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MODIFIED NET PRESENT VALUE AS A USEFUL TOOL FOR SYNERGY VALUATION IN BUSINESS COMBINATIONS

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Abstract:
The subject of this paper is a modified net present value, and how it could be a useful tool for synergy valuation in the process of business combination. Every successful acquisition has to result in synergy in the post acquisition value. In the process of valuation each company has three components that must be taken into account for an efficient valuation (assets, earning power and firm uniqueness). The process of analyzing business combination could be divided in three interdependent analyses: (1) An analyst must start by applying traditional capital budgeting analyses; (2) followed by identifying various flexibility options; and finally, (3) an analyst must determinate the present value of other strategic options along with the overall certainty of exercising them, together with the added certainty value of these options on traditional present value of business combination. Traditional capital budgeting analyses of business combination is based on net present value techniques. These techniques result with inadequate present value if the post-acquisition reinvestment rate is different from the post-acquisition cost of capital. In these cases, the analyst can apply modified net present value method.

Keywords: valuation, business combination, net present value, modified net present value, decision tree, option value.

Jel Classification: G31, G34

PROLOGUE

Take over in the form of M&A activities are faced with many economic and market effects. Most of these effects have financial implications which, together with pure financial effects, determinate the final or post-acquisition value of the combined firm. Every successful acquisition must result in synergy in the post-acquisition value of the combined firms which t can be expressed as:

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$$V_{AB} > V_A + V_B$$

V_{AB} – post-acquisition value of combined firms
V_A and V_B – pre-acquisition value of individual firm

and

$$V_{AB} = V_A + V_B + V_S$$

V_S – value of synergy

Every firm has three components that must be considered in an efficient valuation (Peterson 1990). The two of them are related to firm assets and firm earning power, represents with both earnings and cash flows. Being that every firm is unique, that makes the uniqueness the third component, which determines the risks and desirability of firm's securities holdings.

First component, firm assets can be valued by using several concepts, starting from a net saleable value (on ongoing or liquidate basis) to economic value represented with the value of discounted cash flows during the period of an economic life of the specified asset. In many cases, analysts can only valuate tangible firm assets.

Therefore, the value of firm assets would be useful in the process of negotiating all terms and conditions of business combinations with the target firm. On the other hand, every successful evaluation for all kinds of business combinations must also include a potential value from all intangible asset holdings of the analyzed firm. The intangible asset holdings include technological and other employee experiences, managerial skills, flexibility potentials etc. Assessment of these value potentials is very far from the traditional concepts of asset valuation.

Second component, the firm earning power, can be valued both by the discounting cash flows approach and the capitalization multipliers approach, like P/E ratio and others usable capitalization's indicators. Discounted cash flows approach is a strong tool for firm value analysis, and the final product of this analysis is an economic value of the projected cash flows from the firm business operations. This concept is closely connected with the evaluation of firm's business potentials by the capital market. Therefore, discounted cash flow value combined with market capitalization indicators can produce useful information on post-acquisition value of the combined firms. Unfortunately, traditional financial analysis cannot derive all the answers about the post-acquisition value, which depend on strategic options, normally stated in business combination.

The third component, which results from uniqueness of the firm, can be considered as a potential discount below or a premium above the established value of both, firm assets and firm earning power. On one hand, additional risk, which can result for some specific occasions in assets holdings, will lower assets value below the value that these assets are holding in normal occasions. Additional risk in the expected cash flows can produce conflicts in the reinvestment rate and the hurdle rate trade-off. On the other hand, flexibility and other options, which may have resulted from holdings similar assets in combinations with others, can produce additional value in newly created intangibles assets. Similar discount or premium can be added on the expected earnings and cash flows from the post-acquisition combined business operations.

SINERGY IN BUSINESS COMBINATIONS

Traditional financial analysis based on discounted cash flows assesses value of the synergy from business combination in incremental cash flows and potential improvements in the capital structure of the combined firm, which can result in lowering the risk of, combined business operations (Ross 2005). Incremental cash flows resulted from incremental earnings, reduction in taxes and from incremental cash flows resulted from lowering the needs, form the capital in the combined firms. Some of these incremental cash flows in business combinations can also be the result of different strategic options. These options can arise from strategic benefits, better use of complementary resources and other increases in the flexibility from different uses of profitable potentials in the combined business operation.

