22-Jun-26

Independent Research and Analysis of SpaceX's Total Equity Value as of December 31, 2024

This analysis was prepared to provide an independent retrospective estimate of the total equity value of Space Exploration Technologies Corp. (hereafter "SpaceX" or "the Company") as of December 31, 2024 (hereafter the "Valuation Date"), and to assess the reasonableness of that estimate in light of the total equity value subsequently implied by the Company's initial public offering. For purposes of this analysis, total equity value represents the aggregate value attributable to all classes of common and preferred stock and other equity instruments outstanding as of the Valuation Date.

This professional article presents independent research and analysis for professional discussion and educational purposes and is structured in the format of a business valuation report. It was prepared solely out of the author's professional interest in the subject and was not commissioned, requested or funded by SpaceX, any of its shareholders, investors or any other party. Accordingly, it does not constitute an expert opinion prepared for a client, transaction, legal proceeding or investment decision. Neither the author nor Intrinsic Value – Independent Business Appraisers is affiliated with, retained by, authorized by, sponsored or endorsed by, or acting on behalf of SpaceX, any of its shareholders or any related party, and neither purports to serve as SpaceX's appraiser. The SpaceX name is used solely and descriptively to identify the subject of this professional article.

In the course of our analysis, we used financial and other information contained in the Prospectus and in other publicly available sources. We assumed such information to be reliable. Our conclusions depend on such information being complete and accurate in all material respects; however, we did not audit or independently verify such information and, accordingly, express no opinion or other form of assurance thereon.

The Prospectus presents the historical financial information in conformity with the reporting structure of the combined company following the mergers. Accordingly, this analysis should be understood as a retrospective valuation of the combined IPO group based on its recast financial information for the year ended December 31, 2024, rather than as a valuation of SpaceX on a standalone legal-entity basis as of that date.

In our analysis, we used computerized calculation tools and unrounded inputs; accordingly, immaterial differences may arise in the presentation of amounts and calculations due to rounding.

SpaceX's business. SpaceX operates in the space transportation, satellite communications and artificial intelligence markets. The Company designs, manufactures, launches and operates advanced rockets and spacecraft; provides reusable launch services to commercial, civil and governmental customers through Falcon 9 and Falcon Heavy; and provides broadband and communications services through the Starlink satellite network. Its activities also include Starshield governmental solutions, satellite-to-mobile services and an integrated artificial intelligence platform.

These markets are highly regulated. SpaceX's launch activities are subject to licenses and approvals from the U.S. Federal Aviation Administration and other governmental agencies. Its satellite communications activities are subject to spectrum allocations, operating licenses and authorizations granted by the U.S. Federal Communications Commission, the International Telecommunication Union and regulators in other countries. The Company is also exposed to substantial technological, execution, capital-investment and competitive risks.

Ownership of SpaceX. As of the valuation date, SpaceX was a privately held corporation controlled by its founder, Mr. Elon Musk (hereafter the "Controlling Shareholder"), primarily through his ownership of Class B common stock carrying enhanced voting rights. The Company's complete shareholder structure and the Controlling Shareholder's exact ownership percentage as of the valuation date were not disclosed in the Prospectus.

SpaceX's shares had limited liquidity because they were not publicly traded and could generally be transferred only through private transactions or Company-sponsored repurchase programs. During 2024, SpaceX repurchased approximately 38.70 million common shares from eligible current and former employees and existing shareholders for aggregate consideration of approximately USD 920.00 million. The Company also repurchased approximately 0.10 million redeemable convertible preferred shares from existing shareholders for approximately USD 101.00 million. These repurchases were completed in unrelated transactions at the shares' then-current fair market value, and the repurchased shares were subsequently retired.

Class of shares as of December 31, 2024	**Shares outstanding**
Redeemable convertible preferred stock	1,748 million
Class A common stock	1,832 million
Class B common stock	768 million
Class C common stock	421 million

Financial obligations. As of the Valuation Date, SpaceX and the entities included in its consolidated financial statements had financial debt, comprising debt and finance-lease obligations, with an aggregate outstanding principal amount of USD 14.15 billion. Financial debt is distinct from total liabilities, which is an accounting measure comprising all current and non-current liabilities. In this simplified contingent claim valuation, we used the Company's total liabilities of USD 31.26 billion as a conservative proxy for the aggregate maturity value of its liabilities. This amount includes

certain non-interest-bearing liabilities that are not included in the conventional definition of financial debt used in calculating enterprise value. Redeemable convertible preferred stock was treated as preferred equity rather than debt because the objective of this analysis is to estimate total equity value, including both preferred and common equity.

