

# **Valuation Considerations of Stock Based Compensation: A Case Study of Semiconductor Firms**

**Russell Engel**  
Southern Connecticut State University

**Bridget Lyons**  
Sacred Heart University

*Equity research analysts and investors remain divided on the treatment of stock-based compensation (SBC) in firm valuation, particularly in discounted cash flow (DCF) and earnings multiples techniques. Many firms and analysts exclude SBC, viewing it as a non-cash expense, while others argue this leads to overvaluation. SBC usage is especially high in the tech sector. This study examines five large semiconductor firms, analyzing SBC levels, its treatment in adjusted earnings, and its impact on share dilution, valuation multiples, and free cash flow calculations. Findings indicate that SBC treatment significantly affects valuation, particularly within the semiconductor industry.*

*Keywords: stock-based compensation, valuation metrics, semiconductor industry, non-GAAP earnings, financial reporting standards*

## **INTRODUCTION TO STOCK BASED COMPENSATION**

Stock-based compensation (SBC), also known as equity-based compensation, refers to non-cash remuneration that firms provide to employees. Equity ownership for employees has historically been common among startups, as early-stage firms are often cash-poor. Non-cash compensation allows these firms to offer competitive recruitment packages while offsetting the risks of failure with the potential rewards of an ownership stake. At more mature firms, SBC is often used to align management's incentives with those of shareholders by tying compensation to stock performance. Additionally, SBC can enhance employee retention, as awards typically vest over several years and cannot be realized immediately.

Although stock-based compensation has existed for roughly a century, its material use began in the 1950s. Initially, most SBC was issued as stock options, but the 1960s and 1970s saw the rising popularity of restricted stock and performance shares. According to Morgan Stanley (2024), SBC totaled approximately \$270 billion in 2022, representing 6 to 8 percent of total compensation for public companies in the United States. While SBC use is widespread, its prevalence varies significantly by sector. For example, Morgan Stanley estimates that the Information Technology sector has the highest SBC levels, at a median of 6.4% of sales, whereas sectors such as consumer staples, consumer discretionary, industrials, materials, energy, and utilities report median rates well below 1 percent.

In 2006, U.S. GAAP began requiring firms to report stock-based compensation (SBC) as an expense on the income statement, in addition to the previously mandated disclosures in the financial statement notes.

This expense is typically embedded within line items such as Selling, General and Administrative (SG&A), Cost of Goods Sold (COGS), and Research and Development (R&D) on the income statement. Meanwhile, the accompanying notes provide additional details on SBC-related activities.

In addition to the required financial statements prepared under U.S. GAAP, many public U.S. firms also report “Non-GAAP” earnings. These disclosures aim to offer insights into a firm’s operating performance by restating operating earnings to exclude non-recurring items such as restructuring costs, acquisition-related expenses, and asset impairments. The rationale is sound, as analysts have long adjusted earnings to focus on recurring revenues and expenses. This process facilitates the identification of trends in operating performance over time and enables meaningful cross-firm comparisons. According to Trullion (2023), an estimated 97% of public firms report adjusted earnings.

However, the adjusted earnings reported by management can differ significantly from those calculated by analysts or data providers such as Cap IQ, FactSet, and Bloomberg. The treatment of SBC in these non-GAAP disclosures varies, with many firms excluding SBC on the grounds that it is a non-cash expense. For example, Qualcomm stated in its second-quarter earnings release: “We believe excluding share-based compensation from non-GAAP financial information allows us and investors to make additional comparisons of the operating activities of our ongoing core businesses over time and with respect to other companies” (Q2 2024 earnings release, page 7).

There is no consensus among analysts regarding the treatment of stock-based compensation (SBC). Studies, such as Mohanram, White, and Zhao (2020), suggest that excluding SBC as an expense when calculating Earnings Before Interest and Taxes (EBIT) is far more common than treating SBC as an operating expense. However, Damodaran (2023) and others argue that SBC represents a real cost associated with personnel and should therefore be included as an expense. We agree with this perspective. If firms did not provide SBC, they would need to increase cash compensation, meaning that excluding SBC overstates profits.

Proponents of adding back SBC argue that it is a non-cash expense, similar to depreciation, and should therefore be excluded from EBIT, Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA), and free cash flow calculations. However, this argument overlooks a critical distinction. Depreciation represents the accounting allocation of the cost of purchasing plant and equipment over time. These purchases involve an actual cash outflow, which is reflected in the investing section of the cash flow statement and included in free cash flow calculations. In contrast, excluding SBC ignores its underlying economic impact and distorts profitability metrics.

