

Some Fallacies in Corporate Finance: A Coasean Perspective

Varouj A. Aivazian* and Jeffrey L. Callen**

*Department of Economics and Rotman School of Management

University of Toronto

varouj.aivazian@utoronto.ca

**Rotman School of Management

University of Toronto

callen@rotman.utoronto.ca

Some Fallacies in Corporate Finance: A Coasean Perspective

Abstract

This paper argues that the M&M Irrelevance Theorem is subsumed by the Coase Theorem. This insight leads us to critique two fundamental results offered by the corporate finance literature. Specifically, we reject the claim by DeAngelo and DeAngelo (2006) that dividends are relevant in frictionless markets. In addition, we reject the claim by Myers (1977) that corporate investment is negatively related to leverage in frictionless markets (the so-called underinvestment problem). We further argue that notions of underinvestment/overinvestment are not meaningful even in a world of positive transactions costs.

1. Introduction

Two influential corporate finance papers develop their analyses in the context of frictionless markets, that is, markets characterized by the absence of transaction costs. We contend that, in the absence of transaction costs, the implications of both papers for corporate finance are fundamentally flawed. Specifically, the claim by DeAngelo and DeAngelo (2006) that dividends are generally relevant in frictionless markets is erroneous. Their claim confounds the notion of irrelevance as is evident by reference to the Coase Theorem. In a zero transaction costs environment, the efficient equilibrium will obtain for *all* initial properties rights over free cash flows as stakeholders recontract to eliminate inefficiency, so that dividend policy is irrelevant. Indeed, we maintain that Miller and Modigliani (1961) are correct in claiming that dividends are irrelevant, no matter the firm's (initial) retention policy.

We also contend that Myers' (1977) claim that corporate investment is negatively related to leverage in frictionless markets, the so-called underinvestment problem, is incorrect. It is our contention, based on the Coase theorem, that the Myers underinvestment solution is not in equilibrium. This is because if the firm plans to underinvest because of debt overhang, shareholders and debtholders will costlessly recontract around the debt overhang until the firm undertakes the optimal investment. Finally, we argue, relying on a broader version of the Coase Theorem, that the notions of underinvestment and overinvestment, so prevalent in corporate finance, are not meaningful in a world of positive transaction costs, a fortiori in a world of zero transaction costs.

In what follows, Section 2 argues that the standard M&M (Modigliani and Miller; 1958, 1963) irrelevance proposition is implied by the more general Coase Theorem and that, under zero

transaction costs, firm value will be optimal and independent of the partitioning of stakeholder rights on the firm. Section 3 contends that DeAngelo and DeAngelo's (2006) critique of M&M's dividend irrelevance argument is not valid. Section 4 argues that the Myers underinvestment result, the negative relation between investment and debt financing, cannot be sustained in perfect markets with zero transaction costs. Section 5 further argues that the concepts of underinvestment and overinvestment are not meaningful even in a world of positive transaction costs. Section 6 concludes the paper.

2. The Coase Theorem

2.1 Irrelevance Propositions

Relating one body of knowledge to another often yields intellectual dividends both from a pedagogical point of view and in terms of potential new insights. We argue that the relationship between the Modigliani and Miller (M&M) Theorems [1958, 1961, 1963] and the Coase Theorem [1960] has not been adequately exploited and show how the Coase Theorem provides a highly useful framework for analyzing property rights in corporate finance.

Irrelevance propositions have been employed with great benefit in several branches of economics. These include, the Coase theorem (1960), the Modigliani and Miller (1958, 1961, 1963) theorems in corporate finance, the Ricardian Equivalence theorem (Barro, 1989) in public finance, and the theory of Money Neutrality (Patinkin, 1987) in monetary economics. Of these, the Coase theorem is the overarching irrelevance theory and subsumes the others; the theorem asserts that under zero transaction costs, resource allocation will be efficient, independent of

initial property rights assignments as interested parties will find it in their interest to bargain around rights assignments that undermine efficiency.¹ The Coase theorem provides a powerful benchmark, a highly useful starting point, for an analysis of an economic environment where the assumptions underlying irrelevance are ultimately violated. Dixit and Olson (2000, pages 309-10) note: “Coase’s article has been arguably the single largest influence on thinking about economic policy for the last three decades. It is one of the most — if not the most—widely cited article in recent times.” Coase (1960, 1981) has emphasized that the zero-transaction cost environment is of interest ultimately because of the light it sheds on the real world of positive transaction costs and efficient property rights structures. The strong merit of the Coase theorem is its simplicity and its generality. It ties together, and explains, fundamental facets of a diverse institutional reality. Its focus is on the transaction costs of exchanging property rights and on property rights structures that minimize these costs and enhance efficiency. In his comprehensive review of the Coase Theorem, Medema (2020) notes that Hirshleifer (1973) and Alchian and Demsetz (1973) were first in pointing out the similarities between the Coase Theorem and the M&M irrelevance theorem.^{2,3} While they are similar, as we shall see, they are not identical.

