Valuation Methods in Fairness Opinions

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INTRODUCTION

- This presentation will discuss valuation methods used in U.S. fairness opinions, as disclosed in publicly available documents filed with the S.E.C.
- It is based on our initial published study of fairness opinions in cash transactions and our study in progress of fairness opinions in stock-for stock mergers
- I will also critique some of the methods and analyses that were used

THE STUDY OF CASH TRANSACTIONS

- We reviewed valuation methods used in 352 fairness opinions in 315 U.S. cash transactions *
- We searched the SEC's EDGAR database for fairness opinions rendered in all-cash acquisitions of U.S. companies during two 12-month periods (Sept. 2007 – Aug. 2008 and Sept. 2010 – Aug. 2011)
  - Transactions in which any portion of the consideration was contingent were excluded
- 294 of the opinions were in 271 arms'-length transactions
- 58 opinions were in 44 related party transactions, which we assessed for possible differences in valuation approaches

* In 36 transactions, there was more than one opinion.

Data Reviewed

- Each fairness opinion description was reviewed to obtain the following information:

• Name of target company	• Methodologies applied *
• Industry of target company	• Discount rates used in DCF calculations
• Date of filed document	• Whether WACC was expressly used
• Fairness opinion provider	• Terminal values:
• Fairness opinion date	○ Based on growth rate or multiple?
• Nature of transaction	○ What growth rate or multiple was used?
○ Related party?	○ Data point to which growth rate or multiple was applied
○ Change of control?	
• Transaction price	• Data points used for guideline company and guideline transaction calculations
• Shares outstanding	

** If a method was described as used "for informational purposes only," it was not counted as a method applied by the opinion provider.*

VALUATION METHODS USED

- As would be expected, the dominant methods were DCF and the market approach (guideline companies and guideline transactions) *[see Table 1]*

- 99% of the opinions relied on more than one method *[see Table 2]*
  - Three opinions for financially troubled companies used only a liquidation analysis

Table 1: Principal Valuation Methods Used in Fairness Opinions in Cash Transactions

Valuation Method Used	Opinions	Percent
Discounted cash flow (DCF)	307	87.2%
Discounted dividend model (DDM) (a)	15	4.3%
Income approach	**321** (b)	**91.2%**
Guideline companies	330	93.8%
Guideline transactions	312	88.6%
Market approach	**337** (c)	**96.0%**
Premiums paid in other transactions	**167**	**48.3%** (d)
Total number of opinions	**352**	

(a) Because DDM is a variant of DCF, DDM numbers are combined with DCF numbers in other Tables except in Tables 10 and 11.
(b) 1 opinion used both DCF and DDM.
(c) Most opinions used both methods.
(d) 8 opinions were for entities whose shares were not traded or did not have an active market.

Table 2: Combinations of Primary Valuation Methods Used in Fairness Opinions in Cash Transactions

Primary Valuation Methods Used	Opinions	Percent
DCF, guideline companies and guideline transactions	281	79.8%
DCF and guideline companies, but not guideline transactions	22	6.3%
DCF & guideline transactions, but not guideline companies	7	2.0%
Guideline companies and transactions, but not DCF	23	6.5%
DCF only	11	3.1%
Guideline companies only	4	1.1%
Guideline transactions only	1	0.3%
None of the three primary methods	3	0.9%
Total	**352**	

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COMMENTS ON VALUATION METHODS USED

- The following points will be addressed ahead:
  - Almost half the fairness opinions employed the questionable "premiums paid" method
  - Supplemental approaches such as a leveraged buyout model and asset value were applied in 40% of the opinions
  - In going-private transactions, guideline transactions were used less frequently than in other transactions and premiums paid were used more often

When Was DCF Not Used?

- DCF was used whenever there were adequate management projections
- DCF was used in the 307 opinions with management projections for three or more years *
- There were 45 opinions with no management projections or with projections for only one or two years
  - In 13 opinions, DCF calculations were performed with projections extrapolated by the valuator
  - In 12 opinions, the proxy statement explicitly stated that DCF was not used because adequate projections were unavailable
  - In the other 20 opinions, the proxy statement lacked any management projections and, most likely, no adequate projections existed

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* *Statistics for DCF include the discounted dividend model (DDM), which was used primarily for financial institutions.*

When Was the Market Approach Not Used At All?

