Chapter 4

FINANCING OF CORPORATIONS

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Abstract

This review evaluates the four major theories of corporate financing: (1) the Modigliani–Miller theory of capital-structure irrelevance, in which firm values and real investment decisions are unaffected by financing; (2) the trade-off theory, in which firms balance the tax advantages of borrowing against the costs of financial distress; (3) agency theories, in which financing responds to managers' personal incentives; and (4) the pecking-order theory, in which financing adapts to mitigate problems created by differences in information.

These theories are conditional, not general. It is easy to find examples of each theory at work, but otherwise difficult to distinguish the theories empirically. Large, safe firms with mostly tangible assets tend to borrow more. Firms with high profitability and valuable growth opportunities tend to borrow less. Each of these tendencies is consistent with two or more of the major theories of financing. It may be possible to devise sharper tests by exporting the theories to developing economies, where agency and information problems are more severe.

Further progress in understanding corporate financing decisions will require a deeper understanding of agency issues when value-maximizing operating and investment decisions cannot be observed or verified. But managers are not just temporary agents motivated by immediate pecuniary compensation or perquisites. Managers specialize their human capital to the firm. Some recent research suggests how financing can support the co-investment of human and financial capital.

Keywords

corporate financing, capital structure, trade-off theory, pecking-order theory, agency costs, financing

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1. Introduction

This review covers corporate financing and capital structure, that is, the mix of securities and financing sources used to finance real investment by corporations.

The leading theories of capital structure attempt to explain the proportions of debt and equity observed on the right-hand side of corporations' balance sheets. Most research assumes that the corporations are public, non-financial firms raising capital primarily from outside investors, not from the firm's entrepreneurs, managers or employees. The firms are assumed to have access to "Anglo–Saxon" capital markets and institutions, characterized by a broad, efficient public market for shares and corporate debt, and by reasonably good protection of the rights of outside investors. Most tests of capital structure theories have examined debt ratios of established, public, USA corporations.

These theories and tests are really focusing on financing *strategy*, the determination of overall debt ratios for a particular type of firm in a particular institutional setting. This review will attempt to look beyond that setting where pertinent research is available. The review will also consider financing *tactics*, for example the design of specific security issues.

The diversity of financing tactics is remarkable. Innovation in security design continues apace. The composition of financing varies cross-sectionally, even within apparently homogeneous industries, and also over time, even when markets, institutions, regulation and taxation are apparently constant. Are these variations and fluctuations just tactical noise overlaying fixed, general principles of optimal financing strategy, or do the tactics dominate strategy?

If financing tactics are more than just noise, then tactics should provide circumstantial evidence for more general theories. Perhaps those theories are plausible not because they do a satisfactory job explaining differences in overall debt ratios, but because one can see the costs and benefits that drive the theories at work in financing tactics.

1.1. Theories of optimal financing

There is no universal theory of capital structure, and no reason to expect one. There are useful *conditional* theories, however. The theories differ in their relative emphasis on the factors that could affect the choice between debt and equity. These factors include agency costs, taxes, differences in information, and the effects of market imperfections or institutional or regulatory constraints. Each factor could be dominant for some firms or in some circumstances, yet unimportant elsewhere.

The leading theories of capital structure are as follows:

Capital-Structure Irrelevance. This theory holds that firm value and real investment decisions are, with few important exceptions, independent of financing. The choice between debt and equity is not totally unimportant – you can surely screw it up – but

its effects on real decisions are second- or third-order. Differences among financing strategies are mostly tactical noise.

Trade-off theory. Firms choose target debt ratios by trading off the tax benefits of debt against the costs of bankruptcy and financial distress. Actual debt ratios move towards the targets.

Agency theory. Financing decisions have first-order real effects because they change managers' incentives and their investment and operating decisions. Agency costs drive financing – or at least they explain the effects of financing decisions.

Pecking-order theory. Financing adapts to mitigate problems created by differences in information between insiders (managers) and outside investors. The firm turns first to the financing sources where differences in information matter least.

Obviously these theories overlap. For example, most versions of the trade-off theory interpret the costs of financial distress as including agency costs encountered at high debt ratios. At the end of the day some blend of all of the theories may be needed to explain capital structure. Nevertheless, it is helpful to address the theories, and the evidence for and against them, one by one. The next three sections of this paper cover the value-irrelevance, trade-off and pecking-order theories, which are well-specified and well-understood, at least theoretically. Section 5 turns to agency theories of financing. These theories are not as tightly specified, but do address broader and deeper issues. Section 6 notes some new ideas and approaches. I conclude that significant progress in understanding financial structure will come only by modeling agency effects of financing at a more fundamental level.

The literature on capital structure is enormous. I have emphasized more recent work, but have not been able to cite, much less discuss, all relevant research. Harris and Raviv (1991) contains a comprehensive survey of research through 1990.

2. The Modigliani–Miller value-irrelevance propositions

The modern theory of optimal capital structure starts with Modigliani and Miller's (MM's) proof (1958) that financing doesn't matter in perfect capital markets.[1] Consider the market-value balance sheet on the next page. The market values of the firm's debt and equity, D and E, add up to total firm value V. MM's Proposition 1 says that V is a constant, regardless of the proportions of D and E, provided that the assets and

[1] "Perfect" requires that capital markets are not only competitive and frictionless, but also complete, so that the risk characteristics of every security issued by the firm can be matched in capital markets by purchase of another existing security or portfolio, or by a dynamic trading strategy. Titman (2002) points out that MM's argument can survive even in incomplete markets if the firm's securities can be repackaged costlessly by financial institutions or investors. A firm that attempts to exploit an area of incompleteness should get nowhere, because of competition from repackagers. But this amounts to saying that markets will quickly become complete with respect to any state of nature that is of interest to investors and that the firm's securities could pay off in.

growth opportunities on the left-hand side of the balance sheet are held constant.[2] Financial leverage or "gearing", that is, the proportion of debt financing, is irrelevant. This leverage-irrelevance result generalizes to any mix of securities issued by the firm. For example, it doesn't matter whether debt is short- or long-term, callable or call-protected, straight or convertible, in dollars or euros, or some mixture of all of these or other types.

Assets-in-place and growth opportunities	Debt (D)
	Equity (E)
	Firm value (V)

Proposition 1 also says that each firm's cost of capital is a constant, regardless of the debt ratio D/V. Let r_D and r_E be the "cost of debt" and the "cost of equity," that is, the expected rates of return demanded by investors in the firm's debt and equity securities. Then the overall (weighted-average) cost of capital is:

$$\text{Weighted Average Cost of Capital} = r_A = r_D\, D/V + r_E\, E/V. \tag{1}$$

The weighted-average cost of capital r_A is the expected return on a market-value-weighted portfolio of all the firm's outstanding securities. It is also the discount or "hurdle rate" for capital investment by the firm.[3]

Solving Equation (1) for the cost of equity gives MM's Proposition 2:

$$r_E = r_A + (r_A - r_D)\, D/E. \tag{2}$$

Proposition 2 shows why there is "No magic in financial leverage". Any attempt to substitute "cheap" debt for "expensive" equity fails to reduce the overall cost of capital, because it makes the remaining equity still more expensive – just enough more expensive to keep the overall cost of capital constant.

MM's propositions are no longer controversial as a matter of theory. The economic intuition is simple, equivalent to asserting that in a perfect-market supermarket "The

[2] Fama (1978) summarizes the conditions necessary for Proposition 1.

[3] Here I am ignoring taxes. Corporations actually use the after-tax weighted average cost of capital (WACC) as a discount or hurdle rate for capital investment:

$$\text{WACC} = r_D(1 - T_C)\, D/V + r_E\, E/V.$$

This incorporates the after-tax cost of debt, calculated at the marginal corporate rate T_C. WACC is the correct discount rate for after-tax cash flows from capital investments that do not change the firm's business risk or market-value debt ratio. See Brealey and Myers (2003, Chapter 19), Miles and Ezzell (1980) and Taggart (1991).

value of a pizza does not depend on how it is sliced". But are capital markets really sufficiently perfect? After all, the values of pizzas *do depend* on how they are sliced. Consumers are willing to pay more for the several slices than for the equivalent whole. Perhaps the value of the firm does depend on how its assets, cash flows and growth opportunities are sliced up and offered to investors. There are surely investors who would be willing to pay extra for particular types or mixes of corporate securities. For example, investors cannot easily borrow with limited liability, but corporations provide limited liability and can borrow on their stockholders' behalf.

We see constant innovation in the design of securities and new financing schemes.[4] Innovation proves that financing can matter. If new securities or financing tactics never added value, then there would be no incentive to innovate.

The practical relevance and credibility of MM's propositions cannot rest on a lack of demand for financial leverage or for specialized securities. The propositions' support must in the end come from the supply side. The key fact supporting MM is that the cost of supply is very small relative to the market value of the firm. Suppose there is a clientele of investors who would be willing to pay extra for the firm's debt and equity securities at a particular, "optimal" debt ratio. In equilibrium they do not have to pay extra, because public corporations' costs of manufacturing debt and equity securities, rather than equity only, are a small fraction of the securities' market values. Thus the supply of debt adjusts until the value added for the marginal investor is essentially zero. (If for some reason firms do not supply the equilibrium amount of debt, financial institutions will do so. They can buy a firm's securities, repackage them in the correct debt-equity proportions, and sell the repackaged securities to investors.)

MM's propositions are exceptionally difficult to test directly, but financial innovation provides strong circumstantial evidence. The costs of designing and creating new securities and financing schemes are low, and the costs of imitation are trivial. (Fortunately, securities and financing tactics cannot be patented.)[5] Thus temporary departures from Proposition 1 create the opportunity for financial innovation, but successful innovations quickly become "commodities", that is, standard, low-margin financial products. The rapid response of supply to a successful, innovative financial product should restore the MM equilibrium.[6] Firms may find it convenient to use these new products, but only the first users will increase value, or lower the cost of capital, by doing so.[7]

[4] See Persons and Warther (1997), Carow, Erwin and McConnell (1999), Finnerty and Emery (2002) and Tufano (1995).

[5] But the number of patents pertaining to other financial applications has been growing rapidly. See Lerner (2002).

[6] There are many clear examples showing the rapid response of supply following financial innovation. These examples cannot prove that *all* deviations from Proposition 1 trigger successful innovation, or that all supply responses completely restore MM's equilibrium. Deviations from Proposition 1 could persist because of transaction costs or segmented markets. See Titman (2002).

[7] Tufano (1989) found that issuers did not appear to capture the rewards of innovation, because the first issues of a new security were not sold on better terms than later issues. Investment banks still had

For regulators and policymakers, MM's leverage-irrelevance proposition is the ideal end result. If that result could be achieved in practice, then investors' diverse demands for specialized securities would be satisfied at negligible cost. All firms would have equal access to capital, and the cost of capital would not depend on financing, but only on business risk. Capital would flow directly to its most efficient use. Therefore public policy should accommodate financial innovation because it makes financing decisions unimportant.

But for corporate finance, the MM propositions are benchmarks, not end results. The propositions say that financing does not affect value *except for* specifically identified costs or imperfections. As Merton Miller (1989, p. 7), noted, "... showing what *doesn't* matter can also show, by implication, what *does*". Perhaps he should have said "what *may* matter". Identifying a fact or factor that affects some financing choices does not prove that MM's leverage-irrelevance theory is systematically wrong. Compared to real investment and operating decisions, most financing decisions have only second-order effects on value. Idiosyncratic financing decisions[8] may not be very harmful, and managers may not have the attention and discernment necessary to see the effects of financing on volatile stock-market values. Black (1986) describes how models based on fine-tuned optimizing can be confounded by "noise".

3. The trade-off theory

The trade-off theory changes MM's Proposition 1 to:

$$V = D + E = \overline{V} + PV \text{ (interest tax shields)} - PV \text{ (costs of financial distress)},$$

where $\overline{V}$ is firm value with all-equity financing, PV (interest tax shields) is the present value of future taxes saved because of interest tax deductions, and PV (costs of financial distress) is the present value of future costs attributable to the threat or occurrence of default. The firm chooses the level of debt that maximizes V.[9] The optimum requires that the firm borrow up to the point where PV (interest tax shields) and PV (costs of financial distress) are equal at the margin.

incentives to create new securities, however, because innovating banks gained larger shares of subsequent issues and trading.

