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The Modigliani-Miller Theorem at 60: The Long-Overlooked Legal Applications of Finance's Foundational Theorem

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The Modigliani-Miller Theorem at 60:

The Long-Overlooked Legal Applications of Finance’s Foundational Theorem

Michael S. Knoll[†]

*2018 marks the sixtieth anniversary of the publication of Franco Modigliani and Merton Miller’s *The Cost of Capital, Corporation Finance, and the Theory of Investment*, which purports to demonstrate that a firm’s value is independent of its capital structure. Widely hailed as the foundation of modern finance, their article is little known by lawyers and legal academics even though it led to many major economic advances, such as agency costs and asymmetric information, recognized and used throughout the law today. The legal profession’s lack of familiarity with these Nobel Prize-winning authors and their work is not merely an oversight; it is a missed opportunity. When inverted, the Modigliani-Miller theorem describes the mechanisms through which capital structure can affect value. This “reverse” Modigliani-Miller theorem provides a powerful framework that can be extremely useful to legal academics, practicing attorneys, and judges.*

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Introduction

In June 1958, two young economists, Franco Modigliani and Merton Miller, published an article, *The Cost of Capital, Corporation Finance, and The Theory of Investment* in the *American Economic Review*.¹ That article, which directly challenged then-conventional financial orthodoxy, is today widely acknowledged as the foundation of the modern academic discipline of finance.² Yet, the article, which is still read by nearly all economics and finance graduate students, is little known among lawyers and legal academics, many of whom have never heard of or have only a passing acquaintance with the authors' names and their work. Nonetheless, MM (as the pair of authors, their joint articles, and the theorems they contain are all colloquially referred to by economists)³ has long been implicitly used throughout the legal profession, although the debt has only been occasionally acknowledged and their work is rarely directly and knowingly applied by legal academics.⁴ That oversight is unfortunate because the first MM theorem, when reversed, provides a powerful framework with broad applications throughout the law. As the sixtieth anniversary of the publication of MM's first article approaches, it is time for the legal profession to add the reverse

1. Franco Modigliani & Merton H. Miller, *The Cost of Capital, Corporate Finance and the Theory of Investment*, 48 AM. ECON. REV. 261 (1958) [hereinafter Modigliani & Miller, *Capital*].

2. *Schools Brief: Unlocking Corporate Finance*, ECONOMIST, Dec. 8, 1990, at 81 [hereinafter *Schools Brief*]; J. Fred Weston, *What MM Have Wrought*, 18 FIN. MGMT. 29, 29 (1989) [hereinafter Weston, *Wrought*].

3. PETER L. BERNSTEIN, CAPITAL IDEAS: THE IMPROBABLE ORIGINS OF MODERN WALL STREET 174 (1992) [hereinafter BERNSTEIN, CAPITAL IDEAS]. Modigliani and Miller jointly authored two more classic articles on the irrelevancy of capital structure. Franco Modigliani & Merton H. Miller, *Dividend Policy, Growth and the Valuation of Shares*, 34 J. BUSINESS 411 (1961) [hereinafter Modigliani & Miller, *Dividends*] (arguing under certain idealized conditions that dividend policy had no impact on firm value); Franco Modigliani & Merton H. Miller, *Corporate Income Taxes and the Cost of Capital: A Correction*, 53 AM. ECON. REV. 433 (1963) [hereinafter Modigliani & Miller, *Correction*] (correcting calculations of value of tax shield provided by corporate debt when there is a corporate income tax).

4. The few explicit references in the legal literature that I am aware of are William W. Bratton & Simone M. Sepe, *Shareholder Power in Incomplete Markets* 15-17 (Inst. Adv. Studies in Toulouse, Working Paper, Nov. 1, 2017), <https://www.iast.fr/sites/default/files/IAST/conf/law/bratton.pdf>; Claire Hill, *Securitization: A Low-Cost Sweetener for Lemons*, 74 WASH. U. L.Q. 1061, 1084-1106 (1996); Peter H. Huang & Michael S. Knoll, *Corporate Finance, Corporate Law, and Finance Theory*, 74 S. CAL. L. REV. 175 (2000); Michael Knoll, *Taxing Prometheus: How the Corporate Interest Deduction Discourages Innovation and Risk Taking*, 38 VILL. L. REV. 1461, 1467 n.24 (1993); Michael S. Knoll & Daniel M.G. Raff, *A Comprehensive Theory of Deal Structure: Understanding How Transactional Structure Creates Value*, 69 TEX. L. REV. 35 (2010) [hereinafter Knoll & Raff, *Comprehensive*]; Kimberly D. Krawiec, *Derivatives, Corporate Hedging, and Shareholder Wealth: Modigliani-Miller Forty Years Later*, 1998 U. ILL. L. REV. 1039, 1058-78 (1998).

MM theorem to the lawyer's toolkit,⁵ alongside other well-known economic ideas, such as the Coase theorem.⁶

The rest of this Essay is organized as follows. After describing MM and its development, I introduce the reverse MM theorem—the idea that if capital structure matters it must work through one of the original MM theorem's assumptions. The three following sections then describe how the reverse MM theorem can be used by legal academics, practicing lawyers, and judges in their work. In each section, I provide one or more examples to illustrate how the reverse MM theorem can serve as a framework to address a broad range of recurring, but challenging legal issues. I then speculate as to why the reverse MM theorem is not already widely known and used by lawyers before offering a conclusion.

I. History

Modern business school finance departments are stocked with Ph.D.s whose scholarship tends to focus on abstract questions with real-world applications. Sixty years ago, the situation was different.⁷ Finance departments were much smaller and something of a backwater. The field lacked mathematical precision and conceptual rigor, relying heavily on accounting conventions, rules of thumb, and anecdotes.⁸ The prevailing view at the time was that the impact of leverage on the value of a firm was “complex and convoluted.”⁹ Debt was generally considered preferable to equity because it was cheaper (the stated return on debt was less than the implied return on equity¹⁰) and because interest could be deducted, whereas dividends could not; however, there was thought to be some unspecified upper limit on value-increasing debt because the risk of corporate bankruptcy and the interest rate increased with leverage. However, none of these intuitions had been formalized.¹¹

With their 1958 article, MM directly challenged the prevailing thinking that debt was cheaper than equity and that each firm had an optimal capital structure. They argued that under certain idealized assumptions the amount of debt had no

5. See, e.g., WARD FARNSWORTH, *THE LEGAL ANALYST: A TOOLKIT FOR THINKING ABOUT THE LAW* (2007) (listing and explaining more than thirty standard legal moves across economics, philosophy, psychology and other fields, but not including MM).

6. Ronald H. Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1 (1960).

7. The development of the MM theorems in the context of contemporary practice and academic understanding is colorfully described by BERNSTEIN, *CAPITAL IDEAS*, *supra* note 3, at 163-80.