## LITERATURE REVIEW

Stock-based compensation (SBC) has evolved alongside corporate governance, financial regulation, and technological innovation. This practice of compensating employees, especially executives, with company stock or options aligns their interests with shareholders, encouraging long-term value creation. SBC's development traces back to agency theory, which examines conflicts of interest between corporate managers (agents) and shareholders (principals). As corporate structures and technology sectors evolved, SBC became crucial for recruiting and retaining top talent to drive innovation.

### **The Birth of Modern SBC: 1950s-1970s**

Modern SBC emerged in the 1950s as businesses sought to align manager and shareholder interests. The Revenue Act of 1950 marked a turning point, introducing favorable tax treatment for stock options. This legislation allowed stock options to be taxed as capital gains rather than ordinary income, providing significant tax advantages (Tax Foundation).

Jensen and Meckling's seminal 1976 work formalized agency theory, arguing that stock options could mitigate conflicts of interest by aligning managerial incentives with shareholder interests. Their theory suggested that granting executives stock options would reduce agency costs and promote shareholder value-maximizing decisions (Jensen & Meckling, 1976). As businesses embraced these concepts, stock options gained traction as executive compensation.

The 1970s saw the increased use of restricted stock, further aligning management and shareholder interests. Unlike stock options, restricted stock grants actual shares to executives, usually with certain vesting conditions or restrictions on sale. These shares have value upon grant, even if the stock price doesn't increase, providing a more stable form of equity compensation. SBC practices varied across industries, with technology firms adopting equity-based compensation more quickly to attract innovative talent compared to traditional industries like manufacturing, which relied more on cash bonuses (Bryan et al., 2006; Sanders & Carpenter, 1998; Hall & Murphy, 2003).

### **Stock Option Growth: 1980s-1990s**

The 1980s and 1990s marked a significant shift in executive compensation, characterized by the widespread adoption of stock options. This transformation was driven by economic growth, technological advancements, and a booming stock market that encouraged firms to align executive incentives with shareholder interests. Murphy's (1985) research provided crucial empirical support for the effectiveness of stock options in enhancing managerial performance, demonstrating how such incentives could improve corporate performance and increase shareholder value.

Throughout this period, stock options emerged as the dominant form of long-term equity compensation. By the late 1990s, they had become the primary vehicle for aligning executive and shareholder interests, particularly in high-growth industries such as technology. These industries leveraged stock options to attract and retain top talent, as Bebchuk and Grinstein (2005) noted. By 1999, stock options accounted for approximately 75% of total compensation for Fortune 500 executives (Harvard Law School Forum on Corporate Governance, 2019).

Murphy's later works, including his 1999 analysis in the Handbook of Labor Economics, further underscore the pivotal role of stock options in reshaping executive compensation frameworks emphasizing the integration of performance pay, exemplified by stock options that redefined managerial incentives and drove firms toward strategies that maximized shareholder wealth.

Despite their initial success, the over-reliance on stock options was critiqued by researchers such as Hall and Murphy (2003), who highlighted potential pitfalls and risks associated with this compensation strategy.

### **Regulatory Shifts and Market Corrections: 2000s**

The early 2000s witnessed changes in stock-based compensation (SBC) practices, driven by regulatory reforms and market corrections following the dot-com bubble burst. This period highlighted the risks of excessive reliance on stock options and led to increased scrutiny and regulatory intervention. In response to prominent accounting scandals and corporate governance failures, the Sarbanes-Oxley Act of 2002 was enacted to enhance corporate governance and improve financial disclosures, particularly those related to executive compensation and stock options (U.S. Securities and Exchange Commission, 2002).

In 2004, the Internal Revenue Service introduced IRC Section 409A, which required stock options to be granted at fair market value to prevent manipulation of grant dates by executives aiming to maximize personal gains (Internal Revenue Service, 2005). This regulatory shift was further reinforced in 2006 when the Financial Accounting Standards Board (FASB) implemented ASC 718 (formerly FAS 123R), mandating the expensing of SBC in financial statements (FASB, 2004). This change compelled companies to account for stock-based compensation as an expense on income statements, thus impacting reported earnings and valuation metrics. Such regulatory changes prompted companies to reassess and refine their SBC practices (Matsunaga & Yeung, 2008).

Restricted Stock Units (RSUs) have since gained traction as a favored form of stock-based compensation, particularly in the technology sector, where innovative strategies are essential for attracting and retaining top talent. The FASB's implementation of stock option expensing made RSUs more attractive due to their simpler accounting and tax treatment. RSUs align employee incentives with company performance by vesting into actual shares, thereby reinforcing the linkage between employee compensation and shareholder value (Harvard Business Review, 2009)

As industries increasingly recognize the strategic importance of human capital, particularly in fields like artificial intelligence and biotechnology, RSUs have become a preferred choice for aligning executive incentives with corporate goals. They offer a stable and predictable form of compensation that appeals to both employers and employees (Investopedia, 2016).