Selected financial data for the year ended December 31, 2024	**USD in billions**
Cash and marketable securities	12.19
Capital expenditures	11.16
Current liabilities	11.79
Non-current liabilities	19.47
Total liabilities	**31.26**
Redeemable convertible preferred stock	20.94
Common stock equity	4.86
Total equity	**25.80**

Valuation model. The valuation consists of two parts. The first part estimates SpaceX's firm value using a relative valuation approach. The second part estimates SpaceX's total equity value by applying the contingent claim valuation approach to the estimated firm assets (i.e., firm value).

Firm value differs from enterprise value. Enterprise value equals the market value of equity plus the market value of interest-bearing debt, less cash and marketable securities. Firm value equals the market value of equity plus the market value of interest-bearing debt (i.e., short-term and long-term financial debt and finance-lease obligations) and therefore equals enterprise value plus cash and marketable securities.

The relative valuation approach has been widely discussed in the academic literature and in numerous business valuation textbooks (see also Polanitzer and Dekel, *The Guide for Corporate Valuators* (2025), Chapter 11, for a discussion of this approach). Consistent with the capital-intensive nature of SpaceX's operations, we estimated the Company's enterprise value using the EV/CapEx multiple of the U.S. Aerospace/Defense industry. We then added SpaceX's cash and marketable securities to the enterprise value implied by this multiple to derive its firm value. We consider this approach appropriate because capital expenditures are a central value driver for a rapidly growing company whose operations require substantial investment in launch systems, satellites, communications infrastructure, artificial-intelligence infrastructure and related property and equipment.

The contingent claim valuation approach – the Merton (1974) model – was used to estimate SpaceX's total equity value. Under the model, the firm value (V) is allocated between the value of debt (D) and the value of equity (S), such that $V = D + S$. Accordingly, given any two of these three values, the third can be determined.

Since S and D are contingent claims, option pricing can be used to determine their values. The Merton

(1974) model assumes that the debt consists of a single zero-coupon bond issue that matures at time M at maturity value D_M. At the maturity of the debt, if the firm value at maturity is less than the maturity value of the debt, D_M, the firm defaults. The debtholders get the firm value, and they either break even or take a loss, while the equityholders get nothing. The payoffs at maturity are as follows:

$$\text{Payoff to debtholders at time } M = D_M - max(D_M - V_M, 0)$$

$$\text{Payoff to equityholders at time } M = max(V_M - D_M, 0)$$

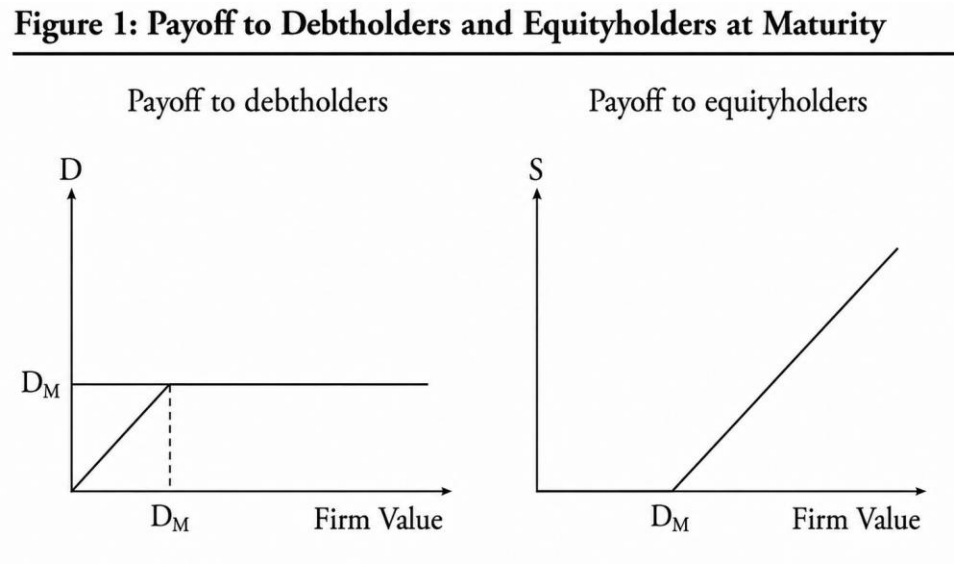
The Merton (1974) model assumes that V follows a certain distribution over time, such that the value of the equityholders' claim can be determined by the Merton (1973) option pricing model. This is because the payment to the equityholders at maturity is like the payoff of a long position in a call option. The payoff of a call option is denoted with the following expression: $max(price\ of\ stock - exercise\ price, 0)$. The debtholders' payoff resembles that of a short put and risk-free bond.

