

A model of complex equity funding for contingent acquisitions – a case study of non-interest bearing convertible unsecured loan stock

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Abstract

Equity finance, raised through a rights issue, is a popular method for funding acquisitions in UK. Acquisitions are often contingent on a number of external factors. This paper uses a binomial asset pricing model to examine the effects on the share price of a company that undertakes an equity rights issue to fund a contingent acquisition. We consider a new equity rights issue instrument called a non-interest bearing convertible unsecured loan stock (NICULS), specifically designed to deal with contingent acquisitions. We develop our model in two stages. First, we assume perfect foresight on behalf of the issuing company and investors and, secondly, we develop a model that relaxes these restrictive assumptions, called a NICULS model. Our preliminary findings based on a case study show that there is a dip in the share price over and above that expected by the dilution effect of the increased number of shares. We interpret this either as a natural consequence of the market's evaluation of the value of the investments for which the funds were raised or as a signal imparted by the company about the future investment opportunities of the company. We have also found that the market's expectation of the success of the acquisition attempt has a

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direct and significant effect on the observed dip in the share price. © 1998 Elsevier Science B.V. All rights reserved.

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1. Introduction

In recent years, companies raising equity finance from their shareholders to finance contingent acquisitions have tended to use new complex mechanisms. A number of fund-raising techniques have been developed to meet the specific requirements of issuing companies.¹ This paper develops a binomial pricing model of the share price of a company using a complex equity rights issue where the proceeds finance an ‘uncertain’ acquisition. We take a different approach to examining share price movements around capital structure changes from the information hypotheses of Myers and Majluf (1984), Miller and Rock (1985) and Korajczyk et al. (1992) and the agency theories of Jensen and Meckling (1976). In this paper, we do not focus on the consequences of the capital structure change per se but instead consider the movement in the share price of the issuing company as being driven by the market’s expectation of the possible future values of the investment being undertaken.²

The majority of equity issues in the UK are rights issues. The practice is enshrined in UK Company Law, the individual company’s Articles of Association and London Stock Exchange practice. The Companies Act 1985 lays down the rights issue mechanism for equity issues exceeding 5% of the authorised share capital. New shares to be issued are offered to all shareholders pro rata to their existing holdings at a discount to the market price. These rules form a series of protective measures to ensure that shares issued for cash are offered first to existing shareholders, creating what are known as ‘preemption rights’, and ensuring new shareholders are not brought into the company on preferential terms to the disadvantage of existing shareholders.

‘Uncertainty’ in the completion of the acquisition can arise because the bid may be controversial and suffer from a prolonged time table. Delays can arise when the proposed acquisition has to receive regulatory clearance from some regulatory

¹ See Marshall (1995a) for a discussion of recent innovative financing instruments issued in the Euromarket and Chen and Chen (1995) for a discussion of US debt equity hybrids.

² Since the funds are raised through an equity issue there will be agency implications, however, our model focuses only on the potential use of funds and their effect on the share price of the bidding company.

body, or when a tender offer results in a competitive bidding situation for the target company with some rival company(s). In these circumstances, the issuing companies face the possibility that funds raised to finance the acquisition may be surplus to their requirements if the offer does not succeed due to shareholder disapproval, regulatory obstacles or losing out to a rival company. In an attempt to tackle these problems, a new method of structuring an equity rights issue is increasingly being used by UK companies called non-interest bearing convertible unsecured loan stock (NICULS).³

Section 2 describes a NICULS financing procedure and the reasons for its use; in Section 3, we develop our model of the NICULS process when markets are fully efficient and future share values do not deviate from *ex ante* expectations. These assumptions are relaxed in Section 4 and a NICULS model is developed. In Section 5, we carry out a case study on a successful NICULS issue by Tomkins in its acquisition of Rank Hovis McDougall. From this study, we describe some preliminary findings and implications for testing our model in the conclusion in Section 6.

2. Non-interest bearing convertible unsecured loan stock

This section describes the process involved in a NICULS issue and the reasons for its growth in popularity. The type of financing used to fund a contingent acquisition is important for a number of reasons including the timing of the acquisition, the accounting treatment of the funding instrument and the consequences of using a particular type of financing, given the success or failure of the acquisition.

2.1. Timing of the acquisition

Funding through an equity rights issue can create a delay in raising funds as shareholders need to approve the equity rights issues. A three-week notice period for an Extraordinary General Meeting is required to approve the issue in the UK.⁴ Shareholders have 21 days to accept the offer of the right – if they fail to do so, their ‘rights’ to the new shares are sold in the market, allowing any profit on the rights to be sent back to shareholders. Shares not taken up by the original holder are taken up either by the new owner of the ‘right’ or by the sub-underwriter of

³ In the UK, there have been fourteen NICULS issues since 1991, which have raised over £5.5 billion. Over half of these issues have occurred in 1994 and 1995.

