



Financial Theory, Breakdown of Separation Theorems, and Corporate Policies

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Abstract: This study examines the implications of the separation theorems in finance to shed light on how these theorems can be refined to accommodate real life financial applications and decision makings. We also generalize the financial theory of the firm by incorporating real options in the production function to accommodate the complexity of real world issues. This modified financial theory of the firm does not presume a perfect market but accommodates changes in the environment to set up investment and financial policies. It also integrates different business functions such as marketing and human resources management into the decision-making framework for the long-term growth and value maximization of the firm.

1. Introduction

Traditional financial theories on capital structure and option pricing were built on axiomatic assumptions of perfect financial markets and rational investors. The axiomatic approach is appealing because it builds on simple assumptions to derive the equilibrium results that can be generalized for different market settings. Typically, the assumptions are static in nature and the economy is assumed to be in

a steady state. If the assumptions underlying the model do not describe the real world situations, which are constantly changing, the theoretic results thus derived may not explain the real world phenomenon well.

Financial theories developed using the axiomatic approach, such as the separation theorem on investment and financing, two-fund separations, and separation of production and stockholders preference underpinning the asset pricing models, are commonplace in the literature. These theories are supposed to help managers make good and sound financial decisions. Yet many observed financial decisions seem to be at odd with the theories developed. Thus, many anomalies in the financial markets are still unexplainable by these theories and remain puzzling to academicians and practitioners. As a result, there is a need to further refine and develop the existing financial theories to accommodate the dynamic nature of the changing environment.

The applicability of financial theories also depends on the efficiency of the markets in which firms operate. The validity of the widely adopted notion of efficient markets has been questioned in the past decade and especially under the microscopic analysis in the wake of the 2008 global financial crisis.¹ Although the efficient markets notion is a useful equilibrium concept enabling us to understand how assets prices are determined and converge in a steady state, evidence that asset returns are predictable over time and financial markets are not efficient even in the weak form has amassed in previous studies (e.g., Carhart (1997)). The dot-com bubble burst in early 2000 demonstrates that the stock market was indeed not efficient at times.² Market inefficiency has significant and far-reaching implications for financial managers as to how they should behave when they are being pressured by the market to act in a short-term manner that may hurt the long-term prospect of the firm [Jensen (2005)].

The axiomatic approach to financial modeling, coupled with the controversial Efficient Market Hypothesis, seems to suggest that we need to evaluate the financial theories developed thus far using a new perspective that accommodates the periodic market inefficiency. We begin by analyzing theories relating to

¹ See, for example, Kirman, Alan. "Economic theory and the crisis." *Voxeu*. 14 November 2009.

<http://www.voxeu.org/index.php?q=node/4208>; "Sun finally sets on notion that markets are rational". *The Globe and Mail*. 7 July 2009.

<http://www.theglobeandmail.com/globe-investor/investment-ideas/features/taking-stock/sun-finally-sets-on-otion-that-markets-are-rational/article1206213/>.

² "Poking Holes in a Theory on Markets". *New York Times*. 5 June 2009.

<http://www.nytimes.com/2009/06/06/business/06nocera.html?scp=1&sq=efficient%20market&st=cse>

managerial decisions on investment and financing. One of the important assumptions about managerial behavior is that managers are able to evaluate and analyze the financing and investment decisions separately as encapsulated in different separation theorems. This seems to imply that there is no linkage between managerial decisions on investment and those on financing. In this study, we analyze why the linkage between investment and financing decisions in a corporation indeed affects corporate strategy and its outcome. Specifically, we believe the theory regarding separate decisions on investment and finance should be changed given the recent evidence suggesting that the theory might no longer work and might have never worked before.

This study re-examines the separation theorems in finance in a theoretical framework and investigates how they should be changed to accommodate real life applications for corporations. Instead of analyzing the debt/investment in detail explicitly, we generalize the financial theory of the firm by incorporating real options in the production function that reflect the long-run sustainability of the firm in a similar spirit as in Fung, Law, and Yau (2010). Finally, we offer a more pragmatic approach to managing a firm by proposing corporate financial policies and strategies that help achieve the value-maximizing goal of the firm.