The relationship of the Merton (1974) model to the Merton (1973) model requires some other strong assumptions (e.g., the debtholders cannot force bankruptcy prior to maturity; the firm value, V, is observable and follows the assumed time-series process; etc.).

If we can assume the Merton model is valid and that the assumptions hold, we can use the previous equations to compute the payoffs. For example, we assume the bonds have a maturity value of \$80. If we consider a case where the firm value is \$200 when the bonds mature, then the payoff to equityholders is \$120, and the payoff to debtholders is \$80. In another case, if the firm value is \$70, when the bonds mature, then the debtholders get \$70, and the equityholders get \$0. These results require the assumption that no adjustment for liquidity is needed.

Diagrams of the payoffs resemble those of option payoffs. Figure 1 shows that the payoff to debtholders increases one-for-one with firm value, $D = V$, for $V < D_M$. At $V = D_M$, the maximum payoff to debtholders, D_M, is reached, and for $V > D_M$, the payoff remains constant at D_M. The payoff to equityholders, S, begins at the point where $V = D_M$ and increases dollar-for-dollar with the firm value for firm values above D_M. It can be viewed as a call option on firm value with an exercise price of D_M, the maturity value of the debt.

Figure 1: Payoff to Debtholders and Equityholders at Maturity



The strengths of the Merton (1974) model are its simplicity when valuing equity as well as its intuitive nature. The weaknesses are the number of assumptions required as well as some practicality issues. For example, the absence of observable market values of debt makes it difficult to accurately estimate the firm value. In addition, it can also be difficult to find an accurate estimate of firm value volatility.

The Merton (1974) model uses market data such as firm value and liabilities to estimate equity value. The Merton (1974) model relies on a list of restrictive simplifying assumptions:

1. There is only one issue of equity and debt, and the debt is in the form of a zero-coupon bond that matures at a given date.
2. Default can only occur at the maturity date.
3. The firm value is observable and follows a lognormal diffusion process (geometric Brownian motion).
4. The risk-free interest rate is constant through time.
5. There is no negotiation between equityholders and debtholders.
6. There is no need to adjust for liquidity (i.e., DLOL – Discount for Lack of Liquidity).

One of the key parameters affecting the model's results is the selection of D_M. In the Merton (1974) model, D_M represents the aggregate maturity value of the Company's liabilities, which are assumed to be non-coupon-bearing and payable on a single maturity date, M. In practice, however, most companies have obligations owed to different creditors and payable at different times. Accordingly, an adjustment is required to reconcile the model's simplifying assumptions with the Company's actual liability structure.

To estimate SpaceX's total equity value as a call option on the Company's firm value, we applied the Merton (1973) option-pricing formula. The formula is based on several simplifying assumptions, including continuous trading, the absence of arbitrage, and constant and known volatility and interest

rates. Although certain assumptions do not fully hold in this case, in our opinion, the Merton (1973) formula provides a reasonable approximation of the theoretical total equity value. The specific parameters used in the valuation are presented below.

