ON THE "UNANIMITY" LITERATURE AND THE SECURITY MARKET LINE CRITERION: A NOTE

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Recently in this journal, Aivazian and Callen (1981) purport to show

"at least when the return on industry investment has an additive risk structure even a firm with some monopoly power in the real asset market should use the security market line criterion to evaluate potential investment projects. Not only is the security market line the optimal and unanimously acceptable criterion in the additive risk case, but this criterion is independent of the industry structure in which the firm finds itself."

If true, this result would be very powerful, since it would extend the appropriateness of value maximisation as the objective of the firm to include firms with monopoly power as well as the normal case of a perfectly competitive firm. Unfortunately, this result is not correct and in this note it is shown that when the firm has monopoly power market value maximization will *not* be the unanimously agreed upon decision rule for the firm. Hence, investors will disagree about the firm's investment decision, causing the separability of ownership and decision-making, that is at the heart of financial theory, to break down.

To show the general failure of Aivazian and Callen's results to hold, the simplest possible case of *certainty* is assumed. Hence, the appropriate discount rate to value the firm is the riskfree rate. This is in contrast to Aivazian and Callen who focus on the acceptability of the security market line to determine a risk adjusted discount rate to value the firm. The present author's basic contention is simply that monopoly power causes the failure of an "optimal and unanimously acceptable criterion" to emerge, even before the introduction of uncertainty and the imposition of the whole new set of assumptions that are required for the security market line criterion to hold. It is the failure of unanimity to hold in the simplest possible certainty case, that causes the analysis of the additive risk case in the Aivazian and Callen framework to be redundant and their results to be misleading.

For purposes of clarity a simple two commodity world is assumed, where the investor-consumer owns a share (α) in the firm producing the second commodity. The investor-consumer's budget constraint is

$$C_1 + P \, C_2 + r\alpha I - r\alpha V - L \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

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where the two commodities are C_1 and C_2, P is the relative price of commodity two with respect to commodity one, so that commodity one is the numeraire with a price of one, r is the riskfree rate, L exogenous labour income, and V and I respectively, the value and cost of the investment.

The model assumes that the consumption and income flows are repeated identically in each period. The investor-consumer converts the 'stock' investment into a flow by borrowing the cost of the investment and incurring interest charges of $r \propto I$ each period. The consumer-investor then earns a dividend flow on the market value of the investment of $r \propto V$. The investor-consumer's problem is to maximise this utility ($U(\cdot)$) from consumption subject to the budget constraint,

$$\max_{C_1, C_2, I} U(C_1, C_2) + \lambda [C_1 + P C_2 + r \propto I - r \propto V - L] \dots\dots\dots\dots (2)$$

where C_1 and C_2 are his consumption decisions and I the optimal investment decision for the firm, which he votes on at the annual general meeting.

The optimality conditions include a repetition of the budget constraint, which is an equality since non-satiation is assumed, and the following first order conditions,

$$U_1'(\cdot) + \lambda = 0 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

$$U_2'(\cdot) + \lambda P = 0 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

$$\lambda \propto [r - rv'] + \frac{dP}{dI}\left(U_1'(\cdot)\frac{dC_1}{dP} + U_2'(\cdot)\frac{dC_2}{dP} + \lambda [\frac{dC_1}{dP} + C_2 \right.$$

$$\left. + \frac{dC_2}{dP}P]\right) \dots\dots (5)$$

where $U_2'(\cdot)$ is the marginal utility from commodity i.

Equations (3) and (4) are standard, and for the perfectly competitive firm, since $dP/dI = 0$, one has the standard optimality condition $V' = 1$. That is, the firm keeps investing until the last dollar contributes its cost to value and thus has a zero net present value (NPV).

For the monopolistic firm on the other hand, one can substitute (3) and (4) into (5) and simplify to obtain,

$$V' = 1 + \frac{dP}{dI}\frac{C_2}{\propto r} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

Hence, only if the investor-consumer consumes none of the firm's product ($C_2 = 0$) will the investor-consumer vote to accept all projects with a positive NPV and thus maximise market value. More normally, investor-consumers who consume the firm's product will vote to expand firm investment and output, since they benefit more from the reduction in market product price than they lose from a reduction in market value. In equation (6) r and dP/dI are not investor specific, however, C_2 and $\propto$ will vary from one individual to another. Hence, investors will disagree upon the *amount* of investment depending upon their personal shareholdings and their particular preference for consuming the firm's product. The result is that quite generally unanimity will break down for a firm with monopoly power, so that there will be no "optimal and unanimously acceptable (investment) criterion" for the firm.