2.2 Irrelevance: Coase versus Modigliani-Miller

The essence of the MM argument is that any contractual arrangement within the firm can be costlessly and efficiently replicated through personal contracts in a perfect market (See Stiglitz 1969, Fama 1978). Quoting Fama (1978):

¹ The Theorem abstracts from wealth effects.

² In an earlier paper, Alchian (1965) also notes similarities between the two irrelevance theories.

³ Medema (2020) provides a detailed review of the literature on the Coase Theorem including criticisms and controversies surrounding the Theorem. For one such criticism, based on cooperative game theory, see Aivazian and Callen (1981, 2023). The latter study also provides a succinct review of the Coase Theorem from a cooperative game theory perspective.

“Suppose there is an optimal capital structure for the firm, but the firm does not choose this capital structure. Any investor can provide the optimal capital structure to the market by buying equal proportions of the firm’s securities then issuing the optimal proportions on personal account. If the market value of the firm were less than the value implied by an optimal capital structure, by providing the optimal capital structure to the market, the investor could earn an arbitrage profit. Since every investor has an incentive to exploit such opportunities and since exploitation is costless, their existence is inconsistent with a market equilibrium. In equilibrium, the market value of a firm is always the value implied by an optimal capital structure, irrespective of the capital structure chosen by the firm. Thus, at least with respect to its effects on the firm’s market value, any choice of capital structure by the firm is as good as any other (page 274).”

The foregoing argument relies on properties of a “perfect” market and the existence of firms. An alternative and more general argument is provided by the Coase theorem. Indeed, the M&M irrelevance proposition is implied by the Coase Theorem. The Coase Theorem states that in the absence of transaction costs, resources and property rights to resources will be allocated to their highest value use independently of the initial configuration of property rights. This is because property rights can be adjusted without cost through mutually advantageous trades among stakeholders to achieve maximum aggregate stakeholder (firm) value. Particularizing this statement to corporate financial contracts, it would read as follows: In the absence of transaction costs the aggregate value of stakeholders’—debt and equity holders’—property rights on the firm or, equivalently, firm value, is independent of the partitioning of stakeholder property rights on the firm or its capital structure. This is because the structure of stakeholders’ property rights will

be adjusted without cost by stakeholders to maximize firm value. This is nothing but the MM capital structure irrelevance theorem.

It is worth emphasizing that the Coase Theorem is bipartite. First, under zero transaction costs, optimality/efficiency obtains. Second, under zero transaction costs, neutrality obtains. By neutrality, we mean that efficiency will result *irrespective* of initial property rights. As we shall see, acknowledging the bipartite character of the Coase Theorem is important when discussing the critique of dividend irrelevance by DeAngelo and DeAngelo (2006).

Inherent in the zero transaction costs assumption are the implicit assumptions that stakeholder property rights over future contingencies, or states of nature, are complete, unambiguous, and costlessly transferable. Externalities and inefficient outcomes cannot persist in an environment with complete, unambiguous, and transferable property rights engendered by zero transaction costs. Moreover, firm financing decisions cannot lead to suboptimal production and investment decisions. To quote Alchian and Demsetz (1973):

“The well-known Modigliani and Miller theorem that the value of an enterprise is independent of its capital structure is a special application of the assumption that the cost of transacting is zero. Titles of various kinds are assigned to parts of an enterprise’s wealth and the value of these titles are no more nor less than the present value of the enterprise’s wealth potential, at least so long as entitlements are well defined, partitionable, and transferable at zero cost. Further, they will be revised and exchanged in ways that maximize the utility of their owner subject only to the constraint imposed by the wealth potential of the enterprise (page 26).”

The Coase Theorem is more general than M&M. In the Coaseian setting, individuals can trade rights directly and without cost amongst themselves and without the need for the firm or the market (Coase, 1937). Institutions are not needed to enable efficient production and exchange. Not only is the firm's financial structure irrelevant but, even more importantly, the firm itself is irrelevant. Firms and other institutions are irrelevant because economic decisions can be fully coordinated among participants without recourse to institutions. In MM's irrelevance theory the existence of the firm is taken as given so that there is an implicit assumption of positive transaction costs in MM. In that sense, the MM theory is a more limited irrelevance theory than that of Coase.

Standard rigorous formulations of the M&M capital structure propositions rely on Walrasian and Arrow-Debreu models which focus on perfect markets and prices rather than transaction costs and property rights. While the merits of the Walrasian and Arrow Debreu models are undeniably many, the Coaseian transaction cost approach is more fruitful for analyzing the efficiency of cooperative arrangements and property right structures. In particular, the Coase Theorem implies that any suboptimal policy of the firm, whether pertaining to leverage, dividends, or other policies, will be corrected through the costless trading of property rights by stakeholders aimed at eliminating mis-valuation of the firm. We will now show that the contention by DeAngelo and DeAngelo (2006) that dividends are generally relevant in frictionless markets is not correct.