2. Separation of Investment and Financing Decisions

In their seminal article, Modigliani and Miller (1958), hereafter MM, developed the separation theorem of investment and financing decisions for a corporation, implying that the financing decision of a corporation is irrelevant to the valuation of the firm. However, Modigliani and Miller (1963) showed that in a world without taxes, the interest tax shield would lead to a corner solution of debt (i.e., 100 percent debt financing) for a corporation. These theoretical implications of MM (both the irrelevance of the method of financing and the corner solution of debt) are clearly at odds in reality with the perceived role of financial management aiming at balancing the tradeoff between maximizing the value of the firm (by using maximum debt-financing possible) and ensuring the long-term survival of the firm.

An implication of the MM framework is that the present value of the net profit (or cash flows) from the production function (i.e., the sales revenue less the production cost) with the appropriate discount rate determines the value of a project, which is then preferred by the current stockholders who invest in the firm primarily for financial rewards. Apparently, one will find that by relaxing the assumptions of

a perfect market (pertaining to homogeneous expectations of investors, information asymmetry, and bankruptcy costs), we find for example that different stockholders may have different preference for socially responsible investments and there will be interactions of financing and investment decisions that will determine optimal financial decisions relevant to firm valuation, bondholders, and stockholders (current and future alike).

Moreover, if the common stock of a firm is valued as a call option as in Merton (1974), shareholders have the right to buy back the firm's assets by paying off bondholders in favorable financial conditions while giving up the control of the firm to bondholders through the limited liabilities provision (i.e., the put option) in adverse financial conditions. As shown in the Black and Scholes (1973) option pricing model, which also assumes perfect financial markets, volatility has significant implications for managerial decisions that may affect firm value for two reasons. First, the wealth of bondholders can be expropriated by shareholders by increasing the debt level in the firm. As a result, bondholders who want to protect their investments in the firm will restrict certain use of firm assets either through monitoring or bond covenants so as to reduce asset volatility. Second, bondholders may also charge a higher interest rate to the firm for perceived higher risk or restrict lending to the firm through credit rationing in the extreme case of enormous asset volatility that makes the bonds worthless.

When a firm increases the use of debt, bankruptcy risk affects the capital structure in several ways. First, probable bankruptcy will force bondholders to impose financing and monitoring costs on the firm in investment and financing decisions through restrictive bond covenants, rendering the breakdown of the irrelevance theorem of MM in the real world. Second, as more debts are borrowed, the tightened covenants demand managers to spend more time and energy on managing the financial constraints on the firm. Managerial efforts toward the production of the firm are diverted away from value-enhancing projects to sheer maintenance of financial covenants, reducing the value of the firm [Fung and Mehta (1993)].

Finally, as a firm borrows more debt, consumers hesitate to buy products of the heavily debt-loaded firm fearing no after-sale services if the firm goes bankrupt. A case in point is that during the 2008-9 global financial crisis, concerns of the imminent bankruptcy of the US automobile manufacturers loomed so large that consumers were reluctant to buy cars from the big three (GM/Ford/Chrysler) on the

brink of their bankruptcy.³ This clearly demonstrates that production and capital structure decisions are endogenously determined and should not be made separately. To reduce the indirect costs of bankruptcy, the firm should choose not to use excessive debt. This result suggests consumer preference has significant impact on the investment/financing decision, and will be discussed more in Section 4.

3. Two-Fund Theorem

Given the positive return-risk relationship in the classical capital asset pricing model, investors trying to maximize the trade-off between risk and return can easily derive the efficient frontier for all feasible sets of risky investments. In addition, if a risk-free asset is present in the market, the two-fund separation theorem can be obtained. That is, the investment opportunity set for all investors in the market will consist of only two funds: riskless asset and market portfolio. As a result, regardless of their utility functions, investors will invest either in a riskless asset, the market portfolio, or both through lending and investing in the risk-free asset. The same implication of the two-fund separation theorem also applies to a global economy if the world financial market is perfect and competitive. That is, we should have a similar version of the international capital asset pricing model in which investors should hold a world market portfolio along with a global risk-free asset, albeit very unlikely in reality.

There are several observations demonstrating that reality does not conform to theory with regard to the two-fund separation theorem. First, there is ample evidence that investors overweight domestic stocks in their investment portfolio, suggesting that domestic investors do not invest proportionally in the world market portfolio. Thus, a home bias in the global investment seems to be present and real [Fung, Xu and Yau (2008)]. Various reasons behind the home bias can be invoked by appealing to market imperfections, information asymmetries between domestic and foreign markets⁴, higher transaction cost, investment barriers of trading imposed by foreign governments, and over-optimism of domestic investors toward domestic assets [Coval and Moskowitz (1999, 2001), Grinblatt and Keloharju (2001), Karolyn and Stulz (2003), and Lewis (1999)].