### **The Modern Era: 2010-Present**

The modern era of SBC continues to evolve with a growing emphasis on performance-based compensation. The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 introduced "say on pay" votes, empowering shareholders with a direct voice in approving or disapproving executive compensation packages (U.S. Securities and Exchange Commission, 2011). This initiative sought to enhance accountability and ensure that executive compensation aligns with company performance and shareholder interests. Research by Ferri and Maber (2013) indicates that this regulatory framework has significantly influenced executive pay structures, steering them towards long-term value creation and responsible corporate governance.

Recent research by Mohanram, White, and Zhao (2020) provides a detailed examination of the ongoing challenges and implications of SBC in modern financial reporting. Their study highlights the tendency of firms and financial analysts to exclude SBC from non-GAAP earnings, which can potentially lead to overvaluation. This issue is particularly relevant in the technology sector, where SBC often represents a significant portion of total compensation. Mohanram et al. argue that excluding SBC from non-GAAP metrics can misrepresent a company's economic performance and lead to equity mispricing. As they note, "By excluding SBC from non-GAAP earnings, firms may present a distorted picture of their economic reality, leading to potential mispricing of equity."

The study by Mohanram et al. (2020) indicates a clear link between high SBC intensity and elevated valuation ratios. Firms in the top quintile for SBC intensity showed an average forward price-to-earnings (P/E) ratio of 27.12, significantly higher than the 19.58 average for firms in the lowest SBC quintile. This suggests that firms with substantial SBC may appear overvalued.

Furthermore, analysts who excluded SBC in their earnings forecasts issued target prices that were, on average, 4.4 percentage points more optimistic for high-SBC firms (17.7% above the current price) compared to low-SBC firms (13.3% above the current price). However, these optimistic targets were not supported by actual returns, highlighting the risk of overvaluation when SBC is omitted from financial analysis.

The authors further explore the reactions of financial analysts to these exclusions, noting that sophisticated market participants, such as financial analysts, often make necessary adjustments. They state, "Sophisticated market participants, such as financial analysts, are not completely swayed by the exclusion of SBC from non-GAAP earnings and often make necessary adjustments." However, there remains a significant portion of the market that may not fully account for the economic impact of SBC, potentially contributing to equity overvaluation.

The findings of Mohanram et al. (2020) underscore the importance of transparent reporting practices and suggest that more consistent inclusion of SBC in reported earnings metrics would provide a more accurate portrayal of company operations. Their work is crucial for understanding the contemporary landscape of SBC and its implications for corporate governance and financial analysis.

## **ACCOUNTING FOR STOCK BASED COMPENSATION**

As noted above, in 2006, U.S. GAAP began requiring firms to report stock-based compensation (SBC) as an expense on the income statement, in addition to the previously required disclosures in the notes. SBC expenses are typically embedded within line items such as Selling, General and Administrative (SG&A), Cost of Goods Sold (COGS), and Research and Development (R&D) on the income statement. The notes accompanying the financial statements provide further details about SBC activity.

Restricted stock is recognized on the income statement over the service period and is valued at the share price on the grant date. In contrast, stock option expenses are amortized over the vesting period and fair-

valued at the grant date using an option pricing model. On the cash flow statement, SBC is presented as a non-cash add-back in operating cash flows, reflecting its non-cash nature.

There are multiple types of SBC, and many firms utilize more than one. Changes in tax laws and other regulations have influenced the popularity of different types of SBC. For instance, Coca-Cola employs various forms of SBC, including stock options, performance-based share units, and restricted share units. The chart in the appendix provides an overview of the most common types of SBC.

The accounting for SBC has evolved significantly, with the most substantial change occurring in 2006 when the Financial Accounting Standards Board (FASB) mandated expensing all forms of SBC under ASC 718. This standard unified the accounting treatment across different types of equity compensation, requiring fair value measurement at the grant date and expense recognition over the service period. While the overarching principles are consistent, the specific application varies by instrument type, as outlined in the chart in the Appendix. These differences in measurement and timing of recognition can significantly impact reported earnings and valuation metrics, underscoring the importance of understanding the accounting treatment when comparing firms or evaluating financial performance.

## **CASE STUDY – THE IMPACT OF SBC AT FIVE SEMICONDUCTOR FIRMS**

We researched these firms during the first nine months of 2024 as AI firm valuations rose dramatically. Given the high use of SBC we selected 5 large semiconductor firms to analyze to see the impact of SBC on valuation. The firms analyzed are AMD, Broadcom, Intel, Nvidia and Qualcomm. We excluded peer companies not yet profitable since many of the numbers would be meaningless.

