

**A NOTE ON CLIENTELES AND THE MILLER MODEL**

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### Abstract

There is some empirical evidence that high tax bracket investors hold the equity of unlevered firms while low tax bracket investors hold levered firms. It has been suggested that an extension of the Miller model can provide a theory which is consistent with this observation. However, it has been stated elsewhere that this separation arises only for some sequences of shareholder voting and trading, implying that solid theoretical support for the existence of clienteles is lacking. This note argues that the sequencing of trading and voting does not affect the formation of capital structure clienteles.

## A NOTE ON CLIENTELES AND THE MILLER MODEL

In his presidential address to the American Financial Association [5], Merton Miller proposed a model of corporate finance integrating personal and corporate taxes. The model assumes perfect certainty, though the results also hold under either risk neutrality or complete markets.<sup>1</sup> Those with personal tax rates above the corporate tax rate hold equity and those with personal rates below the corporate rate hold debt. The debt-equity ratio for the economy as a whole is therefore determined by the allocation of investors across tax brackets. In equilibrium, firms must be indifferent between debt and equity for both types of securities to be issued. While marginal tax rates separate stockholders from bondholders, there are no clienteles amongst stockholders.

Because of its elegance and simplicity, the Miller model has fostered a great deal of research in corporate finance. Two works, Taggart [7] and Sarig and Scott (SS) [6], carefully analyze the Miller model in a world with risk averse investors and incomplete markets under uncertainty. Taggart argues:<sup>2</sup>

"...two distinct clienteles will emerge, one demanding that firms have no debt at all, and the other demanding that firms have as much debt as possible.

If there were a number of firms in each risk class, this standoff in investor preferences could be resolved by having all firms gravitate toward one or the other of these extreme capital structures in proportion to the relative demands from the two clienteles. Any firm with an intermediate capital structure could find a market for its shares only among investors whose personal discount rates were just equal to  $R(1-t_c)$ , so such firms would tend to disappear from the market."<sup>3</sup>

Sarig and Scott (SS) [6] state that Taggart's analysis cannot be used to imply the existence of financial clienteles in the real world. They reach this conclusion by rejecting Taggart's assumptions, not by finding fault with his analysis. In particular they disagree with the sequence of events he adopts. SS then argue that the received empirical results (e.g. Kim et. al. [4] and Harris et. al. [3]) supporting the existence of financial clienteles in capital structure are probably proxying for financial clienteles in dividend policy.

Because the two papers reach different conclusions, the existence of financial clienteles lacks firm theoretical support. We show that the implications of the two works are more similar than previously thought. Our analysis implies the existence of capital structure clienteles in the Sarig and Scott model, as well as in the Taggart model. In addition, we show that the final holdings of investors are identical in the two models.

Sarig and Scott's model is considered in Section I. In Section II we compare Taggart's model to that of Sarig and Scott. Finally, Section III contains brief concluding remarks.

#### I. The Sarig and Scott Model

Sarig and Scott argue that the formation of financial clienteles is crucially dependent on the sequence of events. They present a model with the following steps:

SS1) Investors receive their initial endowments.

SS2) Investors vote on the capital structures of the firms in which

they own stocks.

SS3) Investors trade to their optimal portfolio.

These three steps should occur instantaneously in a world with no transaction costs, since a delay before trading (step SS3) can only reduce utility. In a model where no investor's consumption opportunity set is affected by the decisions of a single firm, the authors conclude that shareholders unanimously vote at time SS2 for the capital structure that maximizes firm value. This result<sup>4</sup> is a special case of De Angelo's [1] finding that, for any decision variable, stockholders unanimously select the value-maximizing policy if no investor's consumption opportunity set is affected by the decision variable.

SS stop short of mentioning what the value-maximizing capital structure is. We now examine this by considering a world where there are two personal tax brackets, one above the corporate tax rate and one below. Furthermore, suppose there are firms of  $I$  different types, with a large number of firms of each type. The large number of firms ensures that the consumption opportunities of individuals are not affected by the decisions of any single firm and that firms are price takers in the securities markets. In addition, the assumption implies that, if clienteles form, the members of each tax group hold an integer number of firms. We assume that all individuals are risk-averse and we exclude tax-exempt bonds and riskless stocks. This ensures that individuals have interior optima, thereby eliminating limitless tax arbitrage without the necessity of positing borrowing or shortselling constraints. We follow SS and Taggart by assuming that firms can only issue risk-free debt

Using the reasoning of Kim et. al. [4], it can be shown that, if all firms of type  $i$  have the same market value, a high tax bracket (HTB) individual always prefers holding the equity of the type  $i$  firm with the least amount of debt. This occurs because an HTB investor desiring a levered investment would receive higher interest tax shields by borrowing on personal account than by letting the corporation borrow for him. Similarly, an HTB individual wishing to avoid debt would be worse off holding any firm of type  $i$  with more than the least amount of debt, since the offsetting debt he holds on personal account would be taxed at the high personal rate. By the same reasoning, a low tax bracket (LTB) individual would only want to hold the firm of type  $i$  with the most amount of debt.

