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STOCK ISSUES AND INVESTMENT POLICY WHEN FIRMS HAVE INFORMATION
THAT INVESTORS DO NOT HAVE : A Note

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Comments Welcome

ABSTRACT

In their article Stock Issues and Investment Policy When Firms Have Information That Investors Do not Have, Myers and Majluf (1981) show that there exist situations where positive net present value projects may be passed up if they have to be financed externally. It is shown here that if projects are marketable and if the managers can pass along their information to a buying firm, then the present value rule will not break down, and further more, the buying firm need not carry slack.

I wish to thank Richard Roll and Brett Trueman for their help in the process of writing this paper.

1.

In their 1981 working paper, Stewart Myers and Nicholas Majluf analyse the firm's financial/investment decisions when managers have information that investors do not have and when the financing funds are obtained by issuing new shares of the company. Assuming that the firm's managers act in the interests of the current shareholders, the authors first show, using a simple example, that there exist situations where the issuance of new shares to finance positive net present value projects is always desirable, independent of the managers' information as to the future state of nature. The traditional acceptance of positive net present value projects obtains and the financing decision does not signal to the market the information which the managers possess. In a second example, they show that there may exist some cases where the traditional investment decision rule of accepting all positive net present value projects will not be implemented. If the managers have private information that a favorable future state of the world will occur, and consequently know that the shares of the company are underpriced, the managers' financial/investment decision will be affected. Managers may not want to issue new shares of the company at a low price, and so consequently may pass up good projects if they must be financed externally. The authors argue that this is one reason why firms carry slack liquid capital resources.

This note argues that if projects are marketable, and if the managers can pass along their information to the buying firm, then the present value rule will not break down. Firms will always either engage directly in positive net present value projects or else will sell them to another company. A positive net present value project will not be passed up. Further, the buying firm need not have slack in order for it to be willing to pay full value for the project. The solution of selling a project to a third company is, in some ways, similar to a proposal made by Myers and Majluf that, if the managers can find a cash rich acquiring firm with which to merge, and can reveal their information to that company, then the merger will result in all positive net present value projects being taken. However the authors do not realize that no slack is necessary in the buying firm for such a successful sale to take place.

In the next pages I will summarize the Myers and Majluf (1981) assumptions, develop a three-date model and then modify the model for the case of marketable projects. Myers and Majluf's examples 1 and 2 will be used to illustrate why the net present value rule does not break down when projects can be sold.

2. ASSUMPTIONS

- (1) Investors are rational and know that managers possess information which they (investors) do not possess. Investors are risk neutral and have no time preference.
- (2) Capital markets are perfect and efficient with respect to publicly available information. There are no taxes or transaction costs.
- (3) There exists limited liability. The firm has a single asset and one investment opportunity that is not divisible.
- (4) There is a three-date world. At time $t = -1$ managers and investors have the same information and hold identical beliefs about the payoff on the firm's existing project, $\tilde{a}$, and the payoff on the investment opportunity, $\tilde{b}$. Let $ABAR$ and $BBAR$ be, respectively, the expectations of the value of the firm and the investment opportunity at time $t = -1$. At time $t = 0$ managers learn the realizations, a and b , of the payoffs of the existing projects and of the investment opportunity respectively. Investors learn the values of a and b only at time $t = +1$.
- (5) Managers always act in the interest of the current stockholders, those owning shares at time $t = 0$. These stockholders are assumed to be passive in the sense that they will not subscribe to a new issue of shares.
- (6) Investment decisions must be taken at time $t = 0$.

3. THE MODEL

Consider a manager who must make the investment decision. At time $t = 0$, he learns the realizations a and b . Assume also that there is no slack. If the investment opportunity is not accepted, then the value of the company for the current stockholders is

$$V = a.$$

If the managers issue new shares and accept the project

$$V = (P / (P + E)) * (a + b + E),$$

where

P = market value at time $t = 0$ of the assets in place,

E = amount of funds needed to finance the new project.

