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The irrelevance of the MM dividend irrelevance theorem ☆

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Abstract

Contrary to Miller and Modigliani [1961. Dividend policy, growth, and the valuation of shares. Journal of Business 34, 411–433], payout policy is not irrelevant and investment policy is not the sole determinant of value, even in frictionless markets. MM ask "Do companies with generous distribution policies consistently sell at a premium above those with niggardly payouts?" But MM's analysis does not address this question because the joint effect of their assumptions is to mandate 100% free cash flow payout in every period, thereby rendering "niggardly payouts" infeasible and forcing distributions to a global optimum. Irrelevance obtains, but in an economically vacuous sense because the firm's opportunity set is artificially constrained to payout policies that fully distribute free cash flow. When MM's assumptions are relaxed to allow retention, payout policy matters in exactly the same sense that investment policy does. Moreover (i) the standard Fisherian model is empirically refutable, predicting that firms will make large payouts in present value terms, (ii) only when payout policy is optimized will the present value of distributions equal the PV of project cash flows, (iii) the NPV rule for investments is not sufficient to ensure value maximization, rather an analogous rule for payout policy is also necessary, and (iv) Black's [1976. The dividend puzzle. Journal of Portfolio

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Management 2, 5–8] "dividend puzzle" is a non-puzzle because it is rooted in the mistaken idea that MM's irrelevance theorem applies to payout/retention decisions, which it does not.

JEL classification: G35; G32; H25

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1. Introduction

Miller and Modigliani's (1958, 1961) irrelevance theorems form the foundational bedrock of modern corporate finance theory. The MM theorems indicate that, in frictionless markets with investment policy fixed, all feasible capital structure and dividend policies are optimal because all imply identical stockholder wealth, and so the choice among them is irrelevant. The central lesson commonly drawn from MM is that investment policy alone determines stockholder wealth in frictionless markets, and that leverage and payout decisions have no impact on firm value, given a value-maximizing investment program (see, e.g., Allen and Michaely, 2003, p. 339). Specifically, when a firm considers different leverage and payout decisions, it is simply slicing a fixed pie (of cash flows from investment) into different pieces, whose individual values in frictionless markets must inevitably sum to the value generated by the underlying investment policy.

This paper shows that payout policy, like investment policy, has first-order value consequences in frictionless markets, and cannot be reduced to a "pie-slicing" exercise as in Modigliani and Miller (1958). By definition, irrelevance requires a one-to-one correspondence between feasible and optimal policies—i.e., throw a dart at the feasible set and, no matter where it hits, stockholders are equally well off. Irrelevance is hard-wired into MM (1961) by assumptions that shrink the feasible set to optimal policies by forcing 100% distribution of free cash flow (FCF) in every period. In effect, MM assume away the value-relevant payout/retention decision to focus on a decision that *can* be reduced to pie-slicing: pay out 100% of FCF or pay out 100% and simultaneously act as an intermediary between new investors and stockholders who want to sell shares. Since portfolio trades are costless in frictionless markets, intermediation adds no value, and the firm's payout "choice" is no choice at all because MM mandate full payout in all cases.

When MM's assumptions are modified to allow retention with the NPV of investment policy fixed, a firm can reduce its value by paying out less than the full present value of FCF, and so payout policy matters and investment policy is not the sole determinant of value. With retention allowed, a firm is no longer constrained to an optimal payout policy as an automatic by-product of its investment decision, and irrelevance fails because some feasible payout policies do not distribute the full present value of FCF to currently outstanding shares. Because irrelevance is a property of the opportunity set ("all feasible decisions are optimal"), payout policy (like investment policy) is relevant in the standard Fisherian model, even though that

model's value-maximization assumption ensures that managers will never choose a suboptimal payout policy (or take negative-NPV projects). In short, payout policy inherently affects stockholder wealth, and its value impact is not limited, as widely believed from MM (1961), to its influence on project choice or to the effect of market imperfections such as personal taxes.

Because payout policy matters when retention is allowed, the following general corollaries apply. First, since some feasible payout policies are strictly suboptimal, the frictionless Fisherian model is not, as commonly thought, consistent with any payout policy managers might select. Rather, the theory is empirically refutable, predicting that firms will distribute the full PV of FCF, an implication that differentiates it from Jensen's (1986) agency theory. Second, MM's "equivalence principle"—that the discounted value of cash flows from investment must equal the discounted value of dividends—is not a universal property, but holds only for optimal payout policies. Third, since investment policy is not the sole determinant of value, the familiar NPV rule for investments ("take the set of projects that generates the greatest overall NPV") is not by itself sufficient to ensure stockholder wealth maximization; an NPV rule for payouts is also necessary ("distribute the full PV of FCF to currently outstanding shares").

Failure to recognize that MM's dividend irrelevance theorem does not apply to payout/retention decisions can cause serious mischief, a point we illustrate by revisiting Black's (1976) "dividend puzzle." Black argues that when taxes are added to the MM framework, firms should largely eliminate payouts to stockholders,[1] which they obviously do not. But the logic Black uses to generate this prediction is flawed. In all cases, including those in which payouts are taxed, optimal payout policy requires distributions that are large in present value terms; if managers actually implemented Black's suggestion to eliminate virtually all payouts, they would destroy untold amounts of stockholder wealth. For corporate finance research, a more troubling consequence of the MM irrelevance theorem is that its central lesson—that investment policy alone determines value—has both limited our vision about the importance of payout policy and sent researchers off searching for frictions that would make payout policy matter, while it has mattered all along even in the standard (frictionless) Fisherian model.

[1]In Black's (1976) words: (1) "Under the assumptions of the Modigliani–Miller theorem, a firm has value even if it pays no dividends. Indeed, it has the same value it would have if it paid dividends." (2) "If this theorem is correct, then a firm that pays a regular dividend equal to about half its normal earnings will be worth the same as an otherwise similar firm that pays no dividends and will never pay dividends." (3) "In a world where dividends are taxed more heavily (for most investors) than capital gains, and where capital gains are not taxed until realized, a corporation that pays no dividends will be more attractive to taxable individual investors than a similar corporation that pays dividends. This will tend to increase the price of the non-dividend-paying corporation's stock. Many corporations will be tempted to eliminate dividend payments." (4) "If a corporation insists on paying out cash, it is better off replacing some of its common stock with bonds." Although passages (1)–(3) refer to dividends rather than total payouts, the only way to rationalize claims (3) and (4) about the tax advantages of retention (from generating unrealized capital gains that are not taxed) is that the passages also apply to repurchases which, like dividends, are tax-disadvantaged because they trigger immediate taxes.

Readers of prior drafts have raised several counter-arguments to our claim that investment policy is not the sole determinant of value in frictionless markets. We summarize and address these counter-arguments in "objection/rejoinder" format at the points in our argument where they typically arise. Section 2 dissects MM's (1961) irrelevance proof. Section 3 shows why payout policy matters when MM's assumptions are relaxed to allow retention. Section 4 discusses applications of our analysis, including its relation to Jensen's (1986) free cash flow theory, the issue of what the market "really" capitalizes, and why payout policy matters in a stock bubble. Section 5 analyzes Fischer Black's (1976) "dividend puzzle." Section 6 summarizes our findings and discusses their implications.

