

Discounted Cash Flow Model to Assess Company Value and Risk Considering Potential Synergistic Mergers and Breakups

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Abstract

Traditional discounted cash flow (DCF) models often fail to capture the full value of a business. This is often noticeable when firms sell at unexpected premiums. The discounted cash flow model introduced by Gélinas [1] addresses this gap by incorporating the potential synergies created when a company's assets are acquired by another firm (DCF_{Synergies} or 2.0 as the author labeled). This paper extends DCF_{Synergies} by examining the further added value and risk implications of structuring a business for segmented sales (DCF_{Segmented}), where different buyers acquire different parts of a firm, unlocking higher synergies than a single buyer could, which could explain even greater acquisition premiums. We also introduce standard deviation analysis to quantify valuation uncertainty and risk in both whole-firm and segmented sales. A numerical example illustrates how breaking a company into parts can result in higher valuation and lower risk-adjusted uncertainty than a whole-firm sale. We also present a recent case study that is consistent with our findings.

Keywords

Discounted Cash Flow Valuation, Corporate Restructuring, Segmented Valuation, Synergy Valuation

1. Introduction

Mergers and acquisitions (M&A) frequently involve takeover premiums that surprise investors relying on traditional DCF models ([2]-[4]). The standard approach assumes that a firm's assets are optimally utilized in their current form, yet this overlooks the potential for additional synergistic value if those same assets

are transferred to better-suited acquirers [5].

The $DCF_{Synergies}$ introduced by [1] corrects this limitation by considering potential acquirers who may extract higher incremental cash flows from a target's assets than its current owners. This paper suggests an improvement to the $DCF_{Synergies}$. We show that configuring a firm to allow for a segmented sale can increase the value of the firm while reducing its valuation volatility.

This paper's findings suggest that corporate reorganizations can create meaningful value for shareholders and that a buyer able to find synergies in a targeted acquisition will be justified to offer a premium purchase price, especially to fend off rival bids if the announcement of such potential transaction can inform competitors about the existence of valuable potential synergies they might have overlooked.

By applying a discounted cash flow valuation model with synergies in a segmented sale framework ($DCF_{Segmented}$), we demonstrate how firms can optimize their structure before a sale to achieve a higher-than-market valuation while managing valuation risk. We illustrate with the recent case of Velan Inc., a Canadian industrial manufacturer.

2. Literature Review

Acquisition premiums, which represent the excess price paid for a target company's shares over their pre-acquisition market value, are a crucial aspect of mergers and acquisitions (M&As). These premiums are influenced by various factors, including synergy potential, bargaining power, and information asymmetry. This review aims to synthesize the existing literature on acquisition premiums, highlighting key findings and theoretical frameworks.

2.1. Theoretical Frameworks and Empirical Evidence

The concept of acquisition premiums is rooted in the idea that acquirers pay more than the current market price to secure a target company. Haunschild [6] defines the acquisition premium as the percentage difference between the trading price of the target's stock before the announcement of the acquisition and the price per share paid by the acquiring firm. This definition provides a foundational understanding of how premiums are calculated and perceived.

Varaiya [7] offers a theoretical perspective on how acquisition prices are determined, suggesting that the price will fall between the target valuation and the current market value. This is influenced by the acquirer's reservation price and bargaining power, which can significantly impact the final premium paid.

Laamanen [8] emphasizes the role of synergy potential in justifying higher acquisition premiums. Synergies, such as enhanced revenue streams and cost reductions, can increase the target's value to the acquirer, thereby supporting higher premiums. This perspective underscores the strategic rationale behind paying more for a target company.

Tong and Wu [9] extend signaling theory to acquisition premiums, highlight-

ing how interorganizational relationships can enhance sellers' gains by reducing information asymmetries. This suggests that premiums may not only reflect the acquirer's valuation but also signal the target's quality or potential to other market participants.

Bennett and Dam [10] note that a significant portion of a firm's stock price is attributed to anticipated merger gains, suggesting that observed premiums may underestimate actual gains from mergers. This perspective indicates that market expectations play a crucial role in determining acquisition premiums.