We consider 5 questions.

1. What is the magnitude of SBC?
2. Does the firm offset the dilutive impact of SBC with share repurchases?
3. Does the firm add back SBC when it reports adjusted earnings?
4. What is the impact of the treatment of SBC on EV/EBIT and EV/EBITDA multiples?
5. What is the impact of the treatment of SBC on Free Cash Flow calculations?

### **What Is the Magnitude of SBC?**

We start by researching the level of SBC at each firm over the past five years and compare this to the firm's revenues, operating profit and net income using information from the firm's published financial statements and data from S&P Capital IQ. The firms have different calendar year ends so we report for the fiscal year. The operating profit is as reported by S&P Capital IQ to facilitate comparison since the firms report differently. Table 1 below summarizes the results.

As noted earlier, Morgan Stanley estimates SBC is highest in the Information Technology sector at a median of 6.4% of sales while many other sectors including consumer staples and discretionary, industrials, materials, energy and utilities have median rates well below 1 percent.

The 5 firms we analyze have relatively high levels of SBC. The five-year average SBC to Revenues is lowest at Intel, 3.6% and highest at Nvidia, 7.9%. The volatility across firms and over the five years is notable.

**TABLE 1**  
**MAGNITUDE OF SBC**

<b>Fiscal Year</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
<b>Nvidia</b>					
SBC - millions USD	844	1,397	2,004	2,710	3,549
SBC - % Revenues	7.7%	8.4%	7.4%	10.0%	5.8%
SBC - % Operating profit	29.7%	29.6%	20.0%	48.6%	10.8%
SBC - % Net income	30.2%	32.2%	20.5%	62.0%	11.9%
<b>AMD</b>					
SBC - millions USD	197	274	379	1,081	1,384
SBC - % Revenues	2.9%	2.8%	2.3%	4.6%	6.1%
SBC - % Operating profit	31.2%	20.0%	10.4%	85.5%	345.1%
SBC - % Net income	57.8%	11.0%	12.0%	81.9%	162.1%
<b>Broadcom</b>					
SBC - millions USD	2,260	1,976	1,704	1,533	2,171
SBC - % Revenues	10.0%	8.3%	6.2%	4.6%	6.1%
SBC - % Operating profit	53.1%	45.3%	19.6%	10.7%	13.2%
SBC - % Net income	83.0%	66.8%	25.3%	13.3%	15.4%
<b>Qualcomm</b>					
SBC - millions USD	1,037	1,212	1,670	2,061	2,484
SBC - % Revenues	4.3%	5.2%	5.0%	4.7%	6.9%
SBC - % Operating profit	12.8%	19.5%	17.1%	13.9%	28.7%
SBC - % Net income	23.6%	23.3%	18.5%	15.9%	34.3%
<b>Intel</b>					
SBC - millions USD	1,705	1,854	2,036	3,128	3,229
SBC - % Revenues	2.4%	2.4%	2.6%	5.0%	6.0%
SBC - % Operating profit	7.6%	7.8%	9.2%	121.5%	10416.1%
SBC - % Net income	8.1%	8.9%	10.2%	39.0%	191.2%

**Does the Firm Offset the Dilutive Impact of SBC With Share Repurchases?**

In Table 2 below we compare SBC to net share repurchases (share repurchases less issuances in millions of US dollars) over the last five years to examine whether SBC is leading to dilution of existing shareholders or if the firms are buying back shares to offset the impact. The results indicate that the firms do repurchase shares to minimize the dilution impact of SBC. Across industries the dollar amount of share repurchases seems to rise as firms mature and net income and cash flow rise. Within our sample we observe the same. Intel did not repurchase shares during 2022 and 2023 as the firm struggled and revenues and income dropped significantly.