[8] Bertrand and Schoar (2002) show that the background and training of top managers can predict their financing choices. This result is hard to square with the theories described below. The result fits the MM leverage-irrelevance hypothesis, where idiosyncratic financing has no effect on value.

[9] Optimal capital structure is sometimes defined as the debt ratio that minimizes the after-tax weighted average cost of capital (WACC). WACC is drawn as a shallow, U-shaped function of the debt ratio. The upward slope of WACC at high debt ratios is attributed to the costs of financial distress. This is not strictly correct. Maximizing V and minimizing WACC are not the same thing. WACC is a (tax-adjusted) expected rate of return. Financial distress reduces future cash flows and asset values, but does not necessarily increase the expected rates of return demanded by investors, which depend only on risk.

The trade-off theory has common-sense appeal. Interest tax shields appear to have significant value, at least under the USA corporate tax system, and there are ample examples of costs triggered by "excessive" debt. The trade-off theory therefore explains moderate, cautious borrowing. We can also identify the types of firms that should face especially high costs of distress, for example, firms facing above-average business risk [10] and firms with unusually valuable growth opportunities and intangible assets. The trade-off theory predicts that firms or industries with these characteristics should be especially cautious and operate at low target debt ratios.

Before considering the evidence for and against the trade-off theory, I will take a closer look at taxes and costs of financial distress.

3.1. Taxes

The USA double-taxes corporate income. The corporate income tax is followed by another tax on interest paid out to investors and on the dividends or capital gains realized by stockholders. Interest is tax-deductible, so it escapes the top (corporate) layer of taxation.

The value of corporate interest tax deductions may be offset at the bottom (investor) layer of taxation, because most equity income comes as capital gains, which are taxed only when realized, and at a lower rate than the tax rate on dividend or interest income. The tax advantage of debt vs. equity, considering both layers of tax, is:

$$\text{Tax advantage of debt} = (1 - T_P) - (1 - T_C)(1 - T_{PE}), \tag{3}$$

where T_C is the marginal corporate tax rate; T_P is the tax rate paid by investors on interest income; and T_{PE} is the effective tax rate on returns to shareholders.

Modigliani and Miller (1958, 1963) recognized the potential value of interest tax shields, but ignored taxes paid by investors (effectively assuming $T_P = T_{PE}$). In this case only the corporate interest tax shields matter. MM also assumed fixed debt and safe interest tax shields, which they discounted at the borrowing rate r_D. For perpetual debt, the resulting PV(interest tax shields) $= r_D T_C D / r_D = T_C D$. [11] With $T_C = .35$, for example, \$1 million of additional debt would generate interest tax shields worth \$350 000.

Tax savings of this magnitude would make interest tax shields the dominant force in capital structure decisions. MM's rule-of-thumb calculation is now understood as a

[10] Captial structure theory takes business risk as given. In fact risk can be managed. For example, oil and mining companies can lock in selling prices with forward commodity trades. The trade-off theory predicts that firms will reduce risk in order to increase debt capacity. I suspect that few firms manage business risk for that purpose. But I have not attempted to cover the theory or practice of risk management in this paper.

[11] The net tax savings, after taxes paid by shareholders, are $T_C(1 - T_{PE})$. Shareholders would discount this saving at an after-personal-tax rate $r_D(1 - T_{PE})$, so the value of the tax shields for a dollar of perpetual debt is $T_C r_D(1 - T_{PE}) / r_D(1 - T_{PE}) = T_C$.

remote upper bound, however. First, any contribution to the current market value of the firm should come only from interest tax shields attaching to assets in place, which will not last forever.[12] Second, interest tax shields are proportional to the total future amount of debt outstanding, which depends on future debt capacity, which depends in turn on the future market value of the firm. Therefore interest tax shields are not safe. For example, if the firm maintains a fixed market-value debt ratio, future interest tax shields will be proportional to firm value and just as risky.[13] Third, the firm may not stay profitable. If it ends up with tax-loss carry-forwards, interest tax shields will be deferred or perhaps lost entirely. Thus the average future tax rate is less than the statutory rate. Fourth, the value of interest tax shields should be partially offset by the tax advantages of equity to individual investors, namely the ability to defer realization of capital gains and then to pay taxes at the relatively low capital gains rate.

Miller (1977) argues that the tax advantages of equity could completely offset the tax-deductibility of interest at the corporate level. Suppose T_{PE} is very low, say zero. Then firms would substitute debt for equity as long as the personal tax rate of the *marginal* investor in debt is less than the corporate tax rate ($T_P < T_C$). As the supply of debt from all corporations expands, investors in higher tax brackets have to be enticed to hold corporate debt, and interest rates rise. The supply of debt increases until there is no further net tax advantage. At that point, $T_P = T_C$ for the marginal investor in debt, the effects of personal and corporate taxes cancel out, and MM's Proposition 1 holds despite the tax-deductibility of interest.

This "Miller equilibrium" shows how the tax advantages of corporate debt could be eroded by supply responses and shifts in investors' portfolios. But it is not a complete theory of taxes and portfolio choice,[14] and actual tax rates do not appear to support this

[12] If interest tax shields are a subsidy to investment, then competition will drive up the cost of new assets and drive down their pre-tax returns. The firm will have to *pay for* the value of interest tax shields on future investments for replacement or growth. Therefore the value of interest tax shields on debt supported by these future investments will make no net contribution to firm value today.

What if a firm has market power, and does not have to pay for the full value of interest tax shields on debt supported by future investments? In that case, be careful not to double-count. The NPV of future growth opportunities is on the left-hand side of the firm's market-value balance sheet. NPVs calculated by standard methods, say by discounting at the after-tax WACC given in footnote 3 above, already include the value of interest tax shields supported by new investment.

[13] The assumption of a constant market-value debt ratio is not realistic. The assumption is nevertheless implicit in practice: the widely used formula for WACC (see footnote 3 above) assumes that the firm's debt is rebalanced period-by-period to keep the market-value debt ratio constant. See Miles and Ezzell (1980).

[14] Miller assumed that investors' choices between debt and equity are based only on a comparison of after-tax interest rates to after-tax equity returns. The equity returns were implicitly assumed safe. The risk and risk premiums of equity investment were not modeled. Modigliani (1982) presents a more general model of debt, taxes and portfolio choice.

If equity risk is measured by beta (β), the Miller equilibrium would require an after-tax capital asset pricing model (CAPM) of the form $r = (1 - T_C)r_f + \beta[r_m - (1 - T_C)r_f]$, where r is expected return, r_m is the expected market return and r_f is the risk-free interest rate. The intercept of the security market

equilibrium. Graham (2000) examines the interest-rate spread between corporate bonds and tax-exempt municipal bonds to estimate the tax rate paid by marginal investors in corporate debt. The rate is about 30%, well below the top bracket of about 40%. He also estimates the effective tax rate on equity income at about 12%.[15] At these rates interest tax shields still have significant value:

$$\text{Tax advantage of debt} = (1 - 0.30) - [(1 - 0.35)(1 - 0.12)] = 0.13.$$

Graham's estimates are not definitive. We are not sure who the relevant marginal investors are, much less their effective tax rates. Yet there is a near-consensus, among both practitioners and economists, that there is a significant tax incentive for corporate borrowing. Therefore we should observe corporations borrowing to exploit interest tax shields. We should not observe corporations leaving interest tax shields "on the table" when the risk of financial distress is remote. Yet many of the most successful firms operate at very low, even negative debt ratios. ("Negative" means that investments in debt securities, typically money-market instruments, exceed total debt outstanding.)

Graham (2000) also examined a sample of firms listed on Compustat and paying taxes at the full statutory rate. He estimated that these companies could have added 7.5% on average to firm value by "levering up" to still-conservative debt ratios.[16] This is not small change. A 7.5% deviation from MM's leverage-irrelevance proposition should prompt a vigorous supply response – conservatively financed firms should issue massive amounts of debt and retire massive amounts of equity. But many mature, profitable corporations seem uninterested in the tax advantages of debt.

Yet we can quickly dismiss the idea that managers and investors don't pay at least tactical attention to taxes. Many securities are creatures of the tax code, for example floating-rate preferred shares, which are designed for purchase by other corporations with excess cash available for short-term investment. (The advantage is that only 30% of inter-corporate dividends are taxed.)[17]

line would be much smaller than in the standard, pre-tax CAPM, and the slope much higher. But tests of the standard CAPM seem to show higher-than-predicted intercepts and lower-than-predicted slopes. See Black (1993).

[15] Graham's estimate of the marginal rate on interest and dividends is an average from 1980 to 1994. The estimate for the effective rate on equity income varied over this sample period. I have quoted the rate for 1993 and 1994.

[16] Graham (2000, pp. 1916, 1934). The 7.5% estimate is probably overstated. I understand that Graham projected several years of future growth in interest tax shields, which is inappropriate in competitive industries. See footnote 12 above. He also discounts at a corporate borrowing rate, which assumes that the level of future debt is fixed rather than rebalanced as firm value changes.

[17] The financial innovators who first created floating-rate preferred shares thus created a partially tax-exempt security that acted like a safe, short-term, money-market instrument. Since then corporations and investment bankers have also figured out how to issue *tax-deductible* preferred shares. The corporation issues a bond to a special purpose trust, which in turn issues preferred stock to investors. The trust is designed to be a tax-free conduit. The issuing corporation deducts interest, and corporate investors can

Financial leases are also largely tax-driven. When the lessor's tax rate is higher than the lessee's, there is a net gain because the lessor's interest and depreciation tax shields are front-loaded, i.e., mostly realized earlier, than the taxes paid on the lease payments.[18] The tax advantage is due to the time value of money, and therefore increases in periods of high inflation and high nominal interest rates.

There are many further examples of tax-driven financing tactics. But finding clear evidence that taxes have a systematic effect on financing *strategy*, as reflected in actual or target debt ratios, is much more difficult. In 1984, after a review of the then-available empirical work, I concluded that there was "no study clearly demonstrating that a firm's tax status has a predictable, material effect on its debt policy. I think that the wait for such a study will be protracted" [Myers (1984, p. 588)].

A few such studies have since appeared, although some relate in part to financing tactics, and none gives conclusive support for the trade-off theory. MacKie-Mason (1990) tested whether companies with low marginal tax rates, for example companies with tax loss carry-forwards, were more likely to issue equity, compared to more profitable companies facing the full statutory tax rate. This was clearly true in his sample.[19]

MacKie-Mason's result is consistent with the trade-off theory, because it shows that tax-paying firms favor debt. But it is also consistent with a Miller (1977) equilibrium in which the value of corporate interest tax shields is entirely offset by the low effective tax rate on capital gains. In this case, a firm facing a low-enough tax rate would also use equity, because investors pay less taxes on equity income than on interest income. Thus we cannot conclude from MacKie-Mason's results that interest tax shields make a significant contribution to the market value of the firm or that debt ratios are determined by the trade-off theory.

Graham (1996) also finds evidence that changes in long-term debt are positively and significantly related to the firm's effective marginal tax rate. Again this shows that taxes affect financing decisions, at least at the tactical level. It does not show that the present value of interest tax shields is materially positive. An early paper by Miller and Modigliani (1966) did find that interest tax shields contributed significantly to market value in a sample of electric utilities. But Fama and French (1998), who examined a much larger sample from 1965 to 1992, found no significant link between taxes, financing and market value.

receive income taxed as inter-corporate dividends. The first tax-deductible preferred was designed and successfully issued in 1993. By the end of 1997, there were 285 more issues raising $27 billion – another example of rapid supply response to a successful financial innovation. See Khanna and McConnell (1998) and Irvine and Rosenfeld (2000).

[18] See Myers, Dill and Bautista (1976) and Schallheim (1994).

[19] This result has been confirmed in later studies, for example Jung, Kim and Stulz (1996).

3.2. *Direct costs of financial distress*

Costs of financial distress are incurred when the threat or occurrence of default reduces the market value of the firm's assets, operations or growth opportunities.

Direct costs of financial distress are incurred in bankruptcy and reorganization. These include legal and administrative costs and the costs of shutting down operations and disposing of assets[20] (but only costs that would not be incurred absent financial distress). Direct costs may also include continued operating losses while creditors and stockholders wrangle or legal processes unfold. (Some railroad bankruptcies took decades to resolve.) Weiss and Wruck (1998) describe how most of Eastern Airlines' remaining value dissipated during two years under the "protection" of the bankruptcy court.