Betton *et al.* [11] provide empirical insights into factors influencing acquisition premiums, including firm size, return on assets, and leverage. Their study underscores the complexity of determining premiums, as various firm-specific characteristics can impact the final price paid.

2.2. Discounted Cash Flow Valuation

The traditional DCF model values a firm as:

$$Value = \sum \frac{CF_t}{(1+r)^t} \quad (1)$$

where CF_t corresponds to the expected future cash flows, r reflects the appropriate risk-adjusted discount rate, and t denotes time periods.

This model assumes that assets generate the same cash flows regardless of ownership. However, buyers frequently justify acquisition premiums by forecasting higher cash flows or lower risks than the current firm structure allows [12].

[1] proposed a refined valuation approach that accounts for synergistic cash flows under different ownership structures. If it is certain that potential acquirers will acquire the firm when it is profitable for them, then the company's value is:

$$Value_{synergies} = \max_k \sum \frac{CF_{t,k}}{(1+r_k)^t} \quad (2)$$

where $k=0$ represents current owner and $k>0$ represents each potential acquirer, $CF_{t,k}$ represents cash flows at time t with owner k , and r_k is the discount rate under k 's business conditions.

If the acquisition is uncertain, the expected value is adjusted by the probability of acquisition:

$$Value_{synergies} = \max_k \left[P[A_k] \sum \frac{CF_{t,k}}{(1+r_k)^t} + (1-P[A_k]) \sum \frac{CF_{t,0}}{(1+r_0)^t} \right] \quad (3)$$

where $P[A_0]$ is the probability that current owner keeps the company, $P[A_{k>0}]$ represents the probability that potential acquirer k purchases the company.

This model justifies takeover premiums by showing that an asset can be more valuable in another company's hands than in its current structure. This is because, assuming investors are rational, $P[A_{k>0}]$ will be zero if k 's post-acquisition expected discounted value of cash flows from the acquisition is lower than current market value of the company (*i.e.*, if the net present value of the acquisition project

is negative). For example, one could expect that $P[A_{k>0}]$ will rapidly fall towards zero as financing costs r_k become prohibitively expensive.

To estimate the standard deviation (or risk) of the company’s value considering potential synergies, one must account for the variability in cash flows under each possible ownership scenario. This includes both the stand-alone case, where the current owner retains control, and the acquisition cases, where one of several potential acquirers takes ownership. While the original valuation framework was outlined by [1], the risk estimation presented here extends that model by incorporating ownership-specific variance in projected cash flows. The variance of the synergistic value of the firm, denoted as $\sigma_{Value_{synergies}}^2$, can be calculated as:

$$\sigma_{Value_{synergies}}^2 = \sum_k P[A_k] \sigma_{CF_{t,k}}^2 \tag{4}$$

In this expression, the summation is taken over all ownership scenarios, where $k = 0$ represents the current owner and $k > 0$ indexes each potential acquirer. The term $P[A_k]$ represents the probability that ownership scenario k occurs – that is, that acquirer k will ultimately control the company. The term $\sigma_{CF_{t,k}}^2$ refers to the variance of the firm’s future cash flows under ownership structure k . This formulation provides a weighted average of the variances in cash flows, where the weights correspond to the likelihood of each ownership outcome. It captures the risk inherent in the firm’s future value, accounting for the fact that different owners may operate the business under distinct strategic, operational, or financial conditions that affect the volatility of cash flows.

Certainty of acquisition is the special case where $P[A_0] = 0$ *i.e.*, $\sum_{k>0} P[A_k] = 1$.

3. Extension Considering Segmented Sales

The valuation model for $Value_{synergies}$ assumes the entire firm is acquired by a single buyer. However, a firm can sometimes generate even higher value when broken into segments and sold separately to the most efficient buyers. Equivalently, a buyer could acquire the firm with the intention of reselling its parts to different buyers. The segmented sale valuation model, denoted $Value_{segmented}$, assumes that each segment will be sold to the most efficient buyer—if doing so is profitable. It can be expressed as:

$$Value_{segmented} = \sum_s \max_k \sum_t \frac{CF_{t,s,k}}{(1+r_{s,k})^t} \tag{5}$$

In this formulation, s indexes each segment of the firm, and k represents the ultimate owner of segment s . As before, $k = 0$ represents the current (pre-transaction) owner, while $k > 0$ indicates potential acquirers. The term $CF_{t,s,k}$ is the expected cash flow from segment s at time t under ownership by k , and $r_{s,k}$ is the corresponding discount rate.

