The impact of dividend policy on the valuation of equity, debt and credit risk

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July 10, 2013
Second, rough draft
Comments are welcome

Abstract

We show how, in a Merton-type model with bankruptcy, the dividend policy impacts the values of debt and equity. The recent financial crisis has emphasized the fact that excessive dividends can lead to financial distress and there is a strong need to set qualitative and quantitative restrictions on the dividends taking into account the potential conflict with debtholders. The model that we develop allows a quantitative setting of these restrictions and gives an important tool to justify (or not) dividend payments opposed by some of the debtholders. We show the implications of our approach compared to the implications of the Signaling Approach.

JEL Classification Numbers: G12; G13; G15

Keywords: credit spread, foreign debt, dividend policy, Merton's model

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We wish to thank XXX for their insights and helpful suggestions and fruitful discussions, as well as the participants of the seminar at the University of Auckland and the University of New South Wales. We acknowledge financial support from the Zagagi Center and the Krueger Center at the Hebrew University.

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Introduction

The contingent claim approach (CCA) to pricing corporate securities was initially suggested by Black and Scholes (1973) in their seminal paper. It was followed by Merton (1974) who applied the option pricing model to pricing corporate bonds, and by Galai and Masulis (1976) who applied the approach to pricing equities. The initial model was based on a simplified firm with a zero coupon, fixed maturity debt, and no dividends during the life of the debt. It was shown that under the simplifying assumptions the equity of a levered firm can be priced as a European call option on the firm's assets. The corporate zero-coupon bond can be priced as a riskless debt minus the European put option. The exercise price in this case is the face value of the debt at maturity, which includes both the principal amount and the accrued interest payments. In this framework, the credit risk of the bond is contained, or priced, in the put option (see Merton (1974), and Crouhy, Galai, Mark (1998)). The Merton model assumes that bankruptcy can occur only at the maturity of the debt instrument.

Since then many papers were published using CCA to price various types of securities issued by corporations (e.g. warrants, convertible bonds, and more, see the reference list). Also, a lot of research was directed toward changing some of the simplifying assumptions. Black and Cox (1976) extended the model to include senior and junior debt instruments. They also allowed for early bankruptcy during the life of the debt instruments. Francois and Morellec (2004) introduced different bankruptcy rules to measure their effect on the credit risk premiums. This work was extended by Galai, Raviv and Wiener (2007) for various legal systems of bankruptcies. Cox and Ross (1976) also apply the CCA to price coupon paying bond and equity with constant dividend payouts.

Empirical research on credit risk spreads showed consistently that actual spreads are greater than predicted by the CCA or other models. Jones, Mason and Rosenfeld (1984) estimated the default spread based on Merton's approach and found it was less than observed credit spread. Elton et al. (2001) were able to explain about half of the spreads by credit risk parameters, and attribute the additional premium to unobservable variables such as taxation, liquidity, and more. Similar results are also reported by Huang and Huang (2003).

We hypothesize that the seemingly under-pricing of corporate bonds may be due to ignoring the dividend policies of the firms. Many of the public companies follow a dividend policy which the model ignores. By paying dividends the credit risk of the bonds is enhanced.

Paying dividends to shareholders is, from the bondholders perspective, similar to reducing the value of the firm and hence increasing the value of the put option, which represents the value of credit risk. In other words, expected dividends during the life of the bonds, which are ignored by the original Merton Model, can explain (at least part of) the overpricing of bonds values and the under-estimation of the risk premium of corporate bonds.

It was observed by many researchers that firms smooth their dividend payments and try to maintain a stable dividend payout ratio, (see, for example, Lintner (1956), DeAngelo et al. (1992)). If according to M&M, dividend policy is irrelevant why firms actively manage their dividends? Many possible explanations are provided in the academic literature, including tax considerations, signaling via dividends, and more (see, for example, Kalay (1980,1982), Lambrecht and Myers (2012), Berk and DeMarzo (2007) chapter 17, Van Horne (2002), chapter 11, and Guttman et. al. (2010)).

