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IRR ANALYSIS OF A LARGE-SCALE LEVERAGED BUYOUT


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# ABSTRACT

This paper seeks to analyze the primary return drivers of leveraged buyouts through the use of a leveraged buyout analysis model. While there is extensive research regarding the primary factors that drive returns in leveraged buyouts, there are few in-depth case studies that analyze return drivers using a financial model. As a result, to better understand how value can be created in private equity deals, a leveraged buyout analysis model is used to analyze a large-scale club deal and determine the financial scenarios in which a gross internal rate of return (IRR) of 20% and a gross multiple of invested capital (MOIC) of 2.0x is achieved for the private equity consortium.

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**Chapter 1**

**Introduction**

In the private equity industry, a leveraged buyout (LBO) is the acquisition of a company financed with a substantial amount of borrowed capital (Blaydon et al. 1). An LBO is typically conducted by a private equity firm (financial sponsor). Since inception, the private equity industry has constantly changed in various ways related to strategies of purchasing and selling (exiting) companies. Similarly, the dynamics of the industries in which private equity firms invest has also changed over time, with the investment scope now including higher growth and riskier sectors relative to historical investments. Due to the significant deal value associated with LBOs and the related impact on the world economy, it is worth analyzing the specific drivers of value creation in recent LBOs.

Across the private equity industry, there are numerous investment strategies that firms stand by. Whether these philosophies vary based on deal size, sector, geographic location, or broader investment styles, differing strategies are still able to result in value creation. For instance, Hellman & Friedman, a well-respected private equity firm, focuses solely on making large-scale investments in businesses that are already performing strongly and operating within developed markets. This investment strategy consists of creating value primarily through strong industry knowledge and operational improvements (Hellman & Friedman, "Approach"). Contrarily, there are other leading private equity firms that differ from Hellman & Friedman in regard to investment style. For instance, Apollo Global Management is considered a value-oriented, contrarian investor who generally looks to purchase companies at a significant discount

(Apollo Global Management, "Private-Equity"). As a result of the variety of investment strategies across private equity firms, the primary sources of value creation across leveraged buyouts vary.

To measure the value creation associated with deals, private equity firms typically analyze a deal's internal rate of return. The internal rate of return (IRR) is defined as "the discount rate that makes the net present value of all cash flows from a particular project equal to zero" (Gallo, *A Refresher on Internal Rate of Return*). Although other valuation approaches exist such as net present value (NPV), IRR tends to be the metric of choice for financial sponsors. NPV is defined as the difference between the present value of cash inflows and cash outflows over time, with the discount rate representing the return that could be earned in alternative investments of similar risk (Gallo, *A Refresher on Net Present Value*).

Moreover, while there is no single, concrete reason as to why the preference for IRR exists, an argument for using IRR over NPV involves the fact that the NPV calculation is sensitive to discount rate assumptions. The aforementioned assumptions may be difficult for private equity portfolio companies whose capital structures vary significantly throughout the holding period. However, despite the typical preference for IRR to NPV in private equity deal analysis, there are certain drawbacks of using IRR. Specifically, the IRR of a private equity deal should be put into the context of the associated multiple of invested capital (MOIC), which is the total value returned from an investment, divided by the invested capital (Harris et al. 1859).

As a result of a shift in private equity toward increased investment in higher growth and larger-sized companies, a case study on the recent LBO of a large-scale, high growth company can create a better understanding of value creation in LBOs. Specifically, the leveraged buyout analysis model is used in the creation of this paper to help better understand how value is created

in LBOs in the context of IRR and MOIC. Consequently, while existing research thoroughly addresses the primary value creation methods in LBOs and how the dynamics of these return drivers have been changing over time, there is little academic literature related to analyzing the performance of an LBO through a leveraged buyout analysis model. An in-depth case study of a recent LBO allows for the performance of an LBO to be interpreted through the financial, operational, and market related conditions of the deal that contribute to an attractive 20% IRR and 2.0x MOIC. Throughout this paper, the buyer in the LBO is a private equity consortium referred to as the "sponsor," and the selling company is a software company referred to as the "target."

**Chapter 2**

**Literature Review**

**Overview**

Private equity has been a widely studied topic for both its historically strong performance and its methods of generating these returns. One of the most commonly studied aspects of private equity includes leveraged buyouts and how value can be created through these types of deals. Academic literature has shown a dispersion of how value is generally created in these deals, with the sources of value typically including operational improvements, financial engineering, and multiple expansion. Within these commonly agreed upon sources of value, there are a variety of other factors to consider such as the type of exit for the sponsor and the sponsor's strategy while owning the portfolio company. Similarly, there is also consideration placed toward the types of deals that private equity firms generally pursue, including minority and majority acquisitions. Consequently, there is a significant amount of research dedicated to private equity and how value is created in leveraged buyouts.

**Types of Acquisitions and Bidders**

When considering competition for acquisitions, one should keep in mind that private equity firms have to compete with strategic bidders as well. While some individuals may initially believe that financial bidders must overpay for a target when up against strategic bidders, it is not always the case. For instance, the article "Strategic and Financial Bidders in Takeover Auctions" explains that target valuations from strategic bidders are typically higher than those from

financial bidders. However, the article also explains how 22.4% of the targets in the authors' sample are valued higher by financial bidders (Gorbenko and Malenko 2516). As a result, the authors conclude that different targets appeal to different bidders, as financial bidders are more likely to pay higher valuations for mature, poorly performing companies.

Additionally, the article discovers that the valuations of financial bidders are less dispersed than strategic bidders and are also more correlated with economic conditions. Moreover, the authors' findings also discover that strategic bidders are generally willing to pay more due to synergies associated with the target, while financial bidders generally are willing to pay higher premiums for poorly performing targets. This is the case for financial bidders since private equity firms could have expertise in restructuring or access to debt at a lower cost than strategic bidders. While this article provides insight toward the differing majority-stake acquisition rationales behind strategic and financial bidders, it is also worth considering the reasoning behind minority investments by private equity firms.

In the book *PIPE Investments of Private Equity Funds*, the author explains how private investment in public equity (PIPE) generally occurs from buyout funds looking for minority positions in typically high growth companies. These investments are similar to venture capital investments as the minority positions are rarely financed with leverage. However, the author determines that buyout funds are relatively more engaged in PIPEs than venture funds. Moreover, the book explains that PIPEs are attractive to buyout funds for their liquidity, faster deal execution, and lack of takeover-premiums. The author also states that PIPEs are attractive for buyout funds looking to use the investment as a way to gain exposure to specific niche markets (Sarve 47).

Despite these statements, it is determined that PIPEs can be a way for buyout funds to deploy excess capital during times of increased fundraising and rising competition for traditional buyout targets. Consequently, the author determines that there are two groups of PIPE investors. The first investor class relates to opportunists who infrequently partake in PIPEs. The other investor class consists of experts who frequently invest in PIPEs and take advantage of the PIPEs' favorable characteristics for buyout funds (Sarve 44). Although returns in private equity are generally driven by value created in leveraged buyouts, minority investments can prove to be a complement to the traditional buyout strategies of many financial sponsors. Similar to the research regarding financial sponsors' decisioning between minority and majority acquisitions to generate returns, there is also academic literature focused on other private equity influenced deals including take-private transactions and add-on acquisitions.

**Add-Ons and Take-Private Deals**

In "Financial Visibility and the Decision to Go Private," the authors explain how the decision to go private is largely driven by issues such as a lack of analyst coverage and decreasing institutional ownership, as well as the benefits of reorganization (Mehran and Peristiani 521). In terms of analyst coverage, the analysts help to increase investor recognition of firms and reduce information asymmetries. As a result, analyst coverage can help to increase share liquidity and firm value, as well as lower financing costs. A lack of analyst coverage could also result from a decline in research analysts among financial advisory firms. The authors explain how financial visibility driven by analyst coverage is particularly valuable for younger and lesser-known firms (Mehran and Peristiani 546).