By ensuring that each segment is held by the owner who can generate the highest net present value, this model captures the potential for higher overall firm

value than a whole-firm acquisition by a single buyer.

When each segment is assigned to its most efficient owner, the risk or volatility of the total value cannot be calculated using a simple probability-weighted variance. Instead, it reflects the variance under the chosen maximum-cash-flow ownership configuration for each segment. Under the simplifying assumption that segment-specific cash flows are uncorrelated across owners and segments, the total variance of the segmented value is:

$$\sigma_{Value_{segmented}}^2 = \sum_s \max_k \sigma_{CF_{t,s,k}}^2 \quad (6)$$

While this assumption enhances tractability, it may need to be relaxed in practice, particularly in cases of intense competition among buyers or when segments exhibit significant synergies if retained together.

In situations where acquisition of each segment by its most efficient owner is uncertain and instead depends on various factors (such as financing conditions, regulatory approval, or strategic fit), the expected value of the firm must be calculated using ownership probabilities. The expected segmented value under probabilistic ownership becomes:

$$Value_{segmented} = \sum_s \sum_k P[A_{s,k}] \sum_t \frac{CF_{t,s,k}}{(1+r_{s,k})^t} \quad (7)$$

Here, $P[A_{s,k}]$ denotes the probability that segment s will ultimately be owned by party k . As before, $k = 0$ refers to the current owner, and $k > 0$ to potential acquirers.

The corresponding variance of the segmented firm value, accounting for ownership uncertainty, is:

$$\sigma_{Value_{segmented}}^2 = \sum_s \sum_k P[A_{s,k}] \sigma^2(CF_{t,s,k}) \quad (8)$$

Again, we assume here that the cash flows associated with different segments and different owners are uncorrelated, allowing variances to be summed directly.

4. Numerical Example: Comparing Regular DCF, Synergies, and Segmented Sale Approaches

To illustrate how ownership structure and segmentation affect firm valuation and risk, this section presents a numerical example comparing three valuation models: the traditional discounted cash flow (DCF) approach, a synergy-adjusted whole-firm acquisition model, and a segmented sale model. The firm comprises three distinct business segments:

- Segment A: a core, profitable operation.
- Segment B: a moderately performing unit under current ownership but with higher potential under alternative ownership.
- Segment C: a “toxic” liability, such as an asbestos-related segment, imposing persistent negative cash flows.

This example builds on standard corporate finance principles regarding cash

flow forecasting and risk-adjusted discounting [13], while extending the analysis to consider segmented divestitures as a means to unlock latent value and reduce firm-level risk ([14] [15]).

4.1. Assumptions

Table 1 presents the expected annual cash flows, discount rates, and cash flow variances under different ownership configurations.

Table 1. Segment-level assumptions under different ownership structures.

Segment	Cash Flow (Current Owner)	Discount Rate (Current Owner)	Variance (Current)	Cash Flow (Efficient Owner)	Discount Rate (Efficient Owner)	Variance (Efficient)
A	100	10%	400	—	—	—
B	70	12%	900	100	9%	625
C	-20	15%	250	-5	25%	100

Each valuation assumes perpetual cash flows, evaluated using the standard perpetuity formula:

$$Value = \frac{Cash\ Flow}{r}$$

4.2. Regular DCF Valuation

Under the traditional DCF model, the entire firm remains under current ownership. The firm’s value is:

$$Value_{DCF} = \frac{100}{0.10} + \frac{70}{0.12} - \frac{20}{0.15} = 1000 + 583.33 - 133.33 = 1450$$

Assuming independence across segments, the firm-level variance is:

$$\sigma_{DCF}^2 = 400 + 900 + 250 = 1550$$

4.3. Synergy-Based Whole-Firm Acquisition

In this model, the firm is acquired by a single more efficient buyer. Segment B is operated more effectively post-acquisition, while Segments A and C remain unchanged. This scenario aligns with the view that synergies often result from improved operations post-merger (Damodaran [13]).