3. The Robustness of Dividend Irrelevance

3.1 Dividend Relevance-The DeAngelo and DeAngelo Argument

DeAngelo and DeAngelo (2006) question the validity of the Miller and Modigliani (1961) dividend irrelevance result by claiming that dividends are generally relevant in frictionless

markets when the firm retains free cash flows. In their view, the MM dividend result is predicated on the unwarranted assumption that residual dividends are paid out fully to shareholders and that without that assumption the MM irrelevance result fails.

The essence of the DeAngelo and DeAngelo (2006) argument is best illustrated by comparing dividend irrelevance to M&M capital structure irrelevance. If the firm's capital structure (leverage mix) differs from its shareholders' preferred capital structure then, given zero transactions costs, shareholders will adjust their capital structure to their preferred mix by engaging in personal security transactions. Under zero transaction costs, personal securities are perfect substitutes for corporate securities; hence, the firm's capital structure decision will not affect any shareholder's feasible choice set (opportunity set) or shareholder wealth. Thus, in a world of zero transactions costs, capital structure decisions by the firm, whether optimal or suboptimal from shareholders' perspective, are irrelevant to shareholders.

By contrast, when it comes to FCF dividend distribution policy, the feasible choice set and, hence, shareholder wealth will be affected by the firm's FCF payout policy. Indeed, if the firm pays out less than the full FCF in the form of dividends, shareholders' feasible choice set and wealth will shrink. This is because undistributed residual dividends are the cash surplus after all positive NPV investment opportunities are exhausted, and therefore by definition have a non-positive NPV. Suppose the value of the firm when not fully distributing residual dividends is V' and that it is V'' when fully distributing residual dividends. Necessarily $V' < V''$ since the opportunity cost of retaining residual dividends—the investment returns foregone in the economy at large—is greater than the return from retaining them.

In DeAngelo and DeAngelo's (2006) own words:

“Payout policy matters when MM’s assumptions are relaxed to allow retention of FCF (Free Cash Flows) 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 (Net Present Value) 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. 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 (page 301).”

3.2 The Counter-Argument

We fundamentally disagree with DeAngelo and DeAngelo. Firm value and shareholder wealth will diminish if there is less than a full distribution of FCF. The ensuing firm under-valuation will trigger a Coaseian corrective mechanism to eliminate the under-valuation. With zero transactions costs, shareholders will costlessly recontract among themselves and with other stakeholders around the firm’s suboptimal dividend policy. The Coaseian mechanism will bring about a full distribution of FCF and raise firm value to its maximum. In short, less than full distribution of FCF is not a sustainable equilibrium with zero transactions costs.

Although DeAngelo and DeAngelo clearly understand the latter argument, they then proceed to fundamentally confound the meaning of irrelevance. Irrelevance was never about the firm's investment policy (the first statement in the Coase Theorem that investment will be efficient in a zero transaction costs framework). Rather, in the context of dividends, irrelevance is about the neutrality of *initial* property rights to FCF in a world of zero transaction costs (the neutrality statement of the Coase Theorem). The initial property rights to FCF are irrelevant, because whether they are to be paid out (partially) as dividends or retained in the firm, stakeholders will recontract around these initial property rights so that all FCF will optimally be paid out as dividends. Complete distribution of residual cash flows would occur because if the firm should decide to retain FCF, stakeholders would costlessly reconstitute the firm or let their stake in the firm be acquired by outsiders who would then proceed to adopt the optimal full distribution policy. The latter would yield a value-enhancing positive-sum rearrangement. In short to paraphrase Fama (1978), at least with respect to its effects on the firm's market value, any initial choice of dividend policy by the firm is as good as any other because all choices will result in the optimal full FCF distribution policy.

The bottom line is that DeAngelo and DeAngelo (2006) are simply incorrect when they maintain that payout policy matters when M&M's assumptions are relaxed to allow the (suboptimal) retention of FCF on the grounds that there is no longer a one-to-one correspondence between feasible and optimal policies. If the firm initially adopts a feasible but sub-optimal dividend policy by retaining FCF, stakeholders will be incentivized to costlessly trade or reconstruct their property rights until the optimal dividend policy that pays out all FCF obtains. Therefore, dividend policy is irrelevant because no matter what the *initial* dividend policy, even if feasible and suboptimal, rational stakeholders will force the optimal dividend policy of no FCF

retention. Thus, in a zero transactions cost environment, no matter the initial dividend policy of the firm, the no FCF retention equilibrium will obtain and so dividend policy is indeed irrelevant.⁴