Incremental earnings in business combination can result from incremental revenues or from post-acquisition cost reduction. Cost reduction is the expected gain in the acquisition from economies of scale and some economies of vertical integrations. Additionally, cost reduction can arise from better use of complementary resource and some other strategic options in the combined business operations. While cost reductions are normally expected from integrated businesses, extra revenues require improvements in marketing and additional investments for taking advantages of the competitive environment in case certain situations occur. Assessing this strategic options require additional improvements in the traditional financial analysis.

Certain amount of synergy in the post-acquisition value can result from tax benefits, which can result from integrated earnings in the business combination. Net operating losses from which the target firm suffers, can be used in the combined firm to create additional tax shields. The same result can produce additional write-up of assets when the purchase method is used in acquisition accounting, and additional write-up of goodwill, if it is permitted by the tax law. The combination can also result in certain amount of debt capacity, which can also be used to shield taxable earnings.

Some additional cash flows in business combination can result from post-acquisition disinvestments. These disinvestments can create an additional value of synergy in business combination from lowering capital requirements in the post-acquisition combined firm (i.e. sale of unnecessary fixed assets after the combination or release of cash from permanent current assets as the result of improvement post-acquisition working capital management).

Although impossible, under the perfect and efficient market hypotheses, business combination can result with some improvement in the cost of capital. Some improvements can result from the effects of the rise in the post-acquisition company size on the beta coefficient, and some of them can be made for improving post-acquisition capital structure. In addition, there are some effects of economies of scale on relative floatation costs in the potential post-acquisition issues of new securities.

REAL INCREASE IN VALUE FROM BUSINESS COMBINATIONS

Many aspects of business combinations can be viewed with traditional financial analysis represented with the present value of the projected post-acquisitions cash flows. Some different strategic options which can arise from strategic benefits, better use of complementary resources and other increases in the flexibility from different uses of

profitable potentials in the combined business operation can also be evaluated by the traditional financial analysis. Some of potential strategic options in business combinations can be evaluated only by the use of option valuation theory.

For example, initially planned merger can result with the holding company if the market negatively responds to the merger. Traditional cash flow analysis based on certain scenarios cannot result with correct present value of this potential business combination because it is not taking into account the probability of different actions that follow the moment when the capital decision was made. The use of decision three techniques can provide some useful concepts of dynamical scenario analysis.

In addition, certain strategic options cannot be evaluated using discounted cash flow method. Reasons for the insufficiency of the DCF method are both failure in the possibilities of cash flow projections and failure in the possibilities of discounting rate establishment. Many of these strategic options are in essence so risky and uncertain that the cash flow projection is simply impossible. These options can be assessed in comparison with similar investment projects or in comparison with the hypothetical financial investment replicate. Strategic options are also possibilities for action. If these possibilities to act are not seized in the future they will be worthless. Certainty, or better uncertainty, from exercising these investment possibilities will vary during time. Therefore, analysts cannot establish risk adjusted discount rate for discounting potential cash flows from certain strategic options.

Existence of different strategic options in M&A activities implies questions about the real increase in value from the specified combination. This problem includes another question about the possible use of methods to evaluate business combination. First, we can answer that the respected analysis of business combination must include both, traditional capital budgeting techniques for discounted cash flows analysis and options evaluating techniques for assessing additional increase in the post-acquisitions value which results from the value of strategic options in business combination. In other words, business combinations analyzing process can be divided in three interdependent analyses (Orsag 2002):

- First, analysts must apply traditional capital budgeting analysis to determinate present value of projected cash flows.
- Then, analysts must identified various strategic options, and try to incorporate them in the dynamical capital budgeting process by using decision three techniques, and
- Finally, analysts must determine the present value of other strategic options and certainty to execute them, together with the added certainty value of these options on traditional present value of business combination.