³ "Five Key Questions on GM Bankruptcy," CBSNews.com, June 1, 2009.

⁴ Seasholes and Zhu (2010) do not find evidence that individual investors in the U.S. have value-added information about local stocks. This contradicts previous results that suggest investors prefer to invest locally because of asymmetric information about the local investments.

Even within a pure domestic financial market without considering the global market, Fama and French (1992, 1993) conclude that the relationship between the average return and beta was weak over the period from 1941 to 1990 and was virtually nonexistent from 1963 to 1990. Second, the prominent adoption of the Fama-French (FF) three-factor model and Carhart four-factor model (i.e., the three factors from the FF model plus the momentum factor) in many financial studies clearly shows that the use of one-factor (market) model is dubious. Clearly, the remaining challenge is to explain why these factor models are appropriate in a theoretical framework to justify their use.

4. Separation Theorem in the Theory of the Firm

4.1 Traditional Economic Theory of Firm

The conventional economic view of the firm is to use inputs of scarce resources (such as capital, K and labor, L) to generate output through a production function in order to maximize profits. This one-period model of the firm linking profits to the production function has been challenged on multiple fronts. First, the transaction theory demonstrates that a business firm will act to overcome impediments over time to minimize the transaction costs [Coase (1937)]. This likely leads to the interaction of investment and financing decisions because investment decisions may be affected by financing constraints and restrictions imposed on the firm.

Second, as society becomes more developed and specialized, a knowledge-based production function becomes essential to the firm [Adler (2001)]. That is, the conventional inputs, capital and labor, are inadequate to capture the knowledge-based technology for the production function. The firm has to incorporate the specific needs and wants of customers and make sales link directly to the production function. The premise of the “supply-creates-its-own-demand” approach to production is arguably inappropriate. For example, in consumer-oriented industries, joint production incorporating the firm’s capabilities and customer needs and wants has become an important development. The recent success of Build-A-Bear, a St. Louis company in the U.S. that relies on efforts from customers and the technology and materials supplied by the firm to build a customer-made toy bear for kids, is an interesting illustration of the joint production concept.

Third, financial markets and division of labor requires trust and credibility among different markets participants beyond what is required by laws and codes of ethics as practiced in reality. Thus, the firm image and brand, which is a more subtle firm characteristic than knowledge and technology, has emerged as a critical factor in the production function that maintains a competitive edge in the market place for the firm [Adler (2001)]. As a result, the incorporation of marketing decision in the production decision causes the separation theorem in the firm's production function to break down. In other words, for a modern firm, there appears to have other fundamental factors that go into the production function than just looking at the mechanical net-present-value rule per se.

In light of the challenges facing the pure economic theory of the firm including the break-down of the separation theorems of production and financing and of others, there are several realistic approaches to resolving market impediments, especially for multinational enterprises that can circumvent domestic market imperfections in a global environment [Shapiro (2008)]. The first approach is tax arbitrage. A firm can reduce its tax burden through various means. In particular, a global firm can reduce taxes by shifting profits from a high-tax to a low-tax location. In financial arbitrage, the second approach, a firm can make higher returns by circumventing financial market impediments, such as foreign exchange control, interest rate ceiling, and others. For instance, if there is credit rationing for a domestic firm, offshore financing is a means to overcome the restriction. Third, the flexibility of the firm to declare profits in the proper timing is a common way to smooth out earnings and thus an approach to overcome the regulatory system that sets the transfer pricing on goods. Thus, it is important to look at firms as strategic option that mitigates impediments of the goods and financial markets.

In this study, we re-examine the theory of the firm that needs to incorporate the contingency analysis with the existing valuation model in a modern financial market, supports the economic theories, and makes them more applicable to current financial issues in an ever-changing world.