But a few examples of meltdowns in bankruptcy do not prove that *direct* bankruptcy costs are generally large enough to make the trade-off theory work. Andrade and Kaplan (1998), who studied a sample of highly leveraged companies that fell into financial distress, found that most of the costs of financial distress occurred before bankruptcy was declared. In general, the bankruptcy process appeared to be reasonably efficient,[21] at least for large firms. There are economies of scale in bankruptcy.

3.3. *Indirect costs of financial distress – conflicts between creditors and stockholders*

Indirect costs of financial distress are mostly due to agency costs generated by conflicts of interest between debt and equity investors. If there is a chance of default, then shareholders can gain at the expense of debt investors. Equity is a residual claim, so shareholders gain when the value of existing debt falls, even when the value of the firm is constant.

Black and Scholes (1973) were first to show that common stock is equivalent to a call option on the firm's assets, with an exercise price equal to the face value of outstanding debt. The market value of debt equals its value if default-risk free minus a default put: $D = D(\text{risk-free}) - P$. The put value P depends on firm value V, the standard deviation of asset returns σ, the debt's time to maturity t and its face value (exercise price) F. Thus $P = P(V, \sigma, t, F)$,[22] and

$$E = V - D = V - D(\text{risk} - \text{free}) + P(V, \sigma, t, F). \tag{4}$$

[20] For example, the costs of a "fire sale" where assets are sold for less than their value to a going concern. See Pulvino (1998).

[21] For example, Weiss (1990) found bankruptcy costs averaging about 20% of equity value pre-bankruptcy. The expected costs for a healthy firm should be far less. An important earlier paper by Warner (1977) likewise finds that direct bankruptcy costs are relatively small. See also Franks and Torous (1994), Gilson (1997) and Maksimovic and Phillips (1998).

[22] For simplicity I assume that the firm has but one debt issue outstanding. Valuing the default put is more difficult when there are many issues with different maturities, terms and covenants, but the nature of the conflicts of interest between lenders and stockholders is unchanged.

Suppose that managers act in stockholders' interests, and that the risk of default is significant. There are several ways for managers to transfer value from the firm's creditors to its stockholders. First, managers could invest in riskier assets or shift to riskier operating strategies. This works because $dP/d\sigma > 0$. Higher risk increases the "upside" for stockholders. The downside is absorbed by the firm's creditors. Jensen and Meckling (1976) first stressed *risk shifting* as an agency problem.

Second, the managers may be able to borrow still more and pay out cash to stockholders. In this case the overall value of the firm is constant, but the market value of the existing debt declines because $dP/dF > 0$. (New debt does not suffer because it is issued at market value.) The cash received by stockholders more than offsets the decline in the value of their shares.

Third, the managers can cut back equity-financed capital investment. Optimal investment I is normally determined at $dV/dI = 1$. But investment at this margin makes debtholders better off, because $dP/dV < 0$. Part of the value generated by new investment goes to existing creditors, who are better protected once the investment is made. The gain in the market value of debt acts like a tax, which discourages investment and tempts managers to shrink the firm and pay out cash to stockholders. Myers (1977) was the first to stress this *underinvestment* or "debt overhang" problem.

Fourth, the managers can "play for time," for example by concealing problems to prevent creditors from acting to force immediate bankruptcy or reorganization. This lengthens the effective maturity of the debt and makes it riskier. Creditors suffer, because $dP/dt > 0$, and stockholders gain.

There are many examples of these temptations at work. Leveraged buyouts (LBOs) provide examples of the effects of additional borrowing. Asquith and Wizman (1990) found that announcement of a leveraged buyout triggered an average loss in market value of 5.2% for bonds lacking covenant protection.[23] When RJR Nabisco's management proposed a LBO, the market value of the company's existing debt fell instantly by more that 10%. Alexander, Edwards and Ferri (2000) examine the returns of a large sample of junk bonds traded on Nasdaq. Junk-bond and common-stock returns should have opposite signs at the announcement of "wealth-transferring events", such as an impending LBO. They find evidence of negative correlation around such events.

Debt investors are of course aware of these temptations and try to write debt contracts accordingly. Debt covenants may restrict additional borrowing, limit dividend payouts or other distributions to stockholders, and provide that debt is immediately due and payable if other covenants are seriously violated. Smith and Warner (1979) provide

[23] At the time, investors were willing to buy the debt of supposedly blue-chip companies with minimal covenants. Asquith and Wizman (1990) found that the value of bonds with strong covenants actually increased when LBOs were announced. Marais, Schipper and Smith (1989) found insignificant negative price reactions for nonconvertible debt in a sample of buyouts from 1974 to 1985. This is surprising, since most issues' credit ratings were downgraded, and the average post-buyout debt ratio tripled.

a detailed analysis of debt contracts and covenants, and show how the contracts are designed to avoid indirect costs of financial distress.[24]

The recognition of the implications of potential conflicts of interest between lenders and stockholders was an important contribution to the trade-off theory. The conflicts of interest mean that the mere *threat* of default can generate agency costs, for example by deterring positive-NPV investment or shifting the firm to riskier strategies.

The agency costs of suboptimal investment and operating decisions are potentially much more serious than "workout" costs incurred post-default. The trade-off theory needs both types of costs to provide a credible counterweight to the present value of interest tax shields.

These agency costs also help to explain why growth firms tend to rely on equity. They have more to lose; the debt-overhang problem is no problem for a firm lacking valuable investment opportunities. Also, the value of those opportunities, which depends on *future* investment decisions, is lousy collateral for a loan today. Lenders are naturally averse to lending against the value of investments that haven't been made yet. (Would you lend today to a growth firm on the strength of its management's promise to undertake "all future investment projects with positive NPVs"? Even if the lender could identify positive NPVs, there would be no way to enforce such a contract.)

3.4. Other indirect costs of financial distress

The threat of default can have other adverse feedback effects on the value of the firm. Titman (1984) stresses the costs imposed by liquidation on customers, suppliers and employees.[25] When the value of a firm's product or service depends on the firm's continued existence – because of a need for spare parts or service, for example – then conservatively financed firms will have a competitive advantage.

Perhaps the most dramatic recent example is the impact of Enron's financial distress on the value of its energy-trading business. This business had the largest share of its market and significant competitive strengths (although Enron may have puffed up its profits and prospects). But trades can be executed only when counterparty risk – the risk that a trading partner will default – is acceptably low. Enron's trading volume fell precipitously once the company's debt rating fell below investment grade, and the trading business lost most of its value as a going concern. Enron's financing strategy also violated a key normative implication of the trade-off theory: if the value of the firm's assets and operations would be damaged severely in financial distress, reduce the odds of distress by reducing financial leverage.

There is another first-order reason why firms favor equity finance. Employees will shy from committing and specializing human capital to a firm threatened by default.

[24] The maturity and priority structures of corporate debt are also adapted to avoid costs of financial distress. See Barclay and Smith (1995a,b), for example.

[25] See also Cornell and Shapiro (1987) and Maksimovic and Titman (1991).

This factor is probably most important for high-tech growth firms. Human capital specialized to innovation will have few alternate uses if the innovating firm fails.

3.5. Evidence on costs of financial distress

It is difficult to distinguish costs of financial distress from the costs of the business setbacks that put the firm into distress. Andrade and Kaplan (1998) attack this problem by examining a sample of highly-leveraged transactions (HLTs, i.e., leveraged buyouts and restructurings). Most of their sample firms would have been financially healthy with normal financing. The firms started with unusually high leverage, however, so minor business setbacks were sufficient to trigger distress.

Andrade and Kaplan estimated costs of financial distress averaging 10 to 20% of firm value. These are not large effects, for two reasons. First, some of the costs may actually flow from the business setbacks that triggered distress. Estimated distress costs were negligible in a subsample of firms that encountered no evident adverse economic shocks. Second, a firm operating at normal debt ratios would be concerned with the *expected* consequences of additional borrowing, and would multiply the costs of distress by a small probability of distress.

HLTs were generally undertaken by established firms with ample operating cash flow and limited growth opportunities. Such firms' assets-in-place are likely to survive distress and reorganization – they are unlikely to be shut down or liquidated, for example. Andrade and Kaplan's results do not necessarily apply to firms with valuable intangible assets and growth opportunities. The value of such assets is fragile, particularly if the value depends on specialized human capital, which is likely to depart in conditions of financial distress.

Andrade and Kaplan also review previous research on financial distress and the bankruptcy process.

3.6. Leverage and product markets

Leverage could also affect firm value by changing the nature of competition in the market for the firm's products or services. If leverage is a competitive disadvantage, then the feedback effect of leverage on competitiveness is an additional cost of financial distress.

Chevalier (1995a,b) found that highly-leveraged supermarket chains competed less aggressively, to the advantage of the chains' more conservatively financed competitors. The announcement of a leveraged buyout (LBO) of a supermarket chain increased the stock prices of the chain's competitors. These competitors tended to expand later at the LBO chain's expense. Zingales (1998) found that highly-leveraged trucking companies invested less and were less likely to survive in a deregulated environment. Phillips (1995) and Kavenock and Phillips (1997) likewise find that highly-leveraged firms tend to invest less aggressively. These studies also suggest that highly-leveraged firms will charge higher prices if they can. But competitors with "deeper pockets" may take

advantage of their highly-leveraged competitors by more intense price competition. In this case the highly-leveraged firms may have to follow suit.

Clearly there are interactions between financing and product markets. The empirical literature[26] so far suggests that highly-leveraged firms are "softer" competitors that will curtail investment and expansion. The choice of financial leverage should therefore depend on the firm's opportunities. A growth firm with valuable future investment opportunities should be a "hard" competitor, and should favor equity financing. A firm with limited opportunities that is tempted to over-invest should favor debt.

3.7. Evidence for the trade-off theory

The trade-off theory can be tested cross-sectionally, using proxies for tax status and the potential costs of financial distress. For example, the following proxies should be associated with low debt ratios: tax-loss carry-forwards; business risk, measured by the volatility of earnings or market value; intangible assets, measured by high expenditures on marketing and R&D (vs. tangible capital investment), and valuable future growth opportunities. Such proxies work reasonably well in cross-sectional tests. Important early papers include Auerbach (1985), Long and Malitz (1985), Titman and Wessels (1988) and Fischer, Heinkel and Zechner (1989).

Smith and Watts (1992) emphasize the empirical importance of the "investment opportunity set".[27] The more valuable a firm's future investment opportunities, the less it borrows today. I have mentioned two reasons why this makes theoretical sense. First, growth opportunities are intangible assets, which are likely to be damaged in distress or bankruptcy. Second, issuing risky debt today undermines the firm's incentives to invest in the future.

The value of future opportunities can be estimated by the ratio of the firm's market value to book value. (Market value includes the value of growth opportunities; book value is an estimate of the value of the firm's assets in place.) There is a strong inverse relationship between the market-to-book ratio and debt ratios, consistent with the casual observation that "growth firms borrow less". This inverse relationship is not confined to the USA – see Rajan and Zingales (1995) and Gul's study (1999) of growth opportunities and capital structure in Japan.

Financial research has now settled on a few general factors that seem to explain debt ratios cross sectionally. Large, safe firms with tangible assets[28] tend to borrow more

[26] Theory on this point is divided. Highly leveraged firms are softer competitors in some setups, harder competitors in others. Harris and Raviv (1991) review theory through 1990, and the papers cited above all discuss more recent theoretical work. See also Lambrecht (2001) and Chevalier and Scharfstein (1996).

[27] See also Barclay, Smith and Watts (1995), Barclay and Smith (1999), Gaver and Gaver (1993) and Goyal, Lehn and Racic (2002).

[28] Liquid assets should also enhance debt capacity and increase the target debt ratio – but only if creditors can be assured that the firm will retain those assets. Liquidity makes it easier to shift safe assets into risky ones. See Shleifer and Vishny (1992), Myers and Rajan (1998) and Morellec (2001).

than small, risky firms with mostly intangible assets. (Intangible assets are usually linked to expenditures on advertising and R&D.) Firms with high profitability and valuable growth opportunities tend to borrow less.[29] Most of these factors make sense under the trade-off theory. For example, intangible assets and growth opportunities are vulnerable in distress. Profitability could proxy for growth opportunities.