Black in his "Dividend Puzzle" paper (1976) says "The harder we look at the dividend picture, the more it seems like a puzzle with pieces that just don't fit together". He checks the issues of taxes, transaction costs and more. He raises the issue of the potential conflict of interest between the stockholders and bondholders but dismisses it as too small in many cases, and, "… if the effects are large, the company can negotiate with the creditors".

Our model provides another explanation which is based on the shareholders-bondholders conflict of interests. By making the dividend policy more certain, the shareholders are extracting (an expected) value from the bondholder, but since the policy is stable, it makes it easier for the bondholders to monitor the policy and assure that it is consistent with the covenants, expectations, and the acceptable range of probabilities of default. If a profitable, levered firm is not paying dividends (or repurchase shares), it actually enhances the value of the debt by reducing the probability of default. If dividends were expected but are not being paid out, there is a transfer of wealth from equity to debt holders. Dividends are, therefore, a means of extracting value to shareholders. However, making this policy known and stable reduces the cost of debt as it stabilizes the credit risk of the firm and makes it more predictable.

We propose to introduce the dividend policy to the Merton model initially under the simplifying assumptions. We assume that dividends are paid continuously at a fixed rate. The paper highlights a few issues: first, in the theoretical part we address in the CCA framework the issue of dividend policy as a contingent claim by itself, and its effect on the valuation of corporate debt and hence, on the credit risk of the corporation.[1] We can derive the probability of default (PD) endogenously in the model (both in risk neutral terms as well as in terms of the economic probability). Second, the model can be related to the issue of corporate debt ratings by agencies such as S&P, Moody's, Fitch. Third, the model has important empirical hypotheses that can be tested on actual data. We apply the model to a case study of an Israeli firm. The advantage of Israeli data is that many corporate bonds are traded on the Tel Aviv stock exchange (and not on OTC like in the USA and many other markets). Fourth, the model can have important implications for corporate governance and regulation of dividend policy and distributions to shareholders. Bond covenants can be set in order to protect in a more rational way the debt holders of a corporation.

Prior research

The topic of dividend policy attracted the attention of many academic researchers. Lintner (1956) was the first to draw the attention to the observed policy of smoothing dividends. Miller and Modigliani (1961) showed, however, that in a perfect capital market dividend policy should be irrelevant. Black (1976) raised the issue of the dividend puzzle due to its tax disadvantage.

Brennan and Thakor (1990) show that despite the preferential tax treatment of capital gains for individual investors, the majority of shareholders may support a cash dividend payment for small distributions. Shareholders may prefer open market stock repurchases for larger distributions. The basic contention of this paper is that in order for share repurchase to be qualified for favorable tax treatment, they cannot be on a pro-rata basis. In such a case the less informed shareholders may be vulnerable to expropriation by the better informed. Brennan and Thakor focus on the potential conflict of interest between informed and uninformed shareholders. Their model completely ignores the potential conflict of interest with the bondholders.

Benartzi, Michaeli and Thaler (1997) find very limited support to the claim that changes in dividends have information content about the future earning of the firm. Increases (decreases) in dividends are correlated with increases (decreases) of earnings in the same year and the year before, but do not explain future unexpected earnings increases (decreases).

Kalay (1980, 1982) looks at the potential conflict of interest between the stock and bond holders, and argues that bond covenants usually prevent stockholders from shifting values away

[1] Garbade (2001), in his book considers discrete-time dividends as contingent claims of the corporations. He does not directly addresses the assessment of credit risk of the firm.

from bondholders. He shows empirically that, in any case, the shareholders did not distribute the maximum possible for distribution at each year; dividend distributions stayed below the constraints imposed by the covenants.

In a more recent study by Brav et al. (2005) the authors surveyed 384 financial executives and what determined their dividend policies. In general they find little support for agency, signaling and clientele hypothesis of payout policies. They find that perceived stability of dividends is important, however the link between dividends and earnings has weakened since Lintner (1956) found that firms manage their dividends to show stability over time.

Various researchers suggested introducing the dividend payout to the contingent claim analysis of debt and equity (e.g. Cox and Ross (1976), Black and Cox (1976)). Fan and Sundaresan (2000) model the value of corporate debt and optimal dividend policy in a game-theoretic setting with varying bargaining powers between debt holders and equity holders. Delianedis and Geske (2001) used the dividend payout policy trying to explain the observed credit spreads, for a sample of firms in the US from November 1991 to December 1998. They accrue all dividends during the life of the bond to its maturity. The empirical evidence, again, shows only partial explanation of the observed credit spreads.