**TABLE 2**  
**SBC VERSUS SHARE REPURCHASES (DATA IN USD MILLIONS)**

<b>Fiscal Year</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
<b>Nvidia</b>					
SBC	844	1,397	2,004	2,710	3,549
Share issuances	149	194	281	355	403
Share repurchases	551	942	1,904	11,514	12,316
Net shares repurchased	402	748	1,623	11,159	11,913
Net shares repurchased/SBC	48%	54%	81%	412%	336%
<b>AMD</b>					
SBC	197	274	379	1,081	1,384
Share issuances	523	85	104	167	268
Share repurchases	6	78	1,999	4,108	1,412
Net shares repurchased	(517)	(7)	1,895	3,941	1,144
Net shares repurchased/SBC	-262%	-3%	500%	365%	83%
<b>Broadcom</b>					
SBC	2,260	1,976	1,704	1,533	2,171
Share issuances	253	276	170	114	122
Share repurchases	6,407	765	1,299	8,455	7,685
Net shares repurchased	6,154	489	1,129	8,341	7,563
Net shares repurchased/SBC	272%	25%	66%	544%	348%
<b>Qualcomm</b>					
SBC	1,037	1,212	1,670	2,061	2,484
Share issuances	414	329	347	356	434
Share repurchases	2,061	2,797	4,103	3,895	3,494
Net shares repurchased	1,647	2,468	3,756	3,539	3,060
Net shares repurchased/SBC	159%	204%	225%	172%	123%
<b>Intel</b>					
SBC	1,705	1,854	2,036	3,128	3,229
Share issuances	750	897	1,020	977	1,042
Share repurchases	13,576	14,229	2,415	0	0
Net shares repurchased	12,826	13,332	1,395	(977)	(1,042)
Net shares repurchased/SBC	752%	719%	69%	-31%	-32%

### **Does the Firm Add Back SBC When It Reports Adjusted Earnings?**

The treatment of SBC in non-GAAP earnings calculations remains a contentious issue. In January 2017, Google followed Amazon and Facebook in announcing it would no longer exclude SBC from its non-GAAP results. Google's CFO Ruth Porat explained, "Although it is not a cash expense, we consider it to be a real cost of running our business because SBC is critical to our ability to attract and retain the best talent in the world." This stance was consistent with Warren Buffett's long-standing criticism of the practice. In his 2015 Berkshire Hathaway shareholder letter, Buffett wrote: "It has been common for managers to tell their owners to ignore certain expense items that are all too real. Stock-based compensation is the most egregious example. The very name says it all: 'compensation'. If compensation isn't an expense, what is it? And if real and recurring expenses don't belong in the calculation of earnings, where in the world do they belong?"

Our analysis of five semiconductor firms reveals significant variation in the GAAP versus Non-GAAP EPS reported. Approaches to Non-GAAP earnings vary and may include adjustments for non-recurring expenses such as restructuring and acquisition related costs. The data in Table 3 below is from the firm's

press releases announcing fourth quarter earnings. The operating profit in the press release at times varies from the numbers reported by S&P Capital IQ.

**TABLE 3**  
**SIGNIFICANCE OF SBC IN NON-GAAP EARNINGS**

Fiscal Year	2019	2020	2021	2022	2023
<b>Nvidia</b>					
GAAP operating income	2,846	4,532	10,041	4,224	32,972
Non-GAAP operating income	3,735	6,803	12,690	9,040	37,134
Difference - USD millions	889	2,271	2,649	4,816	4,162
SBC adj to Non-GAAP earnings	844	1,397	2,004	2,710	3,549
SBC - % difference	95%	62%	76%	56%	85%
<b>AMD</b>					
GAAP operating income	631	1,369	3,648	1,264	401
Non-GAAP operating income	840	1,657	4,069	6,345	4,854
Difference - USD millions	209	288	421	5,081	4,453
SBC adj to Non-GAAP earnings	197	274	379	1,081	1,384
SBC - % difference	94%	95%	90%	21%	31%
<b>Broadcom</b>					
GAAP operating income	3,444	4,014	8,519	14,225	16,207
Non-GAAP operating income	11,929	12,939	15,912	20,294	22,125
Difference - USD millions	8,485	8,925	7,393	6,069	5,918
SBC adj to Non-GAAP earnings	2,185	1,976	1,704	1,533	2,171
SBC - % difference	26%	22%	23%	25%	37%
<b>Qualcomm</b>					
GAAP operating income	7,667	6,255	9,789	15,860	7,788
Non-GAAP operating income	4,700	5,932	11,772	17,067	11,460
Difference - USD millions	(2,967)	(323)	1,983	1,207	3,672
SBC adj to Non-GAAP earnings	1,037	1,212	1,670	2,061	2,484
SBC - % difference	-35%	-375%	84%	171%	68%
<b>Intel</b>					
GAAP operating income	22,035	23,678	19,456	2,334	93
Non-GAAP operating income	23,752	25,292	22,205	7,917	4,667
Difference - USD millions	1,717	1,614	2,749	5,583	4,574
SBC adj to Non-GAAP earnings	0	0	0	3,128	3,229
SBC - % difference	0%	0%	0%	56%	71%

*\*For Qualcomm in 2019 & 2020 the non-gaap revenue was lower*

*\*Intel began adding back SBC in 2022, perhaps due to falling earnings*

The results show that a very significant portion of the adjustment to Non-GAAP earnings relates to SBC. When earnings are strong SBC adjustments have minimal impact on its non-GAAP metrics. Interestingly Intel did not add back SBC in the Non-GAAP earnings calculation until 2022 when earnings dropped.