⁴ The exact period depends on a company’s Articles of Association and the structure of the unissued share capital.

the issue. Despite the apparently cumbersome time table, equity rights issues are very commonly used by UK public companies to fund acquisitions.⁵

2.2. *Accounting treatment*

A practical factor in the use of equity financing to fund acquisitions in the UK is the effect of the acquisition on the shape of the balance sheet. Under current UK accounting requirements purchased goodwill is written off against a company's reserves. This can mean that some of the primary balance sheet ratios, such as the gearing ratio, will deteriorate if the company's reserves figure is lowered by a goodwill write-off. This would especially be true if debt is used to finance the acquisition. Companies constrained by borrowing covenants are especially sensitive to potential breaches due to worsening of their balance sheet ratios.⁶ For many companies, equity issues are the preferred option for financing acquisitions as the equity proceeds can bolster reserves in light of the purchased goodwill write off.⁷

2.3. *Equity financing and the success or failure of an acquisition*

If a company waits until the acquisition is unconditional before it raises the required financing it may face the possibility that it cannot raise sufficient funds to meet the acquisition price in a timely fashion or that it faces further delay due to the time involved with an equity rights issue. In practice, a planned large equity rights issue to fund an acquisition may cause problems for the company as the market may have moved in the period between announcing the bid and receiving clearance and may now be unreceptive to an equity rights issue by the company.⁸

If a company raises all the cash before the acquisition is unconditional it may find the funds surplus to requirement if the acquisition fails to materialise. Calling

⁵ For a sample of 333 equity rights issues in the UK between 1990 and 1994, 63 (19%) were used to finance acquisitions.

⁶ As one of the NICULS issuers argued: "we were buying a business with negligible net assets for £510 million cash. This would have the dual effect of increasing borrowings and reducing shareholders' funds due to the goodwill write-off. The latter would have resulted in a breach of Group's borrowing covenants so we had to issue shares. Our dilemma was the acquisition was conditional on clearance by regulatory authorities" (Letter from treasurer of Thorn EMI).

⁷ This preference, although it appears widely held, is not necessarily correct. Supporters of the efficient market hypothesis and some of the capital structure models would suggest that analysts and investors can adjust the accounting ratios for factors like goodwill write-offs (as long as there is information available in the notes to the accounts). The preference for equity before debt is also contrary to the 'Pecking Order Hypothesis'.

⁸ The cost could also be higher since evidence indicates the bidding company's share price 'normally' declines after the announcement of a bid, see, for example, Dodd (1980) and Asquith (1983).

an equity rights issue to fund an acquisition that fails could be embarrassing for company directors as it may leave the company with surplus funds but no positive net present value projects. This would be a negative signal to the market. It would appear that since companies are limited in the number of calls that they can make on shareholders, due to shareholder disapproval of frequent calls and transaction costs, there may be an unwillingness on behalf of existing shareholders to approve subsequent acquisitions. To deal with this problem some companies have used a new form of equity rights issue, called a Convertible Stock Unit, which simply repays the shareholders the amount they subscribed if the acquisition fails.⁹

The final alternative, a NICULS issue, is the focus of this paper. NICULS can be used in a tender offer situation where the success is dependent on capturing a sufficient number of shares or where there is general agreement between the acquiring and target companies' board of directors but regulatory clearance is necessary for the enlarged group. In using a NICULS issue, a company makes the announcement of the issue at the same time as the announcement of the acquisition. They are issued as in a rights issue with a subscription price above the nominal value but at a discount to the prevailing share price.¹⁰ They are structured so that the second stage of the issue could be abandoned if the company does not get regulatory approval or the bid fails. The innovative mechanics of the NICULS deal with the problem of uncertainty in contingent acquisitions as they do not raise all the cash at once. They have two calls for cash which allows time to gain regulatory clearance or to see if the bid has been successful in a competitive situation or where shareholder approval is required. The initial tranche is raised upon announcement of the bid to secure the funding in advance.

The issue terms at announcement determine the amount paid at the first and second call.¹¹ The amount raised in the first installment depends on the alternative uses to which the company can put the funds if the acquisition does not become unconditional. The first installment is paid when the acquisition is still provisional. Therefore, a proportion of the issue is received unconditionally within the underwriting period. This installment serves to ensure that the issue is completely distributed. The subscribers have a clear obligation to pay the remainder of the equity rights issue, i.e., the second installment, or risk losing the first

⁹ In 1994, three companies in the UK used Convertible Stock Units to raise funds in an equity rights issue. The form of this instrument is such that the stock units are only convertible if the acquisition became unconditional. If the acquisition failed the issue price is repaid to shareholders. This is similar to a very short-term redeemable convertible bond.

¹⁰ The discount on a rights issue calculated against the ex-rights price is usually between 15–20% see, for example, Higson (1986). This is designed to make the shares look attractive even if the markets falls during the three week offer period (Conference Documentation of Financing Acquisitions, 1995). The discount on the NICULS issues is similar to the normal discount averaging 19.4% (from the Extel Financial records of UK rights issues in 1996, the actual discount on 81 rights issues was 15.81%).

¹¹ Except for one of the issues where the amount of the second call was not specified.

installment that has already been paid. The second stage of the equity rights issue cannot be called if the acquisition is not completed whereby the second installment is canceled and the partly paid loan stock is converted into ordinary shares. If the acquisition is successful and the second installment is paid, the shares are automatically converted into ordinary shares of the issuing company. In both cases, the holders of NICULS receive ordinary shares after a short period and NICULS are a temporary financing device.¹² The full subscription price of the shares is determined at the launch of the NICULS, although the dilution factor is partially dependent on whether the acquisition is successful.