But the empirical case for the trade-off theory is not as strong as it looks. First, statistical results "consistent" with the trade-off theory can be consistent with other theories as well. I return to this point in Section 4.3. Second, there are too many examples of successful, highly profitable firms operating at low debt ratios. These firms are not "the exceptions that prove the rule", because studies of the determinants of actual debt ratios consistently find that the most profitable companies in a given industry tend to borrow the least.[30] For example, Wald (1999) found that profitability was "the single largest determinant of debt/asset ratios" in cross-sectional tests for the USA, UK, Germany, France and Japan. Booth et al. (2001) reached a similar conclusion for a sample of ten developing countries.

High profits mean low debt, and vice versa. But if managers can exploit valuable interest tax shields, as the trade-off theory predicts, we should observe exactly the opposite relationship. High profitability means that the firm has more taxable income to shield, and that the firm can service more debt without risking financial distress.

3.8. Target-adjustment models

The trade-off theory predicts a target debt ratio that depends on the potential value of interest tax shields and the consequences of financial distress. If immediate adjustment to the target is costly, the theory implies a target-adjustment model. The target is not observed directly, and would probably vary through time.

The simplest estimate of the target is the firm's average debt ratio over a sample period, although the target can also be estimated based on tax status, asset risk and other attributes of the firm. Successful early tests of target-adjustment models include Taggart (1977), Jalilvand and Harris (1984) and Auerbach (1985).

Hovakimian, Opler and Titman (2001) conducted a more extensive search for evidence of target-adjustment financing. First they regress debt-to-value ratios on firm size, industry and asset type (for example, tangible vs. intangible assets). The predicted ratio for each firm and year is taken as an estimate of the target ratio. Then the difference between this target and the firm's actual, start-of-year debt ratio is used, along with other variables, to predict whether the firm issues debt or equity. The difference between target and actual works as expected; the firm is more likely to

[29] See Harris and Raviv (1991) and Rajan and Zingales (1995).

[30] Myers (1984) stressed this point; see also Baskin (1989) and Fama and French (2002). Other studies are cited in Harris and Raviv's review article (1991). Rajan and Zingales (1995) confirm the negative correlation between profitability and leverage for the USA, Japan and Canada, although no significant correlations were found for France, Germany, Italy and Britain.

issue debt when it is below-target, for example. The probability of a debt issue is also higher for more profitable firms (profitability is taken as a measure of debt servicing capacity) and for firms with low market-to-book ratios (low ratios mean that growth opportunities are relatively unimportant). It appears that management acts to move the firm towards a target debt ratio, and that the target depends in reasonable ways on firm characteristics. But the difference between target and actual debt ratios did not explain the *amounts* of debt and equity issued.

Hovakimian, Opler and Titman also examined a sample of firms that returned capital to investors. Firms with debt ratios below target were more likely to repurchase shares; above-target firms were more likely to retire debt. The statistical performance of their regressions was better for this sample than for issuers, and the differences between firms' actual and target debt ratios explained the amounts of debt retired or equity repurchased. This is an interesting, but odd, finding: there is no a priori reason to expect the trade-off theory to work better for firms with excess capital than for firms with capital deficits.

3.9. Computational models

The trade-off model's testable implications are mostly qualitative. For example, the theory predicts that firms with valuable growth opportunities should borrow less, but not how much less. We can quantify one side of the trade-off, by estimating the present value of interest tax shields, but not the other side. The theory does not specify the probability of financial distress as a function of leverage, and it does not quantify the costs of financial distress, except to say that these costs are important.

"Computational" models seek to quantify both sides of the trade-off in a consistent valuation model. The valuation approach is based on option pricing theory, following Black and Scholes (1973), Merton (1974), Black and Cox (1976) and Brennan and Schwartz (1984). The advantages of computational models are stressed in Leland (1998).

Computational models are complex because value and cash flow evolve dynamically. Future investment and financing decisions typically interact because of conflicts of interest between creditors and stockholders. The model-builder must specify dividend payout rules, debt maturity and the rebalancing rule for debt as the value of the firm changes over time. Various parameters must also be specified. Then the model is checked, for example by comparing the computed credit spread – the difference between the computed bond yield and the risk-free interest rate – to spreads for actual bonds.

The payoff is a detailed description of the firm, suitable for numerical experiments. So far the results of these experiments are informative but not conclusive. Some experiments seem to confirm a long-standing criticism of the trade-off model, that at typical debt ratios the costs of financial distress come nowhere close to offsetting the value of additional interest tax shields. Mauer and Triantis (1994, p. 1253) conclude that "the impact of debt financing on the firm's investment and operating decisions

is insignificant". Mello and Parsons (1992) estimate agency costs equal to about 4% of the face value of debt – not a large sum, but perhaps enough to deter some debt issues. Parrino and Weisbach (1999) conclude that distortions in investment due to risk shifting and underinvestment are small. A series of papers by Leland and co-authors consider taxes, agency costs of financing, default and credit risk. The latest model, in Goldstein, Ju and Leland (2001), generates optimal debt ratios and credit spreads that seem realistic.[31]

Computational models have evolved, and arbitrary limiting assumptions in early papers are gradually disappearing. I believe this is an important line of research.

4. The pecking-order theory

The pecking-order theory of Myers and Majluf (1984) and Myers (1984) starts with a firm with assets-in-place and a growth opportunity requiring additional equity financing. Myers and Majluf assume perfect financial markets, except for asymmetric information. Investors do not know the true value of either the existing assets or the new opportunity, so they cannot exactly value the shares issued to finance the new investment. Announcement of the stock issue could be good news for investors if it reveals a growth opportunity with positive NPV. It could also be bad news if managers are trying to issue overvalued shares.

Some firms will have *under*valued shares, however. Issuing shares at too low a price transfers value from existing shareholders to new investors. If managers act in the interest of existing shareholders, they will refuse to issue undervalued shares unless the transfer of value is more than offset by the growth opportunity's net present value (NPV).

Myers and Majluf derive an equilibrium in which firms can issue shares, but only at a marked-down price. Share price falls not because investors' demand for equity securities is inelastic, but because of information inferred from the decision to issue. It turns out that the bad news (about the value of assets in place) always outweighs the good news (about the positive-NPV investment).[32] Some good firms whose assets-in-place are *under*valued at the new price will decide not to issue even if it means passing by a positive-NPV opportunity.

The prediction that announcement of a stock issue will immediately drive down stock price was confirmed by several studies, including Asquith and Mullins (1986). The average fall in price is roughly 3%, that is, 3% of the pre-issue market capitalization of the firm. The price drops are much larger fractions of the amounts issued.

[31] See also Leland (1994, 1998) and Leland and Toft (1996).

[32] This result depends on Myers and Majluf's assumption that the firm will not undertake negative-NPV investments. See Cooney and Kalay (1993).

This price drop should not be interpreted as a transaction cost or compared to the underwriting spreads and other expenses of stock issues. On average, the companies that issue shares do so at a fair price.[33] However, the companies that decide to issue are, on average, worth less than the companies that hold back. Investors downgrade the prices of issuing firms accordingly.

The price drop at announcement should be greater where the information asymmetry (manager's information advantage over outside investors) is large. Dierkens (1991) confirms this using various proxies for information asymmetry. D'Mello and Ferris (2000) show that the price drop is greater for firms followed by few security analysts, and for firms with greater dispersion of analysts' earnings forecasts.

The price drop also depends on the value of growth opportunities vs. assets in place. According to the Myers–Majluf model, growth firms are more credible issuers. Investors' worries concentrate on the possible mis-valuation of assets in place. Several studies, including Pilotte (1992), Denis (1994) and Jung, Kim and Stulz (1996), find that the price impact of stock issue announcements is less for growth firms than for mature firms. In some cases, the average price impact for growth-firm samples is negligible.

4.1. Debt vs. equity in the pecking order

Now suppose the firm can issue either debt or equity to finance new investment. Debt has the prior claim on assets and earnings; equity is the residual claim. Investors in debt are therefore less exposed to errors in valuing the firm. The announcement of a debt issue should have a smaller downward impact on stock price than announcement of an equity issue. For investment-grade issues, where default risk is very small, the stock price impact should be negligible. Eckbo (1986) and Shyam-Sunder (1991) confirm this prediction.

Issuing debt minimizes the managers' information advantage. Optimistic managers, who believe their companies' shares are undervalued, will jump at the chance to issue debt rather than equity. Only pessimistic managers will want to issue equity – but who would buy it? If debt is an open alternative, then any attempt to sell shares will reveal that the shares are not a good buy. Therefore investors will spurn equity issues if debt is available on fair terms, and in equilibrium only debt will be issued. Equity issues will occur only when debt is costly, for example because the firm is already at a dangerously high debt ratio where managers and investors foresee costs of financial

[33] The companies that decide *not* to issue face a kind of transaction cost equal to the difference between the attainable issue price and the true value per share of their assets and growth opportunities.

distress.[34] In this case even optimistic managers may turn to the stock market for financing.

This leads to the pecking-order theory of capital structure:

(1) Firms prefer internal to external finance. (Information asymmetries are assumed relevant only for external financing.)[35]
(2) Dividends are "sticky", so that dividend cuts are not used to finance capital expenditure, and changes in cash requirements are not soaked up in short-run dividend changes. Changes in free cash flow (operating cash flow less investment) show up as changes in external financing.
(3) If external funds are required for capital investment, firms will issue the safest security first, that is, debt before equity. As the requirement for external financing increases, the firm will work down the pecking order, from safe to riskier debt and finally to equity as a last resort, when the firm is sufficiently threatened by financial distress. If internally generated cash flow exceeds capital investment, the firm works up the pecking order. Excess cash is used to pay down debt rather than repurchasing and retiring equity.[36]
(4) The firm's debt ratio therefore reflects its cumulative requirement for external financing.

The preference of public corporations for internal financing, and the relative infrequency of stock issues by established firms, have long been attributed to the separation of ownership and control, and the desire of managers to avoid the "discipline of capital markets". Myers and Majluf suggest a different explanation: market-value maximizing managers will avoid external equity financing if they have better information than outside investors and the investors are rational.

The pecking-order theory explains why the bulk of external financing comes from debt. It also explains why more profitable firms borrow less: not because their target debt ratio is low – in the pecking order they don't have a target – but because profitable firms have more internal financing available. Less profitable firms require more external financing, and consequently accumulate more debt.

[34] The decision to issue equity as a last resort can be modeled exactly as in Myers and Majluf (1984). In this setting, the "growth opportunity" is not a real investment, but an injection of equity to reduce the probability of financial distress. NPV is the reduction in the present value of the costs of financial distress. The firm has to trade off this NPV against the cost of issuing shares that may be undervalued. The decision to raise equity remains, on balance, a bad-news signal for investors.

[35] This assumption is questionable. See Myers and Majluf (1984, Section 4.1, pp. 210–214).

[36] The Myers–Majluf analysis works equally well (in theory) when the firm is distributing cash to investors. Information asymmetry leads to an equilibrium in which the firm is forced to pay down debt rather than repurchasing and retiring equity. See Shyam-Sunder and Myers (1999). However, the amount of cash returned to investors via stock repurchases has grown steadily. Stock repurchase programs are not as sticky as dividend payouts. See Jagannathan, Stephens and Weisbach (2000) and Guay and Harford (2000). Changes in repurchases may displace debt as the marginal source of financing for cash-cow firms. This would undermine the pecking order.

4.2. *What's wrong with the pecking order as theory?*

The pecking order assumes that managers act in the interest of *existing* shareholders, maximizing the value of existing shares. Myers and Majluf (1984) do not show why managers should care if a new stock issue is over- or undervalued, or why managers do not simply maximize the value of the entire firm, regardless of the division of value between existing and new shareholders. This policy would assure optimal capital investment decisions *and* make existing shareholders better off ex ante.

The pecking order is not derived from an explicit treatment of management incentives, as in Ross (1977). In Ross's signaling equilibrium, the design and parameters of the manager's compensation package drive the choice between debt and equity, and the firm's financing decision reveals the managers' information about the intrinsic value of the firm. Dybvig and Zender (1991) present examples of models in which managers have better information than investors, but managers' compensation schemes are fine-tuned to assure optimal capital investment decisions. In one of their setups, the announcement of a stock issue is bad news to investors, just as in the Myers–Majluf analysis. This setup does not generate the pecking order, however. Also, Persons (1994) questions whether shareholders or boards of directors could credibly commit to the optimal compensation schemes that Dybvig and Zender have in mind.