8. *Schools Brief*, *supra* note 2, at 82.

9. STEPHEN ROSS, RANDOLPH WESTERFIELD, JEFFREY JAFFE & BRADFORD JORDAN, *CORPORATE FINANCE* 497 (11th ed. 2016) [hereinafter ROSS ET AL., *CORPORATE FINANCE*].

10. The implied return on equity is the inverse of the price-earnings ratio or the earnings-price ratio. According to Miller, at the time they were working on their first article, interest rates on corporate debt were around three to five percent, whereas the cost of equity capital ran from fifteen to twenty percent. Merton H. Miller, *The Modigliani-Miller Propositions After Thirty Years*, 2 J. ECON. PERSP. 99, 100 (1988) [hereinafter Miller, *Thirty*].

11. BERNSTEIN, *CAPITAL IDEAS*, *supra* note 3, at 167.

impact on firm value.¹² Expressed more confrontationally, MM averred that their finance colleagues were wasting their time and their clients' money trying to ascertain what a firm's optimal capital structure was because one capital structure was as good as any other.¹³ That idea, which is also MM's principal substantive result and is today known as the capital structure irrelevancy proposition, or more succinctly, as MMI,¹⁴ has been called "the bombshell assertion."¹⁵ As with many bold ideas, the underlying intuition is extremely simple. In an interview after Modigliani won the Nobel Prize in Economics, Miller (who subsequently won the prize, too) analogized their irrelevancy proposition to slicing a pizza. A pizza can be cut into as many slices as desired but doing so does not change the pizza's size.¹⁶ Similarly, MM argued that the firm's capital structure divides the firm's cash flows, but because it does not change those cash flows, it does not affect the overall value of the firm, which is just the present value of all of the firm's cash flows.

Although MM's main result is most intuitively expressed by analogy, they presented their argument formally. MM began their formal argument with a series of idealized assumptions. Although there are different ways to state the MM assumptions, from a lawyer's perspective, the most intuitive and helpful listing of the MM assumptions is probably as follows:

Efficient capital markets – All investors have access to the same information, which they process in the same way. As a result, all investors agree on the market value of all cash flow streams.

Frictionless markets – There are no transaction costs. Contracts can be costlessly written to cover all contingencies and can be costlessly enforced.

No taxes (or other regulations) – There are no taxes at the firm or the individual investor level. There are also no government regulations, or at least no regulations that relate to or are affected by capital structure.

Only cash flows matter – Investors care only about the cash flow generated by an investment. Alternatively, no investments generate nonpecuniary benefits, such as shelter (owner-occupied housing) or aesthetic appreciation (art).

Using only the above four assumptions, MM showed that a firm could not change its value by adjusting its leverage. MM proved their central claim by assuming the contrary result (that the firm could change its value by adjusting its

12. Modigliani & Miller, *Capital*, *supra* note 1.

13. Five years later, MM made a similar claim about dividend policy. Modigliani & Miller, *Dividends*, *supra* note 3.

14. MM derived two more theorems from MMI. MMII describes the relationship between leverage and the required return on equity. MMIII holds that the weighted average cost of capital to the firm is independent of capital structure.

15. James R. Vertin, *Editorial Board Commentary*, 20 CFA DIG. 56, 57 (1990) (appended to abstract of Weston, *Wrought* and recommending that article to subscribers because of Weston's "comprehensive review of the research that flowed from [MM's] bombshell assertions").

16. ROSS ET AL., *CORPORATE FINANCE*, *supra* note 9, at 505. In their original article, MM drew an analogy to milk. Although cream sells for more than whole milk, which in turn sells for more than skim milk, a dairy farmer cannot increase the value of the milk by separating whole milk into cream and skim milk. Modigliani & Miller, *Capital*, *supra* note 1, at 279-80.

leverage) and then showing that the result could not persist in a market with rational investors.

Because MM's capital structure irrelevancy theorem was so out-of-step with conventional thinking and practice, it was initially met with deep skepticism.¹⁷ Many thought the theorem was simply wrong: that the conclusion did not follow from the assumptions. However, after some back-and-forth and various technical corrections, economists concluded that the argument was correct as a matter of theoretical economics. Given the initial assumptions (efficient and frictionless markets, no taxes, and only cash flows matter) the result (a firm's value was independent of its capital structure) held.¹⁸ Next, skeptics questioned whether the assumptions were so inaccurate as to render the theorem true as a matter of internal logic, but not very useful. Most practicing finance professionals reached that conclusion and they largely ignored MM's work. Academic economists, however, took a different approach. For a time, many accepted the theorem as fairly accurate and turned their attention to other issues, but they did not ignore MM.¹⁹ Instead, they built modern finance upon it.²⁰

The economists, whether or not they accepted the MM capital structure irrelevancy result, mined MM's formal argument. By appealing directly to the economic principle of one price—the notion that two perfect substitutes will sell for the same price—the MM proof introduced the idea of arbitrage into financial economics.²¹ Since its introduction by MM, financial economists have been employing arbitrage arguments in order to develop new insights.²² Consider two major examples from the 1960's and 1970's. The first example is the capital asset pricing model (CAPM), which holds that investments are priced according to their market risk (typically measured by beta – β), which cannot be diversified away, not their unique risk, which can be eliminated through diversification.²³ The second example is the Black-Scholes option pricing model, which recognizes that a call option is equivalent to holding a share of the underlying

17. The journal that published MM's original article, the *American Economic Review*, published five critiques and a brief sur-reply that Miller credited with publicizing MM's methods and results. BERNSTEIN, CAPITAL IDEAS, *supra* note 3, at 175.

18. *Id.* at 174-77.

19. *See id.* at 177-80.

20. *See id.* at 181-269.

21. Arbitrage is the simultaneous purchase and sale of the same asset (or cash flow stream) in two different markets to take advantage of price differences. Profit-seeking arbitrageurs tend to eliminate arbitrage opportunities forcing prices in separate markets to equalize. Economists use arbitrage arguments to price an asset (the price of which is unknown) in terms of a second asset (the price of which is known).

22. *E.g.*, Hal R. Varian, *The Arbitrage Principle in Financial Economics*, 1 J. ECON. PERSP. 55 (1987).

23. Much of that work was done by Jack L. Traynor, William F. Sharpe, John Lintner and Jas Mossin.

stock and borrowing against that share.²⁴ Today, arbitrage is the cornerstone of financial economics. Indeed, the MM proof has been called the “watershed between old and new finance.”²⁵

Economists, however, were not finished with capital structure. After a roughly twenty-year hiatus, economists began to return to studying capital structure.²⁶ And when they did, they recognized that the MM capital structure irrelevancy proposition provided the key to understanding capital structure.