The recent financial crisis has emphasized the fact that excessive dividends can lead to financial distress and there is a strong need to set qualitative and quantitative restrictions on the dividends taking into account the potential conflict with debtholders.

The Model

A. Pricing of Debt and Equity when the Company Does Not Pay Dividends.

Merton (1974) showed how corporate bonds can be priced as riskless government bonds for the same duration (T) minus the price of a put option on the value of the firm, V, with a strike price equal to the face value of the bond (F), which is the promised payment due at T, including the principal and the cumulative interest.

$$D = Fe^{-rT} - P\,(\mathrm{V, F, r, T}, \sigma) \qquad (1)$$

where σ is the standard deviation of the rate of return of V. Based on Black-Scholes and Merton

$$\text{PUT}= -V \cdot N(-d_1) + F \cdot e^{-rT} \cdot N(-d_2) \qquad (2)$$

where N(d) is the cumulative standard normal distribution up to point d, r is the continuous riskless interest rate and

$$d_1 = \frac{\ln\left(\frac{V}{Fe^{-rT}}\right) + \frac{1}{2}\sigma^2 T}{\sigma\sqrt{T}},\ d_2 = d_1 - \sigma\sqrt{T}$$

Hence, the value of the bond is

$$D = Fe^{-rT} - \left(-V \cdot N(-d_1) + F \cdot e^{-rT} \cdot N(-d_2)\right) = F \cdot e^{-rT} \cdot N(d_2) + V \cdot N(-d_1) \qquad (3)$$

Galai and Masulis (1976) showed that under these assumptions, the value of equity, S, is priced as a call option on the value of the firm, V.
Hence,

$$S = V \cdot N(d_1) - F \cdot e^{-rT} \cdot N(d_2) \qquad (4)$$

and, of course, S+B = V as is dictated by the Modigliani-Miller (1958) Theorem I.

When the Merton model was empirically tested, it was found that the realized spreads are higher in practice as compared to the model prices. This phenomenon means that bond prices are underpriced compared to the model prediction. Various reasons were suggested to explain the gap between model prices and market prices. See for example Elton et al (2001).

We can show that dividends are similar to paying junior debt before the maturity of the senior debt and hence increasing the credit risk of the senior debt. Dividends behave like junior debt in terms of the resulting credit risk of senior debt.

By constructing a model for credit risk on senior debt when dividends are being paid, we can construct covenants for bondholders such that the probability of default will be below a given level, or we can restrict the dividend policy to maintain certain credit ratings.

B. Pricing of Debt and Equity when the Company Pays Dividends.

We make the traditional assumption of Black and Scholes (1973) and Merton (1973, 1974). We assume that the firm is financed by equity, S, and a pure discount bond, B, with face value, F, to be paid at time T. In addition, we assume the firm V, pays a continuous dividend, δ, to the shareholders.

In Merton (1973), the pricing of a European call option was extended to the case of continuous dividends, over the life of the option, to which the option holders are not entitled. In our case, the shareholders in the levered firm can be regarded as having a call option on the firm, however, they are entitled to get the dividend. The dividends paid to the shareholders reduces the value of the firm V, by the rate δ, hence, the value of the put option, which reflects the credit risk is affected by the dividend stream. Let us denote by P^{EX} the value of the put option on V, with strike price F and maturity T, when continuous dividends at a rate δ, are paid to the shareholders:

$$P^{EX} = -Ve^{-\delta T} N\left(-d_1^{EX}\right) + Fe^{-rT} N\left(-d_2^{EX}\right) \tag{5}$$

where

$$d_1^{EX} = \frac{Ln\left(\frac{Ve^{-\delta T}}{Fe^{-rT}}\right) + \frac{\sigma^2 T}{2}}{\sigma\sqrt{T}}$$

$$d_2^{EX} = d_1^{EX} - \sigma\sqrt{T}$$

It can be noticed that $\frac{\partial P^{EX}}{\partial \delta} \geq 0$.

