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A Brief on Estimating Costs of Intangible Assets During Capital Budgeting Decisions

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A Brief on Estimating Costs of Intangible Assets During Capital Budgeting Decisions

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ABSTRACT

By examining financial reporting methods to determine the effects of a pandemic, intellectual property rights and other intangible assets. The goal is to explain how these factors are related to capital budgeting decision utilizing a very common and useful model for capital budgeting.

Keywords: Abandonment; present value; intellectual property; Financial Leverage; Estimation, Mergers and acquisitions (M&A); Pandemic.

INTRODUCTION

Most business analysts use capital budgeting procedures to coordinate and motivate activities throughout their organization. It is well-understood that the budgeting process is dynamic and flexible, involving the information flow throughout the organization that determines the investment and abandonment decisions at the individual stages. We now examine at how an abandonment option influences the optimal timing of information and vice versa. In particular, we compare timely information, where the manager acquires perfect pre-contract project information. We examine how the future revenues from intangible assets may affect the level of financial leverage of a firm when not is all known about the economic value of intangible assets. Furthermore, the Pandemic of 2020 to 2020 and beyond which in the United States started shortly after the beginning of the year produced a shock to the manner in which capital budgeting decisions are executed at the managerial level. For example, Target's soaring online growth suggests scared shoppers who abandonment and may not return when malls and department stores reopen.

In the absence of the real option the following trade-off arises: if information is timely, the investment decision can be based on perfect information. Alternatively, if information about intangible assets is not considered in the abandonment option, the timing and decision concerning the abandon option may very well be estimated incorrectly. The incorrect information is the product of the misreporting of factual events associated with intangible assets and the error associated with incorrect analysts' forecasts.

In this study, one considers normal capital budgeting methods with or without the abandonment option determines whether there is a relationship among the various capital budgeting options, financial leverage and estimating earnings by analysts. We begin by studying capital budgeting with the abandonment option, later turn to the estimation problem in

financial accounting and in turn apply it to the relationship of analysts' forecasts and the bias in estimating earnings and cash flow present in evaluating capital decisions.

THE CAPITAL BUDGETING METHODOLOGY

Many previous studies established the link among analysts' forecasts, cash flow the expected CAPM return, and the present value of cash flow which includes forecasts of earning rather than the distributable cash flow. In addition, Jarrett (2016, 2017A, 2017B, and 2019) examined the relation between the abandonment option may affect a firm's decision analysis and eventual the analytics employed to determine the optimal decision and operating leverage. Furthermore, McDonald (2003) analyzed abandonment options, divestment options, expansion options and growth options previously examined in a survey by Triantis and Borison (2001). These and many more studies revealed that they use real options to the general problems of the general problems associated with capital budgeting.

Analysts earnings forecasts enables analysts to estimate the present value of cash flow (**PVCF**). According to Berger, Ofek and Swary (1996), the advantage is that analysts' forecasts of earning do not incorporate the value of the abandonment option. If forecasts of distributable cash flows, cash flows from non-ongoing concern events would be included in the forecasts. Thus, earnings may not be the same as cash flows. Hence, we adjust because capital expenditures are not equivalent to depreciation and the growth in working capital is not subtracted from earnings. No longer is it required to adjust for capital structure changes in the environment that such changes cannot be foreseen. Borrowing again from Barnea and Sadan (1996), equation (1) constructs the **PVCF** evolves from the analyst's discounted forecasts.

$$PVCF = \sum_{t=1}^n \frac{EARN_t}{(1+r)^t} + \frac{EARN_{n+1} * (1+gr)^{n-1}}{(1+r)^n} * \frac{1}{(1+r)^{10-tg}} - CAPEX ADJUST - WC ADJUST \quad (1)$$

where

PVCF == present value of analysts' predicted going-concern cash flows,

EARN_t, = analyst forecast of year *t* after-interest earnings,

r == expected CAPM return, described below,

gr = consensus forecast of five-year earnings growth,

tg , = terminal growth rate of earnings,

n = number of years for which earnings are forecast,

l = year index,

CAPEX ADJUST== reduction to the present value of analysts' earnings forecasts to adjust for the difference between capital expenditures and depreciation.

WC ADJUST = reduction to the present value of analysts' earnings forecasts to adjust for growth in working capital.

The expected CAPM return is defined as

$$r = r_f + \beta_e * [r_m - r_f], \quad (2)$$

where

r_f = risk-free rate,

β_e = the firm's beta or systematic risk (from the CRSP beta file).

$r_m - r_f$ = risk premium of the stock market over the risk-free rate.