Moreover, there are also costs of being public such as various fees and scrutiny from shareholders. As a result, the authors explain how the decision to go private also revolves around the ability to restructure operations without shareholder pressure and the ability to reduce agency costs. Although there is literature regarding whether the decision to go private is a result of lacking popularity with public investors or being inefficiently run by management, the reasoning will vary deal by deal. Consequently, the strategies of sponsors after taking a company private will vary in accordance with the reasoning behind the take-private transaction. Specifically, while a sponsor may focus on operational improvements with a portfolio company that was inefficiently managed to create value, a private equity firm may utilize add-on acquisitions for a different portfolio company.

In the article "Inorganic Growth Strategies and the Evolution of the Private Equity Business Model," the authors analyze the prevalence of add-on acquisitions for private equity portfolio companies and how it impacts exit decisioning. Specifically, the article determines that add-on acquisitions are likely if the portfolio firm is large and has M&A experience at entry, or if the portfolio firm made acquisitions under a previous private equity owner. Moreover, the authors discover that a small number of private equity firms account for a majority of add-on acquisitions due to differences in experience and reputation in the add-on market. Add-ons are also likely to occur in industries with moderate fragmentation and in an environment of favorable financing conditions (Hammer et al., "Inorganic Growth Strategies and the Evolution of the Private Equity Business Model" 32).

Additionally, the authors explain that add-on acquisitions increase the likelihood for portfolio companies to exit through an initial public offering (IPO) or secondary buyout (SBO). A secondary buyout consists of the sale of a private equity portfolio company to another private

equity firm, and this transaction is a common exit strategy due to the fact that new private equity owners can continue with an inorganic growth strategy. Although the article explains the impact of add-on acquisitions on exit route and the concentrated market of sponsors that engage in add-on acquisitions, it does not thoroughly mention the ability to create value through add-on acquisitions. As a result, it is worth considering how an add-on acquisition strategy of private equity firms would compare to other strategies in terms of creating value.

The idea of add-on acquisitions being used to create value by sponsors is explained in the article "Inorganic Growth Strategies in Private Equity: Empirical Evidence on Add-on Acquisitions," in which the authors state how the use of add-ons in a private equity portfolio company is likely already determined at entry and is executed at an early point in the holding period. Add-ons are also generally conducted to achieve operating synergies, and an add-on is executed early in the holding period to allow for synergy realization to be maximized by exit. Moreover, the authors explain how an inorganic growth strategy requires a significant deal network, an abundance of financial resources, and strong execution capability (Hammer et al., "Inorganic Growth Strategies in Private Equity: Empirical Evidence on Add-on Acquisitions" 3).

As a result, private equity firms with greater experience generally execute a majority of these deals. Moreover, favorable debt market conditions, large deal size, and a large financial sponsor are all factors that increase the likelihood for add-ons (Hammer et al., "Inorganic Growth Strategies in Private Equity: Empirical Evidence on Add-on Acquisitions" 4). While add-ons are stated to be a source of value creation in some buyouts, they are also difficult to execute and time-consuming. Specifically, the authors argue that it is potentially easier for sponsors to achieve value creation through other strategies such as operational improvements.

Similar to how sponsor reputation and experience play a role in add-on acquisitions, these factors also contribute to the creation of club deals.

**Club Deals**

Clubs refer to two or more private equity firms joining to bid for the target. In the article "A Theory of LBO Activity Based on Repeated Debt-Equity Conflicts," the authors explain how club deals are constructed when sponsors are looking to combine skills that complement each other, such as one sponsor adding value through its reputation with creditors and another sponsor contributing through its ability to make operational improvements. However, the authors also explain how club deals can sometimes result in a decrease in buyout value creation because of the sponsors relying on each other (A. Malenko and N. Malenko 609). Therefore, it is worth considering the experience of the private equity firms engaging in club deals to ensure a higher chance of each sponsor contributing to the value creation process.

Moreover, in "Do Buyouts (Still) Create Value?," the authors determine that buyout returns are higher for deals in which multiple private equity firms are involved, which is likely due to the fact that these deals draw the attraction of consortiums due to favorable deal characteristics (Guo et al. 481). Despite numerous positive findings regarding club deals, the authors in "Inorganic Growth Strategies and the Evolution of the Private Equity Business Model" explain that sponsors in club deals are less likely to engage in add-on acquisitions due to the high level of monitoring required and increased costs related to the acquisition process. (Hammer et al., "Inorganic Growth Strategies and the Evolution of the Private Equity Business

Model" 35). Similar to how the process of choosing a target involves an extensive amount of strategic planning, there are also numerous factors to consider when choosing an exit route.

**Leveraged Buyout Exit Routes**

The exit route of a private equity firm includes selling to a strategic buyer or financial sponsor or engaging in an IPO, and there is extensive academic literature analyzing each exit route. In regard to a strategic buyer, it is a firm that operates in a similar industry to the target and purchases the target to enhance the combined entity's business operations. Additionally, there is also a significant amount of research regarding the strong performance of private equity-backed IPOs. For instance, in "The Performance of Private Equity-Backed IPOs," the author determines that the superior aftermarket performance of private equity-backed IPOs is largely due to companies' leverage and sponsor ownership after the IPO (Levis 257). While investors are generally skeptical of portfolio companies at the IPO date due to the high leverage, the companies can experience strong performance after investors realize the companies' abilities to reduce debt effectively and maintain strong operational performance. Additionally, investors become attracted to the idea of the sponsor maintaining involvement with the company after the IPO date.

Moreover, while Levis primarily focuses on the strong performance of private equity-backed IPOs, other authors focus on the increased attractiveness of secondary buyouts. In "IPO or SBO?: The Increasing Importance of Operating Performance for Private Equity Exits Following the Global Financial Crisis, " the authors argue that while IPOs have historically been viewed as the most attractive exit route for sponsor-backed companies, secondary buyouts

should be looked at as a favorable exit route as well (Holm and Plagborg-Moller 115). First, the

authors determine that better performing portfolio companies are generally more likely to be

exited through an IPO rather than an SBO due to the fact that the company is likely to have paid

down the majority of its debt and is not looking to refinance. Moreover, the authors state that

SBOs are attractive due to the fact that the entire process is quicker than that of an IPO. Lastly,

the authors state that SBOs are common for poorly performing companies whose operations have

room for additional improvement from another sponsor.

      While Holm and Plagborg-Moller primarily focus on the benefits of exiting through a

secondary buyout, Jenkinson and Sousa analyze the rationale behind exiting through an IPO or

secondary buyout. First, the article explains how the exit choice is largely driven by market

conditions. For instance, sponsors are likely to exit through an IPO when the equity markets have

been strong and are likely to exit through a secondary buyout if debt is cheap and abundant

(Jenkinson and Sousa 407). Exiting through an IPO is also argued to be a tactic for an early exit

route and could potentially help with marketing future funds. The authors explain how exit

choice is partially dictated by company characteristics, such as secondary buyouts attracting

companies with steady cash flow and profitability, low capital expenditures, and a high capacity

to service debt. On the other hand, a sale to a strategic buyer is likely for a smaller firm that has

experienced significant growth (Jenkinson and Sousa 401).

      Moreover, the article also touches on the strengths of secondary buyouts when compared

to IPOs. While IPOs have historically been argued as the most successful exit route, secondary

buyouts offer more certainty in terms of sale proceeds and a shorter timeline. For instance, an

IPO makes it difficult for private equity firms to quickly receive proceeds due to lock up periods

and the need to dispose of significant stakes in the public markets. Similarly, sales to strategic

buyers are also generally less efficient due to potential regulatory issues with the deal.