By that time, financial economists had recognized that the MM irrelevancy proposition had wide application. Given the original MM assumptions, it follows that a broad array of corporate actions, not just leverage, have no impact on firm value. Indeed, the MM assumptions imply that the value of a firm is determined solely by the firm’s investments or assets (the left side of the balance sheet), not how those investments are financed (the right side of the balance sheet). Thus, for example, the MM assumptions also imply that hedging activities, leasing versus owning, the form of legal organization, the compensation structure, the state of incorporation and the legal rules that follow, and so much more have no impact on firm value either. That suggests a tension, if not an outright conflict, between the MM capital structure irrelevancy theorem and the goal of understanding capital structure.

The key to reconciling this tension was to reverse or invert the MM irrelevancy theorem. As Miller wrote in 1988, as part of a symposium on the thirtieth anniversary of the publication of the first MM article, MM wrote their original article in order to dispel much thinking about how capital structure can affect firm value.²⁷ However, by showing which aspects of capital structure do not affect value, MM also showed how capital structure can affect value.²⁸ Thus, the power of MM is through the MM assumptions, which describe how capital structure can impact firm value. This idea is called the reverse MM theorem, and it holds that capital structure can affect the overall value of the firm only by releasing or withholding information, by decreasing or increasing transactions costs, by decreasing or increasing taxes (or the costs of other regulations), or through the allocation of assets with consumption elements. According to MM, the above is an exhaustive list of how capital structure decisions can affect firm value.

The reverse MM theorem, thus, takes the original MM theorem and turns it on its head. It replaces the idea that under certain assumptions capital structure

24. Fischer Black & Myron Scholes, *The Pricing of Options and Corporate Liabilities*, 81 J. POL. ECON. 637 (1973).

25. *Schools Brief*, *supra* note 2, at 82 (quoting Robert Merton).

26. Miller, who continued to work on capital structure during the 1960’s and 1970’s, was a notable exception to this trend. *See, e.g.*, Merton H. Miller, *The Corporate Income Tax and Corporate Financial Policies*, in STABILIZATION POLICIES 381 (1963).

27. Miller, *Thirty*, *supra* note 10, at 100.

28. *Id.*; *see also* BERNSTEIN, CAPITAL IDEAS, *supra* note 3, at 176-80; Clifford W. Smith, Jr., *The Theory of Corporate Finance: A Historical Overview*, in THE MODERN THEORY OF CORPORATE FINANCE 3, 4 (Clifford W. Smith ed., 2d ed. 1990).

does not affect the value of the firm with the idea that capital structure affects firm value only to the extent that it operates through the MM assumptions.²⁹

Starting in the 1970s, economists began to mine the MM assumptions for insights into how capital structure affects the total value of the firm. Consider the following two examples from that decade. Michael Jensen and William Meckling argued that the conflicting interests of the managers and the owners of a business generate agency costs, which the owners seek to reduce by monitoring and writing contracts that bond their employees with contingent payments.³⁰ Thus, Jensen and Meckling developed a theory of capital structure that exploits the notion that the second MM assumption, frictionless markets, is false.

Around the same time, Stephen Ross recognized that managers are usually better informed about a firm's prospects than are its shareholders. Ross argued that managers could signal to shareholders that a firm's prospects have improved by raising the firm's debt-to-equity ratio or declined by reducing that ratio. Ross argued that investors can easily read these signals, which are credible because they are costly for managers to send.³¹ Ross's article, which was the first application of signaling theory to finance, assumes that the first MM assumption, informationally perfect markets, is wrong.

The above are only two examples—albeit two very important and highly influential examples—of how capital structure can impact value. Over the last forty years, economists have developed many ideas in addition to the two above that illustrate how capital structure can affect value in situations where the original MM assumptions do not hold (Miller himself developed many of the ideas about taxes and value.³²). And some of these ideas, including agency costs and signaling, have made their way into the lawyer's toolkit. However, the work of MM, which gave birth to these ideas, and which in the form of the reverse MM theorem serves as a framework that organizes these and many other ideas, has not been incorporated. That is unfortunate because the reverse MM theorem is a powerful analytical tool with a wide range of legal applications.

29. The reverse MM theorem is the contrapositive of the MM theorem. The contrapositive of a theorem "if A, then B," is "if not B, then not A." If a theorem is true, its contrapositive must be true. The reverse MM theorem adds economic content because capital structure must affect value *through* the MM assumptions (not merely because some assumptions do not hold).

30. Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure*, 3 J. FIN. ECON. 305 (1976) [hereinafter Jensen & Meckling, *Agency*].

31. Stephen Ross, *The Determination of Financial Structure: The Incentive Signaling Approach*, 8 BELL J. ECON. 23 (1977).

32. The most well-known of Miller's solo work on taxation and capital structures is Miller's presidential address to the American Finance Association, which was published as Merton H. Miller, *Debt and Taxes*, 32 J. FIN. 261 (1977).

II. Ivy Halls: Use by Legal Academics and Policy Makers

Scholars can use the reverse MM theorem for both positive and prescriptive analyses. Positively, academics can use the theorem to understand why a particular structure is used and how it has developed and changed over time. Implicit in the exercise is the assumption that the observed structure is the structure that maximizes value. The theorem is then being used to explain why the observed practice is optimal. Scholars can also use the reverse MM theorem prescriptively to criticize existing structures and to develop recommendations for improved structures.

A. Positive Analysis

Use of the reverse MM theorem for positive analysis is sometimes explicit in finance scholarship,³³ but it is rarely explicit in legal scholarship.³⁴ Nonetheless, sophisticated legal academics frequently make arguments in the vein of the reverse MM theorem. Such arguments often take the form that some capital structure is optimal because it solves a particular informational, incentive, or tax problem, which is to say it solves a problem relating to a failure of one of the MM assumptions. Contained within that argument is usually a nod to the notion that the structure does not create or amplify other problems—that it does not increase costs relating to a failure to meet the other assumptions.

The practice of aircraft leasing, for example, can be readily understood through the reverse MM theorem. Airlines have three alternatives to fund new aircraft: equity, debt, or capital (long-term) leases.³⁵ Among the three alternatives, airlines rarely purchase new aircraft by issuing equity or using retained earnings. That is largely because equity financing is subject to two levels of taxation—first at the corporate level and then at the investor level—whereas borrowing and lease-financing incur only one level of taxation.³⁶ Thus, airlines rarely finance aircraft through equity because the tax cost, which relates to the third MM assumption, is prohibitive.