$$Value_{Synergies} = \frac{100}{0.10} + \frac{100}{0.09} - \frac{20}{0.15} = 1000 + 1111.11 - 133.33 = 1977.78$$

Variance under synergistic ownership:

$$\sigma_{Synergies}^2 = 400 + 625 + 250 = 1275$$

4.4. Segmented Sale Model

Here, each segment is transferred to the most efficient owner. Segment A remains with the current owner, Segment B is sold to a better-suited acquirer, and Segment

C, a toxic liability, is sold to a specialized firm capable of managing legal and operational risk. Such “carve-outs” are consistent with the literature on toxic asset restructuring (House & Masatlioglu [14]) and the role of specialized buyers in managing environmental and legal exposures (Duchin *et al.* [15]).

$$Value_{Segmented} = \frac{100}{0.10} + \frac{100}{0.09} - \frac{5}{0.25} = 1000 + 1111.11 - 20 = 2091.11$$

Assuming uncorrelated segments:

$$\sigma_{Segmented}^2 = 400 + 625 + 100 = 1125$$

4.5. Comparative Analysis

Table 2 summarizes the value and risk under each approach.

Table 2. Comparison of valuation approaches.

Model	Firm Value	Variance (σ^2)	Standard Deviation (σ)
Regular DCF	1450.00	1550	39.37
Synergy-Based	1977.78	1275	35.68
Segmented Sale	2091.11	1125	33.51

The results show that, when conditions are right, firm value increases, and risk decreases, as ownership flexibility improves. The segmented sale model yields the highest value and the lowest risk, demonstrating the strategic advantage of divesting underperforming or high-risk assets to specialized entities. These findings reinforce prior work emphasizing that synergy creation [13] and toxic asset divestiture ([14] [15]) are key levers for optimizing both corporate valuation and risk management.

5. Real Life Illustration: Strategic Restructuring and Shareholder Value Creation at Velan Inc.

This case study explores the strategic transformation of Velan Inc., a Canadian industrial valve manufacturer, in the face of regulatory constraints, legacy liabilities, and a failed acquisition. Founded in 1950, Velan has supplied highly engineered valves to global industries including power generation, oil and gas, and cryogenic applications. Despite its technical strengths, Velan’s public valuation stagnated due to operational inefficiencies and legacy asbestos liabilities. Between 2023 and 2025, the company enacted a series of transformative actions, including a failed acquisition, strategic divestitures, and liability restructuring, that ultimately generated significant shareholder value. The case draws on academic frameworks related to synergy valuation [13], toxic asset divestiture [14], and segmented sales [15], while emphasizing investor response as reflected in share price movements.

Velan operated across three core components:

- Velan Inc. (Global, ex-France): Designs, manufactures, and markets a wide

range of industrial valves for critical applications. Its focus is on high-performance cast and forged valves, especially for power plants and other demanding industries.

- Velan SAS (France): A wholly owned subsidiary located in Lyon in a 160,000 sq. ft. facility. It specializes in the design and manufacture of high-performance valves for nuclear and cryogenic applications. Its strategic importance attracted regulatory attention in France.
- Velan Valve Corp.'s (USA) Asbestos Liability: Carried significant asbestos-related legacy liabilities, reducing Velan's valuation and posing litigation and insurance risks.

On February 10, 2023, Flowserve Corporation announced plans to acquire Velan for CAD 329 million (USD 245 million), at a price of CAD 13.00 per share. The acquisition promised USD 20 million in synergies and enhanced aftermarket access. Shareholders approved the transaction in May 2023. However, in October 2023, the French Ministry of Economy blocked the acquisition under foreign direct investment rules. The market responded with disappointment, and Velan shifted to independent value creation through divestiture.