Consequently, the authors conclude that capital markets conditions are the most important

determinant of the exit route.

**Private Equity Returns**

As a result of leveraged buyout returns being partially driven by capital markets

conditions, there is a notable amount of research on the variability of private equity returns. In

the article "How Persistent Is Private Equity Performance? Evidence from Deal-Level Data," the

authors argue that persistence of fund managers has significantly declined as the private equity

industry continues to mature and become more competitive. Similar to other asset classes, the

article explains how the past performance of private equity is a poor predictor of future

performance. Moreover, the authors also explain how it is generally difficult to find accurate

information on fund returns. However, the article states that it is best to look at value creation on

the basis of gross returns, since fund terms for fees will vary (Braun et al. 274).

While "How Persistent Is Private Equity Performance? Evidence from Deal-Level Data"

focuses primarily on the persistence of private equity returns from a high level, other literature

analyzes sponsor returns to understand the contribution of the various return drivers. For

instance, in "Do Buyouts (Still) Create Value?," the authors argue that it is unlikely for private

equity returns to persist without the existence of operational improvements. Specifically, it is

determined that changes in operational performance and industry valuation multiples each

account for ~20% of deal returns (Guo et al. 514). While the value of leverage is frequently

mentioned to result from the increased tax shields, the authors also elaborate on the benefits of

debt in reducing agency costs. Specifically, this relates to the idea that debt reduces the agency costs of equity due to the pressure to meet interest payments. Consequently, the article illustrates the idea that leverage is only one factor that partially drives leveraged buyout returns, with benefits that are only realized if value is created through the other return drivers as well.

**Leverage in Leveraged Buyouts**

Across academic literature, there is research regarding the role leverage plays in leveraged buyouts. These perspectives include its usefulness when combined with other value creation factors, as well as its harmful effects if used improperly. For instance, in *Private Equity 4.0,* the author argues how the value of leverage as a value creator in buyouts has significantly decreased. Specifically, the author explains how leverage is useless if applied in poorly performing deals (Leleux 23). Moreover, the author also explains that he believes there is a deleveraging within private equity that is beneficial for the industry. He states that this trend shifts a focus toward value creation through operational improvements, which he believes should be the core focus of private equity firms.

Moreover, in the article "A Theory of LBO Activity Based on Repeated Debt-Equity Conflicts," the authors determine that two factors primarily dictate leverage in buyout activity. Specifically, the authors state that leverage is based on sponsors' ability to borrow based off their reputations with creditors, difficulties from competition, and the formation of clubs (A. Malenko and N. Malenko 608). Moreover, it is stated that the primary sources of value creation in LBOs are operational improvements and the benefits of higher leverage such as tax shields and

improved management incentives (A. Malenko and N. Malenko 607). As a result, the authors explain how sponsors cannot add value through financing if they do not add operational value.

Furthermore, the article also explains how the use of leverage with private equity portfolio companies is different than with independent firms, as leverage for independent companies is generally driven by firm-specific factors and buyout leverage is mostly dictated by economy-wide and sponsor-specific elements. Additionally, while some argue that private equity firms over-lever portfolio companies, the authors explain that this would harm sponsors' reputations with creditors for future deals. Consequently, the authors conclude that in order to create value through leverage in buyouts, sponsors must have competitive advantages over their peers. Specifically, the ability to make operational improvements results in the increased ability to add value through financing, indicating that buyout leverage generally increases with sponsors' skills.

Lastly, in the article "Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts," the authors argue that private equity funds frequently over-lever their portfolio companies and negatively impact returns. Specifically, the authors state that sponsors will sometimes take on excess leverage during times in which credit conditions are favorable and the high-yield spread is low, resulting in low returns (Axelson et al. 2252). These low returns are due to the fact that the private equity firms are overpaying for deals and the portfolio companies are struggling to pay down the debt. Lastly, the authors mention the potential for private equity firms to be expecting low returns, causing the sponsors to partake in large, risky transactions with high leverage. While there are three primary drivers of leveraged buyout returns at a broader level, there is a range of literature that addresses the specifics of how these drivers can generate value.

**Value Creation in Leveraged Buyouts**

Throughout existing research, there are differing viewpoints regarding the most important

factor that drives returns in leveraged buyouts. While no single driver will consistently dictate

returns on every private equity deal, authors have analyzed the factors that tend to have the

largest impact on value creation. For instance, "The Private Equity Challenge to Corporate

Finance" explains how private equity returns are largely driven by private equity firms' ability to

improve companies' operations without the pressure of being a public company. The article also

states that the success of private equity is indicated by the fact that distributions to limited

partners have exceeded capital calls for seven years in a row (Talmor 39).

Moreover, the author explains how a large portion of issues faced in the public stock

market is addressed by private equity. Specifically, it is stated how operational inefficiencies

generally exist for public companies due to managers with incentives that are not completely

aligned with those of the shareholders. These inefficiencies result from either the board not

properly monitoring the managers' actions or the shareholders not being active enough in

stimulating change (Talmor 39). As a result, when purchased by a private equity firm, the

portfolio company is stated to usually consist of a smaller board and managers with equity

contributed toward the deal to help align incentives.

While the previous article focuses primarily on the benefits of not facing pressure from

public shareholders, other articles take a broader approach and elaborate on the different

elements of the three return drivers. For example, in "Private Equity: Levered on Capital or

Labour?," the authors explain how the returns of private equity deals are influenced by a variety

of factors that are both controllable and uncontrollable. The article explains how a sponsor could

exit through an IPO and the sale value would be dictated by either a change in market valuation or a change in the firm's profits. It also states how the profits could be influenced by the broader macroeconomic landscape or by sector competition (Folkman et al. 522). Similarly, the authors also state how the economic conditions during the holding period could dictate whether a significant amount of value is driven through operational improvements.

Furthermore, the article touches on how the three sources of gains for private equity firms include financial engineering, multiple expansion, and operational improvements. Moreover, the authors argue that while leverage and timing are significant to private equity returns, it is also important to consider the fact that gains from leverage are magnified by easy access to cheap debt during strongly performing equity markets (Folkman et al. 524). Lastly, the article explains how private equity firms are likely to shift focus toward operational improvements through job cuts if a weak economic backdrop makes it difficult for gains through financial engineering and multiple expansion.

Moreover, in the article "Drivers of Holding Period Firm-Level Returns in Private Equity-Backed Buyouts," the authors elaborate on leverage's role in value creation. The article explains how leverage impacts various types of private equity deals, including buy-outs and buy-ins. For instance, the authors explain how leverage's impact on high-performing deals is greater than its impact on low performing deals (Valkama et al. 2390). The article also states that leverage has no impact on the likelihood of achieving a higher-than-market return or a successful exit.

Moreover, the authors explain how buyouts generally outperform buy-ins since current management is likely to have an informational advantage over an outside management team (Valkama et al. 2389). Leverage is also stated to have a more significant impact on whole-

company buyouts rather than on buy-ins, since buy-outs are generally larger and there is an increased availability of debt for a whole-company rather than a division. The article also explains that buyouts create value by reducing agency costs and shifting managers' strategies from managerial to entrepreneurial. Consequently, the article elaborates on the idea that the importance of leverage in private equity deals is illustrated by its ability to create value in a variety of deal scenarios.

Lastly, certain research also quantifies the portion of private equity returns attributable to specific factors. For instance, in "Corporate Governance and Value Creation: Evidence from Private Equity," the authors focus on common value generating factors such as leverage and sector-picking ability. The research determines that ~28% of the total return in the average private equity deal is attributable to the incremental leverage effect. The authors also calculate that less than one-fifth of the total return is attributable to either sector-picking ability or luck (Acharya et al. 384). Similarly, the article determines the most significant metrics used to measure operational improvements throughout the life of a private equity deal. Specifically, out of the frequently used operating metrics, the authors determine that the improvement of EBITDA margins and multiples are the most significant determinants of strong performance in private equity deals (Acharya et al. 388). While value drivers will vary deal by deal, there appears to be a general consensus among researchers that leverage is only useful if not used excessively and if accompanied by operational improvements.

