

PITFALLS IN ADJUSTING MERGER RATIOS *for cash payout*

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For merging entities, this paper identifies the technically correct adjustment to the merger ratio when some part of the consideration is cash rather than shares in the merged entity. It also highlights the problems arising from adopting an alternative short-cut adjustment method.

A merger is a combination of two or more merging entities to create a larger merged entity. A critical component of the merger transaction is the merger ratio which determines the relative shareholding of the shareholders of each merging entity in the merged entity.

The merger ratio for a given merger transaction depends on a multitude of factors including, but not limited to, the relative enterprise value and relative equity values of the merging entities, the nature of the expected synergies from the merger, the extent to which the merging entities (particularly if they are listed entities) are perceived as being overvalued or undervalued, and the relative bargaining positions of the merging parties.

When the merging entities have similar pre-merger (interest bearing) debt-equity ratios, a common starting point in establishing the merger ratio is the pre-merger standalone equity value¹ of each merging entity.² This merger ratio also implicitly reflects each merging party's contribution to and determines their share of the expected synergies from the merger.

A complication in establishing the merger ratio arises when shareholders in one (or more) merging entity receive a mixture of cash and shares. Such circumstances require, *inter alia*, the adjustment of the merger ratio based on the pre-merger equity values to allow for the cash payout.

Despite its practical necessity, our review of a sample of 10 corporate finance textbooks which have chapters dealing with takeovers/mergers indicates that none of the textbooks contains discussions on this type of adjustment.

The aim of our paper is twofold. The first is to identify the technically correct adjustment to the merger ratio when some part of the consideration is cash rather than shares in the merged entity. The second is to alert practitioners to the problems

arising from adopting an alternative short-cut adjustment method which we have seen used in practice.

The technically correct adjustment method

Assume a scenario in which two merging parties, A and B, have agreed on the first step being a merger ratio based on their respective pre-merger equity values (assuming consistent initial debt-equity ratios). However, shareholders in Entity A will receive part payment in cash, necessitating a cash payout from the combined entity. The aim is to determine the correct post-cash payout merger ratio for Entity A (the cash receiving entity) and Entity B. For the remainder of this paper, the terms Entity A and Entity B are used to represent the shareholders in Entity A as a whole and the shareholders in Entity B as a whole.

Notations

We have adopted the following notations:

$PV(A)$	=	Pre-merger standalone equity value of Entity A
$PV(B)$	=	Pre-merger standalone equity value of Entity B
$PV(Synergies)$	=	Present value of expected synergies (net of implementation costs) from the merger ³
X	=	Entity A's agreed pre-cash payout merger ratio, which is equal to $PV(A) / [PV(A) + PV(B)]$
C	=	the amount of cash to be received by shareholders in Entity A as part of the consideration for its shares
Y	=	Entity A's post-cash payout merger ratio to be determined

The value of the equity of the merged entity ($PV(AB)$) (before Entity A's cash payout) are as follows:

$$PV(AB) = PV(A) + PV(B) + PV(\text{Synergies})^4 \quad (1)$$

In the absence of the cash payout, Entity A would receive shares in the merged entity such that the value of their post-merger relative shareholding in the merged entity is equal to $PV(A) + X PV(\text{Synergies})$.

In the absence of surplus cash in the combined entity, the cash payout to Entity A is funded by new debt to be raised by the merged entity. This is conceptually equivalent to a selective share buy-back whereby the merged entity raises new debt and buys back a portion of Entity A's shares in the merged entity. In substance, Entity A receives the cash component in exchange for a lower relative shareholding in a smaller total equity base (post-merger) due to the effective equity-debt swap undertaken by the merged entity.⁵

Prima facie, Entity A still gets a share of synergies, partly in cash and partly via its remaining shareholding in the merged entity. But whether or not Entity A gets a 'fair' remaining shareholding in the merged entity depends upon whether or not the post-cash payout merger ratio (Y) for Entity A is properly calculated.

To maintain Entity A's position it is necessary that:

$$PV(A) + X PV(\text{Synergies}) = C + Y [PV(AB) - C] \quad (2)$$

The left-hand-side is the value received by Entity A in an all-equity transaction while the right-hand-side is the value received by Entity A as a cash amount (C) plus an equity share in the combined entity which has paid out the cash amount of C .