This situation is illustrated in Figure 1, where there are two investment and output levels, I_M and I_C for the monopolistic and perfectly competitive solutions respectively, and two consumption goods, C_1 and C_2. The graph has been drawn so that the perfectly competitive solution leaves the individual on indifference curve Ux. As the firm reduces its investment to exploit its monopoly rents, it increases the individual's income by $\propto r [V' - 1]$, but also increases the price that he has to pay for commodity two. In the example the solution for this individual has been drawn assuming high preference for C_2 and a low shareholding in the firm that produces C_2. Hence, although he could buy more C_1 with his increased income, his utility is maximized on indifference curve Uz, which is *below* Ux. Hence, this individual would 'vote' to increase firm investment and firm output, which would result in a fall in market value *and* the price of C_2. Together these two effects would make this individual better off. An alternative can also be constructed where the shareholding in two is so great and the preference for C_2 is so low that the monopoly investment solution is preferred. Hence, there is a conflict between shareholders and unanimity breaks down.

In general, Nielson (1976) and De Angelo (1981) show that in order to have a decision-rule that does not depend on the preferences of any individual shareholder, then the firm must be a price-taker in *all* markets. In this situation, maximizing net present value just shifts the individual's budget line out parallel and the individual is *always* better off as a result, since he can reach a higher indifference curve, e.g., Uy in Figure 1. Whenever a price changes in the firm's investment decision then it is possible that the opportunity set of an investor is not unambiguously expanded. Hence, it is possible to construct a preference ordering to make an individual worse off as a result of the value maximizing investment. Unfortunately, in the perfectly competitive case it is inconsistent to talk of a project having a positive net present value, since a positive net present value, or the existence of positive economic rents, can only exist with monopoly power. Hence conceptually, shareholder unanimity and value maximization will always diverge except for the zero net present value project.

FIGURE 1

THE CONFLICT BETWEEN VALUE MAXIMIZATION
AND SHAREHOLDER WELFARE UNDER MONOPOLY
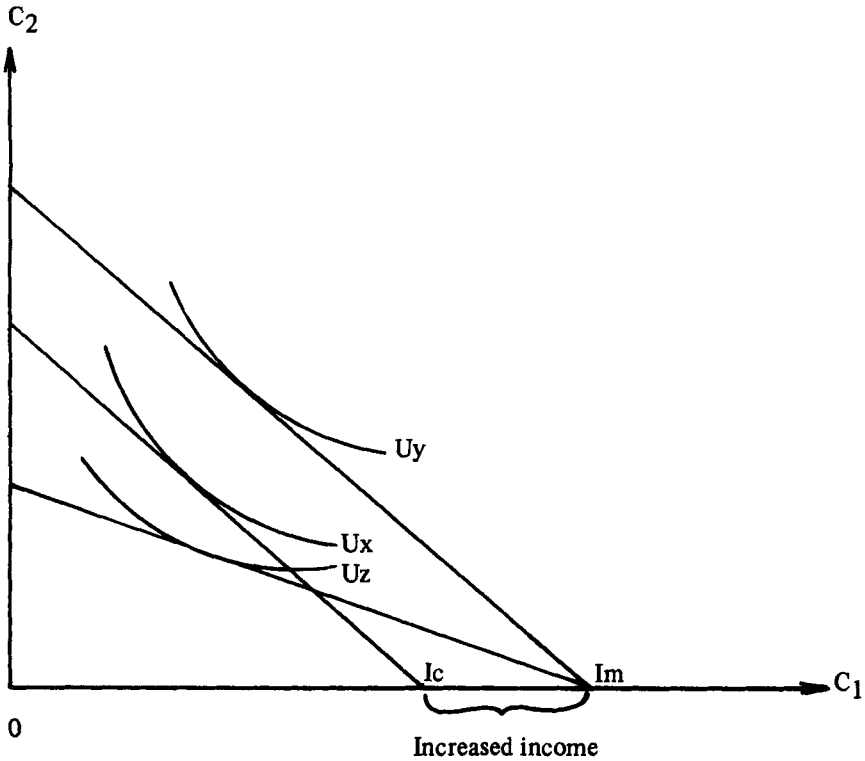
The conclusion of this note is not to destroy the notion of value maximisation. In practice, it would be impossible to canvass shareholders individually to take their consumption decisions into account in the firm's investment decision. Moreover, given the wide variety of consumption goods and the limited existence of economic rents it is unlikely that such canvassing would be worth the effort, even if it were practicable. Instead, the purpose of this note is to show the limited usefulness of the unanimity concept and the pitfalls that exist in its application to corporate investment decisions. It has been shown that unanimity breaks down in the very simplest case of monopoly power in a

world of certainty. It is then misleading to conclude that an optimal and unanimously acceptable criterion can possibly exist with monopoly power in a world of uncertainty, even one characterized by the highly restrictive assumptions necessary to generate the security market line.

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