

A REVIEW OF IMPLICATIONS OF INFORMATIONAL ASYMMETRY AND PRINCIPAL-AGENT RELATIONSHIP

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ABSTRACT

This is an extension of article published by Younis, Kisa, and Howard in the *Researcher*, July 2006, entitled "Implications of Informational Asymmetry and Principal-Agent Relationship". In this article the authors will cover the comprehensive review of seminal works for Miller and Rock (1985) and Myers and Majluf (1984), accompanied by a series of short reviews of related empirical studies.

THEORETICAL MODELS

A. Miller and Rock (1985)

If we replace symmetric information assumption of standard finance model of the firm's dividend/investment/finance decision with the more plausible one that managers know more than outside investors about the true state of the firm's current earnings, in a world of rational expectations, the firm's dividend (or financing) announcements provide information about the unobserved firm's current earnings. However, incentives for managers whose compensations are tied directly or indirectly to the firm's short-run price performance, may induce them to pay out more dividends than the market is expecting, even

if that means cutting back on investment. On the other hand, if we introduce trading of shares in the system, even though the market will eventually adjust the price, that eventual restoration will be of little concern to those shareholders who have managed to sell out at the inflated post announcement price. In such a case, Fisherian Criterion for optimal investment by the firm that states that the firm should invest in real assets until the marginal internal rate of return equal the appropriately risk-adjusted rate of return on securities fails to hold.

The paper investigates the effects of departing from the optimum investment policy on both sellers and stayers and show that the potential gain to the sellers will exceed the loss of stayers i.e. Fisherian optimum is thus no longer a time consistent equilibrium investment policy. The authors explore one possible route to restoring consistency to dividend and investment policies in the face of informational asymmetries and possible incentives of managers discussed above. The paper constructs a model in which announcement effects and their consequences are analyzed in a two-period, one decision, and under asymmetric information and no tax world. The model suggests that, to the extent that announced dividend values differ from those anticipated by the market at the end of first period, the disclosure triggers price adjustments, the direction and size of which depend in turn on how the market forms its anticipations. The presumption here is that dividend announcements convey information about the firm's future earnings prospects. Yet, no consensus exists as to what this information via their dividend declarations. It should be pointed out that earnings figure rather than the dividend itself serves as the basis for estimating future earnings. The market uses the dividend announcement to form a new estimate of expected current earnings. The full story of the current condition does not emerge until the firm

announces its earnings or until it completes the net dividend by specifying its plans for outside financing.

As discussed earlier, under asymmetric information firms have incentive to diverge from the assumed optimal level of investment. Hence, the market would overestimate the firm's current earnings and place a higher-than-warranted value on the firm's shares. Even though the market is expected to adjust the price eventually, the gain of sellers is permanent under over inflated dividend announcement, while the net loss on the unsold shares is zero. Thus, inconsistent equilibrium takes place once inside information of the possibility of profiting from it is present. To restore the time inconsistency, the following line of reasoning is provided. Outside investors realize they know less than insiders and figure out the incentives of managers to exploit their superior information and accordingly, the postannouncement price that outsiders will offer discounts the likely departure from the optimum investment decisions. Management, in turn understands that the market is allowing for this departure and will accordingly provide it. To do otherwise would send a bad news signal to the market. Thus both expectations are to be fulfilled and time consistency is restored at the expense of efficiency. The new consistent optimum investment level will be below the first-best optimum of full-information case. The paper also mentions other such alternatives as disclosure laws and restrictions on insider trading to remove the conditions that give rise to the inconsistency. The authors indicate where which route or combination of which routes to maintain consistency in the real world practice remain to be answered by future empirical research.

It should be pointed out that Miller and Rock model pertains only to new financing of investment and does not predict a stock price response to offerings that refinance

debt. Moreover, neither does it take into account that the price effects depend on the type of security offered.