The pecking-order theory cannot explain why financing tactics are not developed to avoid the financing consequences of managers' superior information. For example, suppose that any special information available to the manager today will reach investors within the next year. Then the firm could issue "deferred equity" securities. For example, the firm could issue debt with a face value of $1000, to be repaid after one year by newly issued shares worth $1000 at the year-one stock price.[37] The manager cannot know today whether he or she will view the future price as too high or too low. Therefore issue of this deferred equity conveys no information. (The deferred equity is really debt payable in a particular currency, the firm's shares.) Thus the firm can pre-commit to issue equity with no adverse signal to investors. Why is this type of security not widespread?[38]

One final criticism: Myers and Majluf consider a very simple setting, where the firm's only financing choice is debt vs. equity. The pecking order does not necessarily hold in more complicating settings, for example when the firm also chooses between straight and convertible debt.[39]

[37] In other words, the debt will be converted to N shares, where N is not predetermined, but calculated as $N = 1000/P_1$, where P_1 is the stock price one year hence.

[38] PERCs (Preferred Equity Redemption Certificates), a special kind of convertible preferred stock, are in some ways similar to this deferred equity security, because they convert to a fixed dollar amount of the firm's stock if the stock price rises sufficiently. But otherwise PERCs convert to a fixed number of shares, thus leaving the downside risk to investors.

[39] See Brennan and Kraus (1987), Constantinides and Grundy (1989) and Noe (1988). See also Cadsby, Frank and Maksimovic (1990, 1998), who investigated the pecking order in experimental settings.

4.3. Pecking order vs. the trade-off theory – time-series tests

It's instructive to compare the time-series predictions of the pecking order and trade-off theories. The trade-off theory implies a target-adjustment model. The pecking-order theory says that the debt ratio depends on the firm's cumulative financial deficit – its cumulative requirement for external financing. Shyam-Sunder and Myers (1999) tested these time-series predictions on a panel of 157 firms from 1971 to 1989. They found statistically significant support for *both* the pecking order and a target-adjustment specification of the trade-off theory.

Shyam-Sunder and Myers questioned the statistical power of the target-adjustment specification, however. They calculated what each sample firm's annual debt ratios would have been if the firm had followed the pecking order exactly. They found that the target-adjustment specification worked just as well on these simulated financing decisions as on the real decisions. The trade-off theory, expressed as a target-adjustment model, was "consistent with" financing choices driven solely by the pecking order.

The pecking order generates mean-reverting debt ratios when capital investments are "lumpy" and positively serially correlated, and when free cash flow varies over the business cycle. Firms will tend to have strings of years with financial deficits, followed by strings of surpluses. Financing by the pecking order means that debt ratios increase in deficit years and fall in surplus years. The pecking-order debt ratios will therefore mean-revert, and the target-adjustment model will "explain" financing strategy.

This test was also run in reverse, by simulating firm's debt ratios on the assumption that they gradually adjust to a fixed target ratio. The pecking order was rejected totally on this simulated data. Thus Shyam-Sunder and Myers concluded that their test of the pecking order had statistical power relative to the trade-off-theory alternative, and that the pecking order was the best explanation of the financing behavior of the firms in their sample.[40]

This lesson about statistical power is general. It applies also to cross sectional tests of the trade-off theory. These tests look for statistically significant coefficients on proxies for the determinants of optimal debt ratios. Such results might support the theory if it were the only game in town. But the same results can be observed in a cross-section of firms whose financing decisions are driven solely by the pecking order or by some other theory.[41]

[40] Chirinko and Singha (2000) show that the time-series test used by Shyam-Sunder and Myers would lack power to reject the pecking order if the choice between debt and equity is determined not by a target-adjustment model, but by certain other rules.

[41] Shyam-Sunder and Myers (1999) also regressed the debt ratios generated by their pecking order simulations on some of the typical proxies used in cross-sectional tests of the trade-off theory. The coefficients on the proxies were plausible and significant.

4.4. *Further tests of the trade-off and pecking-order theories*

Frank and Goyal (2003) tested Shyam-Sunder and Myers' (1999) time-series specification for the pecking order on a much larger sample of firms from 1971 to 1998.[42] This specification worked reasonably well for large firms, particularly in the 1970s and 1980s. But Frank and Goyal show that financing behavior is more complicated than the simple pecking order predicts. For example, the coefficient on the financing deficit, which should be 1.0 in the simple pecking order, is at most .325 for the 1990s when estimated for their entire sample.[43] The performance of the pecking order degrades for smaller firms and for firms with data missing for some years.

The financing deficit has hardly any effect on debt issues for small, growth firms, which frequently rely on stock issues for external financing.[44] Frank and Goyal suggest that the pecking order should work especially well for this subsample, where the information asymmetries ought to be largest. But Myers and Majluf (1984) show that the most important asymmetries attach to assets in place. For example, firms with valuable growth opportunities, but minimal assets in place, should be credible issuers. In fact, small growth firms are more likely to issue stock than debt. When they announce a stock issue, the drop in stock price is small.[45]

Firms with few growth opportunities, relative to assets in place, should face the strongest pressures to follow the pecking order. Frank and Goyal find that the pecking order works best for large firms with moderate leverage.[46] But Jung, Kim and Stulz (1996) identify a class of low-growth firms that issue equity despite unused debt capacity and strong negative stock price reactions to the issue announcements. Such issues contradict the pecking order.

Frank and Goyal also find that variables motivated by the trade-off theory help explain changes in debt financing, even after accounting for changes in firms' financial deficits. Large firms with tangible assets borrow more, profitable firms with high market-book ratios borrow less.

Fama and French (2002) test the predictions of both trade-off and pecking-order models on a large panel of firms from 1965 to 1999. They also consider modified versions of the pecking order. As Myers (1984) notes, a firm with valuable future investment opportunities can take action immediately to assure that financing will

[42] Shyam-Sunder and Myers (1999) set out to compare the performance of target-adjustment models to simple expressions of the pecking order. They included only industrial firms with complete financial histories – no gaps in the data required for either model. This forced them to a relatively small sample of 157 firms.

[43] Frank and Goyal (2003, Table 4).

[44] Helwege and Liang (1996) follow a sample of firms after their initial public offerings. These firms did not follow the pecking order.

[45] See Jung, Kim and Stulz (1996) and Pilotte (1992). Denis (1994) finds no stock price drop at all, on average, for a subsample of small, high-growth firms that issue equity.

[46] Fama and French (2002) find that the pecking order works best for dividend-paying firms, which tend to be larger and more conservatively financed.

be available when needed. For example, if there is a window of opportunity when information asymmetries are small, it can make sense to issue shares immediately, violating the strict pecking order, in order to build financial slack for the future. This could explain why growth firms seek equity financing and keep leverage low.[47]

Both theories score some points in Fama and French's tests, but run into serious difficulties. The trade-off theory struggles to explain the strong inverse relationship of profitability and leverage. The pecking order struggles to explain the heavy reliance on equity issues by small growth firms. (Are all of these issues really undertaken to build up financial slack in windows of low information asymmetry?)

Baker and Wurgler (2002) find that issuing firms seem to "time" the market, issuing shares when their stock prices are high and turning to internal finance or debt when prices are low. Consistent pursuit of timing strategies would make debt ratios depend on paths of past stock prices as well as on requirements for external funds. Ritter (2003) calls this the "windows of opportunity" theory. If investors sometimes overprice issuing firms' shares, so that equity is truly cheap, then equity can move temporarily to the top of the pecking order. (There is evidence, summarized by Ritter, that stock issues are overpriced on average.)[48] Thus the windows of opportunity theory could absolve the pecking order of a major empirical shortcoming, provided that one is willing to assume systematic mispricing of new issues, at least in "hot" issue periods.

The reader may be forgiven some confusion at this point. It appears that both the trade-off and pecking-order theories are at work in real life. The economic factors that drive the theories – taxes, costs of financial distress and information asymmetries – clearly are important. Yet each theory stumbles when asked to explain the financing of certain classes of firms.

The stumbles should not be surprising. The theories are conditional, not general; each works better in some conditions than in others.[49] Further progress will require sharper predictions of these conditions. We also need better theory explaining how managers manage financing, acting as agents for shareholders.

5. Agency theories of capital structure

So far we have assumed that the interests of the firm's financial managers and its shareholders are perfectly aligned, and that financing decisions are in the shareholders'

[47] Minton and Wruck (2001) and Lemmon and Zender (2001) find that the most conservatively financed firms do appear to be stockpiling financial slack. See Korajczyk, Lucas and MacDonald (1991) for an analysis of information releases and the timing of equity issues.

[48] "Cheap" means that the price drop on announcement of a share issue is less than predicted by the Myers–Majluf (1984) model. If so, share issues are overpriced on average, and investors in these issues on average end up with substandard risk-adjusted rates of return.

[49] It is tempting to nest the theories, and to hope the data will tell us the relative impacts of taxes, distress costs and information asymmetries on financing. This will not work for cross sections or panels including a wide range of firm types. The data will be Delphic unless sharper hypotheses can be framed.

interest. As Jensen and Meckling (1976) argued, this assumption is implausible in theory and impossible in practice. Corporate managers, as agents for shareholders (the principals), will act in their own interests. They will seek private benefits, including higher-than-market salaries, perquisites, job security and, in extreme cases, direct capture of assets or cash flows.[50] They may make "entrenching investments", which adapt the firm's assets and operations to the managers' skills and knowledge, in order to increase the managers' bargaining power vs. investors.[51] Shareholders can discourage such value transfers by various mechanisms of monitoring and control, including supervision by independent directors and the threat of takeover. But these mechanisms are costly and subject to decreasing returns, so perfect monitoring is out of the question.

Managers' and investors' interests can also be aligned by design of compensation packages. Here again perfection is out of reach. First, the manager never bears the full costs that his or her actions impose on investors – unless, of course, the manager is also the owner. Second, there is no complete, verifiable measure of managers' performance. Investors would like to reward effort, commitment and good decisions, but these inputs are imperfectly observable. Even if good performance on these dimensions were observable by some informed monitor, the performance would not be verifiable. "Complete contracts" cannot be written. A contract offering a bonus for, say, "good decisions" is not enforceable, because the decisions could not be evaluated by a disinterested outsider or by a court of law.

If agency costs are taken seriously, then the trade-off and pecking-order theories seem naive. Each assumes that managers act solely in the interests of the firm's stockholders.

5.1. Jensen and Meckling's pecking order

One expects (or hopes) that principals and agents will arrange financing ex ante to minimize agency costs ex post. Jensen and Meckling (1976) consider the following trade-offs. Start with a firm owned entirely by its managers and employees. Agency costs should be minimal, because the costs of private benefits are internalized. If the firm subsequently needs external financing, debt is better than equity. With debt, the costs of private benefits stay internalized. Issuing "outside equity" would create agency costs, because the costs of private benefits are borne partly by the new stockholders, while the benefits are retained by the "inside" stockholders. As the amount of debt

[50] There can also be non-pecuniary private benefits, such as reputation or the personal satisfactions of running a corporate empire. Such benefits also generate agency costs if they tempt managers to make poor decisions.

[51] See Shleifer and Vishny (1989). Berger, Ofek and Yermack (1997) find an inverse relationship between leverage and several measures of managerial entrenchment. They also find that events that ought to reduce entrenchment generally lead to increased leverage. Garvey and Hanka (1999) find that legal changes that protect firms from takeovers lead to lower leverage.

expands, however, default risk increases, leading to conflicts between lenders and stockholders and costs of financial distress. These costs eventually force a shift to outside equity.

This is a pecking order, because the firm prefers internal to external finance, and prefers debt to outside equity until debt becomes so risky and costly that managers turn to outside equity as a last resort.

Jensen and Meckling's pecking order makes the most sense for smaller firms where managers and employees can own a large fraction of the firm's shares. It is less credible for larger companies that must seek outside equity. For most public companies, managers and employees do not have sufficient wealth to own more than a small fraction of the firm.[52] Separation of ownership and control is a fact of life, and attention must shift to mechanisms of control and to compensation and incentives, particularly the use of stock ownership or options to motivate managers.

Going public to raise outside equity also has advantages that can upset this agency-based pecking order. Public companies can use their shares as a currency to compensate managers – a currency whose value is determined not just by earnings from assets in place, but also by growth opportunities. Compensation by stock or options therefore gives incentives to create growth opportunities.