Using equation (1) and noting that (by definition):

$$PV(A) = X [PV(A) + PV(B)] \quad (3)$$

$$Y = X - \frac{C(1-X)}{PV(A) + PV(B) + PV(\text{Synergies}) - C} \quad (4)$$

It is obvious from Equation 4 that Entity A's appropriate post-cash payout merger ratio (Y) is (as expected) less than its pre-cash payout merger ratio (X) because the second term on the right-hand-side of Equation 4 is clearly positive.

The short-cut adjustment method

A short-cut method sometimes (albeit wrongly) adopted in practice to allow for the cash payout received by the shareholders of the relevant merging entity is to simply deduct the amount of the cash payout (C) from both the pre-merger standalone equity value of the merging party receiving the cash and the sum of the pre-merger standalone equity values of all the merging parties.⁶ Expressed mathematically:

$$Y^{\text{short-cut}} = [PV(A) - C] / [PV(A) + PV(B) - C].$$

Using Equations (1) and (3), $Y^{\text{short-cut}}$ can be expressed as follows:

$$Y^{\text{short-cut}} = X - \frac{C(1-X)}{PV(A) + PV(B) - C} \quad (5)$$

It is obvious from Equation 5 that $Y^{\text{short-cut}}$ is less than X (as expected). Moreover, the denominator of the second term in Equation 5 is less than the corresponding component of Equation 4 because it ignores synergies. Hence $Y^{\text{short-cut}} < Y$.

Table 1 provides a simple example involving two merging entities A and B to illustrate the calculation of the merger ratio based on the short-cut method.

Taking into account Entity A's cash payout of \$300 million under the short-cut method reduces Entity A's post-cash payout merger ratio from 80 per cent to 50 per cent. By definition, this also reduces Entity A's share of synergy benefits from 80 per cent to 50 per cent for which reduction Entity A receives no consideration.

At the simplest level, the fundamental flaw of the short-cut method can be demonstrated by assuming that Entity A withdraws 100 per cent of its pre-merger value in cash. Entity B would gain 100 per cent of the value of the expected synergy, despite the fact that on a pro rata pre-merger basis Entity B is only entitled to only 20 per cent of the value of the expected synergy from the merger transaction.⁷

TABLE 1: Calculation of the post-cash payout merger ratio under the short-cut method

	Pre-merger standalone equity value \$m		Cash payout \$m	Pre-merger post-cash payout standalone equity value \$m		Pre-cash payout merger ratio %		Post-cash payout merger ratio %	
A	400	[a]	(300)	100	[d]	80	[g] = [a] / [c]	50	[i] = [d] / [f]
B	100	[b]	-	100	[e]	20	[h] = [b] / [c]	50	[j] = [e] / [f]
Total	500	[c]	(300)	200	[f]	100		100	

As noted earlier, $Y - Y^{short-cut}$ is greater than zero as can be seen by subtracting Equation 5 from Equation 4 and rearranging:

$$Y - Y^{short-cut} = \frac{C(1-X)PV(Synergies)}{[PV(AB) - C][PV(A) + PV(B) - C]} \quad (6)$$

Equation 6 confirms that the short-cut method underestimates the appropriate post-cash payout merger ratio of the cash receiving merging party. This is because the short-cut method wrongly excludes Entity A's share of the value of expected synergies. The larger the value of the expected synergies and hence Entity A's pre-cash payout share of this value, the larger the extent to which $Y^{short-cut}$ underestimates Y . The combination of a relatively large cash payout received by Entity A and a relatively large value of the expected synergies magnifies the downward bias of the short-cut method.

Using the same example contained in Table 1 and assuming that $PV(Synergies)$ is \$200 million, the difference between Y and $Y^{short-cut}$ is around 15 per cent. That is, taking into account the same amount of cash payout received by Entity A should technically only reduce Entity A's merger ratio from 80 per cent to 65 per cent, instead of 50 per cent as indicated by the short-cut method.

Conclusion

It is clearly incorrect to use the short-cut method to adjust a starting merger ratio based on the pre-merger equity values of the merging entities for the cash payout received by one of the merging parties.