Managers will invest in the project if

$$(P / (P + E)) * (a + b + E) > a,$$

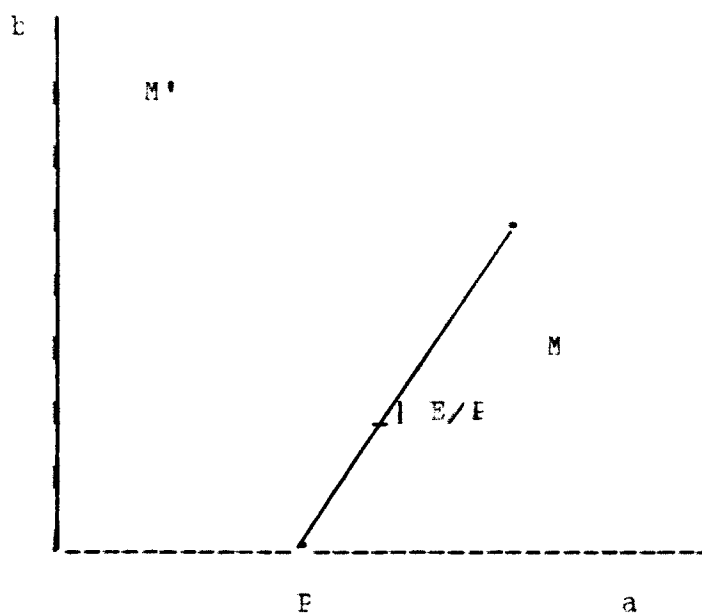
or

$$(P / (P + E)) * (b + E) > a * (1 - P / (P + E)),$$

$$P * (b + E) > a * E,$$

$$(P / E) * (b + E) > a. \quad \text{cond (1)}$$

This is the same condition (1) that Myers and Majluf obtain when there is no slack. This condition also defines the regions M' and M where managers should invest in the project and pass it up, respectively.



Firm's Financial/Investment Decision
When Projects Are Not Marketable.

FIGURE 1

However, if the investment opportunity is marketable,¹ and, if it is sold, then

$$V = a + b .$$

¹ This assumes that the managers are able to disclose the value b to the buyer.

It will be better to sell the project rather than engage in it directly if

$$a + b > P / (P + E) * (a + b + E),$$

or

$$(a + b) * (1 - P/(P + E)) > (E * P) / (P + E),$$

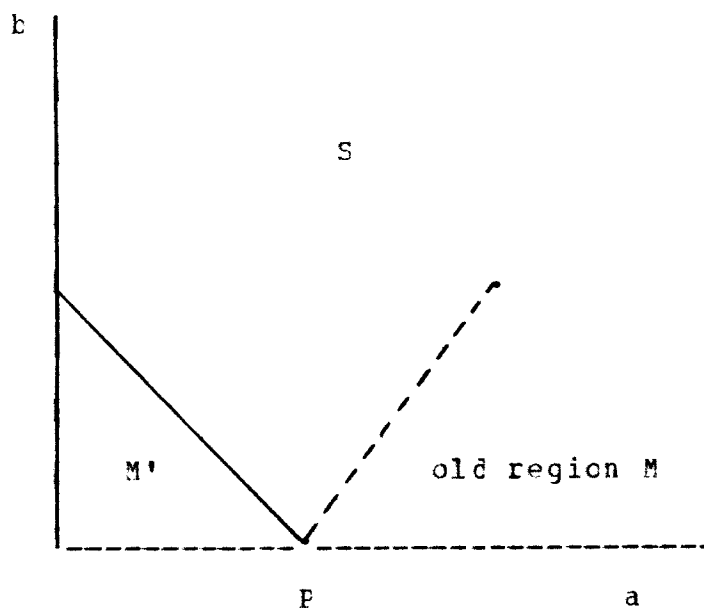
$$(a + b) * (E / (P + E)) > (P * P) / (E + P),$$

$$a + b > P \quad . \quad \text{cond (2)}$$

Condition (2) defines the region S in the chart, (cf. FIGURE 1), which replaces M and part of the old region M', in which the project would not be undertaken given a lack of marketability.

The value of the company to the current stockholders will be the maximum among the three following possibilities: disclose and sell the project to a third company, sell shares and invest in the project, and pass up the project, that is:

$$V = \max (a + b , (P/(P+E)) * (a+b+E) , a) . \quad \text{cond (3)}$$



Firm's Financial/Investment Decision
With Marketable Projects.