If outside equity is needed, the firm faces a choice between private equity, e.g., from venture-capital partnerships, and equity from public stock markets. Private equity investors face lower costs of monitoring, and thus should be the efficient source of equity financing in Jensen and Meckling's pecking order. But Myers (2000) and Burkhart, Gromb and Panunzi (1997) stress the importance of *not* giving equity investors too much power over managers or employees. Incentives for effort and risk-taking are weakened if shareholders can set compensation after the fact. Myers argues that growth firms "go public" in order to *reduce* the power of equity investors and to preserve incentives.

Jensen and Meckling's pecking order applies more generally in countries where outside investors are poorly protected. La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998, 2000) find that weak institutional or legal protection for investors impedes external financing and forces corporations to rely mostly on inside equity and debt (usually bank) financing. An agency-based pecking order predicts this outcome when effective monitoring and control by outside equity investors is impossible or prohibitively costly. La Porta, Lopez-de-Silanes and Shleifer (1999), in a survey of 27 developed countries, find that few firms are widely held, except in a handful of countries with good shareholder protection. Most firms are controlled by families or governments.

[52] Some public companies' shares include concentrated block-holdings. The market value of such companies seems to increase with block size, other things equal. Very large blocks seem to depress value, however. See Morck, Shleifer and Vishny (1988).

5.2. *Free cash flow, leveraged buyouts and restructurings*

Jensen (1986, p. 323) later turned to a simpler idea, expressed in a brief but widely cited note: "The problem is how to motivate managers to disgorge the cash rather than investing it below the cost of capital or wasting it on organizational inefficiencies". The solution to this problem can, in some circumstances, be debt financing.

Debt is a contract that forces the firm to pay out cash. A high debt ratio can be dangerous, but it can also add value by putting the firm on a diet and curbing overinvestment. Stulz (1990) presents a model of how the diet works. He assumes that managers will always invest free cash flow, even in negative-NPV projects, unless the cash is required for debt service. The ideal level of debt (and debt service) leaves just enough cash to fund all – and only – positive-NPV projects. Thus leverage should depend on the investment opportunity set. Firms with valuable growth opportunities should choose low debt ratios to free up cash for expansion. Firms with limited growth opportunities should operate at high debt ratios to constrain management.

But what prevents the empire-building managers from (1) servicing previously issued debt, (2) raising more capital by selling shares, and (3) investing as they like? Perhaps the discipline comes from the threat of takeover, as in Zwiebel (1996). Linking top management's compensation to stock price (by stock options, for example) could also work. The announcement of a stock issue by a firm with limited growth opportunities should trigger an immediate drop in stock price. In fact leverage does appear to constrain investment.[53]

The LBOs of the 1980s were of course the classic examples of diet deals, in which debt ratios were set ahead of time to constrain investment (or force disinvestment). Here Jensen's and Stulz's arguments seem to apply exactly.

Contemporary accounts attributed various motives to the LBO organizers and investors: interest tax shields [Kaplan (1989)], artificially high junk bond prices [Kaplan and Stein (1993)], wealth transfer from existing bondholders, and attempts by raiders to capture value accruing to employees and other "stakeholders" [Shleifer and Summers (1988)]. There is some truth in each of these attributions, but with a decade's hindsight, it seems clear that the LBOs were first and foremost attempts to solve Jensen's free-cash-flow problem. They were shock therapy designed to cut back wasteful investment, force sale of underutilized assets, and to generate cash for investors.

Debt plays a similar role in leveraged restructurings, where a public firm all at once borrows a large fraction of the value of its assets and pays out the proceeds to stockholders. Wruck (1995) provides a fascinating case study of the leveraged restructuring at Sealed Air Corporation.

[53] See Lang, Ofek and Stulz (1996), Hanka (1998) and Peyer and Shivdasani (2001).

5.3. Is there a general free-cash-flow theory of capital structure?

Jensen's free-cash-flow problem is real. Many managers would like the freedom to overinvest and would prefer to operate at low debt ratios. There is no evidence that public corporations generally over-invest, however, or that debt issues generally add value by disciplining management. McConnell and Muscarella (1985) found that capital investments are generally viewed as good news, that is, positive-NPV, by investors. Shyam-Sunder (1991) and Eckbo (1986) found that announcements of debt issues had no significant effect on stock prices, even for junk debt issues, where the risk of default, and the pressure on managers to "disgorge cash", are high.[54, 55] Many of these debt issues may have been routine refinancings, however. Replacing one junk debt issue with another does not force management to disgorge any additional cash.

The free-cash-flow theory is best regarded as another conditional view of capital structure. The theory explains why cash-cow firms with few growth opportunities are candidates for LBOs or HLTs, and why small, growth firms are not. It may explain the higher debt ratios observed for large, mature firms. The higher the expected future costs of overinvestment, the greater the probability of a takeover followed by an increase in debt. Even unsuccessful takeovers may force a shift in financing, as in the leveraged restructurings of several major oil companies when threatened by takeover in the 1980s.[56] Some managers will voluntarily shift to high debt ratios, as in the Sealed Air case described by Wruck (1995).

But Jensen's (1986) free-cash-flow theory does not provide a principal-agent model of the incentives and actions of managers, except to say that they are prone to overinvest. It is really a theory about the consequences of high debt ratios in mature, cash-cow firms – and perhaps also a normative theory about how managers of such firms *should* arrange financing, given the financial objective of maximizing shareholder value.

6. What next?

Most research on corporate financing decisions considers the trade-off, pecking-order or free-cash-flow theories. My review necessarily concentrates on these theories.

[54] Pilotte (1992) does find negative announcement effects on the stock prices of firms issuing risky debt, but the price drops are much smaller than for equity issues.

[55] Several authors, starting with Masulis (1980) find that equity-for-debt exchange offers are bad news for investors (negative announcement effects) and debt-for-equity exchange offers good news. These effects are best interpreted as reactions to the repurchase or issue of equity, not to the issue or retirement of debt. Lie, Lie and McConnell (2001) find that equity-for-debt exchanges are undertaken by financially distressed firms. This is consistent with pecking-order theory, in which equity is issued as a last resort. See footnote 34 above.

[56] Safieddine and Titman (1999) find that leverage increases for targets of unsuccessful takeovers. The higher leverage can be part of the takeover defense, and may reflect the managers' perception of increased vulnerability to further takeover attacks.

There are convincing examples of all three theories at work. The economic problems and incentives that drive the theories – taxes, information and costs of agency and distress – show up clearly in financing tactics. Yet none of the theories gives a general explanation of financing strategy. They are plausible as conditional theories, but we have only a partial understanding of the conditions under which each theory, or some combination of the theories, works.

Zingales (2000) says that we need "new foundations" for corporate finance. The foundations will require a deeper understanding of the motives and behavior of managers and employees of the firm. I close with examples of research directed to this requirement.

6.1. Compensation and incentives

All of the standard theories of financing start by assuming that the manager pursues a simple objective. Managers' actual objectives depend on how they are rewarded for their actions.

Ross (1977) was first to show how financing choices could signal managers' inside information to investors. Suppose investors do not know how confident managers are about the future profitability and value of their firms. If managers' compensation is based in part on today's stock price, and if costs of financial distress make higher leverage a potentially costly signal, then a signaling equilibrium can be reached in which the more confident managers choose higher leverage. Firm value therefore increases with leverage because of information conveyed by financing. (MM's Proposition 1 would hold in other respects, however. For example, the cost of capital for real investment would be unaffected.)

Dybvig and Zender (1991) follow up with further examples showing how information asymmetry need not interfere with optimal real investment decisions, provided the manager's incentives are set optimally.

These points are important. Theorists should not make ad hoc assumptions about managers' objectives, particularly when those assumptions imply inefficiencies. There must be significant value gains from setting incentives optimally. But as yet there is no signaling or incentive-driven theory of capital structure that is meaningfully differentiated from the theories reviewed above. One reason, perhaps, is that the nature of optimal compensation for managers varies by firm type.

The first objective of compensation should be incentives for value-maximizing real investment and operating decisions. Decisions about the left-hand side of the balance sheet are more important than financing decisions for the value of the firm. The nature of efficient compensation schemes should vary from firm to firm, however. For example, one would expect growth firms to give more weight to stock price, mature firms more weight to current earnings. But compensation schemes focused on the left-hand side of the balance sheet may, as a by-product, create financing incentives that

vary widely across firms. Researchers should consider how differences in managers' actual incentives lead to differences in financing.[57]

But we cannot fully understand financing choices just by writing down the CEO's utility function or the parameters of the CEO's compensation package. Most studies of capital structure focus on public corporations. These firms act as organizations, not individuals. They presumably act in the interests of a coalition of the managers or employees who make, or are affected by, investment and financing decisions. The firm acts to maximize the value of the current and future benefits flowing to this coalition.[58]

6.2. Human capital and financing

We are used to thinking of managers as the agents of stockholders. But managers and employees also invest their human capital. The investment comes in the form of personal risk-taking, sweat equity (working extra-hard for less than an outside wage) and by specialization of human capital to the firm. Of course the services of human capital can be withdrawn from the firm at any time.

A general financial theory of the firm would model the *co-investment* of human and financial capital.[59] A start has been made on such a theory, by research focused primarily on the conditions under which insiders can raise financing from outside investors when insiders can extract cash or private benefits after the investment is made. For example, Hart and Moore (1994, 1998) consider an entrepreneur who cannot commit to stay with a new venture or to work effectively in it. No contract can mandate the entrepreneur's participation and effort, and there is no way to verify whether cash flow is appropriately distributed or reinvested. But the venture requires a real asset in addition to human capital. The outside investors cannot reach the entrepreneur's human capital, but can take the asset and shut down the business. In fact that is their only property right.

Hart and Moore show that debt financing is optimal in this setting. Equity does not work. (If equity were issued, it would become the functional equivalent of debt. Outside investors can never extract more than the value of the real asset.) Thus the firm ends up at the bottom of Jensen and Meckling's (1976) pecking order, with a combination of inside equity – perhaps just the entrepreneur's human capital – and outside debt.

[57] An interesting recent paper by Lewellen (2002) estimates the risk-adjusted present values of compensation packages for top managers at nearly 2000 USA firms. She calculates how changes in leverage would have affected these values, thereby estimating the managers' incentives to issue or retire debt. These incentives predict financing choices. For example, firms are more likely to issue debt rather than equity when the volatility created by additional financial leverage would impose higher costs on risk-averse managers.

[58] See Treynor (1981), Donaldson (1984) and Myers (2000).

[59] The importance of co-investment by insiders and outside investors is stressed in Zingales (2000) and Myers (1999, 2000).

These and related papers[60] make no clear predictions about financing in practice, but they do put financing in a deeper and richer economic setting.[61] Three fundamental points emerge. First, when human capital is important to the firm, financing should be arranged to assure the humans' efficient participation. Second, even when managers and investors have all the same information, outside investors are not able to verify all relevant actions or outcomes in the firm. Contracts based on such outcomes or actions are not feasible. Third, because complete contracts cannot be written, financing must specify *control rights* as well as cash-flow rights.

Traditional capital structure theories focus on cash-flow rights, that is, the division of the value of the future cash flows generated by the firm. Modigliani and Miller (1958), for example, say that the division makes no difference. But securities are packages of cash-flow and control rights. Debt has fixed cash-flow rights and no control rights except in default. Equity has residual cash-flow rights and complete control rights so long as the firm does not default. Of course the exercise of control rights may be costly. For example, the dispersed stockholders of a public firm must overcome costs of collective action before their control rights can be exercised.

The study of capital structure in this richer economic setting is in infancy. Most work assumes inside equity – perhaps just the human capital contributed by the entrepreneur – and outside debt. There are only a handful of consistent models of outside equity, including Myers (2000) and Fluck (1998). These models must now be generalized to include debt vs. equity financing.[62]

6.3. Exporting capital-structure theory

The leading theories of financing all assume that firms have access to reasonably well-functioning capital markets and to modern financial institutions. This assumption is not always true. It may not hold for small, private firms in the USA. It clearly does not hold in many other countries. For example, in countries with limited public capital markets, firms may be forced to rely on bank debt. Levels of bank debt would reveal cumulative requirements for external financing. The debt ratio would not be a strategic choice, but an end result forced by market imperfections.

We are used to thinking of markets and institutions adapting to the financing needs and objectives of corporations. But in many countries adaptation is blocked by severe

[60] See also Diamond (1984), Bolton and Scharfstein (1990) and Aghion and Bolton (1992). Gale and Hellwig (1985) and Townsend (1979) analyze debt in a setting with costly state verification (outcomes can be verified if investors are willing to incur a cost to do so).