These three steps in nontraditional financial analysis of business combination yield the answer for the second question. Real increase in the value from some business combinations consist of two components: (1) Traditional present value of expected post-acquisition cash flows, and (2)Value of strategic options from business combination.

MODIFIED NET PRESENT VALUE

The net present value failure to take into account the managerial option to abandon or extend the project, underestimating the true NPV of the project cash flows, is now incorporated in many modern corporate finance textbooks. Same is with other real

options (see for examples Pinches 1994, Van Horne 1995, Brigham et al. 1999 or Brealy and Meyers 2000). The interaction of financing and investment decision has also been addressed by numerous researchers and has led to the adjusted NPV method as the sum of the NPV to equity and the present value of financing effects (Myers 1974, Luehrman 1997). Solomon (1956) and Renshaw (1957) have shown that one of the reasons that IRR and NPV give conflicting recommendations is the implicit reinvestment assumptions embedded in these two approaches. In contrast, Dudley (1972) and Biedleman (1984) argue that there is no implicit reinvestment rate assumption in NPV and IRR methodology. However, they show that it is necessary to make an explicit reinvestment rate assumption when selecting from competing projects.

Net present value is the dominant capital budgeting technique under the marginal analysis assumption of firm optimal investment situation. In these circumstances all cash flows will be reinvested with reinvestment rate equal to the cost of the capital. Hence, every investment project can be analyzed by using only one discount rate – cost of the capital. If this assumption fails in real world circumstances net present value has similar reinvestment problems as internal rate of return method. In addition, modified internal rate of return is not a solution of reinvestment problems. Thus, we have an additional problem of using traditional capital budgeting problems.

Starting from the possibilities that the firm's reinvestment rate is different from the cost of its capital, if the firm accepts project with different risk, McClure and Girma (2004) suggested the modified net present value. Theirs MNPV is developed under the following assumptions:

1. Total initial outlay (I_t) is the present value of all net cash outflows discounted at the firm's financing rate (WACC – k_a).
2. The appropriate reinvestment rate for net cash inflows is the firm's k_r.
3. The risk adjusted discount rate for high (low) risk project (k) is $k_a + y$.
4. Firm maintains it target capital structure.
5. Accepted project(s) do not affect the firm's risk characteristic.

General formula for the modified net present value (*MNPV*) can be expressed as follows:

$$MNPV = \frac{\sum_{t=1}^{T} V_t (1+k_r)^{T-t}}{(1+k)} - \sum_{t=0}^{T} \frac{I_t}{(1+k_a)^t}$$

where V_t is net cash inflows of project at time t.

We find that this modified net present value formula can be used for improving the traditional net present value in business combinations such as mergers and acquisition. Namely, in these business combinations target firm can be analyzed as an acquisition firm investment project. The total initial outlay is the acquisition price paid for acquiring the target firm (market price of equity plus acquisition premium). Net cash inflows are the net cash flows from target firm operations. These net cash flows can be reinvested at the appropriate reinvestment rate for net cash inflows which can be different from acquisition firm's overall cost of capital. Acquiring firm does not affect the acquisition firm's risk characteristic if acquisition is not in the form of consolidation and if the target firm is significantly smaller then the acquisition firm.

Merger or acquisition will cause change in the investment policy of the target firm, normally in the way of improvements total post-merger investment policy. For example, using free cash flows from lover operating activities to invest in higher operating

activities, or using cash flows from disinvestments form profitable investing. Some improvements in post-merger investment policy can arise from change in dividend policy of the target firm. All these improvements may raise post-merger reinvestment rate above the cost of the capital. With traditional net present value method synergy potentials from raising reinvestment rate will absent. These potentials can be correctly predicted only by using modified net present value.

CONCLUSION

Business combinations can create value for post-acquisition stockholders only when combinations result with some value of synergy. Synergy in business combinations is often related with much different type of strategic or real options, which can be exercised in future, like additional types of action or additional investments. Therefore we are trying to analyze the value of business combination using nontraditional approach in the value analysis or, better, we are trying to develop a business combination analysis in the form of traditional capital budgeting process combined with decision three techniques together with the value of strategic option on traditional value of business combination.