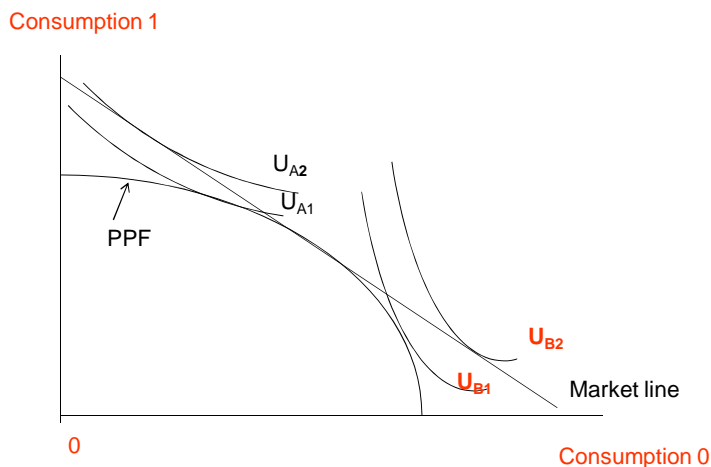
4.2 Production Decision and Stockholders

In extending a single-period analysis to a multi-period analysis in the existing economic and financial models, the preference of stockholders is critical to the production decision that needs to be specified in order to define firm profit and production decision over time. That is, the financial theory of a firm in a

multi-period context assumes that rational investors (stockholders) prefer more to less and are only interested in pecuniary gains. As a result, a firm should select projects that maximize the net present value (NPV) of free cash flows over time with the appropriate risk-adjusted discount (market) rate or cost of capital. If stockholders do not have the same liking of the firm's production function, they themselves can achieve their own particular preference through the market action of buying and selling under the perfect market assumption.

In the microeconomic theory, the optimal production occurs at a level where the marginal production cost equals the market interest rate (i.e., the slope of the market (budget) line that touches the production possibility frontier of the firm.). Such a production decision produces a win-win situation for the firm and is thus unanimously agreeable to all stockholders and not based on a particular stockholder preference. If stockholders have a different preference for firm production, the production decision will be different. The optimal production for a firm without inputs from stockholders (and consumers) is shown in the following figure.

Separation Theorem - Production



Notes:

- (1) U_A is the utility function of stockholder A and U_B is the utility function of stockholder B.
- (2) Higher utility moves outward (i.e., $U_2 > U_1$).
- (3) PPF is the firm's production possibility frontier in a one-period model (i.e., time 0 and time 1)
- (4) The market (budget) line is the reciprocal of the interest rate.

While it seems reasonable to assume in the past that stockholders are not involved in making production decisions, this assumption is no longer true. Stockholders have become activists in corporate governance that affect the production function in several important ways. First, they are more involved in the executive compensation of public companies to mitigate the agency cost through proxy fights. Stockholders in many public companies including American Airlines, Citigroup, Electronic Data Systems, and JP Morgan have approved proposals enabling them to be actively involved in the board decision on executive pay. The executive pay has been the subject of hot debate for awhile and stockholder involvement may change the way that the corporate executive board conducts business.

Second, as stockholders have become more aware of corporate social responsibility, they demand their firms to consider their inputs in firm decisions, especially in socially responsible investing [Fung, Law, and Yau (2010)]. In recent years, some mutual funds acting as major stockholders of public companies are strong activists at stockholder meetings, demanding socially desirable changes in firm policies such as greener environment and social justice. Some funds invest only in firms that have set up a formal process in evaluating socially responsible investment projects.

Finally, if the board of directors does not exercise proper fiduciary duties for stockholders, shareholders can take legal actions against the firm and its board of directors. The call for stronger fiduciary duties on serving corporate boards will become more relevant by the government and stockholders, putting more pressure on board members to behave responsibly.

4.3 Production and Corporate Image/Branding

The production function of a firm does not exist in a vacuum; a firm cannot simply produce a product that is unconditionally accepted by consumers. Consumers buy a product because it fulfills an intrinsic need or satisfaction. The extent to which the satisfaction of a product can be maintained after purchase over time depends on the consumer's perception of the image, credibility, and actual quality of the product.

A firm can provide assurance of the product quality to customers through the development of good technology for the product and a good organization structure that maintains control over the product quality over time. That is, the firm needs to have internally a good corporate culture to maintain product quality and externally

a good image perceived favorably by consumers. Erhard, Jensen, and Zaffron (2008) recently developed a new model of the firm to incorporate corporate integrity, a necessary condition for the firm to maintain sustainable performance. Reduction in corporate integrity will diminish the degree of sustainability, lowering corporate performance. For example, the Johnson and Johnson Tylenol case demonstrates that maintaining corporate integrity and promoting such image help the firm to sustain market share and growth. In 1982, Extra-Strength Tylenol capsules in Chicago area were laced with cyanide for some reasons, causing several deaths. Johnson and Johnson immediately offered to exchange all Tylenol tablets bought by customers to ensure safety. This offer to uphold the firm's integrity cost millions of dollars to the firm but won over the customers' trust enabling the firm to maintain its market share [Erhard, Jensen, and Zaffron (2008)].