FIGURE 2

4. EXAMPLES

The next paragraphs deal with the examples used by Myers and Majluf in their 1981 working paper. The numbers in the examples are exactly the same; however, the results obtained are different due the possibility of selling the investment opportunity to a third company. We will first show that if the project can be sold, the value of the firm will be correctly priced by the

market in all cases. We will then show that the project in their example 2 can be taken by a third company and financed by new shares without signalling to the market which future state will occur.

EXAMPLE 1. There are two equally-probable states of nature. Asset values are:

	STATE 1	STATE 2
Assets in place (a)	150	50
Project NPV (b)	100	10

The investment opportunity requires an investment of 100. Given the assumption that there is no slack, the firm needs to issue new shares. In this case,

$$P = ABAR + BBAR = 155,$$

$$E = 100,$$

and the current stockholders' value of the firm is

$$V = (P / (P + E)) * (VF),$$

where VF is the value of the firm after the investment opportunity is accepted.

If state 1 occurs,

$$V = (155 / 255) * 350 = 212.75.$$

If state 2 occurs,

$$V = (155 / 255) * 160 = 97.25.$$

If instead of investing in the project the managers sell it to a third company, the value of the firm is

$$V = a + b .$$

Then

$$V = 150 + 100 = 250 \text{ in state 1,}$$

$$V = 50 + 10 = 60 \text{ in state 2.}$$

In this case, the optimal strategy is to sell in state 1, and to issue shares and to invest in state 2. However the above strategy reveals to the market the true state, and the value of the company will be 60 in state 2. Consequently, the average payoff at time $t = -1$ is

$$P^* = 1/2 * (250 + 60) = 155 .$$

Note that in both cases, selling or investing, the shares are correctly priced. If one applies the valuation formula in (3), the same results are obtained

$$V = \max (a + b , (P/(P+E)) * (a+b+E) , a) ,$$

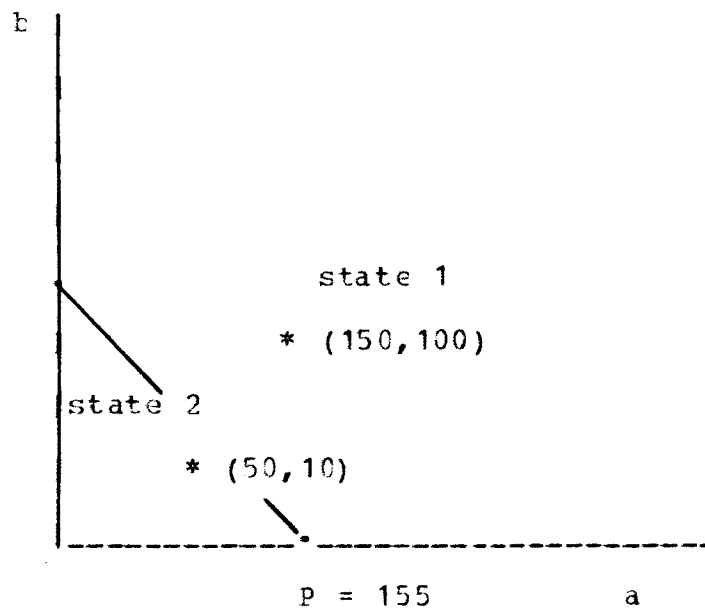
or

$$V = \max (\text{sell, invest, do nothing}) ,$$

$$V = \max (155, 155, 100) .$$

Figure 3 plots the results obtained above.

EXAMPLE 2. There are two equally-probable states of nature. Asset values are:



Solution For Example 1.

FIGURE 3

	STATE 1	STATE 2
Assets in place (a)	150	50
Project NPV (b)	20	10

The investment opportunity requires an investment of 100. Given the assumption that there is no slack, the firm needs to issue new shares. In this case,

$$P = \text{ABAR} + \text{BBAR} = 115,$$

$$E = 100,$$

and the current stockholders' value of the firm is

$$V = (P / (P + E)) * (VF),$$

where V_F is the value of the firm after the investment opportunity is taken.