Damodaran does not publish an EV/CapEx multiple directly. We derived the multiple from two aggregate industry figures reported in separate Damodaran datasets for the U.S. Aerospace/Defense industry as of December 31, 2024. Aggregate enterprise value of USD 1,286,602.96 million was obtained from the *Dollar Value Measures by Industry* dataset. In that dataset, enterprise value represents the market value of equity plus the market value of debt, less cash and marketable securities. Aggregate capital expenditures of USD 13,791.95 million were obtained from the *Capital Expenditures, Depreciation, Reinvestment Rate and Sales to Capital Ratios by Industry* dataset. Capital expenditures represent cumulative capital spending reported in the statements of cash flows of the companies included in the industry and generally exclude acquisitions.

Accordingly, we calculated the industry EV/CapEx multiple by dividing aggregate enterprise value by aggregate capital expenditures, resulting in an EV/CapEx multiple of 93.29x.

$$EV/CapEx = \frac{\$1{,}286{,}602.96\text{M}}{\$13{,}791.95\text{M}} = 93.29\text{x}$$

The use of a capital-expenditure multiple is also consistent with SpaceX's investment-intensive profile in 2024. During the year, the Company incurred capital expenditures of approximately USD 11.16 billion. Capital expenditures therefore provide a meaningful benchmark for the scale of the Company's investment activity during the period.

Parameters. In order to apply the valuation described above, we have used the following parameters:

Parameter	Value	Source
Valuation Date	31-Dec-24	Valuation Date selected for purposes of this retrospective analysis
EV/CapEx	93.29x	Derived by dividing the aggregate enterprise value of the U.S. Aerospace/Defense industry by its aggregate capital expenditures, based on two Damodaran industry datasets as of December 31, 2024.
Capital expenditures	11.16B	SpaceX consolidated statement of cash flows for 2024
Cash & marketable securities	12.19B	SpaceX consolidated balance sheet as of December 31, 2024
Current firm value	1,053.54B	Estimated using the EV/CapEx approach described above
Aggregate maturity value	31.26B	SpaceX total liabilities as of December 31, 2024
Time to maturity	2.68 years	Estimated liability-weighted average term
Risk-free interest rate	4.26%	Linearly interpolated U.S. Treasury par yield used as a proxy for the continuously compounded risk-free rate
Dividend yield	0.00%	Assumption based on SpaceX's historical distributions as of December 31, 2024
Firm-value volatility	36.50%	The Standard Deviation in Firm Value for the U.S. Aerospace/Defense industry, based on Damodaran's industry dataset as of December 31, 2024.

Since we are dealing with several debt instruments—with principal and coupon cash flows— whereas the Merton (1974) model requires a single exercise date and a single exercise price on that date, in our case the debt instruments and their cash flows may be converted into a single zero-coupon bond based on their duration (see also Damodaran, *Corporate Finance* (1997), p. 761, for a discussion of this method).

The information regarding the Company's debt as of December 31, 2024, is as follows:

Debt instrument	**Principal Amount, USD in billions**	**Duration***	**Coupon***
X 2027 Notes	0.03	2.95	3.88%
X 2030 Notes	0.002	5.16	5.00%
X B-1 Term Loan	6.57	4.82	10.82%
X First Lien Bridge Credit Facility	2.97	4.82	9.50%
X Second Lien Bridge Credit Facility	3.00	5.82	13.00%
Other equipment financings	0.06	4.50	5.30%
Total debt / weighted average	**12.62**	**5.05**	**10.99%**

*The durations and coupons presented in the table are based on information disclosed in the Prospectus and, where the required information was not separately disclosed, on estimates derived from the available information and simplifying assumptions applied as of December 31, 2024.

At this stage, we will treat the debt instruments presented above as a single debt obligation whose principal amount as of the Valuation Date is USD 12.62 billion, whose average duration is 5.05 years and whose average coupon, in nominal U.S. dollar terms, is 10.99%.

Based on the consolidation of the debt and its treatment as a balloon loan with a term of 5.05 years and an average annual coupon of 10.99%, the Company has an obligation to pay, in 5.05 years, a total amount of $12.62 \cdot (1 + 10.99\%)^{5.05} =$ USD 21.37 billion.