# Chapter 3

## Methodology and Data Collection

**Overview of Leveraged Buyout Analysis Model**

This leveraged buyout analysis model serves to better understand the primary value drivers in a large-scale leveraged buyout. Specifically, the model allows for a thorough analysis regarding the financial scenarios in which a gross IRR of 20% and a gross MOIC of 2.0x is achieved for the private equity consortium. The target 20% gross IRR is chosen as an attractive target for the private equity consortium, as it represents a return slightly less than the median gross IRR, as of the end of 2019, of 26% since inception for several leading U.S. buyout funds that typically engage in large-scale LBOs (Company SEC Filings). Additionally, the target gross MOIC of 2.0x reflects a level slightly below that of the average gross MOIC for fully realized technology LBOs from 2010-2018 of 2.3x (Bain & Company). As a result of the deal closing after the first quarter of 2019, quarters two through four of 2019 reflect estimates. Similarly, it is worth noting that the target's fiscal year end matches the calendar year end. Through in-depth projections of the target's financial statements, different scenarios result in which the private equity consortium achieves sufficient returns. Despite potentially similar returns, the model allows for analysis toward whether the returns are impacted more significantly by certain factors, such as operational improvements, or whether the returns are impacted evenly by the primary value creation factors in leveraged buyouts. Consequently, by inputting assumptions regarding operational and financial performance, the model arrives at an IRR and MOIC for each respective projection case used in the model.

**Transaction Assumptions**

Deal-specific data regarding purchase price and financing methods significantly impacts both operational assumptions and leveraged buyout returns. Since this model focuses on a real transaction, much of the transaction-related data is factual and not assumption-based. Specifically, the sources and uses of funds for the deal, as well as the pricing of the debt, is directly sourced from either SEC filings or FactSet. However, the following transaction-related aspects of the deal are based on assumptions: fair value adjustments to assets, financing fees, and transaction fees.

In regard to the fair value adjustments related to the deal, both plant, property, and equipment (PP&E) and intangible assets are written-up to fair value based on proportions of the purchase price in excess of the book value of net assets. Specifically, 13% of the excess purchase price is allocated to a write-up of PP&E, and 36% of the excess purchase price is allocated to a write-up of intangible assets. The aforementioned assumptions are based on a 2017 Houlihan Lokey purchase price allocation study that derived the median purchase price allocated in application software and internet software transactions in the U.S. (Houlihan Lokey, "2017 TMT Purchase Price Allocation Study"). Additionally, the model assumes PP&E to have a useful life of ten years since the target's most recent SEC filing states that its PP&E typically has a life of 2-15 years. Similarly, the model assumes intangible assets to have a useful life of eight years since the target's most recent SEC filing states that its intangible assets typically have useful lives of 4.6 to 9.4 years.

Furthermore, assumptions for both the financing fees and transaction fees are based on discussion with industry professionals. Specifically, the fee percentage of both the financing and

transaction was relatively low due to the large size of the deal. The financing fees for the revolver, term loan A, and term loan B were assumed to be priced at proportions of their amount outstanding at issuance at 1.0%, 1.0%, and 1.5%, respectively. Additionally, the transaction fee reflects 1.0% of the overall equity purchase price. Lastly, to ensure that the model portrays adequate cash balances in the projection period, the minimum cash balance for the target is assumed to be $25mm, reflecting a balance relatively lower than historical levels.

**Economic Considerations**

The model places great emphasis on the company-specific aspect of leveraged buyouts, rather than economic conditions. Specifically, there are no assumptions regarding abnormalities in economic growth during the projection period. Therefore, the projections reflect an economic environment of average growth and are not significantly impacted by outside factors. Furthermore, in regard to the interest rate environment, the future London Interbank Offered Rate (LIBOR) for each projection period is based on the most recent estimates of Chatham Financial (Chatham Financial, "USD LIBOR and SOFR Forward Curves"). Finally, the model does not assume any extreme cases of either industry growth or industry consolidation that would significantly impact the financials of the target.

**Operational Assumptions**

In the context of the model, when a metric is referred to as a "margin," the metric is taken as a percent of total revenue. Due to the fact that the deal closed after the first quarter of 2019,

there is no recent data published by either the target or analysts regarding financial projections. As a result, the model assumptions reflect analyst estimates at the time of the deal's close, as well as current estimates of the target's closest competitors. Specifically, the model projects each line-item of both the income statement and balance sheet. Consequently, both the income statement and the balance sheet reflect five cases: base, bear, bull, industry, and consensus.

The base case of the model is influenced by historical margins and growth rates of the company, previous company-specific analyst estimates, as well as current industry estimates. The base case is portrayed as the financial case most probable for the target. Moreover, the bear and bull cases reflect slight deviations from the base case across each financial statement line-item. The aforementioned cases are less likely to be achieved and generally represent lower and upper boundaries for the target's valuation. Furthermore, the industry case reflects current consensus estimates from FactSet for the target's three closest competitors. For line items or specific projection years that do not have estimates provided, the margins or growth rates chosen reflect no change in the margin or growth rate from the most recent projection period with available data. However, if there are no projections available for the line item, the line item is assumed to have the same growth rate or margin as the base case for the respective year. Lastly, the consensus case reflects consensus estimates from Capital IQ for the target as of nine months ago. For specific line items in which no estimates are available, the same growth rate or margin as the base case for the respective year is used. Similarly, for projection periods that extend beyond the projection periods provided by Capital IQ, the margins or growth rates chosen reflect no change in the margin or growth rate from the most recent projection period with available data.

Furthermore, in regard to the income statement, assumptions are created for the target's revenue growth; cost of revenue (COGS) margin; selling, general, and administrative expense (SG&A) margin; research and development (R&D) margin; depreciation margin; amortization margin; and stock-based compensation margin. With respect to revenue growth, the target operates in a high-growth software subsector, resulting in significant revenue growth. Revenue growth year-over-year in the model is assumed to decrease from ~21% in the most recent fiscal year to 14% by fiscal year 2023. Moreover, the model assumes that all margins - except for the depreciation and amortization margins - remain flat throughout the projection period. The aforementioned margins are all in-line with the most recent historical data periods. The depreciation and amortization margins gradually decrease due to the fact that capital expenditures and intangible asset purchases are expected to be moderately lower in the projection period when compared to historical levels. Finally, the projected tax rate of ~25.3% reflects a blended rate of the 21% federal tax rate for corporations and a 5.5% corporate income tax rate based on the target's state of headquarters. This tax rate is in-line with previous consensus estimates for a tax rate of 25%.

Moreover, in regard to the balance sheet, assumptions are created for the target's accounts receivable margin; other current assets margin; accounts payable as a percentage of COGS; accrued expenses and other liabilities margin; short-term deferred revenue margin; capital expenditures margin; and purchases of intangible assets margin. The model assumes that all margins remain flat throughout the projection period. The aforementioned margins are all in-line with the most recent historical data periods. However, the value of capital expenditures and purchases of intangible assets are expected to be slightly lower than historical averages under the assumption that spending will be reduced under ownership of the private equity consortium.

**Exit Assumptions and Debt Paydown**

        To reflect the deal's real-life conditions, the model assumes a deal close after the end of

the target's fiscal year 2019 first quarter. As a result, the capital provided for the buyout of the

target is reflected on the target's balance sheet at the end of the fiscal year 2019 first quarter. To

be conservative, the exit *Enterprise Value / Revenue (EV / Revenue)* multiple used to calculate

the target's enterprise value is the same value as the implied entry EV / Revenue multiple of

9.1x. The EV / Revenue multiple is used in the enterprise value calculation due to the variability

associated with the *Enterprise Value / EBITDA (EV / EBITDA)* multiple. Specifically, due to the

target's high-growth nature, the EV / EBITDA is skewed to an extremely high value, reflecting

relatively low earnings in relation to a sizable enterprise value.