[61] See Hart (1995). Hart (2001) reviews research on financial contracting and relates it to research on the traditional theories of capital structure.

[62] Fluck (2001) presents a life-cycle model that distinguishes optimal financing of a startup from financing of an established firm. The startup relies primarily on equity, short-term debt or convertible debt. The established firm turns to retained earnings and long-term debt. Dybvig and Wang (2002) model the trade-off of debt vs. outside equity for an entrepreneur.

agency problems or by government restrictions. Nevertheless, public stock markets exist in nearly every country. Some companies are able to raise outside equity, even in emerging economies where protection for outside investors is poor.[63]

Most capital-structure theory was developed for public USA corporations. Even in that well-structured setting, no general theory of capital structure emerges. We have only conditional theories, and no definite specification of the conditions under which the theories work empirically. Export of the theories to emerging markets may therefore seem premature and foolhardy.

It depends on what "export" means. We can confidently identify the factors that drive financing: agency costs, information differences, distress costs and distorting taxes and regulations.[64] These factors should be stronger in emerging economies than "at home" in countries with well-developed financial markets and institutions. The impacts of these factors on financing choices should be more pronounced in emerging economies, and the chances for meaningful advances in understanding correspondingly greater. For example: if the object is testing or improving an agency theory of financing, it makes sense to investigate financing where agency problems are most severe.

Export of the *ideas* underlying the standard theories of optimal financing decisions should therefore be highly informative. Do not expect any simple, general theory, however. Financing is half of the field of corporate finance. If half of a broad field can be compressed into a simple equation or two, then the field itself cannot be very interesting. If this compression is in fact achieved, I will be sorely disappointed.

References

Aghion, P., and P. Bolton (1992), "An incomplete contracts approach to financial contracting", Review of Economic Studies 59:473–393.

Alexander, G.J., A.K. Edwards and M.G. Ferri (2000), "What does Nasdaq's high-yield bond market reveal about bondholder–stockholder conflicts?", Financial Management 29:23–39.

Andrade, G., and S.N. Kaplan (1998), "How costly is financial (not economic) distress? Evidence from highly leveraged transactions that became distressed", Journal of Finance 53:1443–1493.

Asquith, P., and D.W. Mullins Jr (1986), "Equity issues and offering dilution", Journal of Financial Economics 15:61–89.

Asquith, P., and T. Wizman (1990), "Event risk, covenants and bondholder risk in leveraged buyouts", Journal of Financial Economics 27:195–214.

[63] The staying power of such financing is questionable, however, when protection for outside investors is poor. For example, the East Asian financial crisis of 1997–1998 was most damaging to countries and companies with poor corporate governance. See Johnson, Boone, Breach and Friedman (2000), Mitton (2002) and Rajan and Zingales (1998).

[64] Booth et al. (2001), who examine a sample of firms in ten developing economies, find that debt ratios are correlated with most of the same factors that "work" in the USA and in other developed countries. For example, long-term debt ratios are lower for more profitable companies holding fewer tangible assets. This paper suggests that export of capital structure theories will be feasible, but does not distinguish the theories; it finds at least some evidence consistent with all of them.

Auerbach, A. (1985), "Real determinants of corporate leverage", in: B.M. Friedman, ed., Corporate Capital Structures in the United States (The University of Chicago Press, Chicago) pp. 301–324.
Baker, M., and J. Wurgler (2002), "Market timing and capital structure", Journal of Finance 57:1–32.
Barclay, M.J., and C.W. Smith Jr (1995a), "The maturity structure of corporate liabilities", Journal of Finance 50:899–917.
Barclay, M.J., and C.W. Smith Jr (1995b), "The priority structure of corporate liabilities", Journal of Finance 50:609–631.
Barclay, M.J., and C.W. Smith Jr (1999), "The capital structure puzzle: another look at the evidence", Journal of Applied Corporate Finance 12:8–20.
Barclay, M.J., C.W. Smith Jr and R.L. Watts (1995), "The determinants of corporate leverage and dividend policies", Journal of Applied Corporate Finance 7:4–19.
Baskin, J. (1989), "An empirical examination of the pecking order hypothesis", Financial Management 18:26–35.
Berger, P., E. Ofek and D. Yermack (1997), "Managerial entrenchment and capital structure decisions", Journal of Finance 52:1411–1438.
Bertrand, M., and A. Schoar (2002), "Managing with style: the effect of managers on firm policies", Working Paper (University of Chicago, IL; MIT, MA).
Black, F. (1986), "Noise", Journal of Finance 41:529–543.
Black, F. (1993), "Beta and return", Journal of Portfolio Management 20:8–18.
Black, F., and J.C. Cox (1976), "Valuing corporate securities: some effects of bond indenture provisions", Journal of Finance 31:351–367.
Black, F., and M. Scholes (1973), "The pricing of options and corporate liabilities", Journal of Political Economy 81:637–654.
Bolton, P., and D. Scharfstein (1990), "A theory of predation based on agency problems in financial contracting", American Economic Review 80:93–106.
Booth, L., V. Aivazian, A. Demirguc-Kunt and V. Maksimovic (2001), "Capital structures in developing countries", Journal of Finance 56:87–130.
Brealey, R.A., and S.C. Myers (2003), Principles of Corporate Finance, 7th Edition (Irwin/McGraw-Hill, Burr Ridge, IL).
Brennan, M., and A. Kraus (1987), "Efficient financing under asymmetric information", Journal of Finance 42:1225–1243.
Brennan, M., and E. Schwartz (1984), "Corporate income taxes, valuation and the problem of optimal capital structure", Journal of Business 51:103–114.
Burkhart, M., D. Gromb and F. Panunzi (1997), "Large shareholders, monitoring and the value of the firm", Quarterly Journal of Economics 112:693–728.
Cadsby, C.B., M. Frank and V. Maksimovic (1990), "Pooling, separating and semi-separating equilibria in financial markets", Review of Financial Studies 3:341–367.
Cadsby, C.B., M. Frank and V. Maksimovic (1998), "Equilibrium dominance in experimental financial markets", Review of Financial Studies 11:189–232.
Carow, K.A., G.R. Erwin and J.J. McConnell (1999), "Survey of U.S. corporate financing innovations: 1970–1997", Journal of Applied Corporate Finance 12:55–69.
Chevalier, J.A. (1995a), "Capital structure and product-market competition: empirical evidence from the supermarket industry", American Economic Review 58:415–435.
Chevalier, J.A. (1995b), "Do LBO supermarkets charge more? An empirical analysis of the effects of LBOs on supermarket pricing", Journal of Finance 50:1095–1112.
Chevalier, J.A., and D.S. Scharfstein (1996), "Capital-market imperfections and countercyclical markups: theory and evidence", American Economic Review 86:703–725.
Chirinko, R.S., and A.R. Singha (2000), "Testing static tradeoff against pecking order models of capital structure: a critical comment", Journal of Financial Economics 58:417–425.
Constantinides, G., and B. Grundy (1989), "Optimal investment with stock repurchase and financing as signals", Review of Financial Studies 2:445–466.

Cooney Jr, J.W., and A. Kalay (1993), "Positive information from equity issue announcements", Journal of Financial Economics 33:149–172.

Cornell, B., and A.C. Shapiro (1987), "Corporate stakeholders and corporate finance", Financial Management 16:5–14.

Denis, D.J. (1994), "Investment opportunities and the market reaction to equity offerings", Journal of Financial and Quantitative Analysis 29:159–177.

Diamond, D. (1984), "Financial intermediation and delegated monitoring", Review of Economic Studies 51:393–414.

Dierkens, N. (1991), "Information asymmetry and equity issues", Journal of Financial and Quantitative Analysis 26:181–199.

D'Mello, R., and S.P. Ferris (2000), "The information effects of analyst activity at the announcement of new equity issues", Financial Management 29:78–95.

Donaldson, G. (1984), Managing Corporate Wealth: The Operation of a Comprehensive Financial Goals System (Praeger, New York).

Dybvig, P.H., and Y. Wang (2002), "Debt and equity", Working Paper (Washington University in St. Louis).

Dybvig, P.H., and J.F. Zender (1991), "Capital structure and dividend irrelevance with asymmetric information", Review of Financial Studies 4:201–219.

Eckbo, E. (1986), "The valuation effects of corporate debt offerings", Journal of Financial Economics 15:119–152.

Fama, E.F. (1978), "The effects of a firm's financing and investment decisions on the welfare of its security holders", American Economic Review 68:272–284.

Fama, E.F., and K.R. French (1998), "Taxes, financing decisions, and firm value", Journal of Finance 53:819–843.

Fama, E.F., and K.R. French (2002), "Testing trade-off and pecking order predictions about dividends and debt", Review of Financial Studies 15:1–33.

Finnerty, J.D., and D.R. Emery (2002), "Corporate securities innovation: an update", Journal of Applied Finance 12:21–47.

Fischer, E.O., R. Heinkel and J. Zechner (1989), "Dynamic capital structure choice: theory and tests", Journal of Finance 44:19–40.

Fluck, Z. (1998), "Optimal financial contracting: debt vs. outside equity", Review of Financial Studies 11:383–418.

Fluck, Z. (2001), "Financial contracting in start-ups and ongoing firms: a life-cycle theory", Working Paper (Michigan State University).

Frank, M., and V. Goyal (2003), "Testing the pecking order theory of capital structure", Journal of Financial Economics 67:217–248.

Franks, J.R., and W.N. Torous (1994), "How shareholders and creditors fare in workouts and chapter 11 reorganizations", Journal of Financial Economics 35:349–370.

Gale, D., and M. Hellwig (1985), "Incentive-compatible debt contracts: the one-period problem", Review of Economic Studies 52:647–669.

Garvey, G.T., and G. Hanka (1999), "Capital structure and corporate control: the effect of antitakeover statutes on firm leverage", Journal of Finance 54:519–545.

Gaver, J.J., and K.M. Gaver (1993), "Additional evidence on the association between the investment opportunity set and corporate financing, dividend and compensation policies", Journal of Accounting and Economics 16:125–160.

Gilson, S.C. (1997), "Transactions costs and capital structure choice: evidence from financially distressed firms", Journal of Finance 52:161–196.

Goldstein, R., N. Ju and H. Leland (2001), "An EBIT-based model of dynamic capital structure", Journal of Business 74:483–512.

Goyal, V.K., K. Lehn and S. Racic (2002), "Growth opportunities and corporate debt policy: the case of the U.S. defense industry", Journal of Financial Economics 64:35–59.