If the airline were to borrow to purchase the aircraft, the airline could depreciate the aircraft because the owner of tangible personal property is entitled

33. *E.g.*, Clifford Smith, Charles Smithson, & D. Sykes Wilford, *Financial Engineering: Why Hedge?*, in HANDBOOK OF FINANCIAL ENGINEERING 126 (Clifford Smith & Charles Smithson eds., 1990).

34. For examples in the legal literature where the reverse MM theorem is explicitly drawn upon, see sources cited in *supra* note 4.

35. The present value of the payments on a capital lease cover the cost of the equipment less the equipment's expected residual value plus the lessor's return. A capital lease, which is a financing technique, stands in contrast to a short-term or operating lease, such as renting a car while on vacation, which is typically for convenience. Operating leases can be understood through the reverse MM theorem as they avoid the transaction costs in buying and selling the leased item.

36. The tax analysis below is for the tax law before it was amended by the Tax Cuts and Jobs Act, Pub. L. No. 115-97, 131 Stat. 2054 (2017). Although some details, such as tax rates, change, the preference for long-term leases remains.

to the depreciation deductions on that property. Depreciation reduces income, and thus provides the owner of the depreciable property with a tax benefit. Moreover, aircraft are eligible for accelerated depreciation.³⁷ These favorable depreciation rules make commercial aircraft a tax-advantaged asset. Such assets are worth most to high-bracket taxpayers confident that they will have the income to take full advantage of the deductions.³⁸ Airlines, however, are not such taxpayers. The airline industry is capital-intensive (aircraft are expensive), volatile, and low-profit. Accordingly, if the airlines took all of the depreciation deductions from the aircraft they operated, they would frequently realize little or no value from doing so. Thus, the aircraft lease and its close cousin, the leveraged aircraft lease, were created in order to transfer the depreciation deductions from the airlines to other taxpayers that value them more.

In an aircraft lease, a third party takes title and leases the aircraft to the airline. The lessor as the aircraft's owner uses the depreciation deductions to offset other income. The airline benefits through a lower operating cost because the lessor accepts a reduced lease rate. In effect, the airline transfers the depreciation tax benefits to the lessor in exchange for a lower lease rate. In a simple lease, the lessor would purchase the aircraft for cash, tying up capital. Because it is the lessor's tax attributes—and only those tax attributes—that make it the preferred owner, most aircraft leases are leveraged leases. In a leveraged lease, a lender provides most of the capital required to purchase the aircraft.

For a brief period during the early 1980's, there was a practice called safe harbor leasing under which any transaction called a lease would be respected as such, even if it closely resembled a sale.³⁹ In that environment, lessors would transfer the full risk of ownership to lessees. Because lessors had no residual risk from the aircraft (which was insured during the lease), they passed nearly all of the tax benefits to lessees through lower lease rates. Later in the 1980's, the safe harbor leasing provisions were eliminated.⁴⁰ The Internal Revenue Service (Service) would then challenge parties' characterization of transactions as leases if the purported lessors had too little residual risk (under the tax law, ownership is not determined by who holds title, but rather by who has the benefits and burdens of ownership.). If the Service's challenge succeeded, it would treat the nominal lessee as owner (and hence the lessee, not the lessor, would be entitled

37. The aircraft frame has an economically useful life of twelve years but is depreciated over seven years using the declining balance method. *See* IRS, HOW TO DEPRECIATE PROPERTY (IRS Publication 946), at 106 (2016).

38. However, if an airline (or any U.S. taxpayer) has a net operating loss for the year, the government does not typically provide a tax refund. Instead, the taxpayer receives a net operating loss (NOL) carryforward. NOLs are not worth as much as current deductions because they can be used only if the taxpayer has positive income. *See* I.R.C. § 172(b)(1)(A) (2012).

39. The safe harbor was found in I.R.C. § 168(f)(8) and was enacted in title II, § 2(a) of the Economic Recovery Tax Act of 1981, Pub. L. No. 97-34, 95 Stat. 172, 203. For a critical, contemporary discussion of safe harbor leasing, see Alvin C. Warren & Alan J. Auerbach, *Transferability of Tax Incentives and the Fiction of Safe Harbor Leasing*, 95 HARV. L. REV. 1752 (1982).

40. Safe harbor leasing was repealed in 1982 as part of the Tax Equity and Fiscal Responsibility Act of 1982, Pub. L. 97-248, 96 Stat. 324.

to the depreciation deductions). Accordingly, aircraft leasing changed. Leasing remained, but lessors took on more residual risk, which created agency problems because lessees controlled the aircraft during the lease. The lease documentation became longer, and the parties and their lawyers carefully negotiated and executed the leases so as to ensure that the lessors retained the requisite amount of risk and that the resulting agency costs were controlled. Lease payments also increased in order to compensate lessors for their increased risk and their increased contracting and monitoring costs.⁴¹ Thus, the elimination of safe harbor leasing led to changes in the optimal capital structure because it changed the trade-offs across the four MM assumptions.

Although aircraft leasing can be understood without reference to the reverse MM theorem, the theorem focuses on the relevant issues—taxes and incentives—the optimal balance among which changed as the legal regime changed. Used in this way, the reverse MM theorem operates as a template to understand alternative transactional structures and their development over time.

B. Prescriptive Analysis

The reverse MM theorem can also be used to criticize inefficient capital structures and to suggest how those structures might be improved. The reverse MM theorem can be used prescriptively because it asks the right question from an economic efficiency perspective—what structure maximizes the total value of the firm—and provides a roadmap to answer that question. In corporate law, the central issue of debate has long been the allocation of control rights among corporate managers, directors, and shareholders. Because directors are typically seen as passive, the corporate governance debate is usually binary: one side argues that shareholders should have greater control rights and, concomitantly, that managers should have less. The other side makes the opposite argument: Managers should have greater control rights and shareholders should have less. The arguments are often anecdotal, but they are increasingly econometric. These competing views of the proper allocation of power between managers and shareholders play out across such issues as staggered boards, waiting periods, and takeover defenses.

The first view, the shareholder primacy position, is often described as the agency model, and it emphasizes the agency costs from having managers make decisions on behalf of shareholders. As such, the agency model is a straightforward example of a violation of the second MM assumption of frictionless markets. The latter view, the management primacy position, is sometimes described as the commitment view. Under that view, activist investors deter firms from making long-term, positive-net-present-value

41. Accordingly, lease rates today also reflect airlines' reputations for maintenance, and the agreed upon use of the aircraft because how the aircraft is used—length of flight, altitude, etc.—impacts the aircraft's and its engines' residual values.

investments that cannot be valued by the market. Thus, the commitment view is an example of a violation of the first MM assumption of informationally perfect markets. The debate usually takes the form of which approach is better—favoring managers or shareholders—which is to say whether the agency costs from manager control are greater than the costs resulting from imperfect information with shareholder control.