B. Myers and Majluf (1984)

In a standard financial setting, if we consider a firm that has assets in place and a valuable real investment opportunity that will evaporate if not taken promptly, the decision rule would be to take every positive NPV project, regardless of whether internal or external funds are used to pay for it. As pointed out in the paper, once we assume that firm's managers know more about the value of its assets, and opportunities than outside investors do, there may be cases in which, if management acts in the interest of the old stockholders, managers will refuse to issue shares even at the expense of passing up a good investment opportunity. Based on this possible fact, the paper asserts that investors, aware of their relative ignorance, will reason that a decision not to issue shares signals 'good news'. The news conveyed by an issue is bad or at least less good. This follows from the assumption that managers' decisions are made on behalf of existing shareholders, who gain if additional stock is sold when it is overvalued and lose if additional stock is sold when it is undervalued relative to managers' superior information. Consequently, rational investors will lower their assessment of the stock's current value whenever a stock offering is announced. This, in turn, affects the issue-invest decision. This decision relies on the assumption that management acts in the interests of old (existing) stockholders who are assumed to be passive in the sense that they do not adjust their portfolios in response to the firm's issue-invest decision. The other major assumption is that the information is of proprietary form, that is, once revealed it loses its attractiveness. The authors contend that firms seem to follow debt over equity issues because asymmetric information about firm value is a stronger determinant of financing behavior than

asymmetric information about risk. This implicit assumption is, of course, subject to empirical investigation.

The major properties of the model in question can be reviewed as follows.

- i) External financing using debt is better than financing by equity. Their model implies that the price effects depend on the type of securities offered.
- ii) Firms whose investment opportunities outstrip operating cash flows, and which have used up their ability to issue low-risk debt, may forego good investments rather than issue risky securities to finance them.
- iii) Firms can build up financial slack, which is defined as the sum of cash on hand and marketable securities, by restricting dividends when investment requirements are modest. The cash saved is held as marketable securities or reserve borrowing power.
- iv) The firm should not pay dividend if it has to recoup the cash by selling stock or some risky security. The model suggests a policy under which changes in dividends are highly correlated with managers' estimates of the value of assets in place.
- v) When managers have superior information, and stock is issued to finance investment, stock price will fall, other things equal. The market reacts negatively to an unanticipated external financing as relatively uninformed investors account for the possibility that the firm is attempting to take advantage of a situation in which it knows that the security offered is priced above its 'intrinsic' value.

Concluding Remarks

In the world of Miller and Rock (1985), the market is less informed than the inside/manager about current earnings i.e. the realization of past investment. Unanticipated announcements of the new financing lead market participants to lower their assessment of a firm's earnings prospects. An implication of their model is that the stock price reaction to a financing announcement is related to the amount of unexpected net new financing. The model does not distinguish among different types of securities.

In Myers and Majluf's (1984) model, the issuance of securities conveys information about the firm's investment opportunities and assets in place. The model implies that issuances of equity securities convey less favorable information about the firm's investment opportunities and assets in place than do issuances of debt securities. Unlike Miller and Rock's model, their model implies that the price effects depend on the type of security offered and in particular, on the sensitivity of security value to changes in firm value of the outstanding stock. Conversely, when the stock is overhauled, the insider has an incentive to issue equity. Knowing these incentives, the market could interpret issues of new equity as negative information. Like Miller and Rock model, the Myers and Majluf model pertains only to new financing of investment, and neither theory predicts a negative correlation between the (negative) stock price effect and the unanticipated amount of new debt offered, while the Myers and Majluf model suggests that the riskier the security issued, the greater the issues' (negative) impact on the market value of the firm. Both models imply that relatively high-value firms will pass up a valuable investment project if the project cannot be financed out of current earnings, and if the expected drop in the share price in response to the news

of the external financing outweighs the project's net present value.

EMPIRICAL STUDIES

A. Mikkelsen and Partch (1986)

This paper attempts to explain the nature of the information that security offerings convey to market participants. Specifically, it investigates whether the market price that investors infer exceeds managers' assessment of share price when any offering of common stock or securities convertible into common stock is announced, regardless of the characteristics of the offering. Security offerings are viewed as examples of the lemons problem presented by Akerlof (1970).