The above shows that, if all firms of type  $i$  have the same market value, no individual would hold the equity of any firm with an intermediate level of debt. Individuals could be induced to hold a firm with an intermediate amount of debt only if that firm has a lower market value. In equilibrium, this means that no value-maximizing firm would issue an intermediate amount of debt. Instead, firms either issue no debt or the maximum amount of debt. Both capital structures must exist in order for HTB and LTB individuals to be satisfied, a condition that can only occur if both high and low debt firms are equally valuable. At SS3, HTB (LTB) individuals buy the stock of low (high) debt firms of type  $i$ .

The existence of leverage clienteles is best explained in a one-period model, a standard financial paradigm. As mentioned earlier, events SS1-SS3 occur instantaneously at the beginning of the period. Time passes before

events, one would expect an "empirical researcher" in our model to measure clienteles after SS3. Thus, unanimity at the voting date is consistent with an empirical observation of financial clienteles.

Provided there are no transaction costs, the results of our one-period model carry over to a multiperiod setting. Voting occurs whenever the wealth or tax brackets of individuals are altered, implying a change in the size of the clientele groups. At each vote, all concerned unanimously support the value-maximizing capital structure. The subsequent trading of individuals should immediately result in the formation of new clienteles. However, if there are costs of trading, shareholders may not immediately adjust their portfolios. Here, although there are still clienteles, there may no longer be unanimity.

## II. The Taggart Model

Taggart assumes the following sequence of three steps:

T1) Investors receive their initial endowments

T2) Investors trade to their optimal portfolios

T3) Investors vote on the capital structure of the firms in which they own stock.

As Sarig and Scott point out, the last two steps of Taggart's sequence are the reverse of their's. SS argue that this reversal leads to a different equilibrium. However, we argue in this section that investors' holdings in the equilibrium in the SS model are the same as those in the equilibrium in

In order to know how much to pay, investors at T2 must have expectations about how firms' shareholders will vote at T3. In a rational expectations equilibrium, these expectations must be fulfilled. Suppose there are two groups among each of the I types of firms. The first group is expected to have no debt and the second is expected to have maximum debt. In order to avoid the possibility of arbitrage, the two groups of firms must have the same market value. Assume, for example, all-equity firms have higher value. Here, any individual could purchase an entire firm of type i expected to have high debt and simultaneously short sell an entire firm of that type expected to be all-equity. Since he owns the entire firm, he can determine its capital structure by himself at T3. He can therefore ensure that the firm he owns has the same capital structure as the firm he short sells. This creates a wash, except for his initial arbitrage profit.

Since the market values are the same, HTB investors purchase the all-equity firms at T2 and LTB investors purchase the high-debt firms. Provided the values of the two groups of firms match up with the wealth of investors in the high and low tax brackets respectively, a rational expectations equilibrium exists. Shareholders of firms in the first group unanimously vote for no debt at T3 and those in the second group unanimously vote for maximum debt. Thus, the equilibrium is the same as that in the SS model. HTB investors hold those firms with no debt and the LTB investors hold only firms with maximum debt.

### III. Concluding Remarks

In this note we have argued that the sequencing of trading and voting does not affect the existence of financial clienteles. Rather, what is

important is the stage at which observations are made. In SS's model there are no clienteles until stage SS3. In Taggart's model there are no clienteles until stage T2.

Finally it should be pointed out that the models have important simplifications. In particular the assumption of risk-free debt is severely restrictive. This limits the empirical implications that can be drawn from the model. An important question for future research concerns the effect of allowing for risky debt on clienteles.

## Footnotes

1. See De Angelo and Masulis [2] for a discussion of the complete markets case.
2. p.654.
3. Here,  $R$  is the taxable bond rate and  $t_c$  is the corporate tax rate.
4. SS's Proposition 2, p.1463.

## References

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