Financial managers have to maintain corporate integrity to ensure long-term sustainable performance through their interactions with various stakeholders of the firm [Jensen (2008)]. For example, earnings management and income smoothing are not truthful and thus will hurt the integrity of the firm. When the firm issues securities such as stocks or bonds, the firm serves as a fiduciary acting in the best interests of the stock and bond investors. Financial strategies causing wealth expropriation of one class of investors by another will tarnish corporate image and integrity. For instance, deliberate delays in paying off debts, receivables, employees, or banks are deemed to be inappropriate. More important, actions taken by the firm that diminishes its credibility, trust, and integrity are harmful to the firm in the long run.

The notion of corporate integrity appears to be a useful long-run equilibrium concept, albeit static in nature without taking into account of the changing environment or a particular firm setting. Moreover, it is also subject to interpretation, depending on the context of the legal environment and cultural factors. That is, in one country, a firm may be perceived to act with integrity while, the same action by the firm in another country may deem to be lacking integrity. Likewise, did Toyota, which prides itself to keep employees for life starting to lay off workers during the 2008 global financial crisis, have corporate integrity when it broke its promise to its employees in fighting for survival?

One thing is clear, though: If a company is perceived by the public not having integrity, it will cause colossal damages to its stakeholders as well as the financial market as a whole. The chairman of Satyam, one of India's largest technology companies, admitted fabricating more than \$1 billion cash balance, overstating

profits, and understating its liabilities, prompting tremendous concerns about corporate governance and accounting standards across India. This is a case with dire effects for India similar to the Enron scandal in the U.S.⁵

4.4 Production, Social Capital, and Real Options

In investigating the characteristics and financial performance of young Chinese private enterprises, Fung, Xu, and Zhang (2007) find that entrepreneurs who contribute most of the capital (social, financing, or human capital) obtain a double-digit average rate of return on assets. Similarly, Doong, Fung, and Wu (2011) demonstrate that social capital, as measured by total lending and borrowing among related-party transactions, has a positive effect on a firm's value for the Taiwanese firms.

Thus, social capital plays an important role in the firm's business and it needs to be strategically formulated and implemented, and hence it is costly. Social capital can be viewed as real options with the initial investment on social capital as the option premium or price. When a firm establishes a social network, it is an investment in real options that will be exercised in the future if conditions are conducive. Moreover, firms invest to project good firm image and trustworthiness in order to establish and maintain sound corporate integrity and credibility in the eyes of the public. Exercise of these real options depends on the need or timing to exercise them. Thus, these real options may benefit the firm later.

The above examples are illustrations for establishing a long position in real options, i.e., having the right to exercise the options at the appropriate time. In reality, firms also write options to counterparties. For example, corporate managers write put options to bondholders, allowing them to impose financial constraints on the firm. As bondholders want to protect their interests in the firm, they limit investment activities of the firm. These options (or put options in this regard) enable firms to lower interest costs and to have easy access to debt financing. In addition, the limited-liability nature of a corporation can be viewed as a put option written by bondholders to shareholders. When the firm cannot meet the interest obligation of debts, stockholders can choose to abandon the firm and leave it in the hands of bondholders. We can thus illustrate the relations of equity shares as a call option with the value of the firm and bonds through a put-call parity, i.e., call =

⁵ Satyam Chief Admits Huge Fraud, New York Times, 1/8/2009.
http://www.nytimes.com/2009/01/08/business/worldbusiness/08satyam.html?_r=2&partner=permalink&expod=permalink

firm assets – value of bonds issued + put. In other words, stockholders being the call option holders are long on firm assets, short on bonds and long on a put option. Alternatively, bondholders are long on corporate bonds and short a put option.

The real options approach synthesizes corporate investment and financing decisions simultaneously, rejecting implicitly the separation theorem of investment and financing decisions. Any financing decision is intricately related to the investment decision through the production function, which may be linked to the future state of economy, consumer preference, and investment and financing opportunities. Moreover, since corporate investments are constrained by put options written to bondholders, a breakdown of the financing-irrelevance theorem becomes inevitable.