Or, the value of the put increases with the increase in the dividend payout. We can now price the bond, when dividends are paid by B^{EX}, as

$$\begin{aligned} B^{EX} &= Fe^{-rT} - P^{EX} \\ &= Fe^{-rT} - \left[Ve^{-\delta T} N\left(-d_1^{EX}\right) + Fe^{-rT} N\left(-d_2^{EX}\right)\right] \\ &= Fe^{-rT} N\left(d_2^{EX}\right) + Ve^{-\delta T} N\left(-d_1^{EX}\right) \end{aligned} \tag{6}$$

Now we can describe the probability of default for the bond over its life when faced with the dividend policy δ. Based on Boness (1964) and Galai (1978), it can be shown that the PD is:

$$PD = N\left(-d_{2V}^{EX}\right)$$

Where

$$d_{2V}^{EX} = \frac{Ln\left(\frac{V}{F}\right) + \left(R - \delta + \frac{1}{2}\sigma^2\right)T}{\sigma\sqrt{T}} \tag{7}$$

It can be shown that $B^{EX} < B$ and hence $S^{EX} = V - B^{EX} > S = V - B$.

Black and Cox (1976) extend equation (6) for the case that the bond has safety covenants. In particular they show (p. 356) the contingent value of the bond when, the firm's reorganization takes place when $V_t \le Fe^{-r(T-t)}$. This is the stopping boundary in a form of a trigger for bondholders to take over the firm.

Introducing such a barrier does not change the basic properties, and B is still an increasing function of V and T and a decreasing function of σ, r and δ. As can be expected it increases the value of B at the expense of reducing the value of equity, S. It affects the elasticities of B and S as the value of V declines and approaches the barrier.

Credit risk and dividend irrelevance

In their seminal paper Miller and Modigliani (1961) (M&M) showed the irrelevance of the dividend policy. This irrelevance was shown under the assumption of perfect capital market (PCM) and given the investment policy of the firm, which determines the current value of the firm V. This last assumption is critical to the irrelevance theorem, since it separates the effect of the investment decision from the decision concerning how it is financed. It is assumed that each claim holder can perfectly protect their interest in the firm. These assumptions are also underlying their other seminal paper, Modigliani and Miller (1958), which shows the irrelevance of the capital structure on the value of the firm.

The major implicit assumption behind both M&M papers is that the potential conflict between the shareholders and bondholders is resolved by negotiations and bondholders are protected from decisions of the shareholders by debt covenants. Miller and Modigliani (1961) in their dividend paper deal with a pure equity firm. In the Modigliani and Miller (1958) paper on the irrelevance of capital structure the issue of the potential conflict of interests between shareholders and bondholders, and specifically the one that is created by the dividend policy of the firm, is assumed away. Our paper is also based on the basic M&M framework and assumptions. We show how, in this framework, debtholders can protect their interest against the dividend policy of the shareholders.

It all depends on expectations, covenants and the possibility to free and costless negotiation among stakeholders of the firm. Actually, not paying dividends, if dividends are expected, means that the value of debt is increasing at the expense of shareholders.

Having a declared policy of not paying dividends (or repurchasing shares for that matter) cannot be an optimal policy in the long run for a levered risky firm (if the number of profitable projects is limited). On the other hand, paying too high dividends for a levered firm can also be non-optimal since the cost of raising debt capital can be excessive.

Between the two extremes we can find that a stable, consistent dividend policy, that geared to keep the probability of default stable, within a narrow range, is the best policy. It is consistent with M&M as well as with the various other approaches, including the signaling approach.

The Binomial Example

Let us illustrate the dividend case with a Binomial distribution example. In Figure 2a we show a firm with initial assets of 100, following a 2-period stationary distribution, either expanding by a factor of U= 1.1, or declining by a factor D=0.9. The riskless interest rate is 1% per period. The firm issued pure-discount bond with a face value of 90. Figure 2a shows the equilibrium values of the bond (B) and equity (S) at each time period and state of nature. This is the case of the firm with no dividend. In the case that the firm will decline successively over two periods, and hence the value of the firm will reach V_{23}=81, the firm will be bankrupt and B_{32}=81 and S_{32}=0. Since all participants know that there is a possibility that the firm will go bankrupt, the current bond value B=86.44 (and S=13.56) will fully reflect the information. (The riskless 2-period bond, with a face value of 90 is worth 88.23, and the difference of 1.79 fully reflects the present cost of the credit risk.) At 86.44 the corporate bond is fairly priced.