- Only 14 (4%) of the 352 opinions did not use either form of the market approach
- The market approach was not applicable in 6 of these omissions
  - 3 biotech companies were valued based on present value of future royalties
  - 3 troubled companies were valued at asset or liquidation value
- The other 8 omissions were unexplained

When Was Only One of the Market Methods Used? (1)

- 34 (10%) of the opinions used only one of the two market methods
  - 26 used guideline companies but not guideline transactions
  - 8 used guideline transactions but not guideline companies
- 11 of these 34 opinions appropriately explained why the omitted method was not applied, *e.g.,* no applicable guideline transactions

When Was Only One of the Market Methods Used? (2)

- 23 of the 34 opinions provided no explanation
  - The omission of a second market method appears to have been unjustified in 8 of these opinions
    - In 6 transactions where two different firms rendered opinions, one firm omitted guideline companies and/or guideline transactions, yet the other used both methods
    - In 4 of these opinions (including 2 of the above), industry transactions were clearly available – they were used for premiums paid but not used for a guideline transaction analysis
  - 15 others were not explained; the omission seems questionable in many of these because adequate data appears to have been available

When Were "Premiums Paid" Used

- The "premiums paid" method compares the premium over market price in the subject transaction with average premiums over market paid for public companies in other transactions, often in unrelated industries
- A majority of the major investment banks, as well as Houlihan Lokey (a leader in fairness opinions), seldom or never employed the premiums paid method, apparently recognizing the method's flaws
  - Firms that issued eight or more opinions (other than Goldman and Morgan Stanley) collectively used premiums paid in only 16% of their opinions

Most Major Firms Used "Premiums Paid" Less than Small Firms

- In contrast to other major firms, Goldman Sachs and Morgan Stanley applied the premiums paid method in 60% and 73%, respectively, of their opinions
  - The data showed no correlation between their use of the method and the premium in the subject transaction, indicating that their use of the method was not selective
- Firms issuing less than four fairness opinions (mostly small firms) used the method in 69% of their opinions

WHY THE "PREMIUMS PAID" METHOD IS FLAWED

- The data underlying the premiums paid method is comprised of companies that the buyer deemed to be undervalued in the market and for which the buyer was willing to pay a premium
- This universe by definition excludes the great majority of companies that buyers consider fairly priced or overvalued and thus unattractive as acquisition targets
- Thus, the data has a substantial built-in upward bias
- An acquiror determines a company's value and generally bids no more than that amount; it does **not** first select a premium and apply that premium to a target's fluctuating market price
  - A premium is the result, not the cause, of a bid

Supplemental Valuation Approaches Used in Fairness Opinions

- Approaches in addition to the primary methods and the premiums paid method were used in 40% of the fairness opinions *[see Table 3]*
- Two or more such approaches were used in 11% of the opinions
- Asset or liquidation value was used in only 6% of the opinions, primarily for troubled companies
  - This figure does not include opinions that used multiples of book value in guideline company and guideline transaction analyses, a common method for valuing financial institutions

Table 3: Supplemental Valuation Methods Used in Fairness Opinions in Cash Transactions

Supplemental Method Used:	Number	Percent
Present value of projected future price	64	18.2%
Target prices of security analysts	43	12.3%
Leveraged buyout model	48	12.6%
Value available in recapitalization	5	1.4%
Asset or liquidation value	22	6.3%
Regression model	8	2.3%
Rule of thumb (value per ton of steel)	1	0.3%
Premium over corporate repurchases	1	0.3%

Note: Some opinions used more than one supplemental approach.

"SIGNATURE APPROACHES"

- Some firms utilized "signature approaches," *i.e.*, supplemental approaches used in a majority of their fairness opinions
  - "Present value of future stock price":
    - Goldman Sachs – 85% of its opinions
    - Morgan Stanley – 53%
    - all others collectively – 7%
  - Transaction price compared to analysts' target prices:
    - Three firms collectively – 62%
    - all others collectively – 7%
  - LBO analyses:
    - Three firms collectively – 72%
    - all others collectively – 11%

Related Party Transactions vs. Arms'-Length Transactions

- The methods used in fairness opinions for related party transactions were generally the same as for arms'-length transactions *[see Table 4]*
  - Related party transactions include transactions in which:
    - the minority shareholders are bought out by the principal shareholder[s] and there is no change of control, or
    - a third party, such as a private equity firm, acquires control and the principal shareholders and/or management have interests adverse to other shareholders because they would receive consideration that would be different in whole or in part