In implementing Eq. (2), we assume that the relevant investment horizon is short-term. Therefore, we use the one-month Treasury-bill rate as a proxy for the risk-free rate and a risk premium (the arithmetic mean from a long period of time from between the return on the S&P 500 and the return on Treasury bills).

The problem with the above approach is the variable EARN (the analysts' forecasts of earnings). Studies concerning analysts' forecasts are well known and include a huge number. In general, as stated by many others in the fields of financial accounting earnings forecasts are dependent on the principles of financial accounting which produces the data for modeling trends and seasonality (or modeling components). The accuracy of analyst forecasts has a long history and includes by Brandon and Jarrett, (1974), Clement, (1999), Gu and Wu (2003), Ramnath, Rock and Shane, (2008), Groyberg, Barnea, A. and S. Sadan and Makridakis Spiliotis, Assimakopoulos (2018) The last manuscript suggested that machine learning models may have better results than self-prepared models for forecasting. These studies focused on a relationship between analysts' forecasts and the magnitude and value of intangible assets. Intangible assets were not considered in the forecasting method discussed by the researchers in their many and detailed studies. The value of intangible assets including intellectual property produces a great source of error if they are not considered in the forecasting methods utilized by analysts in the production of cash flow, rates of return earning per share forecasts. When adjustments for intangible assets are included in the analyst's forecasts, Gu and Wang stated that "The rise of intangible assets in size and contribution to corporate growth over the last two decades poses an interesting dilemma for analysts. Most intangible assets are not recognized in financial statement, and current accounting rules do not require firms to report separate measures for intangibles." (p.673, Gu and Wang, 2005). Intangibles include trademarks, brand names, patents and similar properties that have value but are generally not listed on financial reports of firms. Many of these items are technology based and are very important in financial decisions such as in mergers and acquisitions. They are an intricate in the growth of firms and therefore are shown to be related in the statistical sense to the overall estimates made by accounting and analysts.

In another study concerning analysts' forecasts, Matoesy and Wyatt (2015) found that the association between EPS forecast, growth rates forecast error and measures of technological conditions in the firm's industry. They found as the forecast horizon increases, the technological conditions and current EPS are statistically associated with analysts' forecasts. Long horizon creates the conditions for within one to conclude that interactions between technological conditions and current EPS are associated with analysts' EPS and growth forecasts. This conclusion aligns itself with Jung, Shane and Yang (2012) who suggested that analysts' growth forecasts effect efforts to evaluate analysts' forecasts may produce optimistically biased long-term forecasts. Since intangible assets which are often technology based are taken up more of the balance sheet of many firms, it is likely that analyst's forecasts may produce less accurate predictions of earnings, cash flow and rate of return. The conclusions of Dechow (1992) become less important. Balance sheets usually have little or no involvement with the value of intangibles although there are some practices by accounting are still used. Thus in the

remaining portions of this analysis, we propose a method by which one can estimate earnings such that the value of intangible assets is valued and earnings estimate are not biased by serious errors of omission such that the capital budgeting model expressed earlier in equations (1) and (2) are not unduly biased. Furthermore, Jarrett (2019) indicated that the use of estimation in financial reporting which effects the reporting of financial data and its inaccurate reporting of data included in forecasting models predicting future earnings. We should also recall that retail visits expand past essential retail visit like supermarkets, small retail and pharmacies. On the other hand, retail visits to Malls and large retailers inspire for consumers a sense of security and safety, hence small retail need to give out more than masks and gloves to inspire customers to come to their units and spend. All of this will affect forecasts, budgeting decisions of all types and, in turn abandonment decisions.

INTELLECTUAL PROPERTY AND TRADITIONAL ACCOUNTING METHODOLOGY

As noted by [Brief and Owen 1969, 1970, 1977; Beneish (1991), Jarrett, 1971, 1974, 1983, 2016, 2017A and 2017B; Roberts and Roberts, 1970; Barnea and Sadan, 1974; and Pappas 1977] the timing of recognition of revenue for IPR in financial statements of ten are not featured in merger and acquisition activity. The financial accounting standards board (FASB) provides for such activities, however, they are often ignored due to their evasiveness or are not fully informational in there normally structured rules. Recognizing future performance is a goal of matching and timing but are unrelated to recognizing cash flow and similar items in the historical performance of a firm. Non-profit entities often do not use accrual rules at all since the goal of these are related to achieving high rates of return. Often IP rights for non-profits would differ from the same item for profit maximizing entities since the goal of seeking high rates of return does not enter the strategic planning process for non-profits. The purpose here is to consider IP as intangible assets as a product of intellect that law protects from unauthorized use by those not responsible for the IP rights. Hence, IP rights are characterized as the protection of distinguished signs such as trademarks for goods and services, patents, and other similar items which are under protection from unauthorized use. This includes art, music, creations by authors including the authorship of computer software and similar items such as discoveries, inventions, phrases, symbols and design. Obviously, a writers and conductors of Music such as Leonard Bernstein, Daniel Barenboim and James Levine would have created IP that differ greatly from Physicists such as Lisa Meitner, Nils Bohr or Albert Einstein.