3.3 The Handley (2008) Argument

In his discussion of the DeAngelo and DeAngelos' (2006) critique of the MM dividend irrelevance argument, Handley (2008) writes, "...The Miller-Modigliani irrelevance theorem does not require investment policy to be fixed at the optimal level of investment; it simply requires that investment policy be fixed at some (arbitrary) level. Importantly, once investment policy is fixed then so too is the level of agency costs borne by the stockholders of the firm" (page 530). Handley's argument, like that of DeAngelo and DeAngelo's (2006), undermines the implications of the assumption of zero transaction costs in M&M. Under zero transaction costs, firm investment is not exogenous but will adjust optimally to the NPV maximizing level. A suboptimal level of investment, implied by a less than full distribution of residual dividends, would not be sustained in the postulated zero transaction cost environment. Note as well that a partial (or full) retention of residual dividends has no bearing on agency problems since there cannot be agency problems or agency costs in a zero transaction costs M&M environment. Stakeholder rights would be completely defined and unambiguous and there would be no option for the manager to take actions that deviate from shareholders' best interests. More broadly, under zero transaction costs, there would be no scope for any suboptimal policy whether pertaining to residual dividends, or

⁴ DeAngelo & DeAngelo (2006, page 295) write: "... since investment policy is not the sole determinant of value, the familiar NPV rule for investments ('take this 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')." We disagree. It is important to remember that in a Coaseian zero transaction cost environment a mandate of NPV maximization with respect to investment, or with respect to FCF, is completely unnecessary as optimal decisions regarding both are automatically and fully implied by the wealth (and utility) maximizing objectives of firm stakeholders. An NPV rule for payouts: "Distribute the full PV of FCF to currently outstanding shares" is redundant since a full distribution of FCF is already implied by all stakeholders' wealth maximizing objectives in a Coaseian (and Miller-Modigliani) zero transaction cost world. Coaseian irrelevance implies Miller-Modigliani dividend irrelevance.

investment, or other policies since suboptimal policies would always be adjusted optimally. The M&M results will carry through. Furthermore, as discussed below, the firm itself is irrelevant in the zero transaction costs environment, which makes all dividends, residual or not, irrelevant.

3.4 The Full Implications of Zero Transaction Costs

If we pursue the implications of the zero transaction costs assumption to their limit, then in a Coaseian world the firm can be fully circumvented as stakeholders can costlessly contract with each other, without recourse to the organizational umbrella of the firm. In view of this, let us ask whether dividend irrelevance is predicated on optimal firm FCF policy. The answer is clearly no. Under zero transaction costs, economic agents (or stakeholders) can make direct and costless agreements among themselves concerning capital investment, production, financing, and interpersonal dividends, without recourse to the firm. (The concept of FCF is not meaningful in this setting). And if they are operating within the organizational structure of the firm, stakeholders can, and will, costlessly offset any “suboptimal” firm decision via direct personal agreements on dividends or real investments. Suboptimal firm decisions regarding FCF distribution, will not affect any economic agent’s feasible choice set (opportunity locus), or wealth, as personal agreements will fully substitute for contracts through the firm. Thus, dividend irrelevance emerges once the implications of zero transaction costs are taken fully into account. This irrelevance proposition is not predicated on optimal firm FCF policy, or optimal investment policy, since economic agents can achieve their preferred objectives regarding interpersonal dividends, or investment, through direct personal agreements. The existence of the firm would have no impact on economic agents’ or stakeholders’ opportunity sets, or wealth, in a zero transaction cost environment. Any decision by the firm involving real or financial choices can be fully and

costlessly replicated through individual agreements. An individual's feasible choice set is independent of all decisions by the firm.⁵

4. The Myers Underinvestment Problem

Myers (1977) argues that financial leverage may induce the firm to forego valuable investment opportunities. Myers' formulation is as follows: Suppose the firm has a potential growth opportunity next period with an investment cost I whose net present value (NPV) is state dependent. Let S denote the set of future states of the world within a complete market, and let s be an element of S , with S spanning the range of states from 0 to plus infinity. Assume states are ordered such that a higher state represents a higher NPV. Specifically, suppose that in state s_a the investment NPV=0; in states greater than s_a the NPV > 0; and in states smaller than s_a the NPV < 0. Myers argues that if the firm is all-equity financed it will undertake all positive NPV investment projects, while if it is levered it may forego some positive NPV investments, thereby yielding underinvestment. In essence, the existence of debt imposes an externality on shareholders' optimal investment decision. Below is a summary of Myers' formal model:

All equity firm (benchmark case):

For an all-equity firm, the investment breakeven state is defined by:

$$V(s_a) = I, \text{ where } s_a \text{ is the breakeven state of the un-levered firm.}$$

$$V(s) > I \Rightarrow NPV > 0$$

$$V(s) < I \Rightarrow NPV < 0$$

$$V(s) = I \Rightarrow NPV = 0$$

⁵ In such a world, FCF and dividend policy would be irrelevant in the sense of DeAngelo & DeAngelo's tenet, "To establish irrelevance, one must show that all feasible policies are optimal. To establish relevance, one must show the feasibility of at least one suboptimal policy." DeAngelo & DeAngelo (2006, page, 301).

$$V_A = \int_{s_a}^{\infty} [V(s) - I]q(s)ds$$

where V_A is the value of the all-equity firm and $q(s)$ is the price of an Arrow-Debreu security that pays \$1 in state s and nothing in any other state.