These findings support the concerns raised by Buffett and illustrated by Google's policy change. The substantial EPS improvements from SBC exclusion, particularly at firms with lower GAAP earnings, suggest that adding back SBC may present an overly optimistic view of financial performance. This becomes especially relevant when such adjusted figures are used in valuation analysis or performance comparisons across firms.

### **What Is the Impact of the Treatment of SBC on EV/EBIT and EV/EBITDA Multiples?**

Earnings multiples including Price per share/Earnings per share and Enterprise Value (firm value) to EBIT or EBITDA or commonly used to value firms. When considering the impact of SBC we focus on Enterprise value since we can then compare the multiples when SBC is treated as an expense versus



ignoring the non-cash expense. We used data from S&P Capital IQ and Financial Edge’s FELix platforms to obtain key data. The valuations and multiples were calculated using share counts and stock prices at 9/13/24 and the most recent financial statement data for balance sheet items.

Notably, the impact can be very significant as is the case with AMD and Intel. However, even the modest differences in multiples would have a material impact on a valuation. For example, if EBIT is normalized to \$100 then applying Qualcomm’s multiple of 19.2 versus 15.2 would lead to a valuation difference of about 25%. Analysts and investors using this technique need to carefully consider how they calculate and use multiples.

**TABLE 4**  
**IMPACT OF SBC ON VALUATION MULTIPLES**

<b>SBC treated as an expense</b>	<b>Nvidia</b>	<b>AMD</b>	<b>Broadcom</b>	<b>Qualcomm</b>	<b>Intel</b>
EV/EBIT	49.4	279.5	59.9	19.2	226.3
EV/EBITDA	48.1	60.2	38.5	16.3	10.9
<b>SBC added back</b>					
EV/EBIT	46.2	105.1	44.7	15.2	28.5
EV/EBITDA	45.0	44.3	31.6	13.3	8.2

The treatment of SBC significantly impacts valuation metrics across our sample firms, though the magnitude varies considerably. When SBC is added back to earnings, AMD's EV/EBIT multiple drops dramatically from 279.5x to 105.1x, and Intel's falls from 226.3x to 28.5x, reflecting both high SBC levels and current earnings pressure at these firms. In contrast, Qualcomm shows more modest changes, with EV/EBIT declining from 19.2x to 15.2x, suggesting more stable underlying earnings despite significant SBC usage (6.9% of 2023 revenues).

NVIDIA presents a particularly interesting case given its market leadership in AI semiconductors. Despite growing SBC from \$844 million in 2019 to \$3.55 billion in 2023, the impact on its valuation metrics is relatively modest - EV/EBIT changes from 49.4x to 46.2x when SBC is added back. This stability reflects two factors: strong operating performance means SBC represents a smaller portion of earnings (10.8% of operating profit in 2023) compared to peers, and aggressive share repurchases (\$12.3 billion in 2023, or 347% of SBC) help offset potential dilution.

These findings highlight that the materiality of SBC treatment varies with operating performance and management's approach to dilution. While high-growth firms like NVIDIA may be less sensitive to SBC treatment due to strong earnings, firms with weaker operating performance show dramatic changes in valuation metrics based on SBC treatment. This suggests analysts should carefully consider both the magnitude of SBC and the firm's broader financial context when choosing how to treat SBC in valuation analysis.

### **What Is the Impact of the Treatment of SBC on Free Cash Flow Calculations?**

Firm valuation based on the discounted cash flow (DCF) approach values the enterprise based on future free cash flows discounted at the weighted average cost of capital. The equity value is then derived from the enterprise value after adjusting for net debt and other claims such as preferred stock. Since SBC is a non-cash expense many would not include it as an expense to calculate free cash flow. In such cases the potential future dilution created by the SBC could be treated as another claim on equity. Conceptually we should come to the same valuation whether we treat SBC as an expense or adjust future shares outstanding to capture the dilution. The former is more straightforward than estimating the additional future equity claims from the additional shares resulting from SBC.

Free cash flow can be calculated a number of different ways. The most common approach is to start with EBIT, tax adjust the EBIT, add back noncash items including depreciation and amortization and adjust for investment in working capital and capital expenditures. However, the tax adjustment to EBIT has several options. S&P Capital IQ applies a set tax rate, others use the firm's effective tax rate or use cash taxes. Table 5 below uses cash taxes paid. The ratio at the bottom of Table 5 shows free cash flow adjusted to add back SBC over FCF where SBC is treated as an expense. Since Intel has negative free cash flows the ratio is not meaningful (nm). If the discounted cash flow approach to valuation is used, we see that there would be an enormous difference between Enterprise value based on free cash flow after SBC versus FCF ignoring SBC. As noted above, dealing with SBC through the future shares is possible but typically not done in practice so it is essential then that the SBC impact and considered by adjusting EBIT to incorporate the expense.