2. MM (1961) allow no payout/retention decisions

Irrelevance means that all feasible payout policies are optimal, so that *any* policy managers could choose yields identical stockholder wealth. MM's (1961) irrelevance proof shows that, in frictionless markets, stockholder wealth is unchanged when all aspects of investment policy are fixed and any increase in the current payout is financed by fairly priced stock sales. In this section, we show that the reason why payout policy is irrelevant is that MM's assumptions require firms to pay out 100% of free cash flow (FCF) in every period. By ruling out retention, MM restrict the feasible set to optimal policies and thereby ensure irrelevance. MM's irrelevance result, however, comes at the cost of side-stepping the fundamental question they pose in their opening paragraph: "Do companies with generous distribution policies consistently sell at a premium over those with niggardly payouts?" Since "niggardly payouts" are impossible in a model that mandates 100% FCF payout every period, MM have nothing to say about the central question of payout policy they pose; thus, their irrelevance theorem is of trivial import.

We maintain all of MM's (1961) assumptions, except in Section 3 where we allow retention (while holding the NPV of investment policy fixed), and show that payout policy matters. We use the term "frictionless markets" as shorthand for MM's economic setting in which there are no taxes, no security trading or flotation costs, rational expectations-enforced fair pricing of securities, and price-taking behavior by individuals and firms. For simplicity, we work in a certainty framework as do MM, but all conclusions generalize to uncertainty using the Arrow–Debreu approach. Like MM, we assume that firms use only equity financing but all findings readily translate to scenarios with debt financing. Although MM use an infinite horizon model, we use a three-date model to graphically illustrate why investment policy is not the sole determinant of value when MM's assumptions are relaxed to allow retention. (There is no loss of generality since our conclusion that payout policy matters holds for both infinite and finite horizon formulations, as we discuss in Section 3.)

Since MM's irrelevance theorem is a statement about the firm's opportunity set (all feasible payout policies are equally valuable), their proof makes no assumption about managerial objectives and we follow suit here. No specification of managerial

objectives is necessary because irrelevance means that, no matter how poorly motivated or self-interested managers might be, they cannot damage stockholders by their payout decisions. We use the term "standard Fisherian model" to refer to a frictionless market setting in which managers are assumed to select value-maximizing policies.

For precision in describing a firm's decisions at date t, let X_t = cash flow from prior operating decisions, I_t = investment outlays, and $X_t - I_t = \mathrm{FCF}_t$ = net-of-investment (free) cash flow, where the FCF label indicates the firm has chosen an optimal investment program.[2] Let D_t = the *gross* distribution, which equals the sum of dividends plus repurchases, and which we pool because we wish to address whether payout versus retention decisions matter and are not concerned with how the firm splits a given distribution between dividends and repurchases, or between these two and interest/principal on debt. Finally, let S_t = cash raised from stock sales, so that $D_t - S_t$ = the *net* distribution (payouts minus stock sale proceeds), where D_t and S_t are nonnegative by definition.

The MM irrelevance result is driven by their requirement that the firm distribute 100% of FCF in every period. This requirement is an unappreciated implication of MM's assumption that all aspects of investment policy are fixed, coupled with their treatment of the condition that the date t distribution to stockholders cannot exceed the sum of contemporaneous FCF and stock sale proceeds. MM treat the latter condition as a strict equality so that the firm's payout at date t is

$$D_t = X_t - I_t + S_t = \mathrm{FCF}_t + S_t. \tag{1}$$

With X_t and I_t assumed constant for all t, FCF_t is also parametric for all t. Since stock sale proceeds, S_t, are nonnegative, the firm's payout, D_t, is constrained to be at least as large as $\mathrm{FCF}_t = X_t - I_t$, and any distributions above the level of current free cash flow are funded by fairly priced stock sales.

The irony here is that, although MM sought to avoid confounding investment and payout policy, their assumptions actually induce an interdependence between the two by mandating 100% FCF payout every period. In effect, MM *force* the payout decision to be a by-product of the investment decision, so that once the latter decision is made, the firm *automatically* distributes all FCF in every period. Obviously, stockholders cannot do better than that. When FCF retention is allowed, the firm can choose $D_t < \mathrm{FCF}_t$, so that policies that pay out less than the full present value of the FCF stream become feasible and irrelevance fails, as we show in Section 3 below.

Fig. 1 illustrates MM's (1961) theorem for a three-date economy in which a given firm raises capital and invests at $t = 0$ to generate free cash flow of FCF_1 at $t = 1$ and FCF_2 at $t = 2$. The x-axis represents the date $t = 1$ distributions to all shares

[2]In MM's (1961) analysis, an investment program is selected arbitrarily and held fixed, with no presumption that it is optimal. Thus, one could interpret $X_t - I_t$ as "net cash flow from investment policy" rather than "free cash flow," since the latter term is commonly used to indicate the amount of cash left after selecting investments with maximal overall NPV. With $X_t - I_t$ representing free cash flow, there can be no misconception that our payout relevance conclusion depends on a hidden assumption that the firm has adopted a strictly suboptimal investment program.

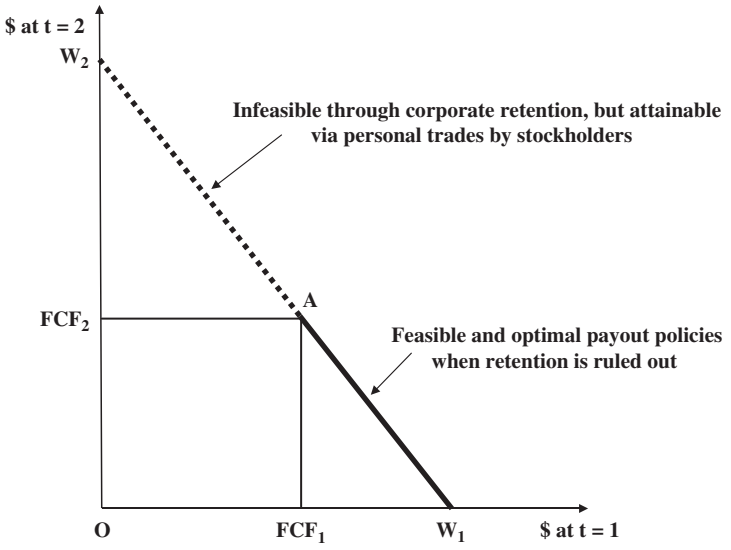

Fig. 1. Feasible and optimal payout policies for a firm operating in frictionless markets: retention of FCF ruled out, as in Miller and Modigliani (1961). The x-axis plots consumption claims (dollars) at $t = 1$ and the y-axis plots consumption claims at $t = 2$ to all shares outstanding at $t = 0$. The slope of W_2W_1 is dictated by the market interest rate for transforming consumption claims from $t = 1$ to $t = 2$. FCF_1 and FCF_2 are free cash flow at $t = 1$ and $t = 2$ from investment at $t = 0$. The solid portion AW_1 is the feasible set of distributions to shares outstanding at $t = 0$ in MM and it is also the optimal set, since all these payout policies yield identical stockholder wealth. At $t = 1$, the minimum allowed distribution is FCF_1, and that is why feasible payout policies are restricted to AW_1. Any $t = 1$ distributions that exceed FCF_1 are financed by new stock sales, which are assumed to be fairly priced so that payouts to $t = 0$ stockholders lie on AW_1. Regardless of the payout policy chosen along AW_1, individuals can make trades to attain any point along the dotted line W_2A, creating "homemade" dividends at $t = 2$. Thus, in MM it does not matter that the firm cannot choose payout policies along W_2A, since stockholders can achieve that result themselves (provided the firm distributes 100% of FCF in each period).

outstanding as of the close of trading at $t = 0$, and the y-axis represents the date $t = 2$ distributions to these shares, which we respectively denote D_1^0 and D_2^0. The slope of the line through point A reflects the market rate of interest for transforming consumption claims from $t = 1$ to $t = 2$, so that all points on W_2W_1 have present value equal to that of the FCF stream.