        Furthermore, once the exit EV / Revenue multiple is applied to the exit year's revenue,

the target's enterprise value results. Next, the net debt of the target as of the exit date is

subtracted from the enterprise value to arrive at the equity value. To arrive at an IRR for the

private equity consortium, the private equity consortium's initial investment at the end of fiscal

year 2019 first quarter is compared to the cash flows associated with the target's equity value at

the end of the exit year. While it may appear relatively simple at the surface level that the IRR of

a deal is driven by the private equity purchaser's initial investment and the target's value at exit,

the intricacies primarily relate to the factors driving the target's valuation at exit. Specifically,

the model allows for great focus on the factors that contribute to a sufficient IRR in this deal,

since there is flexibility to monitor the operational improvements, the entry and exit conditions,

and the debt paydown structure. Lastly, the MOIC of the deal is calculated as the target's equity

value at exit divided by the sponsor's initial investment.

While the debt associated with the deal reflects real deal conditions such as the pricing and the terms, the model incorporates paydown assumptions related to how debt can be treated in a leveraged buyout scenario. Specifically, the model assumes a cash sweep of 100% for both term loan A and term loan B. A cash sweep is when a certain portion of cash left after meeting all financial obligations, any mandatory debt repayments, and any minimum cash balances, is used to discretionarily reduce the outstanding balance on tranches of debt. Therefore, a cash sweep of 100% indicates that any cash leftover after meeting the aforementioned obligations is used to reduce outstanding debt. As a result, as the target generates greater cash flows, more debt is able to be paid down and the sponsor's equity value increases. Consequently, there is significant value associated with the target's ability to both make operational improvements and reduce debt, with this value reflected in the target's equity value at exit.

**Chapter 4**

**Results**

**Interpreting the Deal's Attractiveness**

As mentioned earlier in the paper, there are certain drawbacks associated with IRR that may skew the attractiveness of a particular deal. In this case, early exit years typically have a higher IRR than the later exit years. Despite the generally high IRR for early exit years, the MOIC for early exit years is rather low. As a result, the attractiveness of the deal in this case is viewed in the context of a balance between a high IRR and MOIC. The aforementioned balance is reflected by the desired performance of a 20% IRR and 2.0x MOIC for this deal. Consequently, the targeted performance level reflects a sponsor's desire for both timely returns and adequate cash generation.

Moreover, to analyze the scenarios under which the IRR and MOIC for the sponsor are derived, an underlying assumption includes the exit multiple. As mentioned earlier, the exit EV / Revenue multiple of 9.1x for the deal reflects a conservative estimate and is the primary exit condition analyzed for the purpose of determining whether the desired IRR and MOIC are achieved. Also, to reiterate, the projections reflect a deal close after the end of the target's fiscal year 2019 first quarter. Similarly, due to a lack of available estimates and difficulty in predicting financials for long time-frames, the IRR and MOIC analyses range from a fiscal year 2020 exit to a fiscal year 2023 exit. The aforementioned range of exit years is in-line with data showing that global buyout-backed exits in 2019 had a median holding period of 4.3 years (Bain & Company).

**IRR and MOIC Analyses**

First, when analyzing the deal under the base case shown in Figure 1, the tradeoff between IRR and MOIC becomes apparent as MOIC generally increases in later exit years as IRR decreases. Specifically, the deal first exceeds an IRR of 20% and an MOIC of 2.0x during a fiscal year 2022 exit with an IRR and MOIC of 22.9% and 2.2x, respectively. In regard to the operating assumptions for the base case, they are more conservative than every other case except the bear case. Accordingly, the IRR and MOIC for the fiscal year 2022 exit only reflect a slight improvement beyond the targeted values.

Additionally, when analyzing the deal under the bear case shown in Figure 2, the deal does not experience an exit year during the projection period in which the IRR reaches 20% and the MOIC reaches 2.0x. Specifically, the IRR decreases below 20% starting in the fiscal year 2022 exit, while an MOIC of 2.0x is not achieved until a fiscal year 2023 exit. The relatively poor performance is indicative of greater working capital needs, as well as an inability to effectively cut costs and decrease capital expenditures. In regard to working capital needs that detract from cash flow generation in the bear case, there is a relatively high amount of capital tied up in accounts receivable and other current assets.

Furthermore, when analyzing the deal under the bull case shown in Figure 3, the deal first exceeds an IRR of 20% and an MOIC of 2.0x during a fiscal year 2021 exit with an IRR and MOIC of 29.8% and 2.1x, respectively. The bull case reflects successful cost cutting initiatives, reduced capital expenditures, and lowered working capital needs. Specifically, modest revenue growth in the projection period is accompanied by spending that does not exceed levels beyond

maintenance. Accordingly, an earlier exit year is achieved relative to other cases, as well as a greater IRR and MOIC for the first year in which the deal reaches its target performance.

Finally, when analyzing the deal under both the industry and consensus cases shown in Figure 4 and Figure 5, respectively, the deal first exceeds an IRR of 20% and an MOIC of 2.0x during a fiscal year 2022 exit with an IRR and MOIC of 24.4% and 2.3x, respectively. The performance of the deal under both scenarios is nearly identical due to similar estimates across analysts for both the target and its competitors, with only slight deviations across the core assumptions. The operating assumptions in terms of margins and spending reflect somewhat of a midpoint between the base and bull case, translating to deal performance between the aforementioned cases as well.

## Figure 1. Base Case Performance

| ($ in millions, except per share data) | FY2020E | FY2021E | FY2022E | FY2023E |
|---|---|---|---|---|
| **Revenue (% Growth y/y)** | *20.0%* | *18.0%* | *16.0%* | *14.0%* |
| **COGS / Revenue** | *31.0%* | *31.0%* | *31.0%* | *31.0%* |
| **SG&A / Revenue** | *32.1%* | *32.1%* | *32.1%* | *32.1%* |
| **R&D / Revenue** | *17.4%* | *17.4%* | *17.4%* | *17.4%* |
| **Depreciation / Revenue** | *4.5%* | *4.4%* | *4.3%* | *4.2%* |
| **Amortization / Revenue** | *0.4%* | *0.4%* | *0.4%* | *0.4%* |
| **Stock Compensation / Revenue** | *11.4%* | *11.4%* | *11.4%* | *11.4%* |
| **Capital Expenditures / Revenue** | *4.7%* | *4.7%* | *4.7%* | *4.7%* |
| **Accounts Receivable / Revenue** | *21.0%* | *21.0%* | *21.0%* | *21.0%* |

**Sponsor IRR - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | **FY2020E** | **FY2021E** | **FY2022E** | **FY2023E** |
| | **8.1x** | 14.3% | 17.6% | 18.4% | 18.2% |
| **Exit** | **8.6x** | 19.6% | 20.9% | 20.7% | 20.0% |
| **Multiple** | **9.1x** | 24.7% | 24.1% | 22.9% | 21.7% |
| | **9.6x** | 29.7% | 27.1% | 25.0% | 23.3% |
| | **10.1x** | 34.5% | 29.9% | 27.0% | 24.8% |

**Sponsor MOIC - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | **FY2020E** | **FY2021E** | **FY2022E** | **FY2023E** |
| | **8.1x** | 1.3x | 1.6x | 1.9x | 2.2x |
| **Exit** | **8.6x** | 1.4x | 1.7x | 2.0x | 2.4x |
| **Multiple** | **9.1x** | 1.5x | 1.8x | 2.2x | 2.5x |
| | **9.6x** | 1.6x | 1.9x | 2.3x | 2.7x |
| | **10.1x** | 1.7x | 2.1x | 2.5x | 2.9x |