Analysis of our sample firms reveals that the treatment of SBC significantly impacts free cash flow calculations. When calculating FCF from EBIT using cash taxes paid, the decision to treat SBC as an expense or add it back produces markedly different results.

The impact varies considerably across firms. AMD shows the most dramatic effect, with FCF increasing by 332% (from \$417 million to \$1,801 million) when SBC is added back. In contrast, Nvidia and Broadcom show more modest impacts of 16% and 13% respectively, despite their substantial absolute SBC levels, likely due to their stronger operating performance. Intel, with negative FCF under both treatments, illustrates how SBC treatment can significantly affect the assessment of financial health during challenging operating periods.

**TABLE 5**  
**IMPACT OF SBC ON FREE CASH FLOW (VALUES FROM FISCAL YEAR 2023)**

<b>Metric</b>	<b>Nvidia</b>	<b>AMD</b>	<b>Broadcom</b>	<b>Qualcomm</b>	<b>Intel</b>
EBIT	32,972	401	16,454	8,650	31
Cash tax	(6,549)	(523)	(1,782)	(1,400)	(2,621)
NOPAT	26,423	(122)	14,672	7,250	(2,590)
D&A	1,508	3,453	3,749	1,809	9,602
Capex	(1,069)	(546)	(452)	(1,450)	(25,750)
Inv OWC	(4,568)	(2,368)	(1,371)	2,001	1,165
<b>FCF</b>	<b>22,294</b>	<b>417</b>	<b>16,598</b>	<b>9,610</b>	<b>(17,573)</b>
SBC	3,549	1,384	2,171	2,484	3,229
<b>FCF + SBC</b>	<b>25,843</b>	<b>1,801</b>	<b>18,769</b>	<b>12,094</b>	<b>(14,344)</b>
<b>Ratio of FCF with SBC/FCF</b>	<b>115.9%</b>	<b>431.9%</b>	<b>113.1%</b>	<b>125.8%</b>	<b>nm</b>

## CONCLUSION

These findings have significant implications for enterprise and equity valuation, particularly in firms where stock-based compensation (SBC) constitutes a substantial portion of operating expenses. Both relative and discounted cash flow (DCF) valuations can vary materially depending on how SBC is treated, underscoring the need for consistent treatment when comparing companies. Analysts must clearly articulate their assumptions regarding SBC treatment, especially in high-SBC sectors like information technology.

Our analysis of SBC within semiconductor firms demonstrates its substantial influence on key financial metrics, including earnings per share (EPS), valuation multiples, and free cash flow (FCF). Excluding SBC from non-GAAP earnings often results in an overly optimistic portrayal of financial performance, with considerable variation across firms. For instance, AMD experiences a 332% increase in FCF when SBC is

excluded, compared to more modest impacts for companies like NVIDIA and Broadcom. Such discrepancies highlight how SBC treatment can significantly alter perceptions of a firm's valuation and financial health, particularly in sectors where SBC constitutes a large portion of total compensation.

Treating SBC as an expense, as advocated by Warren Buffett and others, offers a more realistic assessment of a company's economic performance. The results emphasize the importance of transparent and consistent SBC reporting, particularly for investors and analysts who rely on non-GAAP metrics. Standardizing SBC treatment across firms would enable more accurate cross-company comparisons and mitigate the risk of overvaluation, especially in high-SBC industries like technology.

This study reinforces that while SBC is a non-cash expense, it represents a real economic cost that impacts shareholder value. Analysts, investors, and firms must carefully consider how SBC is treated in financial reporting and valuation to avoid distortions in market pricing. As the debate over SBC continues, a clearer and more standardized approach to its treatment in financial analysis would benefit stakeholders and contribute to more accurate assessments of corporate performance.