Levered firm:

For the levered firm, the investment break-even state for controlling equity holders is defined by:

$$V(s_b) = I + P, \text{ where } s_b \text{ is equity holders' breakeven state, and } s_b > s_a.$$

$$V_B = \int_{s_b}^{\infty} Pq(s)ds$$

$$V_E = \int_{s_b}^{\infty} [V(s) - I - P]q(s)ds$$

$$\begin{aligned} V_L = V_B + V_E &= \int_{s_b}^{\infty} Pq(s)ds + \int_{s_b}^{\infty} [V(s) - I - P]q(s)ds \\ &= \int_{s_b}^{\infty} [V(s) - I]q(s)ds, \end{aligned}$$

where V_L is the value of the levered firm, and P is the promised payment to debt holders.

Note that

$$V_A - V_L = \int_{s_a}^{s_b} [V(s) - I]q(s)ds$$

is the ex-ante value of “underinvestment” for states $s_a < s < s_b$ in which the firm foregoes positive NPV investment projects.

But Myers’ undervaluation result stems from a suboptimal partitioning of stakeholders’ property rights on the firm and would not be in equilibrium in a zero transaction costs economy.

This is because it is in the interest of the firm's stakeholders, namely debt and equity holders, to engage in mutually beneficial costless trading of their property rights on the firm to eliminate underinvestment incentives, and undervaluation. The increase in aggregate stakeholder value, when underinvestment incentives are fully mitigated, is $V_A - V_L$. Under zero transaction costs, there is full scope for restructuring stakeholder property rights since the rights on the firm's returns in all future states are complete, unambiguous, and costlessly transferable. Undervaluation would be eliminated through the costless trading of property rights on the firm.

Many different mechanisms can eliminate the underinvestment effect of Myers. An agreement among stakeholders that constrains shareholders ex ante to undertake positive NPV investments would be one such mechanism. Alternatively, debt and equity holders can agree ex ante to re-partition their property rights and to provide themselves with Pareto improving and optimal allocations in all states in the range $[s_a, s_b]$ —see next paragraph. Note that without such an agreement the payoffs to debt and equity in an underinvestment state in the Myers model would both be zero although investment NPV is positive. The costless ex ante restructuring of property rights would allocate, for each state in the range $[s_a, s_b]$, payoffs to debt and equity that add up to the positive NPV value in each state. Clearly, such allocations Pareto dominate those of Myers' and ensure that all positive NPV investments are undertaken. In equilibrium, under zero transaction costs, firm value will be V_A independently of initial firm capital structure, since the costless adjustment of property rights eliminates underinvestment incentives and, hence, undervaluation.

Other property rights structures that would generate allocations that Pareto dominate those of Myers include the purchase of all the firm's debt by equity holders or of the equity by the debt holders; either of these transactions represents a mutually beneficial repartitioning of rights and

overcomes ex post underinvestment incentives. Alternatively, the use of convertible debt or callable debt would provide either class of claimants the option of gaining full stake and control of the firm and again overcomes underinvestment incentives.⁶ Alternatively, an outside party can buy out all claims on the firm and undertake all positive NPV investments. The foregoing mechanisms entail the costless re-partitioning of stakeholder property rights and would generate allocations that Pareto dominate those in Myers. Thus, starting from any suboptimal partitioning of property rights there will be opportunities for the costless and mutually beneficial restructuring of property rights to enhance the aggregate value of stakeholder property rights.

If we take Myers' (1977) assumption of complete markets seriously, its implications for the optimal partitioning of stakeholder property rights would be: all equity financing dominates levered financing as it is the higher valued alternative. Therefore, the standard interpretation of the model as implying underinvestment presupposes some form of market incompleteness or transaction costs. However, even if we accepted such an interpretation of the Myers model, the resulting equilibrium would not be one of underinvestment or inefficiency. We turn next to the the issue of efficiency under transaction costs.

5. The Broader Coase Theorem and Efficiency under Positive Transaction Costs

5.1 The Broader Coase Theorem

In this section, contrary to much of the literature, we will argue that equilibria under positive transaction costs are not inefficient, and that notions of underinvestment or overinvestment are not economically meaningful.