## Figure 2. Bear Case Performance

| ($ in millions, except per share data) | FY2020E | FY2021E | FY2022E | FY2023E |
|---|---|---|---|---|
| **Revenue (% Growth y/y)** | *17.0%* | *15.0%* | *13.0%* | *11.0%* |
| **COGS / Revenue** | *33.0%* | *33.0%* | *33.0%* | *33.0%* |
| **SG&A / Revenue** | *34.1%* | *34.1%* | *34.1%* | *34.1%* |
| **R&D / Revenue** | *18.4%* | *18.4%* | *18.4%* | *18.4%* |
| **Depreciation / Revenue** | *4.0%* | *3.9%* | *3.8%* | *3.7%* |
| **Amortization / Revenue** | *0.2%* | *0.2%* | *0.2%* | *0.2%* |
| **Stock Compensation / Revenue** | *12.4%* | *12.4%* | *12.4%* | *12.4%* |
| **Capital Expenditures / Revenue** | *5.7%* | *5.7%* | *5.7%* | *5.7%* |
| **Accounts Receivable / Revenue** | *24.0%* | *24.0%* | *24.0%* | *24.0%* |

**Sponsor IRR - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | FY2020E | FY2021E | FY2022E | FY2023E |
| | **8.1x** | 9.8% | 13.6% | 14.5% | 14.4% |
| **Exit** | **8.6x** | 15.0% | 16.9% | 16.8% | 16.2% |
| **Multiple** | **9.1x** | 20.0% | 20.0% | 19.0% | 17.8% |
| | **9.6x** | 24.9% | 22.9% | 21.1% | 19.4% |
| | **10.1x** | 29.7% | 25.8% | 23.1% | 21.0% |

**Sponsor MOIC - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | FY2020E | FY2021E | FY2022E | FY2023E |
| | **8.1x** | 1.2x | 1.4x | 1.7x | 1.9x |
| **Exit** | **8.6x** | 1.3x | 1.5x | 1.8x | 2.0x |
| **Multiple** | **9.1x** | 1.4x | 1.7x | 1.9x | 2.2x |
| | **9.6x** | 1.5x | 1.8x | 2.1x | 2.3x |
| | **10.1x** | 1.6x | 1.9x | 2.2x | 2.5x |

## Figure 3. Bull Case Performance

| *($ in millions, except per share data)* | **FY2020E** | **FY2021E** | **FY2022E** | **FY2023E** |
|---|---|---|---|---|
| **Revenue (% Growth y/y)** | *23.0%* | *21.0%* | *19.0%* | *17.0%* |
| **COGS / Revenue** | *29.0%* | *29.0%* | *29.0%* | *29.0%* |
| **SG&A / Revenue** | *30.1%* | *30.1%* | *30.1%* | *30.1%* |
| **R&D / Revenue** | *16.4%* | *16.4%* | *16.4%* | *16.4%* |
| **Depreciation / Revenue** | *5.0%* | *4.9%* | *4.8%* | *4.7%* |
| **Amortization / Revenue** | *0.7%* | *0.7%* | *0.7%* | *0.7%* |
| **Stock Compensation / Revenue** | *10.4%* | *10.4%* | *10.4%* | *10.4%* |
| **Capital Expenditures / Revenue** | *3.7%* | *3.7%* | *3.7%* | *3.7%* |
| **Accounts Receivable / Revenue** | *18.0%* | *18.0%* | *18.0%* | *18.0%* |

**Sponsor IRR - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | **FY2020E** | **FY2021E** | **FY2022E** | **FY2023E** |
| | **8.1x** | 20.7% | 23.5% | 23.8% | 23.4% |
| **Exit** | **8.6x** | 26.0% | 26.7% | 26.1% | 25.1% |
| **Multiple** | **9.1x** | 31.1% | 29.8% | 28.3% | 26.7% |
| | **9.6x** | 36.1% | 32.8% | 30.3% | 28.3% |
| | **10.1x** | 41.0% | 35.6% | 32.3% | 29.7% |

**Sponsor MOIC - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | **FY2020E** | **FY2021E** | **FY2022E** | **FY2023E** |
| | **8.1x** | 1.4x | 1.8x | 2.2x | 2.7x |
| **Exit** | **8.6x** | 1.5x | 1.9x | 2.4x | 2.9x |
| **Multiple** | **9.1x** | 1.6x | 2.1x | 2.5x | 3.1x |
| | **9.6x** | 1.7x | 2.2x | 2.7x | 3.3x |
| | **10.1x** | 1.8x | 2.3x | 2.9x | 3.5x |

## Figure 4. Industry Case Performance

| ($ in millions, except per share data) | FY2020E | FY2021E | FY2022E | FY2023E |
|---|---|---|---|---|
| **Revenue (% Growth y/y)** | *20.9%* | *18.9%* | *15.6%* | *15.6%* |
| **COGS / Revenue** | *28.8%* | *28.6%* | *28.6%* | *28.6%* |
| **SG&A / Revenue** | *31.6%* | *32.0%* | *32.0%* | *32.0%* |
| **R&D / Revenue** | *20.8%* | *20.8%* | *20.8%* | *20.8%* |
| **Depreciation / Revenue** | *4.5%* | *4.4%* | *4.3%* | *4.2%* |
| **Amortization / Revenue** | *0.4%* | *0.4%* | *0.4%* | *0.4%* |
| **Stock Compensation / Revenue** | *11.4%* | *11.4%* | *11.4%* | *11.4%* |
| **Capital Expenditures / Revenue** | *3.6%* | *3.3%* | *4.7%* | *4.7%* |
| **Accounts Receivable / Revenue** | *21.0%* | *21.0%* | *21.0%* | *21.0%* |

**Sponsor IRR - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | FY2020E | FY2021E | FY2022E | FY2023E |
| | **8.1x** | 17.2% | 19.9% | 19.8% | 19.7% |
| **Exit** | **8.6x** | 22.5% | 23.2% | 22.1% | 21.5% |
| **Multiple** | **9.1x** | 27.7% | 26.3% | 24.4% | 23.2% |
| | **9.6x** | 32.8% | 29.4% | 26.5% | 24.8% |
| | **10.1x** | 37.7% | 32.3% | 28.5% | 26.3% |

**Sponsor MOIC - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | FY2020E | FY2021E | FY2022E | FY2023E |
| | **8.1x** | 1.3x | 1.6x | 2.0x | 2.3x |
| **Exit** | **8.6x** | 1.4x | 1.8x | 2.1x | 2.5x |
| **Multiple** | **9.1x** | 1.5x | 1.9x | 2.3x | 2.7x |
| | **9.6x** | 1.6x | 2.0x | 2.4x | 2.9x |
| | **10.1x** | 1.8x | 2.2x | 2.6x | 3.0x |

## Figure 5. Consensus Case Performance

| ($ in millions, except per share data) | FY2020E | FY2021E | FY2022E | FY2023E |
|---|---|---|---|---|
| **Revenue (% Growth y/y)** | *19.6%* | *20.8%* | *18.2%* | *18.0%* |
| **COGS / Revenue** | *34.2%* | *31.8%* | *31.8%* | *31.8%* |
| **SG&A / Revenue** | *32.1%* | *32.1%* | *32.1%* | *32.1%* |
| **R&D / Revenue** | *17.4%* | *17.4%* | *17.4%* | *17.4%* |
| **Depreciation / Revenue** | *4.5%* | *4.4%* | *4.3%* | *4.2%* |
| **Amortization / Revenue** | *0.4%* | *0.4%* | *0.4%* | *0.4%* |
| **Stock Compensation / Revenue** | *11.4%* | *11.4%* | *11.4%* | *11.4%* |
| **Capital Expenditures / Revenue** | *6.9%* | *4.9%* | *4.9%* | *4.9%* |
| **Accounts Receivable / Revenue** | *21.0%* | *21.0%* | *21.0%* | *21.0%* |