In MM's proof, feasible payout policies lie on the bold line segment AW_1, and all policies in this constrained feasible set yield identical stockholder wealth. Point A represents full payout of FCF_1 at $t = 1$ and FCF_2 at $t = 2$ to shares outstanding as of $t = 0$ ($D_1^0 = FCF_1$ and $D_2^0 = FCF_2$). The dotted segment W_2A is off-limits for the firm since points along this segment entail retention of part or all of FCF_1, but consumption bundles along W_2A are attainable by stockholders who lend on personal account. Along the bold segment AW_1, the firm can increase current payouts above FCF_1 by issuing new shares at a fair price at $t = 1$, a strategy that provides $t = 0$ stockholders with the same consumption opportunities they had

initially. The firm distributes the same total FCF_1 plus the stock sale proceeds to the $t = 0$ stockholders, who now receive more cash at $t = 1$ and less at $t = 2$, with an unchanged present value. At $t = 2$, the firm distributes FCF_2, which is now split between shares outstanding at $t = 0$ and those issued at $t = 1$.

In substance, movements along AW_1 are simply trades between investors at $t = 1$, with no variation in the firm's level of retention. If the incremental "distribution" at $t = 1$ comes as a repurchase, it is exactly as if old stockholders sold their shares directly to outside investors. If it comes as a dividend, it is exactly as if new investors paid cash to old stockholders for a portion of the firm's equity (and then the firm split its stock to increase the number of shares outstanding). The firm is merely a financial intermediary in these transactions and, since trading is costless in frictionless markets, intermediation adds no value for stockholders. But the issue of concern here is payout policy, not intermediation. And these transactions represent trivial changes in payout/retention decisions for firms *whose retention levels never change* because they are forced to distribute all FCF under any allowed "payout choice."

Bottom line, in MM (1961), the only policies the firm can choose entail 100% FCF payout, and that is why the payout choices examined by MM are all equally valuable to stockholders and why investment policy is the sole determinant of value. Although their proof assumes 100% FCF payout, MM (1961, footnote 12) indicate elsewhere in the paper that stockholder wealth is invariant to all payout/retention decisions except those with exactly zero payouts in every period, thereby creating the impression that, except for one pathological and economically trivial case, all feasible policies yield identical stockholder wealth.[3] This cannot be true, however, since rational investors will set a near-zero value on the equity of firms whose payout policies entail near-zero distributions every period. In fact, MM (1961) does not apply to payout/retention decisions, since their assumptions prohibit retention.

[3]MM's argument follows (with (14) being the "discounted dividend" formula for equity value, (12) the "investment opportunities" formula, and (9) the discounted "net cash flow" formula):

> "The statement that Eqs. (9), (12), and (14) are equivalent must be qualified to allow for certain pathological extreme cases, fortunately of no real economic significance. An obvious example of such a case is the legendary company that is expected never to pay a dividend. If this were literally true then the value of the firm by (14) would be zero; by (9) it would be zero (or possibly negative since zero dividends rule out $X(t) > I(t)$ but not $X(t) < I(t)$; while by (12) the value might still be positive. What is involved here, of course, is nothing more than a *discontinuity at zero* since the value under (14) and (9) would be positive and the equivalence of both with (12) would hold if that value were positive as long as there was some period T, however far in the future, beyond which the firm would pay out $\varepsilon > 0$ percent of its earnings, however small *the value of* ε." (MM, 1961, footnote 12, emphasis added in final sentence).

The closing sentence of the passage states that the "dividend discount" valuation formula yields the same value as the "investment opportunities" formula as long as there is an *arbitrarily small*, but positive, stream of payouts beginning in some future period. The term "discontinuity at zero" indicates that equity value under the discounted dividend formula is identical for all payout vectors except for the singular point at which the vector of time-dated dividend payments has every element exactly equal to zero. These statements are not correct.

Objection #1: I always thought that MM showed that, although firms must pay out the full present value of free cash flow, the timing of those payouts is irrelevant.

Rejoinder: MM allow no variation in the timing of FCF payout. MM mandate payout of all FCF every period, and if the firm wants to pay a yet-higher dividend or buy back more stock today, it sells shares to outsiders and immediately hands over the cash to current stockholders. It is no different than if the current stockholders had sold some (ex-dividend) shares to other investors. The fact that current stockholders get more cash today and less tomorrow is the result of portfolio trades, and has nothing to do with resources received from the firm since the firm's retention level never changes.

Objection #2: It is unfair to criticize MM (1961) for requiring 100% FCF payout, since that assumption is perfectly appropriate for proving that the choice of how to divide a given cash payout between dividends and repurchases is a matter of indifference in frictionless markets.

Rejoinder: Indifference to the dividend/repurchase mix is not sufficient to establish that investment policy is the sole determinant of value, a conclusion that is incorrect once retention is allowed. Moreover, MM's (1961) concern is the level of distributions and not the dividend/repurchase mix, as is evident from the following. (1) MM's opening paragraph asks: "Do companies with generous distribution policies consistently sell at a premium over those with niggardly payouts?" (2) MM do not mention stock repurchases anywhere in their article, not even in the closing section where they discuss the effect of taxes on payout policy. (3) If MM had repurchases in mind, they would have (should have) stated that the discounted "stream of dividends approach" understates equity value by the present value of buyback proceeds. (4) The body of MM's irrelevance proof asks: "Which is the better strategy for the firm in financing the investment: to reduce dividends and rely on *retained earnings* or to raise dividends and float new shares?" (emphasis added). It is not surprising that repurchases are mentioned nowhere in MM (1961) since dividends were the only empirically meaningful equity payout at that time, and so the issue of the dividend/repurchase mix was simply not on the profession's radar screen.

3. Why payout policy matters with retention allowed

Because their assumptions ensure payout policy optimality by forcing 100% FCF distribution to be an *automatic* by-product of the investment choice, MM (1961) confound investment and payout policy and mistakenly attribute the value impact of payout policy optimization to investment policy. When MM's assumptions are relaxed to allow retention, payout policy optimization is not an automatic by-product of the investment choice. Rather, to maximize stockholder wealth, managers must make a separate decision to adopt a payout policy that distributes the full PV of FCF to currently outstanding shares. One can resurrect irrelevance by assuming that costless contracting restricts managers to payout policies that fully distribute FCF, but costless contracting renders *both* investment and payout policy irrelevant

because *all* sub-optimal choices are now off-limits to managers. Critically, with retention allowed, investment and payout policy are perfectly symmetric—either (i) both are relevant because some feasible decisions are strictly better than others, or (ii) both are irrelevant because the contracting technology precludes all suboptimal choices. If we proceed in the spirit of the literature, which universally assumes that project choice matters independent of the contracting regime, both investment and payout policy are first-order determinants of stockholder wealth, even in frictionless markets.

Payout policy matters when MM's assumptions are relaxed to allow retention of FCF because there is no longer a one-to-one correspondence between feasible and optimal policies. To analyze the payout/retention decision, we hold the NPV of investment policy fixed while allowing the firm to modify the time-profile of investment cash flows through unlimited access to zero-NPV projects. The payout policy optimality condition is that the full present value of the FCF stream be distributed to currently outstanding shares. Since this condition is satisfied by more than one payout policy, the choice among them is *indeterminate*. The payout choice is *not irrelevant*, however, because many feasible but suboptimal policies have present values below that of the FCF stream.[4] The same is true of investment policy—with unlimited zero-NPV investments, the optimal investment program is indeterminate (since infinitely many programs have identical NPV), but investment policy is not irrelevant because other feasible investment programs have strictly lower NPV. Critically, since payout policy and investment policy are both relevant (although neither is uniquely determined), it is simply not true that investment policy is the sole determinant of value in the frictionless Fisherian paradigm.