Table 4: Methods Used In Arms'-Length vs. Related Party Cash Transactions

	Related Party	Arms'-length
Total number of opinions	**58**	**294**
Discounted cash flow	89.7%	86.7%
Discounted dividend model	1.7%	4.8%
Income approach	**91.4%**	**91.2%**
Guideline companies	93.0%	93.9%
Guideline transactions	77.2%	90.8%
Market approach	**93.0%**	**96.6%**
Asset or liquidation value	15.5%	4.8%
Regression model	0.0%	2.7%
Asset approach	**15.5%**	**7.5%**
Premiums paid	**52.6%**	**47.9%**

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GOING-PRIVATE TRANSACTIONS VS. OTHER RELATED PARTY TRANSACTIONS

- However, there were 4 notable differences in related party transactions with no change of control (going-private transactions) *[see Table 5]*
- 3 of the 4 differences in the going-private transactions can be explained
  - The premiums paid method was used much more often – smaller firms (which were more likely to use this flawed method) gave many of the opinions in this category
  - DCF was used less often – many of the companies lacked projections
  - The asset approach was used somewhat more often – an anomaly reflecting the nature of some of the companies

Table 5: Methods Used in Related Party Transactions without and with Change of Control

	No Change of Control	Change of Control
Total number of opinions	**30**	**28**
Income approach	**83.3%**	**100.0%**
Guideline companies	93.3%	92.9%
Guideline transactions	66.7%	89.3%
Market approach	**93.3%**	**96.4%**
Asset approach	**20.0%**	**10.7%**
Premiums paid	**69.0%**	**35.7%**

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GUIDELINE TRANSACTIONS ARE RELEVANT IN GOING-PRIVATE TRANSACTIONS

- The fourth difference is that guideline transactions were used less often – improperly
- Only one proxy statement for a going-private transaction stated why guideline transactions were not used, but the reasoning was unsupported:

"[A]n analysis of multiples paid in change of control transactions . . . [was] considered not relevant by Lehman Brothers and Morgan Stanley as the transaction being considered by the special committee did not involve a sale by the Dolan Family Continuing Investors of their interest in Cablevision." [Cablevision Systems proxy statement, 14/9/07, p. 29

  - The bankers' explanation – their view that multiples of guideline transactions are inapplicable to a transaction with no change of control – contrasts with the fact that most other firms consider guideline transactions in going-private opinions *[see Table 5]*
  - Minority shareholders in a squeeze-out are entitled to a pro rata share of equity value

Discount Rates Used in 313 DCF Analyses

Tables 6 though 14 are in the Appendix to this presentation

- We reviewed the discount rates used in each of 313 fairness opinions that used the income approach and disclosed the discount rate used
- As would be expected, discount rates declined as the size of the company increased *[see Table 6]*

WACC Used in Most DCF Analyses

- 187 opinions explicitly used WACC *[see Table 7]*
- Only 12 opinions expressly disclaimed the use of WACC
  - 1 used the build-up method
  - 11 arbitrarily selected a discount rate, asserting that their selection was "appropriate" or was based on the "judgment," "experience" or "expertise" of the investment bank rendering the opinion
- 121 opinions did not explicitly discuss how the discount rate was determined; however, some of these may have utilized WACC without specific disclosure

Wide Ranges of Discount Rates

- Although WACC was widely used, most of the discount rates had wide ranges *[see Table 7]*
  - In 73% of the opinions, the high end of the range of discount rates was at least 2% above the low end (*e.g.*, 10% – 12%)
  - In 26%, the difference was 4% or more

Wide Ranges of Discount Rates Result in Wide Ranges of Value

- Wide ranges of discount rates necessarily result in wide valuation ranges
- As an example, assuming 3% growth, DCF value calculated with a 10% discount rate is about 50% higher than the DCF with a 14% discount rate
  - Moreover, there is a lack of precision in the discount rates, illustrated by the fact that the high and low discount rates in most opinions were rounded to an integer, and most of the others were rounded to a number ending in .5

TERMINAL VALUE: GROWTH RATE OR MULTIPLE?