**Sponsor IRR - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | FY2020E | FY2021E | FY2022E | FY2023E |
| | **8.1x** | 13.5% | 18.6% | 19.8% | 20.3% |
| **Exit** | **8.6x** | 18.8% | 21.9% | 22.2% | 22.1% |
| **Multiple** | **9.1x** | 23.9% | 25.1% | 24.4% | 23.8% |
| | **9.6x** | 28.9% | 28.1% | 26.5% | 25.4% |
| | **10.1x** | 33.8% | 31.0% | 28.6% | 27.0% |

**Sponsor MOIC - Assuming 9.1x EV / Revenue Entry Multiple**

| | | Exit Year | | | |
|---|---|---|---|---|---|
| | | FY2020E | FY2021E | FY2022E | FY2023E |
| | **8.1x** | 1.2x | 1.6x | 2.0x | 2.4x |
| **Exit** | **8.6x** | 1.4x | 1.7x | 2.1x | 2.6x |
| **Multiple** | **9.1x** | 1.5x | 1.9x | 2.3x | 2.8x |
| | **9.6x** | 1.6x | 2.0x | 2.4x | 2.9x |
| | **10.1x** | 1.7x | 2.1x | 2.6x | 3.1x |

**Chapter 5**

**Conclusion**

As a result of this study, the significant amount of academic literature regarding value creation in LBOs is able to be analyzed from the perspective of a sponsor looking to achieve attractive deal performance. Through the leveraged buyout analysis model that deviates from traditional research methods used in existing academic literature, a thorough understanding is derived regarding the feasibility of achieving a sufficient IRR and MOIC. Specifically, core assumptions such as margin growth and capital spending reduction are adjusted to arrive at a reasonable time frame and operating scenario in which the sponsor can exit the large-scale, high growth investment. Due to the deal's unique characteristics such as its size and the proportion of equity used in its purchase, the analysis reveals that non-traditional LBO candidates can still offer attractive returns under the proper operational scenarios.

Consequently, as the nature of LBO candidates evolves and specific value drivers become more prevalent in the associated deals, traditional assumptions regarding the primary return drivers in LBOs may change. While this case reflects an instance of a shift toward large-scale, high growth buyouts with a large equity contribution, future buyout activity may shift in the complete opposition direction or include additional unique characteristics. Essentially, the trend of buyout activity characteristics is difficult to predict, resulting in a research opportunity to understand how value creation drivers can vary across deals. Whether future deal activity transitions toward the purchase of low-growth companies with significant leverage, or shifts

toward high-growth buyouts, there will always exist an opportunity to use a leveraged buyout

analysis model to understand financial scenarios in which the deal performance is optimized.

# Appendix A

## Income Statement Assumptions

| | FY2020E | FY2021E | FY2022E | FY2023E |
|---|---|---|---|---|
| **Revenue (% Growth)** | | | | |
| Base | *20.0%* | *18.0%* | *16.0%* | *14.0%* |
| Bear | *17.0%* | *15.0%* | *13.0%* | *11.0%* |
| Bull | *23.0%* | *21.0%* | *19.0%* | *17.0%* |
| Industry | *20.9%* | *18.9%* | *15.6%* | *15.6%* |
| Consensus | *19.6%* | *20.8%* | *18.2%* | *18.0%* |
| **COGS / Revenue** | | | | |
| Base | *31.0%* | *31.0%* | *31.0%* | *31.0%* |
| Bear | *33.0%* | *33.0%* | *33.0%* | *33.0%* |
| Bull | *29.0%* | *29.0%* | *29.0%* | *29.0%* |
| Industry | *28.8%* | *28.6%* | *28.6%* | *28.6%* |
| Consensus | *34.2%* | *31.8%* | *31.8%* | *31.8%* |
| **SG&A / Revenue** | | | | |
| Base | *32.1%* | *32.1%* | *32.1%* | *32.1%* |
| Bear | *34.1%* | *34.1%* | *34.1%* | *34.1%* |
| Bull | *30.1%* | *30.1%* | *30.1%* | *30.1%* |
| Industry | *31.6%* | *32.0%* | *32.0%* | *32.0%* |
| Consensus | *32.1%* | *32.1%* | *32.1%* | *32.1%* |
| **R&D / Revenue** | | | | |
| Base | *17.4%* | *17.4%* | *17.4%* | *17.4%* |
| Bear | *18.4%* | *18.4%* | *18.4%* | *18.4%* |
| Bull | *16.4%* | *16.4%* | *16.4%* | *16.4%* |
| Industry | *20.8%* | *20.8%* | *20.8%* | *20.8%* |
| Consensus | *17.4%* | *17.4%* | *17.4%* | *17.4%* |
| **Depreciation / Revenue** | | | | |
| Base | *4.5%* | *4.4%* | *4.3%* | *4.2%* |
| Bear | *4.0%* | *3.9%* | *3.8%* | *3.7%* |
| Bull | *5.0%* | *4.9%* | *4.8%* | *4.7%* |
| Industry | *4.5%* | *4.4%* | *4.3%* | *4.2%* |
| Consensus | *4.5%* | *4.4%* | *4.3%* | *4.2%* |
| **Amortization / Revenue** | | | | |
| Base | *0.4%* | *0.4%* | *0.4%* | *0.4%* |
| Bear | *0.2%* | *0.2%* | *0.2%* | *0.2%* |
| Bull | *0.7%* | *0.7%* | *0.7%* | *0.7%* |
| Industry | *0.4%* | *0.4%* | *0.4%* | *0.4%* |
| Consensus | *0.4%* | *0.4%* | *0.4%* | *0.4%* |
| **Stock Compensation / Revenue** | | | | |
| Base | *11.4%* | *11.4%* | *11.4%* | *11.4%* |
| Bear | *12.4%* | *12.4%* | *12.4%* | *12.4%* |
| Bull | *10.4%* | *10.4%* | *10.4%* | *10.4%* |
| Industry | *11.4%* | *11.4%* | *11.4%* | *11.4%* |
| Consensus | *11.4%* | *11.4%* | *11.4%* | *11.4%* |