⁶ See Aivazian and Callen (1980)

Before introducing our arguments, let us ask if it is possible to reformulate the Coase theorem for a positive transaction costs environment. Our answer is in the affirmative. Even with transaction costs and incomplete property rights, individuals will have incentives to bargain around rights assignments (even if incomplete) when there are externalities, so long as there are mutual gains from such bargains, net of transaction costs. Thus, the standard Coase theorem can be extended into a broader Coase theorem that asserts that property rights will be traded so long as the marginal benefits from trading these rights exceed the marginal transaction costs. In the limit, gains from trade will be maximized when marginal net benefits, after transaction costs become zero; this represents the efficiency condition under positive transaction costs. As Dixit and Olson (2000, page 311) note, "...Transaction costs must be taken into account in defining the Pareto frontier...If the familiar Coase theorem is true, it must also be true that rational parties in an economy will make all those trades... that bring positive net gains— that is, gains greater than the transaction costs needed to realize them." Dixit and Olson call this the "Super Coase Theorem". The implication is that if there are inter-stakeholder externalities, for example as in agency conflicts, stakeholder property right on the firm will be adjusted by joint agreement, under positive transaction costs, so long as there are mutual gains net of transaction costs.⁷

⁷Investment decisions may be affected by agency conflict among stakeholders, because of divergences between investment choices that maximize the payoffs of a sub-coalition of stakeholders and those that maximize the combined payoffs of all stakeholders. Under zero transaction costs, inter-stakeholder externalities will be fully internalized, but not under positive transaction costs. The externalities may pertain to agency conflicts between controlling and outside shareholders (Jensen and Meckling, 1976; Myers and Majluf, 1984), or between shareholders and debtholders (Myers, 1977), or between managers and shareholders (Jensen 1986, Stulz, 1990). The scope for inter-stakeholder externalities under positive transaction costs is circumscribed by the costs of contracting to constrain the behaviour of controlling stakeholders. Financial markets will induce controlling stakeholders to limit through ex-ante contractual constraints on their actions, ex-post externalities on other stakeholders. However, in general, externalities will remain in equilibrium and engender decisions, e.g., concerning investment, that differ from those under zero transaction costs.

In theories of underinvestment and overinvestment, transaction costs limit the mitigation of externalities engendered by the actions of controlling stakeholders. As the labels of underinvestment and overinvestment suggest, these theories conclude that investment outcomes will be inefficient or suboptimal; but this conclusion is based on a failure to properly account for transaction costs. The broader Coase Theorem asserts that equilibria, under positive transaction costs, are efficient as they represent situations where mutual gains from trade net of transaction costs are exhausted; in this equilibrium, the transaction costs of mitigating externalities are just offset, on the margin, by the accruing benefits. Underinvestment and overinvestment models mistakenly employ, as the benchmark of optimal investment, the level that prevails under zero transaction costs and not the level that includes transaction costs. Essentially, these models treat transaction costs as different from other costs—an invalid distinction. It is worth quoting the discussion of Demsetz (2011, page 7) on transaction costs.

“We know that, if transaction cost is assumed to be zero, the perfect decentralization model yields an efficient allocation of resources, but the model embraces positive costs of producing all other the types of goods and services. If these costs do not block the deduction of efficiency, why should the deduction be blocked by including one more type of service—the provision of a price system? Imagine, a railroad capable of shipping goods between two firms. The railroad incurs cost if it does this, and the cost may be so high that the shipment does not occur... No inefficiency has been created. If the shipment does not take place under these circumstances, for the implied gain from making the shipment is less than the cost of doing so. But, pray tell, we reach the same conclusion if we change ‘shipment cost’ to transaction cost. So, we had better re-examine Coase’s reasoning about positive transaction cost).”

Essentially what Demsetz (2011) is saying is that transaction costs are no different from factor production costs. Under positive transaction costs, externalities in an agency setting are mitigated when marginal net benefits (after transaction costs) from the adjustment of rights become zero. Aggregate stakeholder or firm value is thereby maximized, and a Pareto optimal solution obtains, as implied by the broader Coase theorem. Thus, once we properly account for transaction costs in our benchmark of optimal investment, the resulting equilibrium will be efficient and leave no room for underinvestment or overinvestment.⁸

5.2 Concepts of Underinvestment and Overinvestment Are Not Meaningful

In this sub-section, we will criticize the reasoning underlying the claims of underinvestment and over-investment as presented in Stein’s survey of the impact of agency and information problems on corporate investment (Stein, 2003). Stein’s discussion of underinvestment is presented in Section 2.1.3 and equations (1) and (2) of the paper (pages, 119-120). In his simple illustrative reduced-form model, the firm invests I at time 1 to yield a gross return of $f(I)$ at time 2, where $f(\cdot)$ is an increasing, concave function. The investment $I = e + w$ is composed of an amount w financed out of retained earnings and an amount e raised externally (debt or equity). In a first-best world, managers would seek to maximize:

$$\text{MAX } f(I) / (1 + r) - I$$

where r is the risk-adjusted discount rate, yielding the optimal investment I_1 .