We establish payout policy relevance by inspecting the opportunity set, just as MM (1961) do to establish irrelevance with mandated 100% FCF payout. To establish irrelevance, one must show that all feasible policies are optimal. To establish relevance, one must simply show the feasibility of at least one suboptimal policy. It is *not* necessary to show that managers will actually adopt a suboptimal policy, only that they *could* do so. For example, the availability of negative-NPV projects shows that investment policy matters, independent of whether managers actually take such projects. And investment policy remains relevant in the standard Fisherian model, even though that model's value-maximization assumption ensures that managers will never take negative-NPV projects.

Brennan (1971) and Rubinstein (1976) allow a firm to reduce its payout below 100% of FCF_t, i.e., to choose $D_t < FCF_t$ when FCF_t is positive. Both authors hold the NPV of investment policy fixed by assuming that undistributed cash is placed in zero-NPV projects, thereby ensuring that retention generates future returns capable of supporting distributions whose present value equals that of the forgone payout. If the firm eventually pays out the full amount that compounds forward, stockholders

[4]To see the distinction between irrelevance and indeterminacy, consider a firm with three mutually exclusive investment opportunities, two of which have identical NPVs that are higher than that of the third. The optimal project choice is indeterminate since stockholders are indifferent between the first two projects, but the choice of investment policy is not irrelevant since stockholders will be strictly worse off if the third is adopted.

are indifferent to the timing of the payout. This logic establishes that no single payout policy is uniquely optimal, i.e., optimal payout policy is indeterminate. But payout policy is not irrelevant, as we next establish.

Fig. 2 describes feasible and optimal payout policies with FCF retention allowed. The feasible payout set is the shaded area bounded by $V_2V_1W_1W_2$, with the upper boundary W_2W_1 determined by the PV of the FCF stream generated by optimal investment policy. Rational expectations dictate a lower bound, V_2V_1, on the set of feasible payout policies that will elicit the firm's desired equity infusion at $t = 0$. This

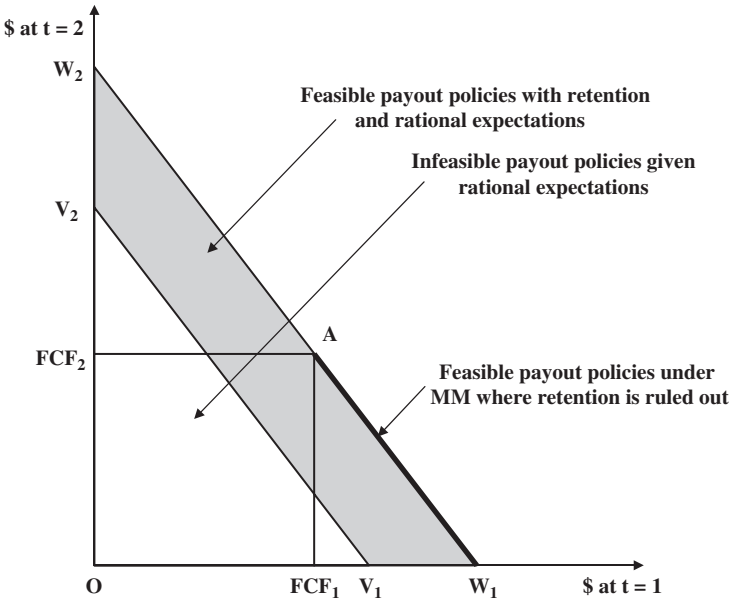

Fig. 2. Feasible and optimal payout policies for a firm operating in frictionless markets: MM (1961) relaxed to allow retention of FCF, holding the NPV of investment policy fixed. The x-axis plots consumption claims (dollars) at $t = 1$ and the y-axis plots consumption claims at $t = 2$ to all shares outstanding at $t = 0$. The slope of W_2W_1 is dictated by the market interest rate for transforming consumption claims from $t = 1$ to $t = 2$. FCF_1 and FCF_2 are free cash flow at $t = 1$ and $t = 2$ from investment at $t = 0$. In MM (1961), all aspects of investment policy are fixed and FCF must be fully distributed each period (retention is not allowed). AW_1 is the feasible set of distributions to shares outstanding as of $t = 0$ in MM, and it is also the optimal set since all these payout policies imply identical stockholder wealth, as shown in Fig. 1. Fig. 2 holds the NPV of investment policy fixed by allowing the firm unlimited access to zero-NPV projects. Optimal *investment* policy is indeterminate, with W_2A showing the set of equally valuable investment policies that are reached by retaining cash at $t = 1$ and investing it in zero-NPV projects. Optimal *payout* policy is also indeterminate, with value-maximizing policies plotting along W_2W_1. The set of feasible payout policies is the full shaded region. V_1 and V_2 are derived by treating the rational expectations constraint on capital supply (Eq. (2) in the text) as a strict equality. Hence $V_1 = (1 + r_{01})(I_0/\theta)$ and $V_2 = (1 + r_{12})V_1$ where I_0 is the total equity capital raised from outsiders at $t = 0$ in exchange for fraction θ of the equity, r_{01} is the market interest rate for transforming dollars from $t = 0$ to $t = 1$, and r_{12} is the rate between $t = 1$ and $t = 2$. Rational expectations rule out payout policies with permanently low or near-zero distributions in OV_2V_1 because these distributions are too low to induce outside investors to fund the $t = 0$ outlay that generates FCF_1 and FCF_2.

bound is determined by I_0, the amount of external capital the firm seeks at $t = 0$, and θ, the fraction of stock issued to outsiders. Since the figure plots total distributions at $t = 1$ and $t = 2$ to all shares outstanding at $t = 0$ (not just to shares issued for the $t = 0$ capital contribution I_0), feasible payout policies are those with distributions D_1^0 and D_2^0 whose present value, V_0, ensures that the value of future payouts to shares sold at $t = 0$, θV_0, is at least as great as the capital contribution I_0. Let r_{01} and r_{12}, respectively, denote market interest rates for transforming dollars from $t = 0$ to $t = 1$ and from $t = 1$ to $t = 2$. Since market interest rates are investors' opportunity cost of capital, only payout policies that satisfy the following condition enable the firm to raise sufficient funds at $t = 0$ to generate FCF_1 and FCF_2:

$$V_0 = \frac{D_1^0}{(1 + r_{01})} + \frac{D_2^0}{(1 + r_{01})(1 + r_{12})} \geqslant I_0/\theta. \tag{2}$$

In Fig. 2, the "efficient frontier" W_2W_1 is the set of optimal policies whose distributions to shares outstanding as of $t = 0$ have present value equal to that of the FCF stream. Hence, the set of optimal payout policies expands beyond AW_1, the optimal policies in MM, to the full line segment W_2W_1. Stockholders are no longer indifferent among all feasible policies because that set is now the entire shaded region $V_2V_1W_1W_2$, while optimal payout policies lie along W_2W_1. With retention admissible, firms are no longer forced to distribute the full present value of FCF as an automatic by-product of selecting an optimal investment policy, and that is why payout policy matters.

Objection #3: I always thought that MM's payout policy irrelevance result holds when retention is allowed, as long as the NPV of investment policy is fixed.

Rejoinder: This seemingly innocuous extrapolation from the MM model to one that allows retention is actually a major logical error because it fails to recognize that MM's payout irrelevance conclusion *relies* on mandated 100% FCF payout. Allowing retention gives managers the previously unavailable opportunity to choose suboptimal payout policies, i.e., policies from within the shaded region in Fig. 2. Payout policy irrelevance is therefore out the window once retention is allowed.