Graham, J.R. (1996), "Debt and the marginal tax rate", Journal of Financial Economics 41:41–73.
Graham, J.R. (2000), "How big are the tax benefits of debt?", Journal of Finance 55:1901–1941.
Guay, W., and J. Harford (2000), "The cash-flow permanence and information content of dividend increases versus repurchases", Journal of Financial Economics 57:385–415.
Gul, F.A. (1999), "Growth opportunities, capital structure and dividend policies in Japan", Journal of Corporate Finance 5:141–168.
Hanka, G. (1998), "Debt and the terms of employment", Journal of Financial Economics 48:245–282.
Harris, M., and A. Raviv (1991), "The theory of capital structure", Journal of Finance 46:297–355.
Hart, O. (1995), Firms, Contracts and Capital Structure (Oxford University Press, Oxford, UK).
Hart, O. (2001), "Financial contracting", Journal of Economic Literature 34:1079–1100.
Hart, O., and J. Moore (1994), "A theory of debt based on the inalienability of human capital", Quarterly Journal of Economics 109:841–879.
Hart, O., and J. Moore (1998), "Default and renegotiation; a dynamic model of debt", Quarterly Journal of Economics 113:1–41.
Helwege, J., and N. Liang (1996), "Is there a pecking order? Evidence from a panel of IPO firms", Journal of Financial Economics 40:429–458.
Hovakimian, A., T. Opler and S. Titman (2001), "The debt-equity choice", Journal of Financial and Quantitative Analysis 36:1–24.
Irvine, P., and J. Rosenfeld (2000), "Raising capital using monthly income preferred stock: market reaction and implications for capital structure theory", Financial Management 29:5–20.
Jagannathan, M., C.P. Stephens and M.S. Weisbach (2000), "Financial flexibility and the choice between dividends and stock repurchases", Journal of Financial Economics 57:355–384.
Jalilvand, A., and R.S. Harris (1984), "Corporate behavior in adjusting to capital structure and dividend targets: an econometric study", Journal of Finance 39:127–145.
Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance and takeovers", American Economic Review 76:323–329.
Jensen, M.C., and W.H. Meckling (1976), "Theory of the firm: managerial behavior, agency costs and ownership structure", Journal of Financial Economics 3:305–360.
Johnson, S., P. Boone, A. Breach and E. Friedman (2000), "Corporate governance in the East Asian financial crisis", Journal of Financial Economics 58:141–186.
Jung, K., Y. Kim and R. Stulz (1996), "Timing, investment opportunities and the security issue decision", Journal of Financial Economics 42:159–185.
Kaplan, S.N. (1989), "Management buyouts: evidence on taxes as a source of value", Journal of Financial Economics 44:611–632.
Kaplan, S.N., and J. Stein (1993), "The evaluation of buyout structure and pricing (or, what went wrong in the 1980s)", Journal of Applied Corporate Finance 6:72–88.
Kavenock, D., and G.M. Phillips (1997), "Capital structure and product market behavior: an examination of plant exit and investment decisions", Review of Financial Studies 10:767–803.
Khanna, A., and J.J. McConnell (1998), "MIPS, QUIPS AND TOPrS: old wine in new bottles", Journal of Applied Corporate Finance 11:39–44.
Korajczyk, R.A., D. Lucas and R.L. MacDonald (1991), "The effect of information releases on the pricing and timing of equity issues", Review of Financial Studies 4:685–708.
La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R.W. Vishny (1997), "Legal determinants of external finance", Journal of Finance 52:1131–1150.
La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R.W. Vishny (1998), "Law and finance", Journal of Political Economy 106:1113–1155.
La Porta, R., F. Lopez-de-Silanes and A. Shleifer (1999), "Corporate ownership around the world", Journal of Finance 54:471–517.
La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R.W. Vishny (2000), "Agency problems and dividend policies around the world", Journal of Finance 55:1–33.

Lambrecht, B.M. (2001), "The impact of debt financing on entry and exit in a duopoly", Review of Financial Studies 14:765–804.

Lang, L., E. Ofek and R.M. Stulz (1996), "Leverage, investment, and firm growth", Journal of Financial Economics 40:3–29.

Leland, H. (1994), "Corporate debt value, bond covenants, and optimal capital structure", Journal of Finance 49:1213–1252.

Leland, H.E. (1998), "Agency costs, risk management and capital structure", Journal of Finance 53: 1213–1244.

Leland, H.E., and K. Toft (1996), "Optimal capital structure, endogenous bankruptcy and the term structure of credit spreads", Journal of Finance 51:987–1019.

Lemmon, M.L., and J.F. Zender (2001), "Looking under the lamppost: an empirical examination of the determinants of capital structure", Working Paper (University of Utah).

Lerner, J. (2002), "Where does state street lead? A first look at finance patents, 1971–2000", Journal of Finance 57:901–930.

Lewellen, K. (2002), "Financing decisions when managers are risk averse", Working Paper (University of Rochester).

Lie, E., H.J. Lie and J.J. McConnell (2001), "Debt-reducing exchange offers", Journal of Corporate Finance 7:179–207.

Long, M.S., and I.B. Malitz (1985), "Investment patterns and financial leverage", in: B.M. Friedman, ed., Corporate Capital Structures in the United States (University of Chicago Press, Chicago) pp. 325–351.

MacKie-Mason, J.K. (1990), "Do taxes affect corporate financing decisions?", Journal of Finance 45:1471–1493.

Maksimovic, V., and G. Phillips (1998), "Efficiency of bankrupt firms and industry conditions: theory and evidence", Journal of Finance 53:1495–1532.

Maksimovic, V., and S. Titman (1991), "Financial policy and reputation for product quality", Review of Financial Studies 4:175–200.

Marais, L., K. Schipper and A. Smith (1989), "Wealth effects of going private for senior securities", Journal of Financial Economics 23:155–191.

Masulis, R.W. (1980), "The effects of capital structure change on security prices: a study of exchange offers", Journal of Financial Economics 8:139–178.

Mauer, D.C., and A.J. Triantis (1994), "Interactions of corporate financing and investment decisions: a dynamic framework", Journal of Finance 49:1253–1277.

McConnell, J.J., and C. Muscarella (1985), "Corporate capital expenditure decisions and the value of the firm", Journal of Financial Economics 14:399–422.

Mello, A., and J. Parsons (1992), "Measuring the agency cost of debt", Journal of Finance 47:1887–1904.

Merton, R. (1974), "On the pricing of corporate debt: the risk structure of interest rates", Journal of Finance 29:449–470.

Miles, J., and R. Ezzell (1980), "The weighted average cost of capital, perfect markets and project life: a clarification", Journal of Financial and Quantitative Analysis 15:719–730.

Miller, M.H. (1977), "Debt and taxes", Journal of Finance 32:261–276.

Miller, M.H. (1989), "The Modigliani–Miller propositions after thirty years", Journal of Applied Corporate Finance 2:6–18.

Miller, M.H., and F. Modigliani (1966), "Some estimates of the cost of capital to the electric utility industry, 1954–57", American Economic Review 56:333–391.

Minton, B.A., and K.H. Wruck (2001), "Financial conservatism: evidence on capital structure from low leverage firms", Working Paper (Ohio State University).

Mitton, T. (2002), "A cross-firm analysis of the impact of corporate governance on the East Asian financial crisis", Journal of Financial Economics 64:215–241.

Modigliani, F. (1982), "Debt, dividend policy, taxes, inflation and market valuation", Journal of Finance 37:255–273.

Modigliani, F., and M.H. Miller (1958), "The cost of capital, corporate finance, and the theory of investment", American Economic Review 48:261–297.
Modigliani, F., and M.H. Miller (1963), "Corporate income taxes and the cost of capital: a correction", American Economic Review 53:443–453.
Morck, R., A. Shleifer and R. Vishny (1988), "Management ownership and market valuation: an empirical analysis", Journal of Financial Economics 20:293–316.
Morellec, E. (2001), "Asset liquidity, capital structure, and secured debt", Journal of Financial Economics 61:173–206.
Myers, S.C. (1977), "Determinants of corporate borrowing", Journal of Financial Economics 5:147–175.
Myers, S.C. (1984), "The capital structure puzzle", Journal of Finance 39:575–592.
Myers, S.C. (1999), "Financial architecture", European Financial Management 5:133–141.
Myers, S.C. (2000), "Outside equity", Journal of Finance 55:1005–1037.
Myers, S.C. (2001), "Capital structure", Journal of Economic Perspectives 15:81–102.
Myers, S.C., and N.S. Majluf (1984), "Corporate financing and investment decisions when firms have information that investors do not have", Journal of Financial Economics 13:187–221.
Myers, S.C., and R. Rajan (1998), "The paradox of liquidity", Quarterly Journal of Economics 113: 733–771.
Myers, S.C., D.A. Dill and A.J. Bautista (1976), "Valuation of financial lease contracts", Journal of Finance 31:799–819.
Noe, T. (1988), "Capital structure and signaling game equilibria", Review of Financial Studies 1: 331–356.
Parrino, R., and M.S. Weisbach (1999), "Measuring investment distortions arising from stockholder–bondholder conflicts", Journal of Financial Economics 53:3–42.
Persons, J.C. (1994), "Renegotiation and the impossibility of optimal investment", Review of Financial Studies 7:419–449.
Persons, J.C., and V.A. Warther (1997), "Boom and bust patterns in the adoption of financial innovations", Review of Financial Studies 10:939–967.
Peyer, U.C., and A. Shivdasani (2001), "Leverage and internal capital markets: evidence from leveraged recapitalizations", Journal of Financial Economics 59:477–515.
Phillips, G.M. (1995), "Increased debt and industry product markets, an empirical analysis", Journal of Financial Economics 37:189–238.
Pilotte, E. (1992), "Growth opportunities and the stock price response to new financing", Journal of Business 65:371–395.
Pulvino, T.C. (1998), "Do asset fire sales exist: an empirical investigation of commercial aircraft transactions", Journal of Finance 53:939–978.
Rajan, R.G., and L. Zingales (1995), "What do we know about capital structure? Some evidence from international data", Journal of Finance 50:1421–1460.
Rajan, R.G., and L. Zingales (1998), "Which capitalism? Lessons from the East Asian Crisis", Journal of Applied Corporate Finance 11:40–48.
Ritter, J. (2003), "Investment banking and security issuance", in: G.M. Constantinides, M. Harris and R.M. Stulz, eds., Handbook of the Economics of Finance, Vol. 1A (Elsevier, Amsterdam) Chapter 5, this volume.
Ross, S.A. (1977), "The determination of financial structure: the incentive-signalling approach", Bell Journal of Economics 8:23–40.
Safieddine, A., and S. Titman (1999), "Leverage and corporate performance: evidence from unsuccessful takeovers", Journal of Finance 54:547–580.
Schallheim, J.S. (1994), Lease or Buy: Principles for Sound Decisionmaking (Harvard Business School Press, Boston, MA).
Shleifer, A., and L. Summers (1988), "Breach of trust in hostile takeovers", in: A.J. Auerbach, ed., Corporate Takeovers: Causes and Consequences (University of Chicago Press, Chicago, IL).

Shleifer, A., and R. Vishny (1989), "Management entrenchment: the case of manager-specific investments", Journal of Financial Economics 25:123–140.
Shleifer, A., and R. Vishny (1992), "Liquidation values and debt capacity: a market equilibrium approach", Journal of Finance 47:1343–1366.
Shyam-Sunder, L. (1991), "The stock price effect of risky versus safe debt", Journal of Financial and Quantitative Analysis 26:549–558.
Shyam-Sunder, L., and S.C. Myers (1999), "Testing static tradeoff against pecking order models of capital structure", Journal of Financial Economics 51:219–244.
Smith Jr, C.W., and J. Warner (1979), "On financial contracting: an analysis of bond covenants", Journal of Financial Economics 7:117–161.
Smith Jr, C.W., and R.L. Watts (1992), "The investment opportunity set and corporate financing, dividend and compensation policies", Journal of Financial Economics 32:263–292.
Stulz, R. (1990), "Managerial discretion and optimal financing policies", Journal of Financial Economics 26:3–27.
Taggart Jr, R.A. (1977), "A model of corporate financing decisions", Journal of Finance 32:1467–1484.
Taggart Jr, R.A. (1991), "Consistent valuation and cost of capital expressions with corporate and personal taxes", Financial Management 20:8–20.
Titman, S. (1984), "The effect of capital structure on a firm's liquidation decision", Journal of Financial Economics 13:137–151.
Titman, S. (2002), "The Modigliani and Miller theorem and the integration of financial markets", Financial Management 31:101–115.
Titman, S., and R. Wessels (1988), "The determinants of capital structure choice", Journal of Finance 43:1–19.
Townsend, R. (1979), "Optimal contracts and competitive markets with costly state verification", Journal of Economic Theory 21:265–293.
Treynor, J.L. (1981), "The financial objective in the widely held corporation", Financial Analysts Journal 37:68–71.
Tufano, P. (1989), "Financial innovation and first-mover advantages", Journal of Financial Economics 25:213–240.
Tufano, P. (1995), "Securities innovations: a historical and functional prospective", Journal of Applied Corporate Finance 7:90–102.
Wald, J. (1999), "How firm characteristics affect capital structure: an international comparison", Journal of Financial Research 22:161–187.
Warner, J.B. (1977), "Bankruptcy costs: some evidence", Journal of Finance 26:337–348.
Weiss, L.A. (1990), "Bankruptcy resolution: direct costs and violation of priority of claims", Journal of Financial Economics 27:285–314.
Weiss, L.A., and K.H. Wruck (1998), "Information problems, conflicts of interest, and asset stripping: chapter 11's failure in the case of Eastern Airlines", Journal of Financial Economics 48:55–97.
Wruck, K.H. (1995), "Financial policy as a catalyst for organizational change: Sealed Air's leveraged special dividend", Journal of Applied Corporate Finance 7:20–37.
Zingales, L. (1998), "Survival of the fittest or the fattest? Exit and financing in the trucking industry", Journal of Finance 53:905–938.
Zingales, L. (2000), "In search of new foundations", Journal of Finance 55:1623–1653.
Zwiebel, J. (1996), "Dynamic capital structure under managerial entrenchment", American Economic Review 86:1197–1215.