If state 1 occurs,

$$V = (115 / 215) * 270 = 144.42,$$

which is less than 150, the value of the firm if no investment is taken. Therefore, if managers know that state 1 will occur, they will not invest, and

$$V = 150 .$$

If state 2 occurs,

$$V = (115 / 215) * 160 = 85.58 .$$

In this case, managers will issue shares only if they know that state 2 will occur, and the value of the firm will increase by 25.58. However, investors are rational, and know that if shares are issued, state 2 will occur. The value of the company will be

$$V = a + b \text{ (in state 2),}$$

$$V = 50 + 10 = 60,$$

and the average payoff at $t = -1$ is

$$P^* = 1/2 * (150 + 60) = 105 .$$

If managers can sell this project to a third company, the value of the firm would then be, at $t=0$,

$$V = a + b,$$

and

$$V = 150 + 20 = 170 \text{ in state 1,}$$

$$V = 50 + 10 = 60 \text{ in state 2.}$$

If state 2 occurs, the managers are indifferent between selling the project to a third company or selling shares to finance it. However, if state 1 occurs they will prefer to sell the project to a third company. Therefore the average payoff at $t = -1$ is

$$P^* = 1/2 * (170 + 60) = 115.$$

If one applies the valuation formula in (3),

$$V = \max (a + b , (P/(P+E)) * (a+b+E) , a) ,$$

or

$$V = \max (\text{sell}, \text{invest}, \text{do nothing}) ,$$

$$V = \max (115, 105, 100) ,$$

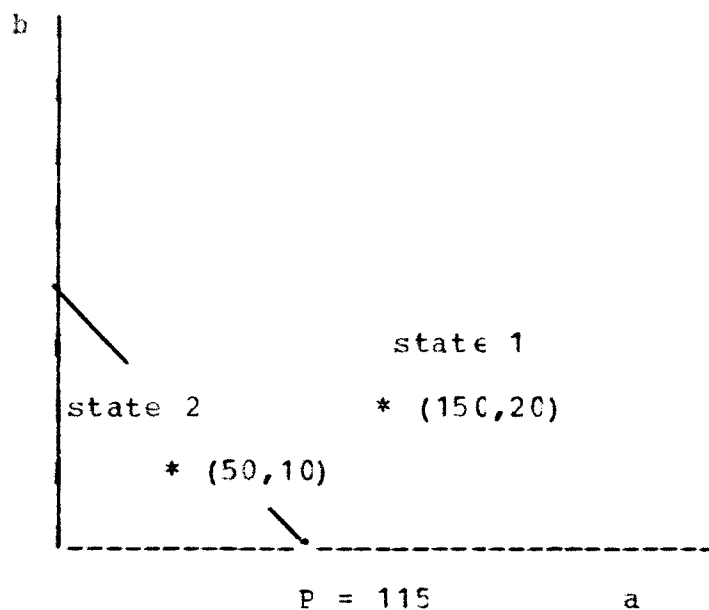
and the correct value $V = 115$ is obtained.

Figure 4 plots the results obtained above:

There is always a set of state payoffs which, if they describe a firm's asset in place, will make the firm willing to buy the seller's investment opportunity in example 2. For example, consider another firm whose original assets are:

	STATE 1	STATE 2
Assets in place (c)	60	50

and assume that it has no slack.



Solution For Example 2.

FIGURE 4

If this firm buys the project from the first firm (at $t = -1$), it will become:

	STATE 1	STATE 2
Assets in place (c)	60	50
Project NPV (b)	20	10

Since the investment opportunity requires an investment of 100, the firm needs to issue new shares if it possesses no slack originally. Thus,

$$P = \text{CBAR} + \text{EBAR} = 70,$$

$$E = 100,$$

and the current stockholders value of the second firm will be

$$V = (P / (P + E)) * (VF),$$

where VF is the value of the firm after the investment opportunity is undertaken.

If state 1 occurs,

$$V = (70 / 170) * 180 = 74.12.$$

If state 2 occurs,

$$V = (70 / 170) * 160 = 65.88$$

therefore

$$P = 1/2 * (74.12 + 65.88) = 70 .$$

5. CONCLUSION

The proposal to sell the project to a third firm when external financing is undesirable contrasts with Myers and Majluf's merger solution in that the company that buys the project need not carry slack. This third company will always prefer to take on the project by selling shares, consequently always investing in the positive net present value project. The selling firm will therefore be able to realize the full value of the project it is selling, no matter what state of nature will occur.

6. REFERENCES

Myers, S. C. and Majluf, N. J. " Stock Issues and Investment Policy When Firms Have Information That Investors Do Not Have, " -Working Paper, MIT, 1981