**Appendix B**

**Balance Sheet Assumptions**

| | FY2020E | FY2021E | FY2022E | FY2023E |
|---|---|---|---|---|
| **Accounts Receivable / Revenue** | | | | |
| Base | 21.0% | 21.0% | 21.0% | 21.0% |
| Bear | 24.0% | 24.0% | 24.0% | 24.0% |
| Bull | 18.0% | 18.0% | 18.0% | 18.0% |
| Industry | 21.0% | 21.0% | 21.0% | 21.0% |
| Consensus | 21.0% | 21.0% | 21.0% | 21.0% |
| **Other Current Assets / Revenue** | | | | |
| Base | 8.0% | 8.0% | 8.0% | 8.0% |
| Bear | 10.0% | 10.0% | 10.0% | 10.0% |
| Bull | 6.0% | 6.0% | 6.0% | 6.0% |
| Industry | 8.0% | 8.0% | 8.0% | 8.0% |
| Consensus | 8.0% | 8.0% | 8.0% | 8.0% |
| **Accounts Payable / Cost of Revenue** | | | | |
| Base | 5.0% | 5.0% | 5.0% | 5.0% |
| Bear | 4.0% | 4.0% | 4.0% | 4.0% |
| Bull | 6.0% | 6.0% | 6.0% | 6.0% |
| Industry | 5.0% | 5.0% | 5.0% | 5.0% |
| Consensus | 5.0% | 5.0% | 5.0% | 5.0% |
| **Accrued Expenses and Other Liabilities / Revenue** | | | | |
| Base | 7.0% | 7.0% | 7.0% | 7.0% |
| Bear | 6.0% | 6.0% | 6.0% | 6.0% |
| Bull | 8.0% | 8.0% | 8.0% | 8.0% |
| Industry | 7.0% | 7.0% | 7.0% | 7.0% |
| Consensus | 7.0% | 7.0% | 7.0% | 7.0% |
| **Short-Term Deferred Revenue / Revenue** | | | | |
| Base | 21.0% | 21.0% | 21.0% | 21.0% |
| Bear | 19.0% | 19.0% | 19.0% | 19.0% |
| Bull | 23.0% | 23.0% | 23.0% | 23.0% |
| Industry | 21.0% | 21.0% | 21.0% | 21.0% |
| Consensus | 21.0% | 21.0% | 21.0% | 21.0% |
| **Capital Expenditures / Revenue** | | | | |
| Base | 4.7% | 4.7% | 4.7% | 4.7% |
| Bear | 5.7% | 5.7% | 5.7% | 5.7% |
| Bull | 3.7% | 3.7% | 3.7% | 3.7% |
| Industry | 3.6% | 3.3% | 4.7% | 4.7% |
| Consensus | 6.9% | 4.9% | 4.9% | 4.9% |
| **Purchases of Intangible Assets / Revenue** | | | | |
| Base | 2.0% | 2.0% | 2.0% | 2.0% |
| Bear | 2.5% | 2.5% | 2.5% | 2.5% |
| Bull | 1.5% | 1.5% | 1.5% | 1.5% |
| Industry | 2.0% | 2.0% | 2.0% | 2.0% |
| Consensus | 2.0% | 2.0% | 2.0% | 2.0% |

# Appendix C

## Sources and Uses of Funds

| | Amount | % of Total | Multiple of LTM EBITDA | Pricing |
|---|---|---|---|---|
| Excess Cash | $ 78.9 | 0.7% | 0.3x | |
| Revolver | – | – | – | L + 375 bps |
| Term Loan A | 2,300.0 | 20.7% | 8.5 | L + 375 bps |
| Term Loan B | 900.0 | 8.1% | 3.3 | L + 800 bps |
| Sponsor Equity | 7,850.1 | 70.5% | 29.0 | |
| **Total Sources** | **$ 11,128.9** | **100.0%** | **41.1x** | |
| | | | | |
| Equity Purchase Price | $ 10,967.5 | | | |
| Refinance Debt | 15.3 | | | |
| Financing Fees | 36.5 | | | |
| Transaction Fees | 109.7 | | | |
| **Total Uses** | **$ 11,128.9** | | | |

## Appendix D

## Shares Outstanding and Purchase Price

| | |
|---|---|
| Basic Shares Outstanding | 31.68 |
| Net Dilutive Options | – |
| Restricted Stock Awards | 0.58 |
| Restricted Stock Units | 0.82 |
| **Fully Diluted Shares Outstanding** | **33.08** |
| | |
| Offer Price per Share | $ 331.50 |
| Fully Diluted Shares Outstanding | 33.08 |
| **Equity Purchase Price** | **$ 10,967.5** |
| (+) Total Debt | 15.3 |
| (-) Cash & Cash Equivalents | (103.9) |
| **Enterprise Value** | **$ 10,878.9** |
| LTM EBITDA | 270.7 |
| LTM Revenue | 1,198.8 |
| *Implied EV / Revenue Multiple* | *9.1x* |
| *Implied EV / EBITDA Multiple* | *40.2x* |

# Appendix E

## Purchase Price Allocation

| | |
|---|---|
| Equity Purchase Price | $ 10,967.5 |
| (-) Book Value of Net Identifiable Assets | (826.3) |
| **Excess Purchase Price to Allocate** | **$ 10,141.1** |
| | |
| PP&E Write-Up | $ 1,318.3 |
| (+) Intangible Asset Write-Up | 3,650.8 |
| (-) Write off of Existing Goodwill | (216.4) |
| (-) DTLs Created | (1,259.4) |
| Adjustments to Book Value of Net Identifiable Assets | 3,493.3 |
| (+) Book Value of Net Identifiable Assets | 826.3 |
| **Fair Market Value of Net Identifiable Assets** | **$ 4,319.7** |
| | |
| Equity Purchase Price | $ 10,967.5 |
| (-) Fair Market Value of Net Identifiable Assets | (4,319.7) |
| **Goodwill Created** | **$ 6,647.8** |

**Appendix F**

**Interest Rate Assumptions**

|  | FY2020E | FY2021E | FY2022E | FY2023E |
|---|---|---|---|---|
| 3-Month Libor (USD) | *1.6%* | *1.5%* | *1.6%* | *1.6%* |

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## EDUCATION

**The Pennsylvania State University | Schreyer Honors College**  University Park, PA
*Smeal College of Business*  *Class of 2020*
*Bachelor of Science in Finance*

## PROFESSIONAL EXPERIENCE

**The Goldman Sachs Group**  New York, NY
*Investment Banking Summer Analyst | Technology, Media, & Telecommunications Group*  *May 2019 – August 2019*
- Prepared materials and managed data room for $3.0 bn acquisition of optical networking technology company
- Created components of strategic M&A pitchbook for $2.0 bn technology hardware company
- Analyzed financial performance and industry trends for advertising company issuing $3.3 bn of debt
- Developed materials analyzing recent technology IPOs and technology companies likely to IPO in the near future

**Pharus Advisors, LLC**  New York, NY
*Investment Banking Summer Analyst*  *June 2018 – August 2018*
- Analyzed public comparables and precedent transactions to help advise clients in buy-side and sell-side M&A deals in industries such as enterprise software, tech-enabled services, digital media, education technology, and consumer health
- Created and presented Affiliate and Performance Marketing industry presentation to founding partners of the firm to inform them about relevant trends and potential clients to contact regarding a possible sale or acquisition

**KenMar Capital Advisors, LLC**  Pittsburgh, PA
*Investment Banking Intern*  *January 2018 – May 2018*
- Extracted historical financial data and conducted industry research on middle market companies seeking capital
- Assembled comprehensive target list of private equity and venture capital firms potentially interested in pursuing deals

## LEADERSHIP EXPERIENCE

**Nittany Lion Fund, LLC**  University Park, PA
*Director of Nittany Lion Fund Education*  *January 2019 – May 2019*
- Delivered weekly presentations to Fund managers about topics such as valuation and financial statement modeling
*Lead Analyst | Communication Services Sector*  *January 2018 – December 2018*
- Managed $930.0 k of investor funds in the Communication Services sector within the $8.8 MM student-run hedge fund
*Summer & Associate Analyst | Consumer Discretionary Sector*  *May 2017 – December 2017*
- Compiled weekly, monthly, and quarterly reports for investors detailing performance, company-specific events, and macroeconomic trends that impacted the sector's portfolio and other companies in the industry

**Wall Street Boot Camp**  University Park, PA
*Graduate*  *August 2017 – December 2017*
- Selected from pool of over 300 applicants for one of 40 spots in a weekly seminar series with Wall Street professionals
- Learned about potential career paths including Investment Banking, Sales and Trading, and Asset Management

**Penn State Asset Management Group**  University Park, PA
*Lead Analyst | Information Technology Sector*  *September 2016 – May 2017*
- Educated members on valuation techniques such as discounted cash flow analysis and comparable company analysis
- Delivered weekly presentations about ongoing trends and potential investment opportunities within the sector

**Penn State Investment Association (PSIA)**  University Park, PA
*Analyst | Financials Sector*  *September 2016 – May 2017*
- Developed fundamental financial analysis skills by using sector-specific valuation methods and industry metrics
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