NICULS are increasing in popularity due to the large number of potential regulations governing takeovers and mergers that can affect the success of any potential acquisition.¹³ This is despite the greater administrative costs in the NICULS issue than a normal rights. However, with a NICULS, there may be some savings compared to a normal rights issue in terms of the underwriter's commission. The first part of the NICULS issue is underwritten in the normal way by an underwriter whose commitment ends with the first payment. Their fee is likely to be based on the total issue amount as this is the maximum possible payment the underwriter must make as the first payment commits the party to paying the second installment. Nonetheless, there may be room for the company to negotiate a better deal with the underwriter as the second installment is contingent on the success of the acquisition.

In Section 3, we explain our model of the share price behaviour of an acquiring company using a NICULS process when investors and company directors have perfect foresight.

3. Model specification

In the model at point ' t ', the acquiring company, company A, issues a statement announcing that it is going to acquire company B and at the same time it announces that the company is funding the acquisition with an equity rights issue that will take the form of a NICULS issue.¹⁴ A notice is issued that the first installment is due to be paid at time ' $t + 1$ '. The second installment of the equity rights issue depends on the success or failure of the acquisition. The announcement of success or failure is at point ' $t + 2$ ', which we call the 'notification date'.

¹² For a full description of the NICULS instrument, see Marshall (1995b).

¹³ This is especially true when companies are expanding internationally, as they have to deal with international as well as domestic regulations. Seven of the NICULS have been used in cases where the UK company was involved with acquisitions with European or US companies.

¹⁴ The model ignores any pre-announcement price run-ups in the issuer or the target due to speculation about a potential bid.

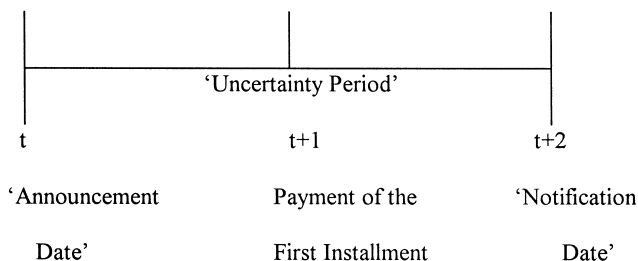


Fig. 1. Schedule of NICULS offering.

We call the period between the ‘announcement date’ and the ‘notification date’, the ‘uncertainty period’.¹⁵ This is shown in Fig. 1.

Due to the uncertainty of success in the acquisition, the shares of company A will be difficult to value during this ‘uncertainty period’.¹⁶ The following three factors are assumed to have a bearing on the share price during the ‘uncertainty period’: (i) the dilution of the initial equity rights issue;¹⁷ (ii) the uncertainty of success of the acquisition and the potential use of the funds if the acquisition is unsuccessful; and (iii) the difference in value between the total equity rights issue,

¹⁵ The company may find that they are successful in their acquisition before the first installment is paid. Therefore, the ‘notification date’ may be before the date of the first installment payment. Nonetheless, there will be a period of uncertainty between the ‘announcement date’ and the ‘notification date’. This uncertainty concerns the outcome of the acquisition attempt and not the share price of either company.

¹⁶ Clearly, there will be market wide and company specific information flowing into the market during the ‘uncertainty period’. These information flows will have an obvious impact on the share price behaviour of acquiring companies during this time. However, inclusion of such factors dilutes the effect of the NICULS process and we exclude them from our model. We also ignore the possibility of synergy such that the value of company A and company B together will exceed the value of the individual parts. Presently, there are not enough testable issues to be able to provide an estimate of the impact of these information flows.

¹⁷ The UK evidence on the effects of a rights issue on the issuing company’s share price is fairly sparse. The only major UK study was by Marsh (1979) in a study of an equity rights issues between 1962 and 1975 who found that there was a 0.5% to 1% price decline when the shares went ex-rights. However, he found that this price set back was only temporary with an abnormal return of 1.8% over the post-announcement period of 1 month. There have been a number of US studies which have considered the effect of equity issues on the returns of the issuing company. Asquith and Mullins (1986), Masulis and Korwar (1986), Mikkelsen and Partch (1986), Kalay and Shimrat (1987), Barclay and Litzzenberger (1988) and Eckbo and Masulis (1992) all show negative abnormal returns for the issuing company averaging around 3%. As noted in our model, we take the view that in a NICULS issue, the market is attempting to deal with a number of events, the equity rights issue, the potential acquisition and its probability of success and the alternative use to which the company can put the funds should the acquisition fail.

which we assume to be the acquisition price, and the value of the company or subsidiary being targeted.¹⁸

To illustrate this last point, if the acquisition is successful the shareholders of company A will benefit from any excess value of company B over and above the total equity rights issue value. On the other hand, they will be adversely affected if the value of the target company is less than the total value of the equity rights issue if the acquisition is a success. In a market with perfect foresight, however, the bidding company will accurately predict the value of the target company. Thus, there will be no difference between investors and the acquiring company's valuation of the target company. As a result, the third factor that influences the value of the share during this period will have zero value. In Section 4, we relax this assumption and find that there is indeed an effect on the share value of the acquiring company, even though initially there may be no difference between the market and the company directors' valuation of the target.