- We looked at the approaches used to determine terminal value
  - 41% used growth rates; 65% used multiples *[see Table 8]*
    - 6% used both growth rates and multiples
  - When a growth rate was used, it was always applied to free cash flow (except for financial institutions) *[see Table 9]*
    - 58% of opinions used growth rates of 2%-3%, 13% used lower growth rates and 29% user higher growth rates *[see Table 10]*
  - When a multiple was used, it was almost always applied to EBITDA (except for financial institutions) *[see Table 11]*
    - EBITDA multiples used varied materially depending on the industry, but a majority were in the area of 8x *[see Table 12]*

Terminal Value Multiples Affected by Market Conditions

- Inputs used to calculate terminal value were affected by market conditions
  - Growth rates selected in the 2010-11 period were materially lower than in 2007-08
    - The median growth rate fell 17% from 3.0% to 2.5%
    - The arithmetic mean fell 26% from 3.4% to 2.5%
  - Average EBITDA multiples chosen in the 2010-11 period were lower than in the 2007-08 period
    - The median multiple fell 6% from 8.0x to 7.5x
    - The harmonic mean fell 10% from 7.9x to 7.1x

Wide Ranges of Inputs into Terminal Value

- Many fairness opinions used excessively wide ranges of growth rates or multiples in calculating terminal value
  - The high end range of growth rates used for terminal values was at least 2% more than the low in more than half of the opinions *[see Table 13]*
  - The high end range of EBITDA multiples used for terminal values was 25% or more above the low in about half of the opinions *[see Table 14]*

Wide Ranges of Growth Rates Result in Wide Ranges of Values

- A 4% growth rate results in a terminal value 20% higher than a 2% growth rate at a 15% discount rate
- The effect is exacerbated at lower discount rates – a 4% growth rate results in a terminal value 36% higher than a 2% growth rate at a 10% discount rate

RANGES OF EBITDA MULTIPLES

- A terminal value using an 8x EBITDA multiple is 33% higher than using a 6x EBITDA multiple
  - The high and low EBITDA multiples in most opinions were rounded to an integer or to a number ending in .5, but the resulting valuations are incongruously more precise

LEVERAGE WIDENS THE VALUATION RANGES

- When a company is leveraged, the valuation range necessarily widens at the equity level
- For example, if the enterprise value is $85 million to $115 million – a 35% difference – and the company has net debt of $50 million, the equity valuation is $35 million to $65 million – an 85% difference

Wide Ranges of Value Affect Credibility of Opinions

- When valuation ranges used in fairness opinions are wide, they are of limited utility in assessing fairness
  - The credibility of fairness opinions is deleteriously affected by wide valuation ranges
- If the price offered to shareholders is near the low end of a wide range, how can that data point be an indicium of fairness?

Principal Multiples Used in Guideline Company Analyses

- In valuing companies (other than financial institutions) using guideline companies, most analyses used at least two multiples *[see Table 15]*
  - 85% of the analyses used EV*/EBITDA
  - 56% used P/E and 41% used EV/Revenues
  - EV/EBIT, P/BV and other ratios were seldom used

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* Enterprise value is generally defined as equity plus interest-bearing debt minus cash. It also includes preferred stock and other relevant items, if applicable.

Table 15: Principal Multiples Used in Guideline Company Analyses

Multiple	Financial Companies		All Other Companies	
EV/Revenues	Not applicable to financial institutions		122	41%
EV/EBITDA			252	85%
EV/EBIT			22	7%
P/E	32	94%	167	56%
P/BV and/or TBV	32	94%	16	3%
Total (a)	**34**		**296**	

(a) Most opinions used more than one multiple.

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PRINCIPAL MULTIPLES USED IN GUIDELINE TRANSACTION ANALYSES

- The principal differences between guideline transactions analyses and guideline companies analyses were:
  - The EV/Revenues ratio was used in 50% of the analyses *[see Table 16]*
  - The P/E ratio was used in only 12% of the analyses
- The strikingly low use of P/E ratios in guideline transaction analyses is inexplicable, since EPS data was available for most acquisitions of public companies

Table 16: Principal Multiples Used in Guideline Transaction Analyses

Multiple	Financial Companies		All Other Companies	
EV/Revenues	Not applicable to financial institutions		139	50%
EV/EBITDA			229	83%
EV/EBIT			20	7%
P/E	29	88%	32	12%
P/BV and/or TBV	31	97%	3	1%
Total (a)	**32**		**278**	

(a) Numerous opinions used more than one multiple.