The sequence of events from 2023 to 2025 reflects a dynamic transformation in Velan's strategic direction, which is mirrored in the evolution of its market valuation. On February 10, 2023, Flowserve's acquisition announcement caused Velan's share price to rise sharply from CAD 6.74 on February 9 to CAD 12.73 the next day, closely matching the CAD 13.00 offer on a discounted basis. Following shareholder approval on May 5, 2023, the stock price remained stable within the CAD 12.70 to 12.90 range, reflecting market confidence in the transaction's completion. However, on October 5, 2023, the French government's rejection of the acquisition triggered a significant market correction, with Velan's share price falling to CAD 5.56 as the takeover premium was erased.

In response, after over a year of repositioning and increasingly positive news, Velan unveiled a new strategic plan on January 14, 2025, which included two major initiatives: the divestiture of its asbestos-related liabilities to Global Risk Capital for USD 143 million, and exclusive negotiations to sell its French subsidiaries, Velan SAS and Velan S.A.S., to Framatome SAS for USD 198.4 million. The market reacted positively, and the share price rose from CAD 11.76 to CAD 17.79 by January 22. This momentum continued into March, when shareholder approval of the French transaction on March 20, 2025, pushed the stock further from CAD 13.65 (March 11) to CAD 16.25, signaling strong investor support for the company's transformation.

Velan's strategic decisions illustrate several academic principles. The initial acquisition premium validates Damodaran's [13] theory that firms may hold greater value under alternative ownership. The rejection by French regulators highlights the role of sovereign interests in M&A constraints [16]. The asbestos divestiture reflects toxic asset management theory [14], while the French asset sale exemplifies how segmented divestitures can enhance value [15].

What distinguishes Velan's case is the investor response. After the Flowserve deal collapsed, the share price languished below CAD 10.00, signaling market doubt about Velan's prospects. However, the January 2025 announcements reversed this narrative. Velan's stock soared to nearly CAD 18.00, a more than 50% increase, suggesting that divesting toxic liabilities and monetizing strategic assets was seen as equally, if not more, value-enhancing than the proposed full-firm acquisition. The approval of the France transaction in March 2025 sustained this optimism, pushing the share price above CAD 16.00.

These outcomes support the argument of this paper that restructuring business units to align with the most efficient owners, and offloading risk-intensive segments, can unlock shareholder value. In Velan's case, it was not the scale of a corporate merger that delivered returns, but the granularity of surgical, segment-by-segment value optimization.

Velan's transformation from an undervalued acquisition target to a strategically realigned, independently thriving company underscores the power of asset-level restructuring. By shedding legacy liabilities and extracting value from nationally sensitive subsidiaries, Velan redefined its trajectory. The sharp increase in market capitalization following the 2025 announcements demonstrates that the company's management earned investor confidence not through scale, but through focus, clarity, and timely execution. Overall, the Velan case provides strong support for the segmented sale valuation model proposed in this paper.

6. Conclusions

This paper finds that corporate executives can enhance shareholder value and significantly reduce valuation risk by strategically considering how potential buyers might capture synergies through the acquisition of specific business segments, rather than the entire firm. By taking a proactive approach to restructuring with targeted divestitures in mind, companies may attract premium bids, especially when the announcement of a possible transaction alerts rival bidders to synergies they had previously overlooked. These results align with Burch and Nanda [17], who challenge the conventional notion of the "conglomerate discount". Their empirical evidence suggests that value loss stems from the inherent diversification of the firm, rather than from its organization into distinct segments.

While this study contributes to the understanding of acquisition valuation frameworks, several methodological constraints warrant acknowledgment and present opportunities for further scholarly inquiry. First, the model's operational complexity may pose implementation challenges for practitioners in M&A valuation teams, potentially limiting its immediate practical utility. Second, the foundational assumption of uncorrelated cash flows across ownership structures and business segments may not align with real-world financial dynamics, where interdependencies frequently exist, thereby introducing risks of model misestimation. Third, the reliance on a single case study design constrains the generalizability of findings; subsequent empirical investigations across diverse industries and trans-

action types are critical to validating the model's external validity and pragmatic relevance. Finally, future iterations of the framework could benefit from refinements that relax its simplifying assumptions—particularly regarding market homogeneity—and incorporate adaptive mechanisms for context-specific scenarios, such as cross-border acquisitions or distressed asset transactions.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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