The reverse MM theorem suggests a different approach, one emphasizing the need for a governance structure that maximizes the total value of the firm. A third alternative that mediates between the above two polar positions is to appoint stronger, more independent directors who can identify and value investments that cannot be publicly disclosed (without losing value). Such directors would allow the firm to capture the benefits from making long-term investments not accurately valued by the market without the costs of managerial entrenchment. Hiring and empowering such directors has the potential to increase firm value above that from either polar position because it takes seriously the concerns expressed by both sides and looks to alleviate each side's concerns without exacerbating the other side's concerns. This suggestion, in essence, is Ira Millstein's proposal for activist directors who partner with management, but who also take responsibility for the corporation's strategy.⁴² As Millstein writes, he favors

a board-centric approach to corporate governance by placing more *activist directors* in the boardroom – people who will ask the tough questions, challenge management practices, and resist those who put their own agendas ahead of those of the corporation and investors like you. Choosing directors will require new diligence and care.⁴³

Millstein developed his proposal for more activist directors without appeal to the reverse MM theorem, but by drawing upon his lengthy and highly successful legal career. For those who lack the in-depth knowledge and experience that comes from decades of working at the pinnacle of the legal profession, the reverse MM theorem provides a framework that should make it easier to develop and defend efficient new forms of corporate governance and capital structure, because the theorem focuses inquiry on the relevant issues and provides a lens through which those issues can be examined and weighed.

Moreover, the observation or recommendation that directors should have more power is only the beginning of the analysis. A more thorough and detailed response would describe the additional duties directors take on, the powers they should have, and the limitations there should be on their powers. In addition, a more thorough analysis would describe how directors should be compensated and how much effort they should apply to each firm. Although I do not know the

42. See IRA M. MILLSTEIN, *THE ACTIVIST DIRECTOR* (2017) [hereinafter MILLSTEIN, DIRECTOR].

43. *Id.* at ix (italics in original).

value-maximizing answers to those questions, the path to finding them runs through the reverse MM theorem, because the theorem directs those using it to look for the structure that strikes the value-maximizing balance across the MM assumptions.

C. Summary

The reverse MM theorem categorizes and partitions the various ways that capital structure, which includes governance, can affect the total value of the firm. The reverse MM theorem takes a large collection of seemingly unrelated concepts and organizes them into categories of closely-related ideas. Once so organized, these concepts can be used and applied more easily and systematically to understand and evaluate existing financial practices and in the search for efficiency enhancing innovations. This organizational framework is of particular use to scholars because it leads them to examine the structure that maximizes value across the MM assumptions, which MM have shown is the value-maximizing structure (because everything outside of its assumptions has no effect on value). The reverse MM framework can be used both to understand capital structures and how they change over time, as with aircraft leasing, and to criticize current practice and develop new ideas, as with governance. The above examples only scratch the surface where academics can use the reverse MM theorem to understand capital structure.⁴⁴

III. Wall Street: Use by Practitioners

Lawyers who have taken a class in corporate finance would have seen the MM theorem, and if they remember it, they probably consider it irrelevant to their work. That is unfortunate because in its reverse form, the theorem can be very useful to transactional lawyers (as I show in this section) and litigators (as I show in the next section).

A. Training Lawyers

For nearly a century, transactional lawyers have been trained through the Cravath method, named for Paul Cravath, of the New York law firm Cravath, Swaine and Moore. Under the Cravath method, a junior associate would start by working on a small piece of a transaction under the supervision of a more senior associate. As the lawyer gained experience, he (and more recently, she) would move up the pyramid, taking responsibility for successively larger portions of the transaction and seeing closely at each stage how a more senior lawyer handled the next stage. The rationale for such a method of training was that good

44. When a structure is adopted for non-efficiency reasons, the reverse MM theorem can be used to estimate the efficiency cost of not choosing the most efficient solution.

transactional lawyering was more art than science, that almost everything there was to learn (beyond the directly applicable law) had to be learned through experience, by working with other lawyers, and that this craft could not be taught in the traditional fashion of most academic subjects.⁴⁵

Slightly more than thirty years ago, Ronald Gilson suggested that important aspects of the professional education of transactional lawyers did not have to be learned through an apprenticeship, but instead could be taught in the classroom.⁴⁶ Gilson asked the following questions: Why do smart, sophisticated business people hire business lawyers, and what is it that business lawyers do that makes them valuable to clients? Gilson described transactional lawyers as business or transactional engineers.⁴⁷ Moreover, those lawyers face the same types of fundamentally economic problems—dealing with incentives and imperfect information—over and over again. Although those problems arise in different situations and present themselves in different forms, ultimately there are only a small number of basic economic concepts that underlie the core work of transactional lawyers. Gilson further believed that lawyers would benefit from studying these basic economic concepts. In Gilson’s view, such an economically trained lawyer would be better able to recognize one of these issues and would have a deeper understanding.⁴⁸ Also, by identifying and understanding the issue, such a lawyer could more quickly and easily draw upon prior transactions to find an appropriate solution, modify that solution to fit the situation, and even develop new solutions when the situation demands it. Gilson then put that thought into practice by teaming with two Columbia colleagues, Victor Goldberg and Daniel Raff, and offering the first Deals course at the Columbia law and business schools.

Deals courses typically begin by introducing the students to the relevant economic concepts through the use of highly stylized examples. The course then progresses through increasingly less stylized case studies that illustrate how these issues present themselves in different legal contexts as well as some standard techniques that address those challenges. The course typically concludes with presentations by professionals of actual transactions, which are then analyzed by the students. The students’ task is to explain why the transaction was structured as it was, using the concepts covered in class. The professionals’ presentations (and the students’ analyses) are intended to reinforce the theoretical concepts covered in class by challenging the students to find and identify those issues in actual transactions, underscoring the importance

45. For a description of the Cravath model and a discussion of its economic rationale, see William D. Henderson, *The “Cravath” System: Excerpts from the Legal Profession Blog*, TEACHING LEGAL ETHICS (2008), www.teachinglegalethics.org/sites/default/files/Henderson-CravathSystem.pdf [<https://perma.cc/3QZN-X3TQ>].

46. See Ronald J. Gilson, *Value Creation by Business Lawyers: Legal Skills and Asset Pricing*, 94 YALE L.J. 239 (1984) [hereinafter Gilson, *Value*].

47. *Id.* at 253-56.