After the initial announcement of the first rights issue (t), if the acquisition is successful, a second installment of the equity rights issue of the shares of company A will occur. Since shares will be issued at some point in the future and the decision of whether to issue is contingent on some factor, this process may be viewed as a warrant on the shares of company A where the option to issue shares is determined by the success or failure of the acquisition.¹⁹ The warrant, however, is not exercisable in the hands of the holder and so far there has been no trading in these partly paid shares. Nonetheless, once the shareholders have paid for the first installment they clearly know the final price they would be required to pay and the maximum period that this call for additional cash can be exercised.²⁰

The model assumes that the market is completely frictionless and there are no taxes or transaction costs. We also assume that prices follow a submartingale process and that investors and company directors alike have perfect foresight in the valuation of the target. In the model, we define:

$V_{0,A}$ = the total value of the assets of company A before the first rights issue;

n_A = the number of shares outstanding of company A before the first rights issue;

n_B = the number of shares outstanding of company B before the first rights issue;

q_1 = the dilution factor of the first rights issue (ratio of new shares to existing shares outstanding);

q_2 = the dilution factor of the second rights issue (ratio of new shares to existing shares outstanding);

¹⁸ Companies may combine the NICULS with other forms of finance. However, NICULS often account for all or the major part of the acquisition price.

¹⁹ This can also be viewed as a put option written by the shareholders. We consider it more like a warrant as it refers to the future issue of shares.

²⁰ Note that this is exogenous to the investment decision-making system.

$r_{1,A}$ = the value of the first rights issue per share of company A;

$r_{1,B}$ = the value of the first rights issue per share of company B;

$r_{2,A}$ = the value of the second rights issue per share of company A if the acquisition is successful;

$r_{2,B}$ = the value of the second rights issue per share of company B if the acquisition is successful; and

p = the ex-ante probability of the success of the takeover bid.

The share price of a company before an equity rights issue is

$$S = \frac{V}{n}. \quad (1)$$

The share price of a company when there is an equity rights issue is

$$S_{t+1} = \frac{V_t + nqr}{n(1+q)} = \frac{S_t + qr}{(1+q)} = \frac{V_t}{n(1+q)} + \frac{qr}{(1+q)}. \quad (2)$$

With a NICULS procedure, the first installment of the equity rights issue is certain. The second installment is contingent on exogenous factors such as regulatory clearance or the acceptance of a tender offer. We define the share price of company A in the event of the first rights issue and excluding all other factors as

$$S_{1,A} = \frac{V_{0,A}}{n_A(1+q_1)} + \frac{q_1 r_{1,A}}{1+q_1} \quad (3)$$

and define the value of the share price of company A in the event of the acquisition succeeding (excluding all other factors apart from the equity rights issue dilution) as

$$S_{2,A} = \frac{S_{1,A}}{(1+q_2)} + \frac{q_2 r_{2,A}}{1+q_2}. \quad (4)$$

If the probability of success in the acquisition attempt is p then the probability of failure is $(1-p)$. Thus, we can model the share price of company A during the ‘uncertainty period’ as ²¹

$$S_A = (1-p) \left(\frac{V_{0,A}}{n_A(1+q_1)} + \frac{q_1 r_{1,A}}{1+q_1} \right) + p \left(\frac{S_{1,A}}{1+q_2} + \frac{q_2 r_{2,A}}{1+q_2} \right). \quad (5)$$

Substituting Eq. (3) into Eq. (5) gives

$$S_A = (1-p) \left(\frac{V_{0,A}}{n_A(1+q_1)} + \frac{q_1 r_{1,A}}{1+q_1} \right) + p \left(\frac{V_{0,A} + n_A q_1 r_{1,A}}{n_A(1+q_1)(1+q_2)} + \frac{q_2 r_{2,A}}{1+q_2} \right). \quad (6)$$

The first element in Eq. (6) reflects the value of the share in the event of an

²¹ Alternatively, we can write: $S_A = S_{1,A} + p(\{q_2 r_{2,A}\}/(1+q_2))$.

acquisition failure and the second element reflects the value of the share when the acquisition attempt is successful.

From this equation, we can see that if the probability of success is one then the model collapses into Eq. (4) and if the probability of success is zero, the model transforms into Eq. (3). The more certain the market is that the acquisition attempt will be a success, the lower the share price of the bidding company will be as a result of the dilution effect on shares. According to Eq. (6), once the NICULS process has been announced the bidding company's share price will be bounded above by

$$\left(\frac{V_{0,A}}{n_A(1+q_1)} + \frac{q_1 r_{1,A}}{1+q_1} \right)$$

and bounded below by

$$\left(\frac{V_{0,A} + n_A q_1 r_{1,A}}{n_A(1+q_1)(1+q_2)} + \frac{q_2 r_{2,A}}{1+q_2} \right)$$

Although investors have perfect foresight in the valuation of company B, they are still uncertain if the acquisition will be a success because the probability of success is based on an exogenous factor. The final outcome is unknown and only revealed at the 'notification date'. Consequently, there will be one initial price fall at the announcement date with no movements thereafter until the 'notification date', where there will be a rise or fall in company value dependent on whether the acquisition is successful or not.

4. Relaxing the perfect foresight assumption – NICULS model

In Section 3, we developed a model of the value of a company undergoing a NICULS process when the market is assumed to be efficient and all investors and company directors have perfect foresight. When these assumptions are relaxed, and the market's and bidder's valuation of the target company is allowed to differ, the shareholders of company A (bidder) may gain or lose from any potential divergence in the target's value. The uncertainty caused by this reduces the value of the bidder's shares. This devaluation effect decreases as we get closer to the 'notification date' since the potential for large differences in valuation decreases. We model this process using a binomial asset pricing model.