Notwithstanding the foregoing, and in order to assess the reasonableness of our calculations, we reconsidered and recalculated D_M and M using the more conservative liability-based approach discussed by Sasi-Brodesky (2011). Under this approach, D_M is equal to the sum of the Company's current and non-current liabilities, in accordance with the original Merton model. The time to maturity, M, is equal to the Macaulay duration calculated from the current and non-current liabilities data, under the assumption that the current liabilities will mature in six months (the midpoint of the period to which the current liabilities relate) and the non-current liabilities in four years (see also Sasi-Brodesky (2011) for a discussion of this approach). Furthermore, the longer the selected time to maturity, the higher the resulting equity value.

As noted above, as of the Valuation Date, the Company's current liabilities amounted to USD 11.79 billion, while its non-current liabilities amounted to USD 19.47 billion.

$$D_M = 11.79B + 19.47B = 31.26B$$

$$M = \frac{0.50 \cdot 11.79B + 4.00 \cdot 19.47B}{31.26B} = 2.68$$

Accordingly, M was set equal to the liability-weighted average duration of 2.68 years. For purposes of our conservative application of the Merton (1974) model, D_M was set equal to the Company's total current and non-current liabilities of USD 31.26 billion. The resulting values of D_M and M were therefore used in our calculations.

In effect, we selected a shorter M and a higher D_M, both of which constitute more conservative assumptions under the model: M is positively related to total equity value S and therefore affects it in the same direction, whereas D_M is negatively related to total equity value S and therefore affects it in the opposite direction.

For purposes of our calculations, we used the U.S. Treasury par yield curve as the basis for estimating the risk-free interest rate. To estimate the rate corresponding to a term of 2.68 years, we applied linear interpolation between the two-year and three-year par yields. As of the Valuation Date, the two-year U.S. Treasury par yield was 4.25% per annum and the three-year par yield was 4.27% per annum. The

resulting interpolated par yield for a term of 2.68 years was 4.26% per annum, which was used as an approximation of the continuously compounded risk-free rate.

Because the Company's shares were not publicly traded as of the Valuation Date, we examined normative firm-value volatility estimates for companies with operating characteristics similar to those of the Company. Our analysis considered, among other factors, Professor Aswath Damodaran's study of firm-value volatility in the U.S. Aerospace/Defense industry for 2024. In our opinion, the industry-average firm-value volatility of 36.50% reported in Damodaran's study appropriately reflects the uncertainty inherent in an investment in the Company. Accordingly, we used this firm-value volatility in our calculations.

Results. Applying the EV/CapEx multiple of 93.29x to SpaceX's 2024 capital expenditures of USD 11.16 billion implies an enterprise value of USD 1,041.36 billion. Adding cash and marketable securities of USD 12.19 billion results in an estimated firm value of USD 1,053.54 billion as of the Valuation Date.

We then applied the Merton (1973) option-pricing formula using the inputs described above: a firm value of USD 1,053.54 billion, an aggregate maturity value of USD 31.26 billion, an estimated liability-weighted average term of 2.68 years, a U.S. Treasury par yield of 4.26% used as an approximation of the continuously compounded risk-free rate, a dividend yield of 0% and firm-value volatility of 36.50%.

Based on the parameters described above, the estimated total equity value of SpaceX as of the Valuation Date is **USD 1,025.66 billion**. This estimate is approximately USD 753.88 billion, or 42.36%, below the approximately USD 1,779.54 billion total equity value subsequently implied by the Company's June 2026 initial public offering.

The valuation results are based on the assumptions described above and represent Valuation-Date-specific estimates rather than precise or definitive values. The comparison with the subsequently implied IPO valuation should be interpreted cautiously because it spans approximately eighteen months and therefore reflects changes in the Company's operations, capital structure, market conditions and investor expectations after December 31, 2024. Accordingly, the difference should not be interpreted solely as a valuation error or as evidence that either value is necessarily incorrect.

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The analysis was prepared using information contained in SpaceX's Prospectus and other publicly available sources that we considered reliable. We did not audit or independently verify such information beyond general reasonableness checks and express no opinion regarding its completeness or accuracy. The valuation analysis reflects the information, assumptions and market conditions applicable as of the Valuation Date and represents an indicative economic estimate rather than a precise or guaranteed value.

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