48. *Id.* at 303-06.

and ubiquity of such issues in practice, and giving the students an opportunity to see how those issues were addressed by professionals. The practitioners' presentations, however, are less successful pedagogically when the structure is driven by one or more concepts not specifically covered in class. In that case, there is an uncomfortable disconnect between the classroom pedagogy and the final presentations. Accordingly, Raff and I, after Raff left Columbia for Penn and recruited me to teach Deals with him, began using the reverse MM theorem to organize the ideas presented in the course. Because the MM assumptions span the ways transactional structures affect the value of a firm (and partition those ways into silos), the reverse MM theorem ensures that the full range of ways in which structure can affect value are at least introduced (and covered at a high level of generality) even though not all variations can be explored at length. Thus, even if a structure is largely driven by a particular issue not explicitly covered in class, the driver can be placed in one of the four MM silos and its similarities to other ideas can be drawn upon to understand the issue and its resolution.⁴⁹

Raff and I have found that there are additional pedagogical advantages from using the reverse MM theorem to organize a Deals course. Lawyers (and other transaction professionals) structure and execute transactions. Each step of the way there are choices to be made that involve trade-offs within and across the MM assumptions. The reverse MM theorem makes those trade-offs explicit. Because it provides a framework that organizes the full range of ways in which structure can affect value, the reverse MM theorem lies at the heart of transactional lawyering. A lawyer who knows the reverse MM theorem and is familiar with the main ideas in each silo is better able to understand the issues driving a transaction. In addition, the same lawyer can more quickly acquire knowledge because she is building out a framework (using the reverse MM theorem as a skeleton), and she is better able to retain knowledge because she can store it systematically, not just as a series of one-off examples. Such a lawyer can also more readily recall and employ her knowledge when a new situation arises because once she has identified and categorized the problem she can focus her search for a solution among solutions to structurally similar problems across various practice areas, rather than gravitating towards what has been done before in the same practice area.⁵⁰

The teaching of the reverse MM theorem is, thus, an example of the kind of reform for which the 2007 Carnegie Report on Legal Education called. The Carnegie Report criticized law schools for relying too heavily on post-graduation apprenticeships in order to train lawyers and recommended that law school faculty seek to identify powerful analytical frameworks that lawyers can use to

49. Knoll & Raff, *Comprehensive*, *supra* note 4.

50. *Id.* at 48. Such a lawyer would also be less likely to fall into the trap of selecting a solution that resolves a particular problem within one silo, but inadvertently causes a larger problem within another silo. Because the reverse MM theorem explicitly invites tradeoffs across silos, practitioners are encouraged to examine the impact of a structure across all four silos.

accelerate their transition from law students to successful practitioners.⁵¹ The reverse MM theorem is precisely such a framework because it captures much of what transactional lawyers do in practice, albeit at a high level of generality.⁵²

B. Practice

The applicability of the reverse MM theorem can be illustrated through some common examples from mergers and acquisitions. There are what might seem to be (especially to a new associate) a bewildering array of methods whereby one corporation (Purchaser) can acquire another corporation (Target). The basic possibilities include:⁵³ Purchaser acquires Target's assets; Purchaser acquires Target's stock; Target merges into Purchaser (forward direct merger); Purchaser merges into Target (reverse direct merger); Target merges into Purchaser's subsidiary (forward triangular merger); or Purchaser's subsidiary merges into Target (reverse triangular merger). The main result of all of these transactions is the same – Purchaser ends up owning Target's assets – but there can be very different legal and economic consequences depending upon the method chosen. The reverse MM theorem can help attorneys (especially beginning attorneys) by giving them a better and deeper understanding of the issues that drive the choice of merger-and-acquisition structure, which come down to the MM assumptions. By recognizing the trade-offs across incentives, informational asymmetries and taxes that arise with the different structuring choices, the reverse MM theorem can also help lawyers to choose an acquisition method. Indeed, as one reads sophisticated treatments by practitioners of the various options and their advantages and disadvantages, their reasons regularly relate back to and can be catalogued under the MM assumptions.⁵⁴ A young lawyer who has internalized the reverse MM theorem should find it easier to acquire, store, retrieve and apply the relevant skills and knowledge required to progress.

As another example where the reverse MM theorem can be useful, consider an example Gilson emphasized in his original article, the negotiation of representations and warranties.⁵⁵ Representations and warranties are statements of fact to which a party to a contract is attesting. Many of Target's typical representations and warranties concern Target's assets and liabilities. For example, Target usually represents to Purchaser that Target owns or has the rights to the assets that it uses in its business and shows on its financial

51. WILLIAM M. SULLIVAN ET AL., EDUCATING LAWYERS: PREPARATION FOR THE PROFESSION OF LAW 126-61 (2007) [hereinafter CARNEGIE REPORT]

52. Knoll & Raff, *Comprehensive*, *supra* note 4, at 48.

53. There are more complex methods as well.

54. *See generally* JAMES FREUND, ANATOMY OF A MERGER: STRATEGIES AND TECHNIQUES FOR NEGOTIATING CORPORATE ACQUISITIONS (1975) [hereinafter FREUND, ANATOMY]; CHRISTOPHER S. HARRISON, MAKE THE DEAL: NEGOTIATING MERGERS AND ACQUISITIONS (2016).

55. Gilson, *Value*, *supra* note 46, at 267-94.

statements. Also, Target commonly represents to Purchaser that Target does not have liabilities beyond those it has disclosed. James Freund, a retired Skadden Arps mergers and acquisition partner and the author of a classic book on mergers and acquisitions, describes the process of negotiating representations and warranties as competitive, with each attorney trying to capture more value for her client.⁵⁶ In contrast, Gilson describes the process as cooperative (or argues that it should be cooperative) because the less well-informed party (typically, Purchaser with the above representations and warranties) wants assurances that it is receiving what it is paying for and sellers have the incentive to provide this information in order to encourage buyers to pay more.⁵⁷ Thus, Gilson's view of representations and warranties fits nicely within the reverse MM theorem framework. The representations and warranties respond to a violation of the first MM assumption, perfect information, by providing Purchaser with useful information about Target and assurances as to the accuracy of that information.

What about Freund's competitive view of negotiating representations and warranties? Recall that the reverse MM theorem holds that capital structure can affect the value of the firm only through the MM assumptions, and hence the capital structure that maximizes the overall value of the firm minimizes the total cost from falling short of the assumptions. However, the lawyers negotiating a merger or acquisition (and their clients) are not only interested in maximizing the value of the deal; each side also has an interest in receiving as much value as it can. Familiarity with the reverse MM theorem can help to explain the disagreement between Freund and Gilson. The reverse MM theorem is a statement about value creation, and the total value of a transaction can be increased by providing information and assurance. The reverse MM theorem says nothing about how that value is distributed. My conjecture is that among experienced mergers and acquisitions lawyers, such as Freund, little time and energy is spent negotiating the representations and warranties that cover what the parties understand each needs. That, however, leaves more time and energy to spend fighting over the division of (expected) surplus that characterizes the rest of the negotiation.⁵⁸ Thus, a scholar reading the final document could conclude it is mostly cooperative, but the lawyer who negotiated it would say more of the time was spent in competitive negotiations. For the new associate, however, the challenge is often figuring out what is going on in the negotiations. Understanding both the value creation and value distribution exercises taking place and the role the reverse MM theorem plays with the former as well as the conflict that often arises between value creation and value distribution can help the young associate to become a more effective advocate and negotiator.