Objection #4: In the standard Fisherian model, managers are assumed to act in the interests of stockholders, and so they will always choose a payout policy along the W_2W_1 frontier, i.e., they will distribute the full present value of FCF to currently outstanding shares and ignore the suboptimal payout policies that fall in the shaded region of the feasible set. And so payout policy is irrelevant.

Rejoinder: The fact that value-maximizing managers will always choose optimal payout policies is completely beside the point because irrelevance is a property of the opportunity set: *all choices that could be made are equally valuable*. The fact that more than one payout policy satisfies the optimality condition does not mean that all feasible policies do so. Irrelevance fails because some feasible payout policies are better than others in exactly the same way that some investment projects are better than others. (See also Objection #5 below.)

Managers can choose any payout policy on the W_2W_1 frontier without affecting stockholder wealth. And so it is correct to say that, *provided* that managers distribute the full present value of FCF, the timing of those payouts is a matter of indifference to stockholders. But this is *not* "payout policy irrelevance," since managers can also

choose policies in the interior of Fig. 2. One might be tempted to label payout policy "irrelevant" because the timing of payouts doesn't matter when managers are *constrained* to choose optimal policies. If so, then one must also label investment policy irrelevant because the same value-neutral reinvestment strategy that enables firms to delay payouts without altering their present value simultaneously changes the timing of investment cash flows without altering their NPV. Bottom line, if the ability to alter policies along the frontier without affecting value makes payout policy irrelevant, it also makes investment policy irrelevant.

But neither payout nor investment policy is actually irrelevant; both are simply indeterminate. Investment policy is relevant because there are feasible but suboptimal investment programs whose cash flows plot strictly below W_2W_1 (although these inferior programs are not shown explicitly in Fig. 2). Payout policy is relevant because (holding the value generated by investment policy constant at the maximum attainable NPV along W_2W_1) there are feasible payout policies that fail to distribute full value, i.e., that plot strictly below W_2W_1. "Homemade" dividends cannot resuscitate payout policy irrelevance because the proceeds individuals receive from selling shares—or borrowing against share collateral—will be discounted if the firm's payout policy plots strictly below W_2W_1.[5] Both policies are indeterminate because there are multiple (actually, an infinite number of) investment and payout policy combinations along W_2W_1 that all yield identical stockholder wealth.

Objection #5: With costless contracting, managers are *forced* to choose value-maximizing policies. Therefore, they will always choose to distribute the full present value of FCF, and so payout policy is irrelevant and investment policy alone determines value.

Rejoinder: If one *forces* managers to consider only value-maximizing policies, then payout policy is irrelevant in a conditional sense, but *so is investment policy* since the same assumption that forces adoption of a value-maximizing payout policy also forces adoption of a value-maximizing investment policy. Therefore, payout and investment policy either both matter or both are irrelevant, so that it is incorrect to label one relevant and the other not.

Objection #5 attempts to salvage dividend irrelevance by injecting a costless contracting assumption to preclude non-value-maximizing policies.[6] With this assumption, payout policy is indeed irrelevant in a conditional sense, since managers

[5]The trades necessary to create homemade dividends are movements along a given budget line whose slope is dictated by the market rate of interest and whose placement in Fig. 2 is dictated by the firm's cash distributions at $t = 1$ and $t = 2$. Homemade dividends are not substitutes for increased cash distributions by the firm, since only the latter move the relevant budget line further out from the origin and thereby increase stockholder wealth. And so the ability of individuals to create homemade dividends in no way alters the requirement that firms must distribute the full PV of FCF to maximize stockholder wealth.

[6]Perfect (costless) disciplinary mechanisms play no role in MM's (1958, 1961) irrelevance proofs, as we discuss below. Such disciplinary mechanisms can take a variety of forms. For example, one could assume a perfectly functioning market for corporate control in which "raiders" or outside stockholders can costlessly take over the firm and prevent managers from adopting policies that fail to maximize stockholder wealth. Alternatively, one could assume that stockholders and managers can enter into costlessly monitored and enforced compensation contracts that perfectly align managers' interests with those of stockholders.

are constrained to choose only among policies that yield the same (maximized value of) stockholder wealth. However, the costless contracting assumption that eliminates suboptimal payout policies also precludes suboptimal investment policies, and so investment policy is irrelevant in the same conditional sense. No one has ever argued that investment policy is irrelevant because of costless contracting. Why not? Because it is obvious that some investment programs are better than others, and it is precisely *because* project choice matters that stockholders can benefit from disciplinary mechanisms that constrain managerial choice. It is equally obvious from Fig. 2 that some payout policies are better than others and, as with investment policy, it is precisely because payout policy matters that disciplinary constraints on managers can increase stockholder wealth. And so, if we apply the same criterion universally applied to investment policy, payout policy matters in exactly the same sense that investment policy matters when costless contracting is assumed.

In general, if takeover pressure, incentive contracts, or other disciplinary mechanisms are required to force particular choices and rule out others, then the decision under analysis cannot possibly be irrelevant. Consistent with this principle, MM's dividend and leverage irrelevance proofs invoke no such disciplinary mechanisms. In MM (1958), the "pie-slicing" nature of the leverage decision they analyze ensures irrelevance: because no feasible change in the mix of dividends versus interest/principal payments alters the total payout delivered to investors, the present value of that total payout is invariant to the debt-equity mix. Wealth redistributions aside, any decision that legitimately can be reduced to a pie-slicing exercise is irrelevant, such as the choice between dividends and stock repurchases in frictionless markets, which is the equity payout analog to the leverage choice analyzed in MM (1958). However, the choice between "generous" and "niggardly" distributions posed by MM (1961) is by nature *not* reducible to a pie-slicing exercise. The reason is that in rational markets stockholder wealth equals the discounted value of payouts and, with retention allowed, the size of the pie delivered to stockholders varies with alternative payout/retention policies that could be chosen.

MM's (1961) irrelevance theorem has led to the mistaken belief that payout policy is *automatically* optimized as long as the firm chooses a value-maximizing set of investment projects. Automatic optimization of payout policy does occur in MM (1961), but only because they mandate 100% FCF payout. With retention allowed, payout of the full PV of FCF no longer happens automatically and so optimizing payout policy requires an extra step beyond selecting an optimal investment program. Two optimality conditions are necessary for stockholder wealth maximization: managers must *both* (i) select projects that generate an overall cash flow stream with maximal attainable NPV, and (ii) distribute the full present value so generated (over the life of the enterprise) to currently outstanding shares.[7] With retention admissible, condition (ii) is not satisfied automatically when (i) is satisfied

[7]These conditions follow MM (1961) and assume the firm is unlevered. For a levered firm, optimal payout policy continues to require distribution of the full PV of FCF, but (ii) must be modified to stipulate that part of the value of FCF flows to debtholders and that the full remainder flows to currently outstanding shares.

because there is nothing inherent in project choice that forces the firm to distribute the full PV of FCF generated by that choice.

Payout policy matters in infinite horizon models of the payout/retention decision because, with no final date for possible "settling up," many feasible policies fail to distribute the full PV of FCF. It also matters in finite horizon models because arrival at the final date does not automatically trigger full payout. (If finite horizon models did necessitate payout of the full PV of FCF, they would be inappropriate for analyzing agency costs, which they obviously are not since the principal/agent literature is dominated by finite horizon models.) Full payout requires an *action* on the part of managers beyond any decisions they make about project choice, and that action is not automatic at the last date in a finite horizon model (or at any other time). We are not arguing that managers *will* fail to distribute full value, only that they *could* do so and therefore the choice of payout policy matters.