When the perfect foresight assumptions are relaxed, the model given by Eq. (6) is only part of the pricing model for the NICULS process. An important factor omitted from the perfect foresight model is the possibility that the value of the acquisition target may rise or fall within the 'uncertainty period'. For example, if the money raised for the total equity rights issue (both initial and provisional) is £200 million (i.e., the acquisition price) but the market value of company B

(target) rises to £240 million, then if the acquisition is a success, the shareholders of company A will benefit from the surplus value of company B.²² There could be many reasons why this may happen. During the ‘uncertainty period’, information may come into the market that increases the value the market places on the target company. It follows that there is no upper bound for the difference in value between the share price of company B and the total equity rights issue raised.²³ Consequently, the maximum loss that company A can incur if the equity rights issue is successful is the total value of the rights issue itself. It is important to note that if the acquisition is unsuccessful, the loss will be zero because it is assumed that the acquiring company will invest the funds raised from the first rights issue into another project with similar risk. Therefore, we can say that the profit or loss, determined by the difference between the value of company B (target) and the total amount of the equity rights issue is bounded by

$$\text{DIFFERENCE} \in [-(R_1 + R_2), \infty]$$

where R_1 is the total value of the initial rights issue at time $t + 1$ and R_2 is the total value of the second rights issue at time $t + 2$.

This difference is similar in many ways to a European call option on company B where, in this case, the option to purchase is determined by an exogenous factor, the success of the acquisition and the exercise price is the equity rights issue value per share. We define this element (derived in Appendix A) as a NICULS instrument (c):²⁴

$$c = \left\{ \sum_{n=0}^T \frac{T!}{(T-n)!n!} \omega^n (1-\omega)^{T-n} [u^n d^{T-n} S_B - (r_{1,B} + r_{2,B})] \right\} / (1+r_f)^T \quad (7)$$

where all definitions are same as before except: ω = the hedging probability;

²² If the acquisition has been agreed between both parties but clearance is required from regulatory bodies, the amount raised will be fixed and declared at the ‘announcement date’. The market value of the target should not exceed this acquisition price in the ‘uncertainty period’, unless it is expected that regulatory clearance will not be received. If the bidder issues a tender offer without the prior agreement of both parties, the value of target company could rise above the NICULS proceeds if a rival company offers a higher price. This is why in at least one NICULS issue the second installment is not specified as it was dependent on the final price of the target company. In the example given, it is assumed that the former method is being followed.

²³ In the case study that follows in Section 5, the share price of the target company did indeed rise above the total rights issue value during the ‘uncertainty period’.

²⁴ Note that Eq. (7) is defined in terms of company B. To express the NICULS instrument in terms of company A we have to scale it so that the denominator is the number of shares outstanding in company A instead of the number of shares outstanding in company B. This is easily done by multiplying Eq. (7) by n_B and dividing by $n_A(1+q_1)(1+q_2)$. The NICULS instrument is now expressed in terms of company A.

S_B = the share price of company B; r_f = one period risk free rate; u = one period multiplicative upward movement in the share price of company B ($u > 1 + r_f > 1$); and d = one period multiplicative downward movement in the share price of company B ($d < 1 + r_f$).²⁵

Cox et al. (1979) have shown that

$$u = e^{\sigma\sqrt{T/n}} \quad (8)$$

and

$$d = e^{-\sigma\sqrt{T/n}} \quad (9)$$

where σ is the annualised standard deviation.

The major difference between the NICULS instrument and a European call option is that the minimum value the NICULS instrument can take is $-(r_1 + r_2)$ whereas the minimum value of a European call option is zero. Since the minimum value of the element, $[u^n d^{T-n} S_B - (r_1 + r_2)]$, is $-(r_1 + r_2)$, the larger the variance of target company B the greater is the value of the NICULS instrument. However, this does not offset the fact that this instrument can take on a negative value whereas a European call option cannot.

Combining all three factors, the share price of a NICULS issuing company during the ‘uncertainty period’ is

$$S = (1-p) \left(\frac{V_{0,A}}{n_A(1+q_1)} + \frac{q_1 r_1}{1+q} \right) + p \left(\frac{V_{0,A} + n_A q_1 r_1}{n_A(1+q_1)(1+q_2)} + \frac{q_2 r_2}{1+q_2} \right) + p \left(\frac{n_B}{n_A(1+q_1)(1+q_2)} (c) \right) \quad (10)$$

where c is the value of the NICULS instrument and n_B is the number of shares outstanding of company B.

The first element in Eq. (10) is the value of the share price of company A in the event of the acquisition failing (DILUTE1). The second element is the value of the share price of company A if the acquisition succeeds (DILUTE2) and the final element is the value of the NICULS instrument (c). These will be zero if company A fails in its acquisition bid.

5. Case study – the takeover of Rank Hovis McDougall by Tomkins

We present a case study of a NICULS issue to illustrate the model. Firstly, we consider our simple perfect foresight model and then relax the assumptions for the more complex NICULS model.

²⁵ A full derivation of Eq. (7) is given in Appendix A.