The incorporation of real options in the production function ensures the firm to be more proactive or strategic in making investment decisions and in implementing financial policies contingent upon the dynamic situations the firm faces. The appropriate application of the real options concept enables the firm to compete more effectively in the marketplace to achieve longer-term superior results in spite of temporary setbacks.

5. Implications of Financial Policies and Strategies

The above section discusses the possible causes of the breakdown of the separation theorem due to the complexities in the modern production function, stressing the importance of the simultaneous consideration of financing and investment decisions.

5.1 The Goal of the Firm and Strategies

The goal of financial strategies that deal with investment and financing decisions is generally viewed as creating value for the firm, particularly for the shareholders [Slater and Zwirlein (1996) and Mallette (2006)]. Several caveats are in order for this traditional view of the firm. First, the value-creation notion should not be made relevant only to current stockholders but also to future stockholders. This is because if the firm does not take care of future stockholders, seasoned equity offerings through underwriting will be at a disadvantage for the firm that desperately needs equity financing [Lee (1997), and Spiess and Affleck-Graves (1995)].

Second, the value-creation objective of the firm should also take into account of the impact on the value of the bonds. That is, the welfare of bondholders should also be part of the value maximizing function. In competitive and efficient markets, managers should try to maximize the total value of the firm, i.e., the total value of shareholders' and bondholders' wealth [Fama (1978, 1980)]. Firms would face scrutiny from within the firm through various internal mechanisms of checks and balance (e.g., fiduciary responsibilities and covenants), and also discipline from external competition via the labor and financial markets. These internal and external mechanisms will mitigate the agency problem between bondholders and stockholders and managers and stockholders. Thus, firms issuing bonds to raise funds must also act in the best interests of bondholders to maintain corporate integrity [Jensen (2008)]. Without properly recognizing the best interests of bondholders in the financing of the firm, there will be incentives for managers to expropriate wealth from bondholders to stockholders.

Third, because financial markets may not be perfect and efficient all the time, when the firm is overvalued and cannot sustain its current value, management of the firm may be tempted to manage earnings or make misrepresentation to analysts [Jensen (2005)]. This may tarnish the integrity of the firm and will likely hurt the value of the firm in the long run if earnings are proven to be non-sustainable in the long run.

Fourth, since the value of the firm can be enhanced by investing in real options through the creation and establishment of consumer loyalty via branding or product image to which we alluded above, financial strategies should integrate production policies into financial policies to create value for the firm [Calandro and Flynn (2007)].

In sum, the implementation of a financial strategy, which may be dynamic in nature, involves three steps. First, it maps out workable ways to achieve the goals of the firm. Second, it integrates non-financial operations of the firm, such as marketing and human resources, into financial strategies in order to better allocate resources to achieve the firm's overall goals. For example, marketing helps develop good branding of the company and the marketing process links production to consumers, who are instrumental in enhancing the firm's value because increased sales raise the market value of the firm [Calandro and Flynn (2007)]. Likewise, good use of the human resources can improve productivity since today's production is more knowledge-and skill-based. Allocation of the human resources within the firm has become an integral part of the firm's overall decision-making

process. Third, a financial strategy keeps updating and revising the existing process, which may call for a new process if the original plan is no longer effective. It also provides feedback for further actions.

5.2 External Markets and Internal Endowment of the Firm

When the financial market is less than perfectly competitive and the decisions involving investment and financings are simultaneously determined, firms have to be aware of the external environment and the existing internal endowments the firm possesses in order to formulate feasible financial strategies for the firm [Mehta and Fung (2004)]. For instance, regarding the influence of the external environment, in a well-developed financial market where imperfections are relatively less binding and efficiency is highly valued, business relationship is more transaction-based. By contrast, in a less developed financial market where market impediments are abundant and more restrictive, business is more often done based on relationship.

Different stages of the product life cycle entail different risk-return tradeoff and infer different internal resource endowments for a firm. The beginning stage of the product life cycle suggests rapid expansion of the firm and the firm will experience shortage of cash and needs more financing with greater financial risk. In contrast, during the declining stage of the product life cycle, the firm will experience declining profits but greater free cash flows which may lead to greater agency costs as managers have greater ability to consume more perks. The firm needs to create new products or diversify into different industries at this stage of the product life cycle. These decisions involve the application of the real options concept. How real options are strategically utilized in relation to investment in the product life cycle reflects the long-term growth strategies of the firm. Stockholders working with the board of directors should ensure that the implementation of financial policies incorporates the cash flows implications during the specific stages of the product life cycle.