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Valuing Financial Institutions with the Market Approach

- In valuing financial institutions using either guideline companies or guideline transactions, most analyses considered two multiples:
  - Price/Earnings and
  - Price/Book Value or Price/Tangible Book Value

  [see Tables 15 & 16]
- Ratios commonly used for non-financial companies, such as EV/Revenues and EV/EBITDA, are generally not applicable to financial institutions

PRINCIPAL COMBINATIONS OF COMMONLY-USED MULTIPLES

- The opinion-givers used different multiples in guideline company valuations than in guideline transaction valuations in almost half of the fairness opinions in the study
  [see Table 17]
  - 44% of the analyses used both EV/EBITDA and P/E ratios in their guideline company analyses but used EV/EBITDA and inexplicably ignored P/E in their guideline transaction analyses

TABLE 17: PRINCIPAL COMBINATIONS OF MULTIPLES (a)

Same Multiples Used for Guideline Companies and Guideline Transactions	Opinions	Percent of Total
Both methods used EV/Revenues only	23	9%
Both methods used EV/EBITDA; neither used P/E	86	34%
Both methods used EV/EBITDA and P/E	18	7%
Both methods used P/E; neither used EV/EBITDA	6	2%
Subtotal	**133**	
Different Multiples Used		
Guideline companies used EV/EBITDA and/or P/E but guideline transactions used EV/Revenues only	8	3%
Guideline companies used EV/EBITDA & P/E but guideline transactions used EV/EBITDA only	112	44%
Guideline companies used P/E only but guideline transactions used EV/EBITDA only	2	1%
Subtotal	**122**	

(a) Excluding financial institutions. This Table includes only EV/EBITDA, P/E and, if neither was used, EV/Revenues.

Methods Used in Fairness Opinions for Stock-for Stock Mergers

- Our study of fairness opinions in stock-for-stock mergers from 2009 through 2014 is in progress
  - The study addresses mergers where target shareholders will own at least 10% of the surviving entity and where the sole consideration is equity
- The methods used in fairness opinions in stock-for-stock mergers are – as would be expected – generally similar those in cash transactions *[see Table 18]*

TABLE 18: PRINCIPAL VALUATION METHODS USED IN FAIRNESS OPINIONS IN STOCK-FOR-STOCK MERGERS

Valuation method used	Merger opinions	Percent in mergers	Percent in cash transactions
Income approach (DCF or DDM)	**122**	**88%**	**91%**
Guideline companies	113	89%	84%
Guideline transactions	82	63%	87%
	124 (a)	**91%**	**96%**
Premiums paid in other transactions	**34**	**30%** (b)	**48%**
Target prices of security analysts	**37**	**30%**	**12%**
Contribution analysis	92	72%	Not relevant to cash transactions
Accretion/dilution	63	61% (b)	
Historical market prices	51	62%	
Comparative data for merged companies	**118** (a)	**72%**	
Total number of opinions	**136**		

(a) Many opinions used more than one of the approaches.

(b) Excluding 13 opinions in transactions where one party's shares were not traded or thinly traded.

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Data based on opinions for U.S. companies in stock-for-stock mergers, 2009-2013

Comparative Analyses Used in Stock-for-Stock Fairness Opinions

- Most of the fairness opinions in stock-for-stock mergers weighed relative fairness in addition to valuation measures
- Comparative data was considered in three manners:
  - A comparison of the relative contributions of each company to the combined business
  - The accretion or dilution in cash flow and/or net income
  - The exchange ratio compared to relative historical market prices of the two companies
- Relative fairness is an important factor to consider in stock-for-stock mergers that are material to both parties

CLOSING COMMENTS

- The use of customary and appropriate methodologies is essential for rendering fairness opinions
- Fairness is not simply a mathematical exercise
  - If all shareholders do not receive the same consideration, the opinion-giver should also consider the impact of differential treatment on the fairness of the transaction
- Although a fairness opinion is not a recommendation to shareholders, the opinion-giver, before rendering an opinion, should consider whether shareholders are better off after a transaction than before it