## REFERENCES

- Bebchuk, L., & Grinstein, Y. (2005). The growth of executive pay. *Oxford Review of Economic Policy*, 21(2), 283–303.
- Bryan, S.H., Hwang, L.S., & Lilien, S. (2006). CEO stock-based compensation: An empirical analysis of firms following the adoption of SFAS No. 123. *Journal of Accounting, Auditing & Finance*, 21(2), 137–159.
- Buffett, W.E. (2015). *Berkshire Hathaway 2015 shareholder letter*. Retrieved from <https://www.berkshirehathaway.com/letters/2015ltr.pdf>
- Damodaran, A. (2023). *Earnings, cash flows, and free cash flows: Fact, friction, and fiction*. Retrieved from <https://aswathdamodaran.substack.com/p/earnings-cash-flows-and-free-cash>
- Ferri, F., & Maber, D.A. (2013). Say on pay votes and CEO compensation: Evidence from the UK. *Review of Finance*, 17(4), 527–563.
- Financial Accounting Standards Board. (2004). *Statement of financial accounting standards no. 123 (revised 2004): Share-based payment*. Retrieved from <https://www.fasb.org/pdf/fas123r.pdf>
- Google Inc. (2017, October 30). *Alphabet Inc. (GOOG) (GOOGL) Q3 2017 earnings conference call transcript*. Retrieved from <https://www.nasdaq.com/articles/alphabet-inc-goog-googl-q3-2017-earnings-conference-call-transcript-2017-10-30>
- Hall, B.J., & Murphy, K.J. (2003). The trouble with stock options. *Journal of Economic Perspectives*, 17(3), 49–70.
- Harvard Business Review. (2009, June). *The growing use of restricted stock units (RSUs) in executive compensation*. Retrieved from <https://hbr.org/2009/06/the-growing-use-of-restricted-stock-units-rsus-in-executive-compensation>
- Harvard Law School Forum on Corporate Governance. (2019, April 16). *2019 U.S. executive compensation trends*. Retrieved from <https://corpgov.law.harvard.edu/2019/04/16/2019-u-s-executive-compensation-trends/>
- Internal Revenue Service. (2005). *IRC section 409A: Nonqualified deferred compensation plans*. Retrieved from <https://www.irs.gov/pub/irs-drop/n-05-94.pdf>
- Jensen, M.C., & Meckling, W.H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- Mohanram, P.S., White, H., & Zhao, R. (2020). Non-GAAP reporting and stock-based compensation: The mispricing implications. *Journal of Accounting and Economics*, 70(1). <https://doi.org/10.1016/j.jacceco.2020.101317>
- Morgan Stanley Research. (2024). *Sectoral trends in stock-based compensation: Technology vs. consumer staples and utilities*. Retrieved from [https://www.morganstanley.com/im/publication/insights/articles/article\\_stockbasedcompensation.pdf](https://www.morganstanley.com/im/publication/insights/articles/article_stockbasedcompensation.pdf)

- Murphy, K.J. (1985). Corporate performance and managerial remuneration: An empirical analysis. *Journal of Accounting and Economics*, 7(1–3), 11–42.
- Murphy, K.J. (1999). Executive compensation. In O. Ashenfelter, & D. Card (Eds.), *Handbook of Labor Economics*, pp. 2485–2563. Amsterdam: Elsevier.
- Sanders, W.G., & Carpenter, M.A. (1998). Internationalization and firm governance: The roles of CEO compensation, top team composition, and board structure. *Academy of Management Journal*, 41(2), 158–178.
- U.S. Securities and Exchange Commission. (2002). *Sarbanes-Oxley Act of 2002*. Retrieved from <https://www.sec.gov/about/laws/soa2002.pdf>
- Trullion. (2023). *Understanding non-GAAP reporting and stock-based compensation*. Retrieved from <https://trullion.com/blog/understanding-non-gaap-reporting/>
- U.S. Securities and Exchange Commission. (2011). *Dodd-Frank Wall Street Reform and Consumer Protection Act – Say on pay*. Retrieved from <https://www.sec.gov/rules/final/2011/34-63768.pdf>

## APPENDIX

### ACCOUNTING FOR STOCK BASED COMPENSATION

Type	Description	Recognition & Measurement	Cash Flow	FASB Ref 718
Stock Options	Right to purchase stock at preset price within specified period	R1, M1	C1, C2	Fair value measurement using option-pricing models
Restricted Stock	Direct grant of shares with vesting conditions	R2, M2	C1, C3	Initial measurement and service conditions
RSUs	Promise to issue shares upon vesting	R2, M2	C1, C3	Recognition and measurement
Performance Units	Share/cash awards tied to performance targets	R2, R3, M3	C1, C4	Performance conditions and periodic remeasurement
Abbreviation	Description			
R1	Expense recognized ratably over requisite service (vesting) period			
R2	Initial recognition based on probability of achieving performance targets			
R3	Periodic reassessment and adjustment of expense based on expected outcome			
M1	Fair valued at grant using option pricing model (e.g., Black-Scholes), no remeasurement			
M2	Measured at fair value (stock price) at grant date, no remeasurement			
M3	Measured at fair value at grant, remeasured based on performance target probability			
C1	Non-cash expense added back in operating cash flows			
C2	Option exercise proceeds shown in financing cash flows			
C3	Excess tax benefits shown in operating cash flows (post ASU 2016-09)			
C4	Cash payment for performance unit settlement in operating cash flows			