5.1. Background

In October 1992, the board of directors of Tomkins, an international industrial management company, and Rank Hovis McDougall, a manufacturer and distributor of a wide range of foods, agreed on terms of an offer for the ordinary shares of Rank Hovis McDougall including a share or cash alternative.²⁶ Tomkins financed the acquisition by an equity rights issue of one NICULS stock unit at an issue price of 200p, a discount of 22%, for every two Tomkins ordinary shares. The company issued 335,784,658 units with a total value if both calls were made of £653 million net of expenses. The first installment was 120p payable by the 30th of November 1992 and the second installment was 80p due in 28 days after the second call. If the bid was successful and the second call was made one NICULS unit would convert into one ordinary share. If the bid was unsuccessful five NICULS units would convert into three ordinary shares. On the 8th of December 1992, the bid was declared unconditional and the second call was made.

5.2. Perfect foresight model

Using this simple model, the share price of Tomkins moves only twice in the period surrounding the takeover attempt. The first movement occurs on the date of the announcement and the second at the 'notification date'. During this time, the share price remains constant.

With this model, we assume that investors are able to measure the value of all securities without error. These simplifications lead to obvious difficulties in the testing of the model with real data. Acknowledging these drawbacks, we use the perfect foresight model to estimate the value of Tomkins during the period surrounding the acquisition attempt of Rank Hovis McDougall.

We used daily market values from the Extel Financial Equity Research database to measure the value of Tomkins and Rank Hovis McDougall. All other information, excluding p – the probability of success, was taken from the prospectus of the Tomkins rights issue. An interesting aspect of both this and the NICULS model is that the market estimate of the probability of success can be measured from the actual share price behaviour around the announcement date. This probability (p) is reflected in the initial price reaction of the company's share at the announcement date. We set p to be the value that causes the initial price change in the model to be equal to the observed price change on the day of the announcement. According to the perfect foresight model, the market's initial estimate of the probability of success of the Tomkins–Rank Hovis McDougall acquisition is 0.6. It would be unrealistic to assume that this value would stay constant for the duration of the uncertainty period since information would leak

²⁶ This was in the face of a hostile bid for Rank Hovis McDougall from another company.

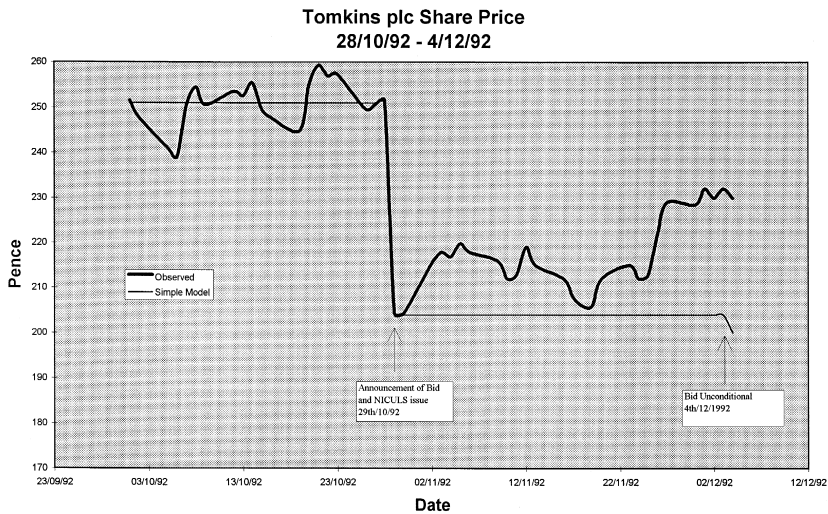


Fig. 2.

into the market concerning the prospects of the proposed acquisition. However, for the purposes of simplicity, we take the probability of success to be constant throughout the ‘uncertainty period’.

As can be seen from Fig. 2, the perfect foresight model does not display much success in predicting the share price of Tomkins. The initial drop in price at the announcement date is not correctly forecasted and because of its structure, it is not able to model the gradual incline in price over the uncertainty period. At the ‘notification date’, the probability of success becomes 1 if the acquisition is successful and 0 if it fails. Since the acquisition was successful, the model predicts another fall in price on this date. Clearly, the perfect foresight model has failed to forecast the value of Tomkins’ share price. It appears that the model has omitted one or more important factors in its estimation of the share price value. In Section 5.3, we try to identify these factors in our NICULS model.

5.3. NICULS model

The more complex NICULS model adds to the perfect foresight model by recognising the importance of the NICULS component (c) during the ‘uncertainty period’. Our simulation shows that the NICULS model predicts a significant dip in the share price of the bidding company over and above that caused by the dilution effect of the extra shares in circulation. This may be due to the fact that the announcement of the equity rights issue is at the same time as the announcement of the potential acquisition as we have found the sensitivity of this dip to be

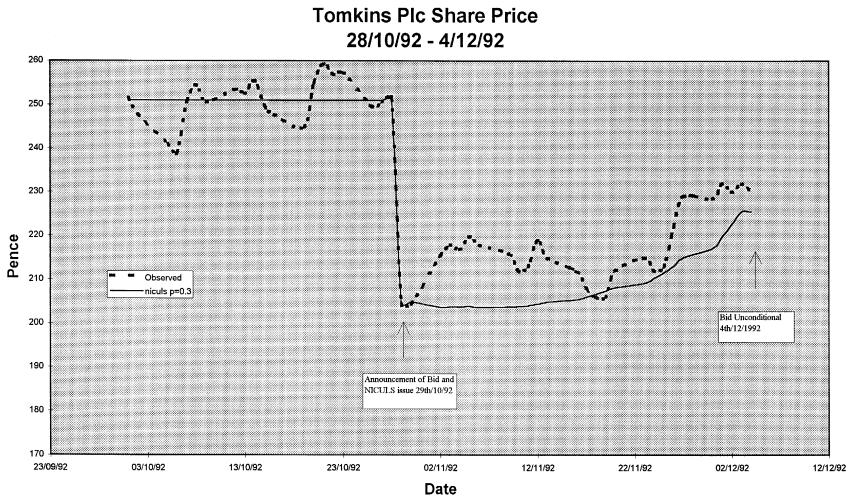


Fig. 3.