The derivation of the technically correct post-cash payout merger ratio is case-specific. It requires, *inter alia*, a proper assessment of the equity value of the merged entity, which inherently involves taking into account the expected synergies (net of implementation costs) from the merger. This critical input is wrongly excluded in the derivation of the

post-cash payout merger ratio under the short-cut method, resulting in the cash receiving merging party's share of the value of the expected synergies being understated.

The apparent merger ratio using the short-cut method can be distorted – compared to the properly calculated merger ratio – by the relative sizes of the merging entities, synergy value, cash payout, method of funding the cash payout, and technical discrepancies/incorrectness in the way in which the pre-merger standalone enterprise values and equity values of the merging entities are calculated.

Further complications arise if the value of equity in the merged entity is materially altered by the change in the debt to equity ratio due to the equity debt swap to fund the cash payout or if one party can generate 'unique' synergies. Even more complications arise if there are significant differences in the initial debt-equity ratios and price earnings multiples of the merging parties.

The flow-on commercial and tax implications are self-evidently significant, given that the merger ratio calculated under the short-cut method is often a poor indicator of the technically correct merger ratio. There is no substitute or short-cut for the technically correct derivation of the post-cash payout merger ratio if a correct commercial and tax outcome is to be achieved.

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TABLE 2: Calculation of the appropriate post-cash payout merger ratio

	Pre-merger standalone equity value \$m		Pre-merger post-cash payout standalone equity value \$m		Cash payout \$m		Pre-cash payout merger ratio ⁽¹⁾		PV of expected synergies		Pre-cash payout merger ratio ⁽²⁾	
A	400	[a]	100	(300)		80 ⁽¹⁾	[e]	160 ⁽³⁾	[g]	65 ⁽⁵⁾	[j]	
B	100	[b]	100	-		20 ⁽²⁾	[f]	40 ⁽⁴⁾	[h]	35		
Total	500	[c]	200	(300)	[d]	100 ⁽³⁾		200	[i]	100		

Notes:

- [e] = [a] / [c].
- [f] = [b] / [c].
- [g] = [e] x [i].
- [h] = [f] x [i].
- [j] = [e] - (1 - [e])x [d] / ([a] + [b] + [i] - [d]).

Notes

1. This is the difference between the pre-merger standalone enterprise value and the existing net interest bearing debt of each merging entity, where the existing net interest bearing debt is equal to interest bearing debt less (surplus) cash. In addition, it should be noted that the standalone enterprise value of a merging entity does not reflect that merging entity's share of the expected synergies from the merger transaction. To the extent that the expected synergies are 'common' synergies (as opposed to unique synergies), which would be available to a hypothetical willing but not anxious buyer, the standalone enterprise value (even when correctly derived) does not represent the market value of each merging entity's total assets; nor does the pre-merger standalone equity value of each merging entity represent the market value of its equity at the time of the transaction.
2. In this case, a merger ratio based on the pre-merger enterprise values of the merging entities is similar to a merger ratio based on the pre-merger equity values of the merging entities anyway. In cases where the debt-equity ratios differ significantly between merging entities, the starting point for establishing the merger ratio and the necessary adjustment for cash payout are case specific, depending on negotiations between the merging parties. In these cases, the final merger terms are required to reflect both synergy share adjustments and financial leverage adjustments.
3. These are the expected synergies from the merger, which accrue to the shareholders of the merging entities. For simplicity we ignore the flow-on benefits from the merger (in terms of improved security and credit ratings) to the existing holders of interest bearing debt to the merging entities, which is assumed by the merged entity.
4. Implicit in this equation is the assumption that the existing interest bearing debt securities of the merging entities are valued at their face value. Technically, this might have already reflected the flow-on synergistic benefits of the merger to these debt securities. However, such benefits, if any, would generally not be material.
5. If the merged entity is a listed entity, a minority interest discount issue also arises.
6. For confidentiality reasons, we are unable to disclose details of the transactions (that we know) in which the (incorrect) short-cut methods were adopted in establishing the merger ratios.
7. For simplicity we have assumed there are no 'unique' synergies.