Now, let us assume that if the company is increasing in value in the first period and the value of assets reaches 110, the shareholders decide to pay out a dividend of 11. Figure 2b depicts such a case. Since now the value of remaining assets will be 99 only conditional on Up-state in period-1, therefore at time 2 the value of assets can reach either V_{21}=99x1.1=108.9 or V_{22}=99x0.9=89.1. The dividend payout lead to a state, that did not exist for the no-dividend case, where the firm is bankrupt and all assets belong to the debtholders. This state is caused by paying dividends at a high rate of 11 at time 1, contingent on the firm increasing in value. Note that with a dividend of, say,10 or below, the bond will be fully paid at time 2 given that it went up at time 1, and it’s current value should stay at 86.44 to reflect the potential bankruptcy if the firm will decline twice successively.

Solving the binomial tree as described in Figure 2b, shows that the current value of the debt is now B^{ex}=86.22 (and S^{ex}=13.78, where 5.990 is the present value of the expected dividends and 7.788 is the present value of the stock without the dividend). The difference of 0.22 (=86.44-86.22) reflects the “loss” of value to the bondholders due to the dividend policy of the firm. Paying dividend of 10 or less at time 1 would have left the values of both equity and debt unchanged from the no-dividend case.

The story of the **potential conflict of interest** between share and bond holders can be easily illustrated with the binomial example:

(1) If the bondholders expected the dividends to be 10 or less, they would price the debt at 86.44. But if at time 1, the shareholder surprise the debtholders and decide to pay dividends of 11 (or more), there is a shift of value from bondholders to shareholders of 0.22 (or more). By increasing dividends unexpectedly at time 1 from 10 to 11 the credit risk of debt has increased, in present value terms, by 0.22, and benefited the shareholders.

(2) If bondholders knew in advance that the dividend is 11, they would price the bonds at 86.22, which is the fair value of such bonds, and at time 1 if it is an up-market the fair value of the bonds is B_{11}=88.71 (rather than 89.11).

(3) If bondholders expected dividends to be 11 and hence priced debt at 86.22; but when the up-market is realized, they go to court to prevent the payment of dividends to go through. The bond holders claim that it can drive the firm to bankruptcy (which can under certain circumstances be a correct statement), and, say, demand to restrict D_{11} to 10 only. In such a case there is a wealth transfer from shareholders to bondholders. The bond price is expected to be B_{11}=89.11 rather than 88.71 and 0.40 is lost by shareholders at time 1 to the bondholders (which translates to 0.22 wealth transfer in present value terms.)

M&M assume that once the dividend policy is known, the prices of shares and bonds will fully reflect such a policy. But, if there is any deviation from the pre-determined policy, there are good chances that there is a wealth transfer one way or another. Since the shareholders decide dynamically on such a policy, there are better chances of transferring wealth away from bondholders. Unexpected decisions are not built in in M&M propositions, and the leverage effect is not treated in the 1961 paper.

However, in real life, if bondholders suspect that the shareholders may act, via the dividend policy to harm their interests, they will price it in the current price they are willing to pay. It means that firms have to pay higher yields than predicted by their current capital structure, the riskiness of their assets and their current dividend policy. **Such a phenomena is indeed empirically observed!** In order to reduce the cost of debt the shareholders must maintain a credible dividend policy. For example, a constant dividend payout, in absolute or relative terms, may be consistent with the scenario described above. It is also easy to monitor by all parties. Constant proportional dividend may be easier to sustain under different economic environments.

Dividend policy and the Signaling Approach

We have shown that by increasing the dividend payout beyond what was expected in the marketplace, one can increase the value of equity while decreasing the value of debt (while also increasing the credit risk of the firm) . This effect will be stronger for highly levered companies than for firms with low leverage, everything else the same.