56. FREUND, ANATOMY, *supra* note 54, at 229 ("I'm willing to bet my briefcase that lawyers spend more time negotiating "Representations and Warranties of the Seller" than any other single article in the typical acquisition agreement.").

57. Gilson, *Value*, *supra* note 46, at 271-73.

58. The competitive aspect of negotiating representations and warranties is exacerbated by the usual practice of negotiating only after the price and acquisition method are set.

C. Summary

For most practicing transactional lawyers, the suggestion that much of their work is an application of the reverse MM theorem is likely to be met with either a shrug or resistance. Immersed in the details of a transaction while focused on the competitive aspects of the negotiations, it is easy to lose sight of the big picture and the scaffolding on which it stands. The reverse MM theorem is that scaffolding, and the lawyer who has internalized that theorem has a powerful framework that can be used to help to identify problems and tailor solutions for her client even in complex and novel situations. Also, because of its breadth, compactness and utility, the reverse MM theorem is a powerful pedagogical tool that can accelerate young lawyers' learning.

IV. The Court Room: Use by Judges and Litigants

Finally, one area where, to the best of my knowledge, the reverse MM theorem has yet to be explicitly applied is in litigation. In this section, I describe how the reverse MM theorem can assist judges in drafting common law rules and litigators in seeking to persuade them.

Consider, for example, the calculation of prejudgment interest. Prejudgment interest is interest that the defendant pays to the plaintiff on a judgment. Prejudgment interest accrues from the date of injury until the date of judgment.⁵⁹ Federal law does not provide for a particular fixed or floating prejudgment interest rate, nor does it explicitly call for a specific method of calculation. Instead, the federal courts have sought to award prejudgment interest at a rate that will compensate the successful plaintiff for delay. According to the economics-based coerced loan theory, a successful plaintiff should receive prejudgment interest at the defendant's unsecured borrowing rate. The rationale is that the defendant, through its wrongful action, has forced the plaintiff to make a loan to the defendant, which debt would be treated as an unsecured debt in the event of defendant's bankruptcy. Accordingly, in order to compensate the successful plaintiff for the risk of not being able to collect its judgment, the defendant should pay the plaintiff interest at the defendant's unsecured borrowing rate taking the duration of the loan into account.⁶⁰

59. Interest that accrues from the date of judgment until payment is post-judgment interest. Jurisdictions often have different rules for prejudgment and post-judgment interest and it is common to have a fixed statutory rate or formula for post-judgment interest even if there is not a similar rule for prejudgment interest.

60. *Gorenstein Enterprises v. Quality Care*, 874 F.2d 431 (7th Cir. 1989) (awarding prejudgment interest at defendant's cost of unsecured borrowing); Jeffrey Colon & Michael S. Knoll, *Prejudgment Interest*, in LITIGATION SERVICES HANDBOOK: THE ROLE OF THE FINANCIAL EXPERT 16.1-14 (Roman L. Weil, Daniel G. Lentz & Elizabeth A. Evans eds., 6th ed. 2017) [hereinafter Colon & Knoll, *Prejudgment*]; Michael S. Knoll, *A Primer on Prejudgment Interest*, 75 TEX. L. REV. 293 (1996) [hereinafter Knoll, *Primer*]; James M. Patel, Roman L. Weil, & Mark A. Wolfson, *Accumulating Damages in Litigation: The Roles of Uncertainty and Interest Rates*, 11 J. L. STUD. 341 (1982) [hereinafter, Patel et al., *Accumulating*]. Proponents of the coerced loan theory recognize that defendant's

However, recognizing that the court should award the plaintiff prejudgment interest at defendant's cost of unsecured borrowing from the date of injury to the date of judgment does not provide the court with all of the direction it needs to determine a unique and unambiguous interest rate. In principle, the defendant could have borrowed unsecured from plaintiff at a fixed interest rate or at an array of floating interest rates. The coerced loan theory cannot resolve this matter as there can be multiple market-based interest rates that can compensate the plaintiff. In such circumstances, the reverse MM theorem suggests that the court should adopt a rule that will minimize the combined cost to the parties from failures of the MM assumptions. Litigants have some control over the pace of litigation. Accordingly, because it is easier to delay litigation than to accelerate it, and because a non-market interest rate gives one party an incentive to delay (and the other to accelerate), a fixed rate obligation is likely to lead to delay (which, in violation of the assumption of frictionless markets, is costly for the parties and the court together). If interest rates have gone up (so the original fixed interest rate is below market), the defendant will have incentive to delay; alternatively, if interest rates have gone down (so the original rate is above market), the plaintiff will have incentive to delay. In contrast, with a floating market interest rate, because the plaintiff is not receiving an above-market interest rate and the defendant is not paying a below-market rate neither party has an incentive to delay.

More generally, there is a broad class of cases that involve choosing among multiple remedies that could in principle compensate a successful plaintiff. Many of these examples involve whether to make an ex-ante or an ex-post calculation of damages.⁶¹ The choice of a fixed or floating prejudgment interest rate is such an example as the fixed rate (the market interest rate at the date of injury) is an ex-ante calculation whereas the floating rate (say, a series of yearly interest rates from the date of injury to the date of the award) is an ex-post calculation. From an expected value perspective, both ex-ante and ex-post calculations will compensate the successful plaintiff. The reverse MM theorem provides a framework for the court to use to allow it to resolve these issues efficiently

unsecured borrowing rate will not fully compensate plaintiff if plaintiff is an individual and the debt constitutes a large portion of plaintiff's wealth. If plaintiff cannot readily insure against or sell the claim, then the risk of nonpayment will likely impact plaintiff's consumption. In such cases, defendant's borrowing rate will not fully compensate plaintiff for having funds tied up with defendant. Conversely, when plaintiff is a public corporation, or the claim is small relative to wealth, defendant's unsecured borrowing rate is sufficient to compensate the plaintiff. Colon & Knoll, *Prejudgment*, at 16-17; Knoll, *Primer*, at 345-47; Patel et al., *Accumulating*, at 354-62. The above can be understood as applications of the reverse MM theorem. When informationally imperfect markets and market frictions make it impractical for plaintiff to sell a claim for its expected value, a plaintiff might require extra compensation to compensate for delay.