Objection #6: If managers select a payout policy that fails to distribute the full PV of FCF to currently outstanding shares, they have essentially changed the firm's investment decisions, and so the associated wealth loss for stockholders is attributable to selection of a suboptimal investment policy, and not to payout policy. Therefore, investment policy alone determines value and payout policy is irrelevant.

Rejoinder: This is a semantic trick to resuscitate the conclusion that investment policy alone determines value by *defining* payout policy-related changes in value as elements of investment policy, e.g., by defining the value loss from a failure to distribute project-generated cash as due to a sub-optimal investment policy. If all value-relevant actions are *defined* as investment choices, then investment policy is tautologically the sole determinant of value and there was no need for MM to provide a formal theorem and detailed analytical proof to establish that "result."

Irrelevance follows as a meaningless tautology when payout policy is *defined* to remove the choice of distributing less than full value to stockholders. Mandatory payout of the full PV of FCF, whether in the last period of a finite horizon model or at any other date, simply restricts the set of feasible policies to those that are optimal, and is the retention analog to MM's mandated 100% FCF payout every period. In such cases, stockholders are certainly not indifferent to receiving less than full value, rather the model employed simply defines such suboptimal outcomes as impossible. Similarly, if one defines any failure to distribute full value to be the selection of a suboptimal investment policy, the principle that "only investment policy counts" becomes tautological because the expanded definition of investment policy includes all decisions that affect stockholder wealth.

Objection #7: You claim that payout policy and investment policy are both first-order determinants of value, i.e., that investment policy is not the only important value driver. Yet, there can be no distributions without investment returns (ignoring the return of capital contributions). Therefore, investment policy is the fundamental value driver, and payout policy is at best of second-order concern.

Rejoinder: It is certainly true that there can be no economically meaningful distributions without investment returns. It is also true that the NPV rule for investment policy is specified without reference to payout policy, whereas the payout

optimality condition is specified relative to investment policy, i.e., pay out the full PV of FCF. And so it might appear that payout policy depends on investment policy, but that investment policy does not depend on payout policy. But this is incorrect, since it ignores the fact that rational investors will fund companies only if their expected future payouts are at least as great in PV terms as their capital contributions. Payout and investment policy must both be optimized to generate maximal wealth for current stockholders (and this optimization enables firms to raise funds at the lowest cost, fund all attractive projects, and provide a stream of payouts with the greatest attainable value).

In sum, MM's conclusion that payout policy is irrelevant and investment policy alone determines value follows from their assumptions that preclude FCF retention and, when retention is allowed, payout and investment policy are both value-relevant. This finding removes the fundamental disconnect between standard Fisherian theory and managers' pervasive belief that payout policy matters (Brav et al., 2005). It also implies that, contrary to the MM irrelevance theorem, the Fisherian model is not devoid of content as either a prescriptive or predictive theory of payout policy. Normatively, the unequivocal payout message for students and managers is to pay out the full present value of FCF to currently outstanding shares. As a positive theory, the Fisherian model is empirically refutable and predicts that managers will distribute this full value. The principle that optimal payout policy requires large payouts in present value terms has fallen by the wayside in favor of the mistaken idea that MM (1961) prove that "anything goes" with respect to payout policy—a viewpoint that, as we discuss in Section 5, led Fischer Black (1976) astray in his classic formulation of the "dividend puzzle."

4. Agency costs, stock bubbles, and what the market "really" capitalizes

What if agency costs are material and managers do not act in the interests of stockholders, as in Jensen and Meckling (1976)? With agency costs, the investment-payout opportunity set managers face is *identical* to that in the standard Fisherian model, i.e., the feasible set in both theories is Fig. 2's shaded region (or, more precisely, the uncertainty model equivalent of that region). The difference is that standard theory assumes that managers select value-maximizing policies, whereas agency theory assumes that managers distort project choice and fail to distribute full value. Thus, Jensen's (1986) free cash flow theory predicts that managers choose policies whose payouts fall strictly in the interior of Fig. 2's shaded region, whereas the standard Fisherian model predicts that managers choose policies on the frontier. Since both paradigms assume rational expectations, agency theory and the standard finance model both predict distributions above V_2V_1 in Fig. 2, thus both can be differentiated from behavioral models in which investors irrationally provide equity infusions in return for expected distributions that, under rational forecasts, plot below V_2V_1 in Fig. 2.

The shaded area in Fig. 2 is determined by the magnitude of the economic rents associated with the idealized (value-maximizing in the absence of agency problems)

investment program for the firm. The larger those rents, the bigger is the shaded area and the greater is the potential for agency problems that generate substantial value losses.[8] This suggests that agency pressures for cash disbursement are especially important for firms that earn substantial economic rents. Obviously, pursuing this point would take us too far afield, but it does illustrate that useful new ideas can emerge from recognizing that the incentives for cash payouts in the standard Fisherian model are intimately related to the incentives for payouts in free cash flow theory.

Fig. 3 shows that MM's (1961) irrelevance theorem does not, as commonly believed, overturn the conventional pre-MM view that increasing a firm's payout increases stockholder wealth. The figure plots the relation between stockholder wealth at $t = 0$ and the firm's capitalized payout ratio (CPR), defined as the ratio of the PV of the distributions to shares outstanding at $t = 0$ to the PV of FCF. Only those payout policies that lie on W_2W_1 in Fig. 2 entail full payout of FCF to shares outstanding as of $t = 0$ and thus have $CPR^* = 1$. All other feasible policies imply lower current stockholder wealth and $CPR < 1$. As long as the firm is constrained to payout policies with $CPR^* = 1$, i.e., constrained to distribute the full PV of FCF as in MM's irrelevance proof, payout policy has no impact on stockholder wealth.

Payout policies with $CPR < 1$ are strictly suboptimal in the same sense that leverage policies are suboptimal when they do not plot at the top of the value-leverage curve in "trade-off" theories of capital structure—i.e., they are feasible policies that will not be adopted by value-maximizing managers. When $CPR < 1$, any variation in payout policy that increases the firm's CPR increases stockholder wealth (because it delivers a distribution stream with larger PV). Thus, MM's analysis does *not* universally refute the traditional practitioner intuition that increased payout means increased stockholder wealth. Rather, MM simply shrink the payout policy choice to a tiny region of the feasible set for which conventional wisdom does not apply because their assumptions force firms to pay out 100% of FCF. The modern version of the traditional view is agency theory, which holds that most publicly traded firms operate at $CPR < 1$, so that a payout increase does increase stockholder wealth.

MM (1961, Section II) conclude that the long-standing controversy over what the stock market "really" capitalizes is essentially empty because the discounted value of cash flows from investment policy (grouped a variety of different ways) must equal the discounted value of distributions to currently outstanding shares. Although MM's "equivalence principle" is widely believed to hold universally for all payout policies, it actually holds only for those that distribute full value, as is easily seen from Fig. 3. Specifically, when $CPR < 1$, as it does in the agency equilibrium, distribution value (the PV of payouts to currently outstanding shares) falls strictly below investment value (the PV of FCF), and the equivalence principle fails. When

[8]If a firm has only zero-NPV projects (zero economic rents), it cannot raise sufficient equity capital to fund its full desired investment outlay unless investors believe that payout policy will distribute the full PV of FCF. In this case, the capital market will constrain the firm to policies along W_2W_1, since any other policy will fail to elicit the necessary capital, and both investment and payout policy are irrelevant.