Presently, accounting suggests two methods to determine the value of IP rights to produce better estimates of from accounting analysts' forecasts. The convention of the "lower of cost or market" is based on the rule of conservatism in valuing assets to anticipate future losses instead of future gains. The policy tends to understate rather than overstate the value of net assets and could therefore lead to an understatement of income, cash flow, earnings and rates of return. The purpose of this study and its conclusive result is to neither understate nor overstate cash flow so as to produce a rate of return on cash flow that is commensurate with the goal producing accurate prediction of cash flow and its rate of return for financial and decision making purposes. Stated differently, the purpose is not to violate accounting policy but to insure the mergers and acquisitions (M&A) that cash flow is estimated properly. Traditionally, when accounting writes policy about intangible assets as a residual. By residual, they mean a buyer is ready to value a firm in excess of the value of the tangible assets. This value is often referred as Goodwill (White, 1994) which is an imperfect method. This notion of goodwill is estimated as a residual value. If the valuation of intangible property is imperfect since it considers part of the

solution of a bargaining process. In this case, the buyer and seller may have different market power which greatly affects the residual of the bargaining process and produces an imperfect or biased estimate of the value of the intangible assets. One may examine the case of the sale of "Superman" by struggling comic artists to a much larger corporate power who could market the character to "Comic Books", Television and the Film Industry. The nearly destitute conditions of the original artists who created the intangible product could never cope with the business and marketing (power) of those who purchased the name "Superman." Thus, goodwill becomes a vague valuation system that justifies the bringing of data analysis and science into the valuation process.

Another solution suggested during the M&A process is to simply list the patents, trademarks, brands and similar items of IP in the financial reporting of the firm. Following this initiative and suggestion of the accounting principles board provide little aid concerning the economic value of IP rights and products for a firm during the M&A events. In the final step of the problem the evaluation may conclude influence relating to the biases of the reading of the financial reports. Such biases of IP occurred often with works of Meitner, Einstein and Bohr. Whereas, at least Einstein and Bohr received Nobel Prizes which did have wealth, but Meitner perhaps due to her gender and religious preference never received the award the others were given (i.e., her work and lack of prize may be due to the influence of the NAZI influence of that era. The three conductors and composers of music there was no economic award from the Nobel Prize Committees. Accountants forecast the overall rate of return for a firm but do not ignore the convention of "conservatism." Accounting practice values the IP rights for a firm each year for each and every IP right under consideration. The principle of Goodwill is not to be used during M&A activity to account for the value of IP rights. IP may induce greater asset values but also effects the rate of return on cash flow because the denominator of the rate of return will change. [To understand the gravity of ignoring or improperly valuing IP rights see Jarrett, 2016 and 2017]. This result debated previously [Brief and Owen, 1969; Pappas' 1977 and Brief, 1977] indicated that including earnings risk may not fully reflect all risk in estimating earnings, but at least, reflects that part of risk from the variation in earnings.

CONCLUSION AND SUMMARY

Decisions regarding M&A, Abandonment during Pandemics as we observe during the increase in mortality associated with the pandemic episode. Decision strategy during Pandemics should not be the result of political programs and also should utilize those people who have the intellectual property to produce the diagnostic lifesaving equipment to control the Pandemic. Promoting drugs, vaccines and the like without listening to the intellectuals and scientists who have the knowledge to produce them is a totally ineffectual and often misleading strategy. Funding and generally promoting ineffectual drugs and vaccines is a totally useless strategy to end a pandemic. Much of the development of accurate estimation the economic value of the economic value of intellectual property and intangible properties is manner in which society and science can find the strategy to end a Pandemic.

A pandemic in 2020-2022 leading to an Endemic will affect the capital budgeting process in numerous ways First, inaccuracies in predicting EARN will increase since the pandemic affect will decrease incoming cash flow even if the nations governments implement policies to promote consumer spending. In the face of uncertainty, both the variation and skewness in predicting the future of EARN will be greatly affected. The variation in the predictions will

increase which will make forecasts ever more difficult. Use of standard normal distributions to predicted may very well not be warranted and forecasters may be unaware as to the shape, skewness and perhaps the flatness of the distribution of all possible forecasts. At least, normality assumptions as to the sampling distribution of forecast means may will be unavailable.

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