⁸ It is also worth quoting Jensen and Meckling’s (1976, page 328) important warning against a non-optimality interpretation of the agency relationship: “In conclusion, finding that agency costs are non-zero (i.e., that there are costs associated with the separation of ownership and control in the corporation) and concluding therefrom that the agency relationship is non-optimal, wasteful or in efficient is equivalent in every sense to comparing a world in which iron ore is a scarce commodity (and therefore costly) to a world in which it is freely available at zero resource cost, and concluding that the first world is “non-optimal”— a perfect example of the fallacy criticized by Coase (1964) and what Demsetz (1969) characterizes as the “Nirvana” form of analysis.

Stein further extends the model to incorporate financing frictions by assuming that there are deadweight costs associated with funds raised externally given by $qC(e)$, where $C(\cdot)$ is an increasing convex function, and q is a measure of the degree of the financing friction. The firm's problem then becomes:

$$\text{MAX } f(I) / (1 + r) - I - qC(e).$$

yielding the (local) optimum I_2 , with $I_1 > I_2$ and therefore, according to Stein, suboptimal underinvestment relative to the first-best zero cost frictionless solution.

But the optimal level of investment will clearly differ in the positive transaction case compared to that of zero transaction costs. To argue that the investment level is suboptimal under positive transaction costs is to deny that transaction costs are real costs. The resources absorbed by transaction costs, e.g., search and agency costs, are as real as any input cost entailed in production. Stakeholders will optimally incur transaction costs so long as the marginal benefits from the increased investment that the transactions enable exceed the marginal transaction costs (or market frictions) of procuring investment funds and structuring, negotiating, and enforcing the contracts. At the optimum, the marginal benefits from investment will equal marginal transaction costs. To conclude, as Stein does, that the decreased level of investment is suboptimal or inefficient when there are transaction costs, and to label the situation as underinvestment, denies that transaction costs are real resource costs. This misleading conclusion illustrates what Demsetz (1969) has termed the Nirvana fallacy.

Stein's discussion of overinvestment, presented in section 2.2.1 and equation (3) (pages 121-122) is subject to a similar criticism. In this model, managers derive private benefits from gross investment output with γ measuring the intensity of agency conflict so that the firm's problem becomes:

$$\text{MAX } (1 + \gamma)f(I) / (1 + r) - I - qC(e).$$

Stein assumes that the firm objective deviates from standard value maximization as he includes a weight, or premium, γ in the objective function to account for managerial preferences. But such a formulation of the firm objective function presupposes, implicitly, positive transaction costs. We know that in a Coaseian zero transaction cost world, the objective of value maximization will be unambiguously in the interest of all stakeholders, including management, irrespective of preferences. The Fisher Separation Theorem is a special case of this Coaseian result for perfect markets. Thus, the objective function of the firm, as formulated in Stein's equation (3), presupposes transaction costs as it allows for deviations from value maximization. The first order condition for a maximum associated with the equation (3), and the resulting level of investment can, in principle, be optimal given the underlying transaction costs. In conclusion, we believe that the concepts of underinvestment and overinvestment, as presented in the extant literature, are not economically meaningful.

6. Conclusion

The strong merit of the Coase theorem is its simplicity and generality as a benchmark. It ties together, and explains, fundamental facets of a diverse institutional reality. Ultimately, its focus is on the transaction costs of exchanging property rights and on property rights structures that minimize these costs and enhance efficiency.

We initially employ the Coase Theorem to critique two fundamental insights offered by the corporate finance literature. DeAngelo and DeAngelo (2006) maintain that in a world of

perfect markets, dividends are not irrelevant contrary to Modigliani and Miller (1963). Using the logic of the Coase Theorem, we argue that the solution offered by DeAngelo and DeAngelo (2006) is not in equilibrium. Irrespective of initial property rights to cash flows/dividends, the firm will invest optimally yielding the same subsequent level of dividends. This is because investors will costlessly recontract around all suboptimal investment plans induced by a suboptimal dividend policy until optimality obtains. Thus, the initial property rights to cash flows/dividends are irrelevant, consistent with Modigliani Miller. We further argue that the Myers' underinvestment problem developed in perfect markets is also incorrect. This is because if the firm plans to underinvest because of debt overhang, shareholders will costlessly recontract around the debt overhang until the firm undertakes the optimal investment. Moreover, if we were to interpret the Myers model as implicitly assuming transaction costs, the resulting equilibrium would *not* be one of inefficiency or underinvestment.