Like earlier studies, the authors find a negative and statistically significant valuation effect at the announcement of common stock and convertible debt offerings. The price effect of straight debt offerings is less pronounced. They also explore the nature of the information asymmetry between managers and market participants by studying share price behavior after the announcement of common stock and convertible debt offerings that subsequently cancelled. A striking finding of the study is that completed offerings are associated with a positive return between the announcement and issuance and a negative return between the announcement and the cancellation and a positive return at the cancellation. This finding is consistent with argument that managers try to issue securities that are overpriced, and that market participants understand managers' incentives. The negative price reaction at the cancellation suggests that a divergence of opinion about share price exists at the outcome of the offering.

Cross sectional analysis of the relation between the stock price effects at the announcement of security offerings and determinants of the price response reveals

that there exists no relation between the stock price effects and either

i) the quality nature of debt ii) the relative net amount of new financing provided by the offering or iii) the relative size of the offering.

It should be pointed out that the measure of the amount of net financing may be imprecise, since it is implicitly assumed that the measures of net new financing reported by different firms are comparable.

There are two major contributions of their study. First, it documents significant stock price effects following the announcement of convertible debt and common stock offerings. This result indicates that the outcome of the issuance process i.e. completion or cancellation is correlated with stock price behavior after the announcement. Second, cross-sectional analysis of announcement period stock price effects for completed, underwritten security offerings reveals that the type of the security is the most important determinant.

B. Kalay and Shimrat (1987)

Like other related studies, this paper documents an average drop of approximately 3% in the market value of the equity of industrial firms at the announcement of seasoned issues defined as the issues of new equity by public firms. The main purpose of this paper is to distinguish empirically the relative importance of potential explanations of this phenomenon which are mainly the price-pressure hypothesis, the wealth-redistribution hypothesis, and the information-release hypothesis.

The price-pressure hypothesis states that the firm is faced with a downward sloping demand curve for its stock. Announcing an increase in the downward sloping demand curve for its stock. Announcing an increase in the quantity supplies will therefore decrease the price of the outstanding equity.

According to the wealth redistribution hypothesis, a decrease in the market value of the outstanding equity is accompanied by an equivalent increase in the market value of the outstanding bonds. An unexpected issue of new equity reduces the corporate leverage ratio, making the debt less risky. Consequently, the market value of the debt increases. In other words, bondholders gain at the expense of the shareholders.

Finally, the information-release hypothesis suggests that seasoned issues of new equity could be interpreted by the market participants as conveying negative information because investors perceive that insiders having superior information issue equity when stocks are overvalued by the market.

Predictions of these hypotheses about the behavior of bond prices differ. Specifically, the wealth redistribution hypothesis predicts a positive bond price reaction, while the information-release hypothesis predicts a reduction in the value and thus a negative effect on bond prices. On the other hand, since the quantity of the corporate bonds is not increased, the price-hypothesis does not predict a decline in bond prices when a new equity issue is announced. It should also be pointed out that these hypotheses are not mutually exclusive. For example, if the information-release and the wealth-redistribution hypotheses are both valid, their conflicting effects could result in no bond-price reaction.

Empirical evidence presented in this paper indicates that bond prices react negatively to the announcements of new issues of equity. Even though the evidence does not rule out some price pressure and/or some wealth redistribution, offsetting effects may take place could reduce the predictive power of the analysis.

C. Eckbo (1986)

It is a well-documented fact that leverage decreasing capital structure changes convey negative information to the market. The primary objective of this paper is to investigate whether there exists a positive relation between a leverage-increasing capital structure and the sign of the revaluation of equity. The conventional view suggests that an unexpected increasing leverage will cause a positive revaluation of the issuing firm's common stock. The author investigates potential valuation effects of debt offering by examining three competing hypothesis.

Under the irrelevance theories of Modigliani and Miller (1958), referred to as 'zero impact hypothesis' in the paper, the capital structure per se no intrinsic value, and the announcement of a pure capital structure change will leave the issuing firm's market value unchanged.

An alternative theory referred to as 'positive impact hypothesis' suggests that the market interprets news of a debt offering as a signal that the company's capacity to extract debt-related benefits has increased. As an extension to this class of capital structure model, information asymmetries rather than taxes and agency costs are suggested to justify a unique optimal leverage ratio. Managers are assumed to possess superior information relative to investors concerning the intrinsic value of the firm. Therefore, an unanticipated increase in financial leverage signals positive management expectations concerning the firm's future earnings prospects, thus causing a positive revaluation of the firm's shares.