Another problem of traditional capital budgeting techniques is post-acquisition situation in which is reinvestment rate is different from the cost of the capital. In this situation traditional net present value cannot predict real present value of synergy in improvement of the post-acquisition investment policy. We find that use of modified net present value method is a better solution for predicting the real present value of synergy.

Result for specified efforts in business combination analysis can be summarized in several steps of nontraditional analysis.

1. Preliminary analysis, which include acquisition candidate finding and using traditional concepts of external financial analysis to establish potential acquisition, costs.
2. Analysis of time series of financial statements of target firm and making necessary adjustments.
3. Traditional financial analysis of acquisition candidate to establish maximum acquisition cost.
4. Traditional evaluating expected cash flows from combined business operations in the combination.
5. Analyzing post acquisition reinvestment rate and, if it is different from the cost of the capital, apply modified net present value to predict the value of synergy from the improvement of investment policy.
6. Identification of strategic options involved in business combination.
7. Using decision three methods for evaluating various potential changing in initially created scenarios for traditional discounting cash flow analysis in uncertainty environment.
8. Applying techniques for evaluating strategic options, which cannot be incorporated in dynamic determination of value of discounted cash flows with the use of decision three techniques?
9. Establishing real value of business combination.

REFERENCE

Allas, Petr, David McDonald, Max Michels, and Ramesh Venkatarman. 1996. Current Research: Managing growth options. *The McKinsey Quarterly* (November): 183–185.

Amram, M., and N. Kulatilaka. 1999. *Real Option: Managing Strategic Investment in an Uncertain World*. HBS Press.

Biedleman, Carl R. 1984. Discounted Cash Flow Reinvestment Rate Assumption. *Engineering Economist* 29 (2): 127–139.

Brealey, R. A. and S. C. Myers. 2000. *Principles of Corporate Finance*. 6th ed. New York: McGraw-Hill Book Company.

Brigham, E. F., L. C. Gapenski, and Michael C. Ehrahardt. 1999. *Financial Management, Theory and Practice*. 9th ed. Forth Worth: The Dryden Press.

Copeland, Tom, and Vladimir Antikusov. 2000. *Real Options: A Practitioner`s Guide*. Monitor Group.

Dudley, Carton L. Jr. 1972. A Note on Reinvestment Assumptions in Choosing Between Net Present Value and Internal Rate of Return. *Journal of Finance* 27 (4): 907–915.

Luehrman, Timothy A., 1997. Using APV: A Better Tool for Valuing Operations. *Harvard Business Review* (May-June 1997).

McClure, Kenneth G., and Paul Berhanu Girma. 2004. Modified net present value (MNPV), A New Technique for Capital Budgeting. Special Conference Issue (December), *Zagreb International Review of Economics and Business* 7: 67–82.

Myers, Stuart C. 1974. Interactions of Corporate Financing and Investment Decision: Implications for Capital Budgeting. *Journal of Finance* 29 (1): 1–25.

Orsag, Silvije, and Danimir Gulin. 2002. Valuation in Process of Business combination. In *Proceeding from 8th International scientific conference Quantitative Methods in Economy and Business – Methodology and Practice in the New Millennium, Bratislava*.

Peterson, C. D. 1990. *How to Sell Your Business*. New York: McGraw-Hill Publishing Company.

Pinches, George E. 1994. *Financial Management*. New York: Harper Collins.

Renshaw, Ed. 1957. A note on the Arithmetic of Capital Budgeting Decision. *Journal of Business* 30 (3): 193–201.

Ross, Stephen A., Randolph W. Westerfield, and Jeffrey Jafe. 2005. *Corporate Finance*. 7th ed. New York: McGraw-Hill, Irwin.

Solomon, Ezra. 1956. The Arithmetic of Capital Budgeting Decision. *Journal of Business* 29 (2): 124–129.

Van Horne, James C. 1995. *Financial Management and Policy*. 10th ed. Englewood Cliffs: Prentice Hall.