We argue that notions of underinvestment/overinvestment are not meaningful even in a world of positive transactions costs. This because transactions costs are fundamentally no different from any other factor input costs and to treat them differently is to succumb to the Nirvana fallacy (Demsetz, 1969). In fact, once we properly account for transaction costs in our benchmark of optimal investment, the resulting equilibrium will be efficient and leave no room for underinvestment or overinvestment. Although we usually view the Coase Theorem in a world of zero transaction costs as a benchmark against which to measure economic activity in a world of zero transactions costs, a more meaningful benchmark would recognize that positive transactions costs are essential to determining the benchmark. A more meaningful and more expansive Coase Theorem that does just that would state that in a world of transactions costs,

property rights will be traded so long as the marginal benefits from trading these rights exceed the marginal transaction costs. In the limit, gains from trade will be maximized when marginal net benefits, after transaction costs become zero.

REFERENCES

- Aivazian, Varouj A, and Jeffrey L. Callen. 1980. Corporate Leverage and Growth: The Game-Theoretic Issues, *Journal of Financial Economics* 8, 379-399.
- Aivazian, Varouj A. and Jeffrey L. Callen 1981. The Coase Theorem and the Empty Core. *Journal of Law and Economics* 24, 175-181.
- Aivazian, Varouj A. and Jeffrey L. Callen. 2023. The Coase Theorem and the Empty Core: Inspecting the Entrails After Four Decades. *International Review of Law and Economics*, March 2023, 73.
- Alchian, Armen. 1965. Some Economics of Property Rights. *II Politico*, 30(4), 816-829.
- Alchian, Armen and Harold Demsetz. 1973. The Property Rights Paradigm. *Journal of Economic History* 33 (1):16-27.
- Barro, Robert. 1989. The Ricardian Approach to Budget Deficits. *The Journal of Economic Perspectives*, 3 (2): 37-54.
- Coase, Ronald H. 1937. The Nature of the Firm. *Economica*, 1937, 4 (16): 386-405.
- Coase, Ronald H. 1960. The Problem of Social Cost, *Journal of Law and Economics* 3, 1-44.
- Coase, Ronald H. 1981. The Coase Theorem and the Empty Core: A Comment. *Journal of Law and Economics* 24: 183-87.
- DeAngelo, Harry and Linda DeAngelo. 2006. The Irrelevance of the MM Dividend Irrelevance Theorem. *Journal of Financial Economics* 79, 293-315.
- Demsetz, Harold. 1969. Information and Efficiency: Another Viewpoint, *Journal of Law and Economics* 12, 1-22.
- Demsetz, Harold. 2011. The Problem of Social Cost: What Problem? A Critique of the Reasoning of A.C. Pigou and R.H. Coase. *Review of Law and Economics*. 2011, 1-13.
- Dixit, Avinash, and Mancur Olsen. 2000. Does Voluntary Participation Undermine the Coase Theorem? *Journal of Public Economics* 76, 309-335.
- Fama, Eugene F. 1978. The Effects of a Firm's Investment and Financing Decisions on the Welfare of its Security Holders, *American Economic Review* 68, 272-284.
- Handley, John C. 2008. Dividend Policy: Reconciling DD with MM, *Journal of Financial Economics* 87 (2), 528-531.
- Hirshleifer, Jack. 1973. Exchange Theory: The Missing Chapter. *Economic Enquiry*, 11 (2):129-146.

Jensen, Michael C., and William H. Meckling. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics* 3, 305-360.

Jensen, Michael C. 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review*. 76: 323-329.

Medema, S.G. 2020. The Coase Theorem at Sixty, *Journal of Economic Literature*, 58 (4), 1045-1128.

Miller, Merton H., and Franco Modigliani. Dividend Policy, Growth, and the Valuation of Shares. *The Journal of Business*. 34 (4), 411- 433.

Modigliani, Franco and Merton H, Miller. 1958. The Cost of Capital, Corporation Finance, and the Theory of Investment, *American Economic Review* 48, 261-297.

Modigliani, Franco and Merton H. Miller. 1963. Taxes and the Cost of Capital: A Correction, *American Economic Review* 53, 433-443.

Myers, Stewart C. 1977. Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, 147-175.

Myers, Stewart C. 1984. Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have. *Journal of Financial Economics*. 13 (2): 187-221.

Patinkin, Don. 1987. Neutrality of Money. *The New Palgrave: A Dictionary of Economics*. Vol.3: 639-644.

Stein, Jeremy C. 2003. Agency, Information and Corporate Investment, in G.M. Constantinides, M. Harris and R. M. Stulz (eds.), *Handbook of the Economics of Finance*, Volume 1, Chapter 2, 111-165, Elsevier.

Stiglitz, Joseph. 1969. A Reexamination of the Modigliani-Miller Theorem, *American Economic Review* 59 (5), 784-793.

Stulz, Rene. 1990. Managerial Discretion and Optimal Financing Policies. *Journal of Financial Economics*. 26: 3-27.