On the other hand, the opposite prediction follows from the asymmetric information models developed by Miller and Rock (1985) and Myers and Majluf (1984). The former model predicts a negative correlation between the (negative) stock price effect and the unanticipated amount of new debt offered, while the latter suggests that the riskier the security issued, the greater the issues' (negative)

impact on the market value of the firm. This last class of capital structure theories is referred to as the 'negative impact hypothesis'.

The main conclusions of the paper can be summarized as follows.

- i) Straight debt offerings have a non-positive impact on the issuing firm's common stock price. This result is surprising in light of most existing empirical evidence on the valuation effects of leverage-increasing capital structure changes.
- ii) Convertible debt offerings have a negative impact on the issuing firm's common stock prices. This result is also inconsistent with theories of optimal capital structure, which predict that a leverage-increasing capital structure will cause a positive revaluation of the issuing firm's equity. However, the result does not reject the asymmetric information models of Miller and Rock (1985) and Myers and Majluf (1984), both of which predict a negative market reaction to unanticipated external financing.
- iii) There is no detectable statistical relation between the valuation effects of debt offerings and a) the size of the offerings b) the increase in the firm's debt-related tax shield c) the rating of the bonds d) the abnormal change in the period immediately following the offering e) the offering method.

The fact that there exists no evidence that the issuance of debt, whether straight or convertible, on average conveys positive information to the market seems to be hard to digest. I could not reconcile some of these perverse results with conventional view suggesting that there is a positive relation between a leverage-increasing capital structure change and the sign of the revaluation of equity.

D. Mikkelsen (1981)

This study examines the returns of different classes of securities at the announcements of convertible security calls and provides evidence on the following: I) security price effects of a decrease in leverage, ii) reduction of agency costs of debt by conversion privileges, iii) importance of security price effects of retiring outstanding convertible claims on convertible securities, and iv) stock price effects of an increase in the number of common shares outstanding and on the elasticity of demand for the shares of firms.

The most striking finding of the study is that announcements of convertible debt call lead to negative average common stock return. On the other hand, no impact on stockholders' wealth is found for calls of convertible preferred stocks. With the announcements of convertible debt call, a small decrease in firm value is documented, which suggests that the call policies are not consistent with firm value maximization.

The major findings of the paper are that negative common stock returns associated with convertible debt announcements are due to a decrease in financial leverage rather than to an increase in the number of shares outstanding and that call policies are inconsistent with firm value maximization. Even though findings suggest the presence of corporate tax effect, they are not supportive of why managers take an action that reduces common stockholders' wealth.

The author suggests the possible explanatory power of signaling hypothesis in identifying the impact of information obtained through announcements of call on the stockholders' wealth.

E. Masulis (1983)

The paper develops a model to explain testable hypothesis of a number of theories on the impact of capital structure change on firm value. Two forms of capital structure change that are examined are issues exchange offers and recapitalizations.

The evidence found is consistent with model of capital structure with the hypothesis that debt level changes release information about changes in firm value. Firm's initial capital structures are defined by the preannouncement market values of the various security classes.

In addition to providing evidence in support of taxed based model and leverage induced wealth transfers, the paper proves to be fruitful in relation information effect theory to the impact of capital structure change on firm value. The major findings of the paper can be summarized as follows.

- i) Changes in stock prices are positively related to leverage changes.
- ii) Changes in non-convertible senior security prices are negatively related to leverage changes.
- iii) Changes in firm are positively related to changes in firm debt level.

F Ofer and Natarajan (1987)

The major thrust of the paper is to examine whether investors perceive the decision to call as a signal that conveys unfavorable information. Of the two hypotheses tested in this study, the one with investors' perception about the quality of firm was already investigated by Mikkleson (1981) and replicated in this study.