I would like to thank

Prof. Bini and the OIV

for inviting me again

to this professional gathering

and for the opportunity

to share ideas with you

Your questions and comments are welcome

APPENDIX

TABLES 6 – 14

Table 6: Midpoints of Discount Rates Used in DCF Valuations

Equity Value of Transaction	Average Discount Rate	Less than 10%	10% to 13.9%	14% to 16.9%	17.0% or More
Less than $100 million	17.4%	1	13	20	33
$100 to $250 million	15.6%	3	18	17	14
$250 to $500 million	13.4%	5	32	15	10
$500 million to $1 billion	12.0%	5	24	7	2
$1 to $3 billion	11.1%	7	41	2	0
$3 to $10 billion	9.8%	18	19	0	0
More than $10 billion	8.5%	6	2	0	0

Table 7: Difference Between High and Low Discount Rates Used in DCF Calculations

Difference	WACC Used	WACC Not Expressly Used
0%	18	4
0.5%	5	0
1% to 1.5%	45	13
2% to 2.5%	59	60
3% to 3.5%	12	16
4% to 4.5%	29	20
5%	10	6
6% to 10%	7	9
Subtotal	**185**	**128**
Discount rate not disclosed	2	5
Total	**187**	**133**

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Table 8: Approaches Used to Calculate Terminal Value

Basis of Calculation	Opinions	Percent
Growth model only	107	34.5%
Multiples only	183	59.0%
Both multiples and growth model	20	6.5%
Subtotal	**310**	**100.0%**
Basis not disclosed	4	
Product life (no terminal value)	6 (a)	
DCF not used	32	
Total	**352**	

(a) 5 of these were developmental pharmaceutical/bioscience companies; 1 was a loan portfolio.

Table 9: Basis of Terminal Value Calculations Using a Growth Model

Growth of:	All Opinions	Financial Companies		All Other Companies	
		Using DCF	Using DDM	Using DCF	Using DDM
Free cash flow	**119**	0	1	118	0
Net income	1	0	1	0	0
Dividends	6	0	5	0	1
Growth model – total (a)	**126**	**0**	**7**	**118**	**1**

(a) 21 opinions (including 3 financial companies) calculated terminal value using both multiples and a growth model.

Table 10: Growth Rates Used to Calculate Terminal Value

Growth Rate	Opinions
0%	5
1%	5
Between 1% and 2%	5
2%	20
Between 2% and 3%	20
3%	28
Between 3% and 4%	9
4%	9
Between 4% and 5%	4
5%	8
More than 5%	4
Subtotal	**117**
Minus 30%	1
Not disclosed	8
Total	**126**

TABLE 11: BASIS OF TERMINAL VALUE CALCULATIONS USING MULTIPLES

Multiples of:	All Opinions	Financial Companies		All Other Companies	
		Using DCF	Using DDM	Using DCF	Using DDM
Revenues	11	Not applicable to financial institutions		11	0
EBITDA	155			155	0
EBITDA & another factor (a)	3			3	0
Free cash flow	3			3	0
Net operating profit	2			2	0
Net income	11	5	2	4	0
Book value	5	4	1	0	0
Book value & net income	15	10	5	0	0
Total (b)	**205**	**19**	**8**	**178**	**0**

(a) One each: revenues, free cash flow and net income.

(b) 21 opinions (including 3 financial companies) calculated terminal value using both multiples and a growth model.

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Table 12: EBITDA Multiples Used to Calculate Terminal Value

EBITDA Multiple	Opinions
3.5x to 4.4x	2
4.5x to 5.4x	15
5.5x to 6.4x	17
6.5x to 7.4x	29
7.5x to 8.4x	42
8.5x to 9.4x	21
9.5x to 10.4x	12
10.5x to 11.4x	6
11.5x to 12.4x	6
12.5x and up	8
Total	**158**

Table 13: Terminal Value – Width of Spreads of Growth Rates

Difference between Low and High	Opinions
0%	9
0.5%	7
1%	37
1.5%	1
2%	53
3%	5
4% or more	5
Total	**117**

Table 14: Terminal Value – Width of Spreads of EBITDA Multiples as Percent of Midpoint of Range

Difference between Low and High (Spread)	Opinions
0% to 9.9%	8
10% to 19.9%	41
20% to 29.9%	65
30% to 39.9%	23
40% to 49.9%	14
50% or more	7
Total	**158**

Example: If the range of multiples is 9x to 11x, the midpoint is 10x and the spread is 2x. Thus, the spread is 20% of the midpoint.

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