sources instead of collecting hard information, engage in wishful thinking, prefer choices that result in less over more wealth (e.g., to pay tax versus not), embrace sunspots (i.e., believe in extrinsic random variables; these are random variables that do not affect economic fundamentals such as endowments, preferences, or technology.)</p> <p>Managers' response: catering, market timing, take the money and run, fraud.</p> <p>Key concepts: sentiments, fads and fashion, herding, ingrained cultural and social beliefs, unicorns type1 (investors are funding hot concepts that entrepreneurs exploit; i.e., ICO (initial coin offering)), separate dumb investors from their money</p>	<p>Unchartered, usually shorter duration but could cause great damage as the scope is wide; Examples: investors rewarding firms and their managers for making value destroying financial choices. Both investors and manager sweep up by the same fad and fashion. Supply of and demand for taxable dividends that could be avoided; pay dividends, stock reinvestment plan.</p> <p>Key concepts: Housing bubbles, stock market bubbles, cryptocurrency, many Kickstarter funding deals, Emperor's new clothes</p>

Table 2: Two special cases: Rationally irrational vs. Irrationally rational

Managers are...	If they...	Example
Rationally Irrational	Intentionally make seemingly irrational choice to rationally maximize value, at least temporarily.	<p>If the market/investors are irrational in mispricing shares, the firm could issue more stocks. This is only half of the story.</p> <p>What the company does with the cash received from stock issues matters, and the markets are watching and derive signals from the action taken.</p> <p>Parking the cash, retiring or paying off debt and other liabilities could lead to an inference, because contrary to the high expectations of growth to support inflated stock price, the action exposes the unsustainability of this high growth expectations.</p> <p>Thus, to sustain the untenable, inflated expectations, the firm even lacking growth opportunity must invest the new funds, albeit at negative NPV to maintain the appearance (rationally).</p>
Irrationally Rational	Act from a rational model that produces irrational results.	<ol style="list-style-type: none"> 1. Moving toward optimal capital according to dynamic capital structure theory when leverage ratio is high (due to low share) by issuing equity; or 2. Moving toward optimal capital structure when leverage is low (due to high share price) by repurchase stocks. <p>Result is moving toward optimal capital structure by buying high and selling low. Who would do that?</p>

Table 3: The sources of behavioral finance:

Intellectual basis	Ideas or hypotheses	Relevance to corporate finance theory and practice. Examples or empirical evidence
<p>In the tradition of modern behavioral economics of Tversky, Kahneman</p>	<ul style="list-style-type: none"> • Prospect Theory utility function • framing • Reference point anchoring • Value function has a kink or break at the reference point leading to much greater value loss than a similar magnitude value gain • Value function is concave in the gain region and convex in the loss region • Cumulative Prospect Theory allows specification of a high value rare event 	
<p>In the tradition of modern behavioral economics of Thaler</p>	<ul style="list-style-type: none"> • People prefer to separate gains and integrate losses • Value from separating two gains is lower than integrating, or taking as a single gain • Value from integrating a single loss is greater than separating it into two losses 	
<p>Assorted observations from the literature in psychology, sociology, anthropology, and other human cognitive and decision sciences</p>	<ul style="list-style-type: none"> • Mood, experience, personality • Calendar time • Self-attribution bias • Attention bias • Short termism, or hyperbolic utility function, time inconsistent choices • Illusion of control • Optimism • Sunk cost fallacy • Herd behavior, availability cascade, groupthink 	