This result can be contrasted with the Signaling Approach (SA) suggested by Ross (...) was tested by Kalay (1980,1982). According to the signaling approach, a firm that increases the dividend payout signals to the market that it expects improved results in the future. In order for the SA to work the new signal should be above and beyond what the market already expects and what is already reflected in stock prices. The SA should equally work, if valid, for firms regardless of their leverage.

We also expect dividends per share to increase with increased profitability. The purpose of the dividend increase in such a case is not necessarily to signal to the market the "good news", but simply to align the interests of the stakeholders and keep the PD (close to) constant. Not increasing the dividend payout when profitability is higher than initially expected, leads to decrease in PD and to improving the welfare of the bondholders beyond what they perceived.

It should be emphasized that in our model current dividend is not necessarily the important measure. What determines the value of equity, debt and the credit spreads in the dividend stream over the life of the bond. So, even when current dividends are temporarily down, for example during recessionary times, it may have small effect if they are expected to increase during expansion period, The important factor is the present value of the dividends, that are also treated as a contingent claim on the corporation.

How to mitigate the potential conflict of interest?

The most efficient way to minimize the potential conflict of interest between shareholders and bondholders is therefore to determine a dividend policy in advance. The "Smooth" dividend policy maybe a reasonable one for stable firms with "smooth" capital requirements. The constant rate policy, δ , can be even more reasonable.

What can be justified is a policy maintaining the probability of bankruptcy, constant. A proxy can be to maintain certain credit rating. Define the optimal dividend policy in terms of the probability of default (eq. (7)):

$$PD = N\left(-d_{2V}^{EX}\right)$$

Where

$$d_{2V}^{EX} = \frac{Ln\left(\frac{V}{F}\right) + \left(R - \delta + \frac{1}{2}\sigma^2\right)T}{\sigma\sqrt{T}}$$

Let us set the objective function as follows:

$$c1 \leq PD \leq c2$$

If c1=.03% and c2=.06, it is consistent with AA+ ratings. It can translate to the dividend payout the company can pay in order to stay in this range by using the above model.

It is easy to see in the expression for the PD the tradeoff between the expected rate of return on the firm's assets and the dividend rate; what determines the PD is the difference between the two parameters $R - \delta$ (given the volatility). Hence a policy of maintaining the probability of default stable can be translated to adjusting the dividend rate to the expected rate of return. But as can be seen the volatility of the firm's rate of return plays also a major role. Low volatility firms can afford to pay higher dividend yield for the same R in order to achieve a certain PD.

Case study

As a case for testing the model we used data for Bezeq Ltd., which is Israeli largest telecommunication company. The company was a monopoly for landline services, and competes on cellular telephone services and internet services. It also owns a cable television company. In 2011 it had annual revenues of over 11B NIS. [2]

It is an interesting case since the company has both stocks and bonds traded on the Tel Aviv Stock Exchange, and the market for both is liquid. In addition, the company announced at the end of 2009 a dividend policy for the coming years: they plan distributing all profits as well as a special dividend of 3 billion NIS (around 750 million dollars). This special dividend will be

[2] The exchange rate during that period was around 4 NIS for 1 dollar.

paid in six equal semi-annual installments. The special dividend also got the approval of the courts since it accounts to equity reduction.

All parameters were estimated for June 30, 2012. The market value of equity, S, was 11.06 billion NIS. The market value of traded bonds was 4.1 billion NIS and the estimated economic value of non-traded bonds and long-term bank loans amounted to additional 5.2 billion NIS. Hence, we estimate the value of the firm assets V to be 20.4 billion NIS.

The weighted average duration of the debt of the firm is 4.3 years and the risk-free interest rate for that duration is 2.97%. We also estimated the historical standard deviation of the stocks and traded bonds to be $\sigma_S = 35.1\%$ and $\sigma_B = 4.5\%$, respectively. The correlation between the rates of return on stocks and bonds is $\rho_{S,B} = 36.8\%$. As a result the standard deviation for the firm is $\sigma_V = 18.5\%$.

For the analysis of the affect of dividend distribution, we took into account the current promised dividend for the first half of 2012 of 997 million NIS, plus the special dividend of 500 million NIS. These amounts were declared long time in advance, and therefore, should be reflected in the market prices of the stocks and bonds.