closely related to p – the probability of success of the acquisition. The probability p is bounded by 0 and 1 and it weights the three components of the model (DILUTE1, DILUTE2, and NICULS). If the probability of success is 0, the equation will collapse to DILUTE1. If the probability of success is 1, the equation will collapse to DILUTE2 + NICULS. The share price of company A is bounded below by (DILUTE2 + NICULS) and is bounded above by (DILUTE1 + NICULS).²⁷

Using the same procedure as in Section 5.2 with the NICULS model instead of the perfect foresight model, we find the ex-ante probability of success of the acquisition attempt is 0.3, as shown in Fig. 3. Any error in the estimate of the probability of success can cause a significant error in the share price estimate.

It could be argued that a low probability is expected given the unpredictability of receiving shareholder and regulatory approval. Over a period of a few days, this probability would most probably converge to a higher and more accurate value when more information is known about the proposed acquisition. However, in both models, we have used only the initial reaction of the share price to infer the ex-ante probability of success. In the NICULS issues, so far, there have been three instances when the second call was not made. In these cases, the failure was not due to regulatory factors but the defeat of the tender offer from a rival bidder. Regulatory clearance has been granted in the eleven other cases. This indicates that ex-ante when a company with a NICULS issue requires regulatory clearance

²⁷ Note that if the acquisition fails, the NICULS element will be zero. However, with any probability of success, the NICULS option will be non-zero.

the value of p is close to 1 but is much less when there is a tender offer with a competitive situation.

The size of the equity rights issue and the dilution effects does not have any significant impact on the sensitivity of the model. The size of the rights issue in the model is related to the acquisition price of the target. These factors affect q_1 , q_2 , r_1 , r_2 (dilution effects and rights issues per share of company A, respectively), in the model. The importance of these variables is determined by the probability of success, p . All things equal, an increase in r_1 and r_2 increases the share price of company A. The effect of q_1 and q_2 is ambiguous because they appear in both denominator and numerator in the equation. Again, they are affected by p . In the majority of acquisitions using NICULS so far, the dilution factor caused by the equity rights issues has been low. Therefore, the impact of the acquisition process on the share price of the bidding company has not been that significant.

The second variable that proves to be sensitive in our simulations is the value of c – the NICULS component. The relative importance of this variable is attributable to two factors: the probability of success and the discrepancy between the share price of the target company and the rights issue amount (acquisition price). The variable c will be negative at the start of the ‘uncertainty period’ and will increase until the end of the period,²⁸ where the value will be p multiplied by the difference in value of the target and the equity rights issue (bounded below by the negative total rights issue value). The value of the target company can rise above or below the acquisition price for a number of reasons, including the probability of success and the reaction of a rival bidder. If a competitor offers a higher price to the target shareholders, the value of the target increases (obviously the probability of success will fall). If the probability of success is high, the price of the value of the target should correspond to the rights issue acquisition price.

Finally, our expectation of the effect of the fundamental value of company A will have a major effect on the value of the model. It appears in both DILUTE1 and DILUTE2 and is thus a constant throughout the model, therefore, this value must be carefully chosen. It is also difficult to measure accurately. We have taken the value of the company at the announcement of the equity rights issue and the contingent acquisition. However, evidence has shown that there is a pre-announcement price run up in companies that are making equity issues (see Asquith and

²⁸ This can be more easily understood when we compare the NICULS element to a European call option. The minimum value of a payoff from a European call option is zero whereas the minimum payoff from a NICULS is $-(\text{total rights issue value})$. Within a binomial asset pricing context, at the start of the uncertainty period, a number of end of period payoffs is $-(\text{total value of the rights issue})$. In the process of adding up, the end of period payoffs we actually result in a negative value for the NICULS element. The value of this element will increase to zero the nearer we get to the notification date. This can be compared to a European call option where the end of period payoffs are bounded below by zero resulting in a large positive value for the option at the start of the issue period which decreases to zero the nearer the exercise date we get.

Mullins, 1986). Nonetheless, it is very simple to deal with these problems by using alternative measures such as an average share price over a preceding period.

6. Conclusions

This paper presents a binomial asset pricing model to examine the effect on the share price of a company that undertakes a new form of equity rights issue, NICULS, to fund a contingent acquisition. We take a different approach from previous theories explaining the behaviour of share prices around announcements of capital structure changes by considering the movement in the share price of the issuing company as being driven by the market's expectation of the possible future values of the investment being undertaken by the funds raised in the NICULS issue or as a signal imparted by the company about the future investment opportunities of the company. This is driven by the number of events that the market is trying to value when a company makes a NICULS issue. These events include the effect of the dilution of the initial equity rights issue, the potential appeal of the combined issuer and target, the probability of success of the acquisition which will determine whether the second call of the rights issue will be made and therefore the equity dilution and the alternative use to which the company can put the initial funds raised if the acquisition is a success.