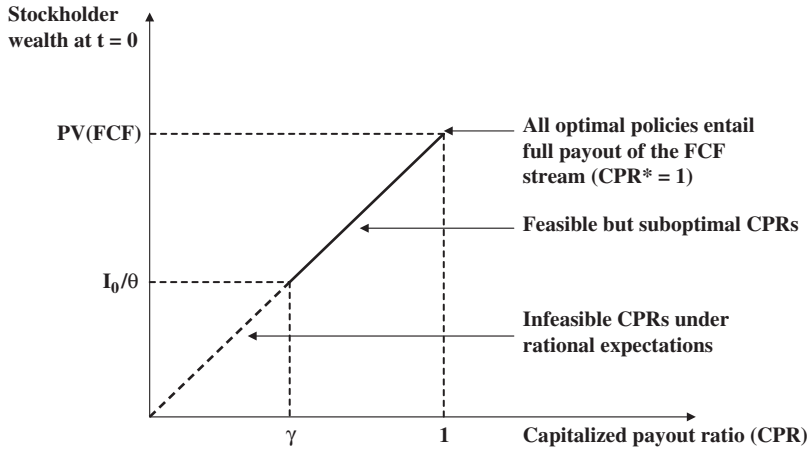

Fig. 3. Stockholder wealth and a firm's capitalized payout ratio. The capitalized payout ratio, CPR, is bounded between 0 and 1 and is defined as the ratio of the present value of the stream of distributions paid to the shares outstanding at $t = 0$ divided by the present value of the firm's free cash flow stream. All payout policies on the efficient frontier W_2W_1 in Fig. 2 provide distributions with a present value equal to that of the free cash flow stream (denoted PV(FCF)) so that these policies map into Fig. 3 at $CPR^* = 1$. Payout policies in Fig. 2 that plot on any line parallel to W_2W_1 but strictly within the region OW_2W_1 have equal present values that imply $CPR < 1$, since they entail distributions to currently outstanding shares whose present value falls below that of the free cash flow stream. As these parallel "iso-value" lines in Fig. 2 move closer to the origin, CPR falls closer and closer to 0. When CPR falls below the critical level, γ, that corresponds to payout policies along V_2V_1 in Fig. 2, rational investors will not supply the level of outside equity that the firm seeks to generate the desired FCF stream. If, as in MM (1961), the firm must distribute 100% of FCF in every period, all feasible payout policies have $CPR^* = 1$ and therefore yield the maximum feasible stockholder wealth. When distributions of less than 100% of FCF are feasible, the choice of payout policy matters, and policies that have $CPR < 1$ are strictly suboptimal, while all policies that plot on W_2W_1 in Fig. 2 have $CPR^* = 1$. Stockholder wealth increases monotonically as the capitalized payout ratio increases from γ to 1.

$CPR^* = 1$, distribution and investment values are equal and the equivalence principle holds because the chosen payout policy distributes the full value of FCF.

With rational expectations, the stock market "really" capitalizes distributions because investors value securities only for the payouts they are expected to provide. Earnings matter, of course, since you can't create distributions out of thin air (see the Rejoinder to Objection #7 above), but distribution value can fall short of investment value due, e.g., to managerial appropriation of FCF and, when it does, the stock market value equals the capitalized value of expected payouts. And so, at the most fundamental level, stockholder wealth is determined by payout policy, with investment policy relevant because it determines the *capacity* to distribute cash. Since value is generated for investors only to the extent that this capacity is transformed into actual payouts, selection of an optimal payout policy is necessary to ensure that the discounted value of distributions equals the discounted value of investment cash flows.

Does payout policy matter when MM's fair pricing assumption is relaxed to allow stock bubbles in which the firm's share price exceeds the discounted value of its payouts? Yes, and for a reason beyond that in Section 3: because some payout policies enable current stockholders to capture more of the rents from issuing overvalued equity. Consider MM's exercise in which the firm acts as an intermediary between investors by selling equity to fund a payout to currently outstanding shares, except now also assume that the firm has no assets and therefore no FCF. In a stock bubble, this firm's equity value exceeds the zero value implied by "fundamentals" (i.e., the discounted value of fully distributed FCF). From current stockholders' perspective, the optimal strategy is for the firm to issue as much equity as possible[9] and immediately distribute all proceeds to them. Immediate distribution captures 100% of the bubble rents for current stockholders, whereas retention forces current stockholders to share those rents with new investors. In a bubble, MM's (1961) strategy of issuing stock to fund immediate payouts is an arbitrage wealth pump for current stockholders, who therefore strictly prefer greater current payouts.

With agency problems, managers have incentives to retain the proceeds from the sale of overvalued stock and use them to their personal advantage, rather than distribute them to current stockholders. Jensen's (2005) analysis of the agency costs of overvalued equity details a variety of ways that opportunistic managers can exploit material over-valuation of shares to fund policies that damage stockholders. From stockholders' perspective, such managerial opportunism is strictly inferior to a policy of full distribution, reinforcing the conclusion that not all payout policies are equivalent in a stock bubble.

5. The MM irrelevance theorem and Black's "dividend puzzle"

Black (1976) argues that firms should distribute little or no cash to stockholders once payout taxes are introduced to an otherwise frictionless model, a prediction strongly contradicted by the substantial taxable distributions actually made by firms. Black's "dividend puzzle" relies on his interpretation of MM (1961) as showing that low payouts are optimal, albeit not uniquely so, absent taxes. Thus, he reasons, zero or near-zero payouts should be strictly preferable once payouts are taxed (our footnote 1 details his logic). Black's line of reasoning seems plausible by analogy with the Modigliani and Miller (1958, 1963) leverage analysis, which shows that absent taxes all leverage decisions imply identical stockholder wealth, and that maximum leverage becomes strictly optimal when corporate income is taxed.

Reasoning by analogy with the MM leverage analysis is inappropriate, however, because payouts cannot be reduced to consistently near-zero levels without

[9]This logic implicitly assumes that managers will strategically constrain the quantity of stock sold and associated payouts since, if the firm increases stock offerings/current payouts without limit, managers risk bursting the bubble. Of course, investors can extract bubble rents via short sales (which must also be limited or the bubble will burst). The firm's intermediation strategy (issuance plus immediate payout) is likely superior to short-selling by individuals because the firm does not have to cover a short position if share prices continue to increase.

destroying stockholder wealth. If firms respond to payout taxes in the manner Black recommends, the value of equities will collapse to near-zero levels and firms will only be able to raise trivial amounts of capital. When investors are taxed at rates τ_{p1} and τ_{p2} on payouts received at $t = 1$ and $t = 2$, the rational expectations condition that governs minimum feasible payout policies applies on an after-tax basis:

$$V_0 = \frac{(1-\tau_{p1})D_1^0}{(1+r_{01})} + \frac{(1-\tau_{p2})D_2^0}{(1+r_{01})(1+r_{12})} \geqslant I_0/\theta. \tag{3}$$

Condition (3) dictates that payout policies with low or near-zero future distributions are infeasible if the firm seeks to raise substantial external equity at $t = 0$. Only if the level of taxation is confiscatory, with τ_{p1} and τ_{p2} in the neighborhood of 1, will distributions be eliminated and, in this case, equity-financed corporations will disappear because shares that yield trivial after-tax payouts are essentially worthless.

With payouts taxed, rational investors will not purchase shares whose expected after-tax distributions have a present value below their initial cost. With low or near-zero payout policies thus infeasible, Black's argument that payout taxes should largely eliminate cash distributions is incorrect. The conditions for optimal payout policy mirror those in Section 3, but with distributions to stockholders now specified on an after-tax basis: the firm should adopt investment and payout policies that maximize the current market value of the after-tax distributions to currently outstanding shares.