In order to estimate the probably of default (rather than the risk neutral probability derived from the B-S formula) we need to estimate the expected rate of return on the firm's assets (see equation (7) for the calculation of the true probability default). To estimate the expected rate of return of the firm R_V we estimated first the systematic risk of the firm, β_V, from historical rates of return for the firm's stocks and bonds and the market index. Based on weekly rates of return we obtain a beta estimate for Bezeq of β_V=0.53. It is a low estimator due mainly to the low beta value of the debt of the firm. Bezeq is a well diversifies utility company with some monopoly power, though regulated. This helps in reducing its systematic risk. If we assume that the risk premium for Israel is 6% (see also Damodaran's estimate at www.damodaran.com) and estimate the risk-free rate to be 2.97% we obtain an estimate of the expected rate of return for the firm of R_V=6.15%. It is rather conservative estimate considering the firm's growth record of over a few years of annual ROIC of well over 30% per annum. Under the above assumptions, we find that the true one-year probability of default of Bezeq is 0.51% (while the risk neutral probability is 1.14%). This result is very sensitive to the assumption about the firm's expected rate of return R_V. If the expected rate of return is 8% per annum, the probability of default drops to 0.05%.

Now we can estimate the effect of the special dividend of 500 million NIS that is due, beyond the current dividends which are equal to the net profits for the first half of 2012. The special dividends are expected to reduce the value of the firm by the same amount. Checking the effect of the special dividends only reveals that the true one-year probability of default increases from 0.51% to 0.59%. Actually, we can show by using the model that the market fully anticipates the distributing of the full amount of the special dividend (i.e. additional 1 billion NIS) and the share price fully reflects such distribution. Under the above parameters there is no material gap between the market value of the equity and its calculated value based on equation (6).

Conclusions

This paper has two interrelated objectives. First, we incorporate the dividend policy of the firm in the contingent claim approach (CCA) to price corporate securities, and especially to assess credit risk. We show how it can be implemented in a case study. Second, we offer an explanation for a stable dividend policy as an important tool to monitor and manage credit risk of corporate bonds. Bond covenants cannot ignore the dividend policy and we highlight how the potential conflict of interest between share and bond holders can be mitigated.

In a perfect capital market as assumed in Miller and Modigliani (1961), Modigliani and Miller (1958), Sharpe (1963) and Lintner (1964), dividend policy may be a matter of indifference. If all securities are held by all investors in their market value weighted ratios, the investors are indifferent to transfer of wealth form one class of assets to another. Also, the “me first” rule (see Fama and Miller (1973)), assumes full protection against shifting of values. However, we know that investors usually do not hold the market portfolio. Also, strict application of the “me first” rule will restrict the investment policies of the firm. We live in a world where the potential for conflict of interests among claimholders is a fact of life.

If the shareholders keep the dividend policy opaque, or chaotic, new debt-holders will reduce the price they will be willing to pay for the bond, to reflect the adverse effect on them of such a policy. So, in order to prove M&M dividend irrelevance when facing default risk we need to set not only the investment policy but also the dividend policy. If not- shareholders will have an incentive to distribute high dividends when facing high probability of default.