First we developed a simple model by assuming perfect foresight on behalf of the issuing company and the investors. Secondly, we introduced a potential difference in value between the acquiring price, the total equity rights issue, and the value of the company being acquired called the NICULS model. Our preliminary findings based on the limited number of testable NICULS issues show there is a dip in the share price over and above that expected because of the dilution effect. We interpret this as a natural consequence of the market's evaluation of the value of the investments for which the funds were raised. We have also found that the market's expectation of the success of the acquisition attempt has a direct and significant effect on the observed dip in the share price. We illustrated the model using a case study of one NICULS issue, Tomkins takeover of Rank Hovis McDougall.

The model can be extended to the case of general equity rights issues, but due to the lack of a definite investment target at the initial announcement date of the rights issue, an empirical test would be difficult. It would also be difficult to measure such variables as p , the probability of success and the investment value. However, we would suggest that it is interesting to view the equity issue process in such a way and further research could lead to insights into share price behaviour in similar situations. Future research will include a more comprehensive test of this model with a larger sample and consideration of related instruments that may raise funds for purposes other than acquisitions. Similar funding instruments may be developed to overcome problems in other areas of corporate finance, for

example, in financing strategic financial investments where subsequent funds may be required depending on the outcome of an initial investment.

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Appendix A

To value the NICULS instrument c , we use a binomial asset pricing model. It is important to note that the value of the NICULS instrument will be zero if the acquisition attempt is a failure and will take some non-zero value (negative or positive) if the acquisition is a success.

We begin with a one period model and then extend this to a multi-period one. We define: S as the share price of company B (target); $(1 + r_f)$ as 1 plus the one period risk free rate; u as the one period multiplicative upward movement in the share price of company B ($u > 1 + r_f > 1$); and d as the one period multiplicative downward movement in the share price of company B ($d < 1 + r_f$).

At the end of one period, the share price of company B may increase to uS with a probability ω or decrease to dS with a probability $(1 - \omega)$.

We now construct an instrument called the NICULS instrument, c , that takes on the value $c_u = (uS - R > 0)$, if the share price of company B increases and a value $c_d = (dS - R < 0)$ if the share price of company B decreases.

To value the NICULS instrument, we construct a hedge portfolio composed of one share of company B and m shares of the NICULS instrument written against the shares of company B. If the end of period payoffs are equal, the portfolio will be risk free. Equating the payoffs, we have

$$uS - mc_u = dS - mc_d \quad (\text{A.1})$$

and solving for m , the number of NICULS instruments to be written against one share of company B, we have

$$m = \frac{S(u - d)}{c_u - c_d} \quad (\text{A.2})$$

We have thus constructed a riskless hedge portfolio. Since it is constructed to be riskless, the current value of the portfolio multiplied by one plus the risk free rate must equal the end of period payoff. That is

$$(1 + r_f)(S - mc) = uS - mc_u. \quad (\text{A.3})$$

Rearranging Eq. (A.3) to solve for c , we have

$$c = \frac{S[(1 + r_f) - u] + mc_u}{m(1 + r_f)}. \quad (\text{A.4})$$

Substituting the hedge ratio, m , into this equation and rearranging terms, we can solve for the value of the NICULS instrument:

$$c = \frac{\left[c_u \left(\frac{(1 + r_f) - d}{u - d} \right) + c_d \left(\frac{u - (1 + r_f)}{u - d} \right) \right]}{(1 + r_f)}. \quad (\text{A.5})$$

We can simplify Eq. (A.5) by using

$$\rho = \frac{(1 + r_f) - d}{u - d} \quad (\text{A.6a})$$

and

$$(1 - \rho) = \frac{u - (1 + r_f)}{u - d} \quad (\text{A.6b})$$

and substituting into Eq. (A.5) to give

$$c = \frac{[\rho c_u + (1 - \rho) c_d]}{(1 + r_f)}. \quad (\text{A.7})$$

We call ρ the hedging probability.

Given u , d and S . We can say that a risk neutral investor would only require the risk free rate from an investment in company B. Thus

$$(1 + r_f)S = \omega uS + (1 - \omega)dS. \quad (\text{A.8})$$

Solving for ω , we have

$$\omega = \frac{(1 + r_f) - d}{u - d}. \quad (\text{A.9})$$

It is clear that for any risk neutral investor, $\rho = \omega$.

The one period model given above can be extended to a T period model in the following way. The payoff of the NICULS instrument after T periods is simply the probability of each final outcome (share price of company B minus the total rights issue value) multiplied by the value of that outcome and discounted at the risk free rate. Thus, the general form of the payoff is

$$u^n d^{T-n} S - R \quad (\text{A.10})$$

where T is the total number of time periods and n is the number of upward movements in the share price of company B ($n = 0, 1, 2, \dots, T$). The general form of the probabilities of each payoff is given by the binomial distribution (standard result):

$$B(n|T, \omega) = \frac{T!}{(T-n)!n!} \omega^n (1 - \omega)^{T-n}. \quad (\text{A.11})$$

Multiplying the payoffs by the probabilities and summing across all possible payoffs, we have

$$c = \left\{ \sum_{n=0}^T \frac{T!}{(T-n)!n!} \omega^n (1-\omega)^{T-n} \left[u^n d^{T-n} S_B - (r_{1,B} + r_{2,B}) \right] \right\} / (1+r_f)^T. \quad (\text{A.12})$$

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