The real contribution of this paper is that it proves that bad news perception is manifested in that those firms calling their convertible bonds experience an unexpected

decline in performance in the years following the call. To test the information-signaling hypothesis, the authors examine whether there is an unexpected change in the firm's performance after the call. Their major findings can be summarized as follows.

- i) returns after the call announcements dates are affected adversely by new unfavorable information.
- ii) The significant negative cumulative residuals subsequent to the calls suggest market inefficiencies implying that information is not fully incorporated into share prices at the time of announcements.

The study proves to be powerful in explaining unexpected decline in performance after the call through the information-signaling hypothesis.

G. Cornett and Travlos (1998)

This study empirically investigates information effects associated with a firm's change in capital structure through exchange offers and addresses managerial motivation to convey information about the firm's future earnings prospects. The findings lend support to the information-effect hypothesis rather than wealth-transfer and tax-effect hypotheses.

As other related studies attest to, this paper presents the effects of announcements of exchange offers on the returns of stocks: positive (negative) abnormal returns for debt-for-equity (equity-for-debt) exchange offers. For the case of non-convertible and convertible bond returns, it is expected that non-convertible and convertible debt holders experience significant abnormal returns and significant losses for debt-for-equity and equity-for-debt exchange offers respectively.

The empirical findings reveal that stock price increases are positively related to changes of managerial

stockholdings for debt-for-equity exchange offers and that there exists a significant relationship between abnormal returns and unexpected earnings changes. Taken together, these findings support the information effects hypothesis.

H. Israel, Ofer and Siegel (1989)

The objective of this paper is to investigate whether some portion of the stock price drop may be attributable to the cash flow hypothesis according to which the announcement of a decrease in leverage conveys negative information about the firm's cash flows. The cash flow hypothesis is tested by examining updates in analyst forecasts of cash flows around announcements of equity-for-debt swaps.

Findings suggest that announcements of equity-for-debt swaps convey information about the expected cash flows of the firm and there is a positive correlation between updates in analyst's cash flow forecasts and the stock price reaction. Evidence also supports the fact that information conveyed by the swap announcement is about transitory, not permanent changes in expected cash flows.

I. Younis, M. (1998)

In a report on health asymmetric information and health insurance in United States, Younis et al., (2006), and Younis, (1998) discussed the issues of asymmetric information, health insurance and competition between hospitals in United States. Health insurance firms try to maximize their profits by enrolling healthy populations in their plans. One way to achieve the profit maximization function is by providing health insurance through individual employers. Since people who are employed are usually healthy and between ages 18-65; the disabled and the elderly population are eliminated from the pool of policy holders.

The federal government created the Medicare and Medicaid programs to provide health insurance to the elderly, disabled, veterans and unemployed individuals. Such programs were later expanded to include children and the families with low incomes.

Hospitals and physicians know more about medicine than the patients. However, under the Prospective Payment System (PPS) 1983, they are paid a predetermined amount based on Diagnosis Related Groups (DRG's). Since price competition is limited, many hospitals adopted strategy to compete based on the quality of service provided to their patient. Younis, (1998), argued that using quality as a method of competition is limited due to the nature of the hospital industry. For example, patients usually have no time to search and find out which hospitals provide the best quality service in their area; furthermore, most patients are admitted to the closest hospital to their residence when emergency care is needed. Also, patient admission to a hospital in non-emergency circumstances is typically based on where the treating physician has privileges. With the recent mergers, acquisitions and hospital conversion from Not-for-profit to for-profit status, many hospitals in the same city tend to be owned by the single hospital chain (for example Tenet Healthcare Corp. and HCA both own multi hospitals in major cities.) which tend to avoid duplicating services among sister hospitals. This limits patients' choices and reduces competition between hospitals (Younis, 2006, Younis et al. 2003).

Further more, many health insurance providers converted from non-profit to for-profit status, which added to their mission maximizing share holders value in addition to providing health care insurance to their policy holders. (Forgione,1999).

In conclusion, insurance and asymmetric information is one of the area of considerable interest to insurance firms, regulators and mathematicians. This areas is in need of

further empirical studies, particularly ones involving the use of econometrics and mathematical models to better delineate methods of health insurance and profit maximization.

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