Figure 1a: Merton model with no dividends

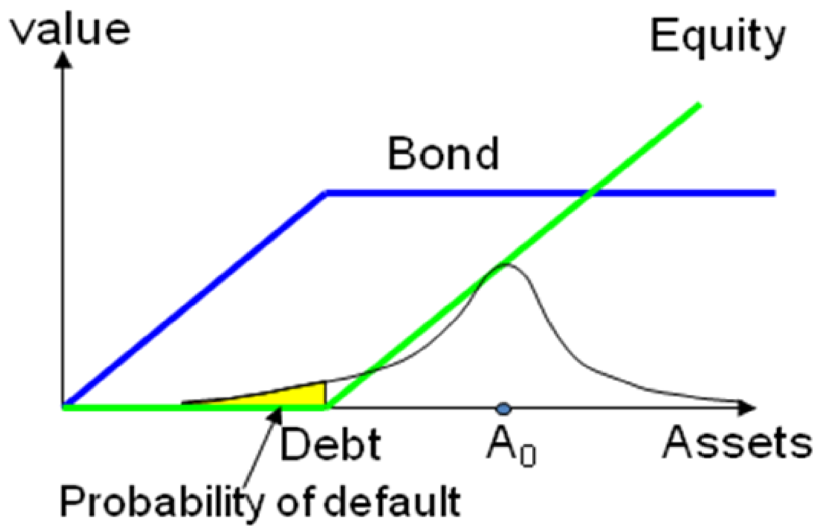

Figure 1b: Merton model with dividend

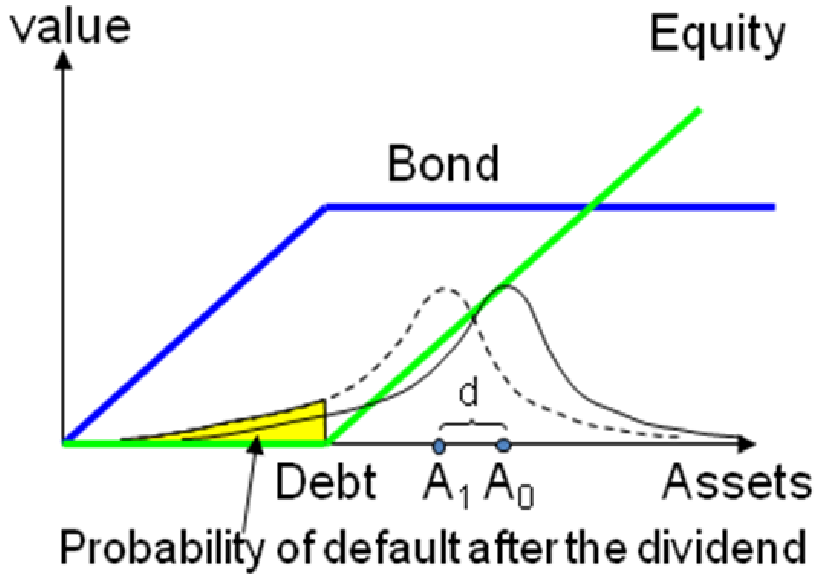

Figure 2a: The Binomial Tree with no dividends: S=100, U=1.1, D=0.9, r=1%, F_2=90, $B_{2,i}$=Min (F_2,$V_{2,i}$)

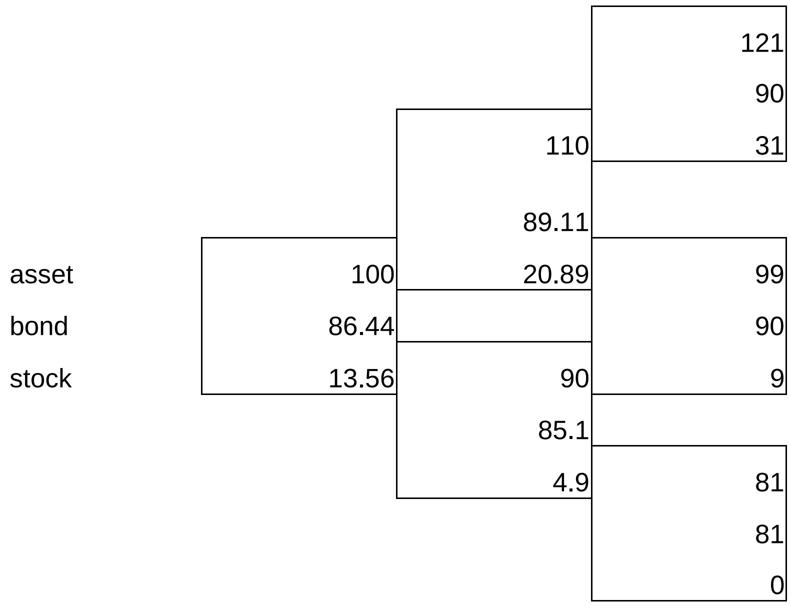

Figure 2b: The Binomial Tree with dividends: D_{11}=11

div	11		
			108.9
			90
			18.9
		99(+11)	
		88.708	89.1
		10.292	89.1
asset	100		0
bond	86.222		
stock	13.778=7.788+5.990		99
		90	90
		85.1	9
		4.9	
			81
			81
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