61. See generally Elizabeth A. Evans & Roman L. Weil, *Ex Ante Versus Ex Post Damages Calculations*, in LITIGATION SERVICES HANDBOOK: THE ROLE OF THE FINANCIAL EXPERT 5.2-23 (Roman L. Weil, Daniel G. Lentz & Elizabeth A. Evans eds., 6th ed. 2017).

because it will focus the court's attention on the informational, incentive and tax differences across the alternative rules and their impact on the parties.⁶²

V. Why the Oversight?

The question, "if you're so smart, why aren't you rich?" has been a cliché since at least the time of Aristotle.⁶³ The variant here is if the reverse MM theorem is such a useful framework for the law, why hasn't it already been adopted? One answer is that in that so many of the ideas economists have developed using the reverse MM theorem, such as asymmetric information and agency costs, have been incorporated into the law. However, the reverse MM theorem itself has not been generally and widely adopted as an ordering principle, which is its incremental value after six decades of scholars building out its main insight. Of course, as an intellectual framework or ordering principle, its exclusion does not withhold any specific idea or preclude any specific analysis. What is lost is a more effective way of ordering and drawing upon knowledge, which still leaves the question.

As for the failure of transactional lawyers to adopt the reverse MM theorem a possible partial explanation is that the theorem would often apply in an environment where both value creation and value distribution are taking place simultaneously. As described above, mergers and acquisition negotiations, including negotiations of representations and warranties and choosing a particular acquisition or merger structure, are simultaneously both cooperative and competitive.⁶⁴ In such circumstances, the competitive aspects frequently overshadow the cooperative aspects.⁶⁵ The reverse MM theorem addresses only the cooperative aspects, and so it does not address all aspects of the negotiations, let alone the most confrontational, which could make it easy to overlook. Nonetheless, as negotiation experts regularly emphasize, understanding the

62. Of course, the reverse MM theorem is about economic value or efficiency; it says nothing about non-economic values, such as distributional fairness. Accordingly, if an award is made not to maximize efficiency, but with a nod towards other values, such as distributional fairness, the reverse MM theorem provides a framework through which to examine the efficiency costs of pursuing other values.

63. ARISTOTLE, *POLITICS*, bk. I, ch. 11, *reprinted in* THE COMPLETE WORKS OF ARISTOTLE 1990 (Jonathan Barnes ed., 1984) (describing how the philosopher Thales, when reproached for his poverty, used his knowledge of meteorology to predict a bumper olive crop; Thales then rented all of the olive presses at a reduced rate months before the harvest; when the harvest came in as Thales anticipated, Thales rented out those presses at a substantial profit).

64. FREUND, *ANATOMY*, *supra* note 54, 229-84 (representations and warranties); MARTIN D. GINSBURG & JACK S. LEVIN, *MERGERS, ACQUISITIONS AND BUYOUTS* ¶104 (2001) (deal structuring).

65. See ROGER FISHER, WILLIAM L. URY, & BRUCE PATTON, *GETTING TO YES: NEGOTIATING AGREEMENT WITHOUT GIVING IN* (2011). Although some other authors view the *GETTING TO YES* authors as having gone too far in the cooperative direction, the authors of *GETTING TO YES* were early writers on negotiation to recognize the importance of the cooperative aspect.

relevant issues and the potential value they have to all parties is a sure way to make one a better negotiator.⁶⁶

Another possible reason for the oversight is suggested by an important recent working paper by Professors Lee Anne Fennell and Richard H. McAdams, entitled *Inverted Theories*.⁶⁷ Fennell and McAdams argue that some of the most well-known ideas in law, including the Coase theorem, the Tiebout hypothesis, and Kaplow and Shavell's theory of tax superiority, are commonly understood in their original form, in which they yield negative or impossibility results.⁶⁸ Fennell and McAdams further argue that the heavy emphasis on the original form of the theorem and the near-total absence of its inverse or reverse form is a major error that calls for correction.⁶⁹ According to Fennell and McAdams, the above theorems are better understood in their inverted form, which takes the focus off of the negative or impossibility result and puts the focus on the assumptions.⁷⁰ Moreover, Fennell and McAdams attribute the emphasis on the original form of the theorem as connected with the conservative political valence of such negative or impossibility result, as opposed to the inverse, which invites an inquiry into situations where the theorem's assumptions do not hold, which they argue is more appealing to liberals.⁷¹

Thus, as applied to the reverse MM theorem, Fennell and McAdams' analysis suggests several reasons why the reverse MM theorem might not have caught on. First, that reverse theorems or inverted theorems are uncommon if not completely unknown in the law. The reverse MM theorem is, of course, such an inverted theorem. Moreover, the reverse MM theorem in its original forms says little about law—or at least little that is likely to appeal to lawyers—since it implies that transactional lawyers are wasting their time and their clients' money. If the MM theorem is accurate, then lawyers are just transaction costs and add no value for their clients. That is not a theorem that lawyers (or legal academics) are likely to embrace. Finally, the MM theorem (as well as the reverse MM theorem) would seem to have little political valence, which would eliminate the ideological motivations that Fennell and McAdams credit for raising the profiles of their original, uninverted examples.

66. *E.g.*, JAMES C. FREUND, SMART NEGOTIATING: HOW TO MAKE GOOD DEALS IN THE REAL WORLD (1992); G. RICHARD SHELL, BARGAINING FOR ADVANTAGE (2006).

67. Lee Anne Fennell & Richard H. McAdams, *Inverted Theories* (University of Chicago Coase-Sandor Institute for Law & Economics, Working Paper No. 648, 2017), <https://ssrn.com/abstract=3017437> [<https://perma.cc/5CCX-2VDG>]. If a theorem is of the form “if A, then B,” the inverse of the theorem holds “if not A, then not B.” In contrast with the contrapositive, which is true if the theorem is true, the inverse is not true simply because the original theorem is true.

68. *Id.* at 4-5.

69. *Id.* at 5-7.

70. *Id.* at 1-2.

71. *Id.* at 30.

Conclusion

Sixty years ago, Professors Modigliani and Miller unveiled their capital structure irrelevancy theorem and revolutionized financial economics with their “bombshell assertion” that under certain idealized assumptions the total value of a firm was independent of its capital structure. Although their theorem has made little inroad into law, many ideas that have developed out of their fundamental insight—that capital structure can affect firm value only through the original MM theorem’s assumptions—are today part of the canon of foundational legal ideas, such as informational asymmetries and agency costs. However, the failure to recognize the many legal settings where the reverse MM theorem can be applied and the numerous issues it can illuminate has deprived legions of lawyers of a powerful analytical framework. Explicitly incorporating the reverse MM theorem into legal analysis and giving it a prominent place in the legal canon will help legal academics, practicing lawyers, and judges all perform their work better. That is because much legal work involves designing and executing value-enhancing capital structures, and the reverse MM theorem provides a roadmap for doing so.