5.3 Organization structure

In light of the external market environment and internal resources available, managers must organize the firm to fit in the environment. Firm organization needs to be flexible enough to accommodate rapid changes in information and technology, and in the environment. A decentralized firm structure in theory appears to be more appropriate to resolve conflicts and to incorporate rapid inflow of information in the organization.

However, in some situations, a centralized decision seems to be more appropriate. For example, some financial policies need to be centralized to employ resources efficiently, such as the firm's overall capital structure decision, hedging policies, and control of investment budget for subsidiaries. For these cases, a decentralized decision-making structure may under-utilize resources because of the duplication of efforts.

5.4 Crisis Management

There are many adverse situations in a firm's life cycle in which they may face costly consequences. Crises are anticipated events that are not supposed to happen often. In other words, crises can and will occur and they need to be immediately dealt with once happened. In managing crisis, CFOs need to consider several financial strategies to deal with the adverse situations before they arise [Durfee (2008)]. First, they need to maintain some debt capacity in the firm's capital structure for emergency purposes. That is, the firm cannot borrow to the maximum debt limit, which may lead to the collapse of the firm if the future cash flows fall short of the plan to meet debt obligations. Second, they need to expand a mix of financing sources for the firm. Firms should diversify funding sources. Relying on a single financing source is like putting all the eggs in one basket, which can be hazardous to the survival of the firm. Third, they should prepare for the dire situation if sales drop drastically. The firm needs to have a contingency plan to reduce operating costs effectively in case of drastic sales decline. Fourth, they should be aware that utilizing the residual theory of cash dividends may be hazardous. The residual theory of cash dividends suggests paying out all earnings as cash dividends should there be no investment opportunity. The theory argues that stockholders can do better on their own with the cash dividends paid to them. Traditional financial theories also suggest that a firm should repurchase its own shares when they are undervalued. As a result, the firm may use up its cash reserves. Although stock repurchase is a valid argument in a static state, it is critically important for the firm to retain some cash for contingencies. In fact, financial managers use excess cash as a strategic tool, which is similar to holding risky growth options that can potentially increase the future stock returns [Simutin (2010)]. In times of crisis, cash reserves enable firms to operate under stress when both revenues and cash flows dry up. Short-term financing may not be available for many firms when the short term credit markets are under siege such as during the period 2007-2009. The need for conserving cash for contingency was prominently demonstrated by companies that survived the 2007 credit crunch and

the 2008 global financial crisis, e.g., DuPont, Hanes-brands, Wipro, ACNielsen, and Waste Management, Inc. [(Charan (2009))]. Finally, retaining talents within the firm even in bad times is vital for the long-term survival and growth. In light of the changing technology, products become obsolete quickly. Without talents applying technology to improve product quality continuously, a firm is doomed to fail in the long-run.

The main principle of managing crisis is to maintain corporate reputation and integrity at all times—good or bad. Planning ahead for crisis management is critical. Although financial markets, especially financial analysts and investors who look for short-term performance, may penalize a firm and exert pressure on the firm having too much cash reserves to pay out cash dividends, it is a crucial balancing act for the top management of a corporation to have the option to use cash in a flexible way to ensure the firm's survival in difficult times.

6. Concluding Remarks

This paper examines the nature of the existing financial theory, which does not address the changing nature of the dynamic environment and financial constraints of the firm. In particular, the MM theory presumes a mature firm that does not have changing growth opportunities.

We discuss a modified theory of the firm that incorporates real options in different business functions (the production process and decision making) of the firm to formulate better policies in coping with the ever-changing environment. The modified theory of the firm does not presume a perfect market in a steady state. Instead, it anticipates changes over the future path of the firm in setting investment and financial policies. Moreover, it integrates different business functions such as marketing and human resources management into the decision-making framework for the long-term growth and survival of the firm.

Our theory of the firm recognizes the limitations of the existing financial theories. Managers need not follow blindly the financial theories, which only serve as reference points for consideration in financial decision making. Management of modern corporations has to think outside the box. Needless to say, constant monitoring and feedback is necessary in the evaluation of revisions and changes of financial policies.

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