Although payouts must be large in present value terms, is it possible that the tax-efficient optimal policy for firms is to defer payouts for as long as possible, making one or a few massive distributions far in the future? Yes, it is possible, but it is unlikely unless firms can avoid immediate payout taxes while satisfying aggregate consumption demand in other ways. DeAngelo (1991, Section I) considers an airtight tax code through which all current payouts to stockholders are taxed without fail. He applies Miller's (1977) logic to show that market prices adjust to encourage firms to distribute cash to meet immediate aggregate consumption demand, even when retention implies both that no current taxes are due (because nothing is paid out today) and that future payouts escape taxation. DeAngelo's argument is analogous to the standard price theory analysis of a unit tax on production under perfect competition. The tax raises the marginal cost of an immediate payout, which reduces the market-clearing quantity, but not to near-zero levels because in the aggregate investors typically demand substantial consumption in each period (since consumption claims at different dates are by nature imperfect substitutes).

If consumption demand can be satisfied in other ways by firms that circumvent the payout tax, the equilibrium unravels and firms will make massive payouts to stockholders at some point in the far distant future. For example, suppose the tax authorities allow firms to make unlimited zero-interest rate (non-taxable) loans to current stockholders at each date until some distant horizon, T. Firms will use such loans to satisfy consumption demand at each date prior to T. At date T, stockholders will repay the loans and immediately receive liquidating distributions from firms, which owe no corporate tax at this or any other date, since the interest

rate on the loans is zero. Of course, the IRS is unlikely to sit idly by if such tax-evasion strategies enable firms and investors to avoid billions of dollars in taxes. And so the most plausible tax-based model lies somewhere between the airtight tax code analysis of DeAngelo (1991) and unfettered tax deferral. In the middle ground, firms make some taxable payouts in periods prior to T, but also engage to some degree in retention strategies that reduce the overall tax bite on the unequivocally large (in present value terms) distributions they must provide to maximize stockholder wealth.

But Fischer Black was not puzzled about the extent to which firms adopt reasonable strategies to temporarily defer some taxable payouts to stockholders. Rather, he was puzzled that firms make *any* taxable payouts at all given the MM (1961) result that, in the absence of taxes, firms can largely avoid doing so forever without reducing stockholder wealth (see our footnote 1). Black began his article with the question "Why do corporations pay dividends?" and ended with the answer "We don't know." Had he followed his opening question not with a statement that dividend policy is irrelevant in frictionless markets, but with recognition that "value maximization requires firms to distribute the full PV of FCF," he surely would not have found large taxable payouts puzzling, although he (and the rest of us) would probably have continued to wonder why tax-advantaged repurchases don't constitute a larger portion of the massive taxable payouts that firms must deliver in order to maximize stockholder wealth.

6. Summary and implications

Contrary to Miller and Modigliani (1961), payout policy is not irrelevant and investment policy is not the sole determinant of value in frictionless markets. MM's assumptions force 100% FCF payout, thereby restricting the feasible set of payout policies to those that are optimal and eliminating the value-relevant payout/retention decision from consideration. When MM's assumptions are modified to allow retention with the NPV of investment policy fixed, payout policy matters and investment policy is not the sole determinant of value because some now-feasible payout policies distribute less than the full PV of FCF. Because irrelevance is a property of the opportunity set ("all feasible decisions are optimal"), payout policy (like investment policy) remains relevant in the standard Fisherian model, even though that model's value-maximization assumption ensures that managers will never make suboptimal payouts (or take negative-NPV projects). In short, payout policy inherently affects stockholder wealth, and not only when it affects project choice or because of market imperfections such as personal taxes.

Although MM (1958, 1961) deserve enormous credit for providing the foundational framework for modern corporate finance theory, more than 40 years later a needless disconnect still exists between the perceived implications of the Fisherian model and the beliefs of corporate managers, investors, and students. From day one, the MM principle that "only investment policy counts" met resistance from practitioners who believed that payout policy also matters. Miller

(1986) provides an entertaining description of the resistance he encountered at his December 1958 dividend irrelevance lecture at a large Wall Street brokerage house, which was interrupted by news of AT&T's first dividend increase in 30 years and an immediate 10% jump in share price. Brav et al.'s (2005) "Payout Policy in the 21st Century" documents that, to this day, managers pervasively believe that payout policy matters. Our paper shows that there is in fact no contradiction between the standard Fisherian model and practitioner intuition. The apparent contradiction arises because MM's assumptions artificially rule out retention and, once retention is allowed, payout policy matters exactly as most managers believe it does.

By its very nature, the central payout/retention choice cannot be reduced to a "pie-slicing" exercise that conserves stockholder wealth, and so optimal payout policy entails distributions that are large in present value terms. This is true for value-maximizing managers in frictionless markets and it is also true with agency costs or with factors that encourage retention such as personal taxes, flotation costs, and Myers and Majluf (1984) asymmetric information problems. The existence of benefits to retention does not change the principle that shares have value only for the overall net-of-tax distributions delivered to stockholders, and so all benefits to retention must eventually be dominated by incentives for distribution. For example, in Myers and Majluf, the firm's strict incentive to retain resources and build financial slack to fund future projects must eventually be superseded by the incentive to distribute cash because equity is valuable only to the extent that it offers the legitimate expectation of future payouts.

The MM dividend irrelevance theorem is responsible for the common belief that the standard Fisherian model is devoid of empirical content, i.e., is consistent with any payout policy a firm could possibly choose. Since payout policy is not irrelevant once retention is allowed, the standard model is empirically refutable, predicting that firms adopt payout policies that distribute the full PV of FCF. This testable prediction differentiates the standard model from Jensen's (1986) agency theory, which predicts that managers distribute less than full value, so that higher payouts increase stockholder wealth. The agency problems identified by Jensen (1986) do not create the need for firms to distribute FCF to make stockholders better off—that need is *always* present. What agency costs do is create pressure for *accelerated* payouts because retention increases managers' opportunities to expropriate stockholders.

Viewed in this light, the arguments advanced here practically beg for a "trade-off" theory of payout policy that incorporates flotation (and other) costs that encourage retention and agency costs that discourage it, and that assigns a central role to the need to distribute FCF and to the evolution of the investment opportunity set (as in Fama and French, 2001; Grullon et al., 2002; and DeAngelo et al., 2006). In their early years, firms' investment opportunities generally outstrip their ability to generate internal capital, hence firms raise outside equity and pay no dividends. In later years, firms' ability to generate internal equity outstrips their profitable investment opportunities and agency problems come to the fore, so that firms pay dividends and repurchase stock to mitigate opportunities for free cash flow wastage.

The trade-off theory is grounded in the premise that the need to deliver FCF to stockholders drives optimal payout policy, and that the ideal time profile of payouts balances flotation cost savings and other advantages of internal capital against the agency problems that manifest as retained earnings accumulate and investment opportunities decline.

MM's (1961) dividend irrelevance theorem has conditioned generations of researchers to view payout policy as a "poor sister" to investment policy. Because payout policy is tagged with the dismissive irrelevance label—with its fallacious implication that "anything goes"—researchers bypass the standard Fisherian model in favor of models that use signaling motives, clientele demands, and behavioral biases to generate empirically refutable payout theories. In fact, the Fisherian model predicts distribution of the full PV of FCF, and it is doubtful that signaling, clientele, or behavioral models could yield a comparably plausible explanation for the large scale and concentration of payouts observed in the world (DeAngelo et al., 2004, Section 7). Finally, the mistaken idea that investment policy alone determines value has long been the central organizing principle in how the profession approaches corporate finance problems. As such, it has focused research attention on the determinants of the firm's *capacity* to distribute cash, while distracting attention from the complementary and equally essential aspect of value creation, namely the extent to which the firm's payout policy translates that capacity into actual distributions to investors.

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