

Quantifying Marketability Discounts Model

Sample Report



800.825.8763 • 719.548.4900

Fax: 719.548.4479

sales@valusourcesoftware.com

www.valusourcesoftware.com

Quantifying Marketability Discounts Model

ValuSource's Quantifying Marketability Discounts Model (QMDM) closely models a specific valuation to accurately determine an appropriate marketability discount. Marketability discounts are often the largest adjustment made to the value of a business. QMDM assists appraisers in developing, quantifying and defending marketability discounts.

There are numerous approaches and studies used to determine marketability discounts, but little exists in theory or practice to assist appraisers in applying the existing research to the specific circumstances of an actual business appraisal. Most appraisers use "average" premiums or discounts, sometimes with modest adjustments based on the specific facts of an assignment. QMDM addresses these situations by allowing the appraiser to very closely model specific scenarios to accurately determine an appropriate marketability discount.

Using QMDM

QMDM is an Excel workbook file. To use the model, you simply complete the clearly indicated input cells.

Example Report

An example report from QMDM follows.

User Field 1
User Field 2
User Field 3

QUANTITATIVE MARKETABILITY DISCOUNT MODEL (QMDM)
Companion to *Quantifying Marketability Discounts (QMD) Revised Reprint*

The appropriate yield from this worksheet should be carried forward to Assumption #2 on *Exhibit - QMDM Analysis*

THE C CORPORATION YIELD FOR C CORPORATIONS

Expected Dividends Per Share (Ongoing)		\$0.45
÷ Marketable Minority Interest Value Per Share	÷	\$10.00
Implied Ongoing Dividend Yield	=	4.5%

C CORPORATION EQUIVALENT DIVIDEND YIELD FOR TAX PASS-THROUGH ENTITIES

		<u>Per Share</u>
Expected Total Distributions Per Share		\$0.450
Pre-Tax Earnings Per Share	\$1.00	
x S Shareholder Blended Tax Rate	39.6%	
- S Shareholder Taxes on Reported Pre-Tax Earnings		(\$0.396)
= After-Tax S Corporation Dividend Per Share		<u>\$0.054</u>
After-Tax S Corporation Dividend Per Share		\$0.054
÷ Personal Blended Tax Rate		39.6%
= Pre-Tax C Corporation Dividend		<u>\$0.089</u>
Expected Dividends Per Share (Ongoing)		\$0.089
÷ Marketable Minority Interest Value Per Share	÷	\$10.00
Implied Ongoing Dividend Yield	=	0.90%

User Field 1
 User Field 2
 User Field 3

**QUANTITATIVE MARKETABILITY DISCOUNT ANALYSIS
 BUILD-UP OF THE REQUIRED HOLDING PERIOD RATE OF RETURN
 USING THE ADJUSTED CAPITAL ASSET PRICING MODEL**

DERIVATION OF SHAREHOLDER-LEVEL REQUIRED HOLDING PERIOD RATE OF RETURN

Components of the Required Holding Period Return	Lower	Higher
Long-Term Government Bond Yield-to-Maturity	6.50%	6.50%
Ibbotson Common Stock Premium	6.50%	
x Market Beta	1.00	
= Beta Adjusted Common Stock Premium	6.50%	
+ Small Cap Stock Premium	3.50%	
= Total Equity Premium	10.00%	10.00%
Base Holding Period Required Return	16.50%	16.50%

Investor Specific Risk Premium(s) for This Entity:

+ Uncertainties of Expected Holding Period	0.00%	1.00%
+ General Illiquidity of the Investment	0.00%	0.00%
+ Lack of Expected Interim Cash Flows	0.00%	0.00%
+ Uncertainties Related to Expected Interim Cash Flows	0.00%	0.00%
+ Potential for Adverse Cash Flow	0.00%	0.00%
+ Uncertainties due to Potential for Unfavorable Exit	1.00%	2.00%
+ General Unattractiveness of the Investment	0.00%	0.00%
+ Rights of First Refusal Limiting Transferability	1.00%	2.00%
+ More Onerous Restrictions on Transfer	0.00%	0.00%
+ Lack of Diversification of Assets	0.00%	0.00%
+ Unattractive Asset Mix	0.00%	0.00%
+ Uncertainties Due to Risks of Future Investment Strategies	0.00%	0.00%
+ Unlikely Candidate for Merger/Sale/Acquisition/IPO	0.00%	0.00%
+ Uncertainties Related to Buy-Sell Agreement	0.00%	0.00%
+ Restrictions on Use as Loan Collateral	0.00%	0.00%
+ Small Shareholder Base	0.00%	0.00%
+ Adjustment for Large Size of the Entity	0.00%	0.00%
+ Large Size of the Investment Limits Market	0.00%	0.00%
+ Other	0.00%	0.00%
Total Investor Specific Risk Premium for This Entity	2.00%	5.00%

Estimated Range of Required Holding Period Returns 18.50% 21.50%

Rounded Range 18.50% 21.50%

Mid-Point of Estimated Required Return Range	20.0%
--	-------

User Field 1
 User Field 2
 User Field 3

QUANTITATIVE MARKETABILITY DISCOUNT ANALYSIS
QMDM ANALYSIS TO DEVELOP MARKETABILITY DISCOUNT

Base Value (Marketable Minority Interest)	\$1.00
<i>Basic Assumptions of the Model</i>	
1. Expected Growth Rate of Underlying Value	4.5%
2. Expected Dividend Yield	8.0%
3. Expected Growth Rate of Dividend	4.5%
4. Mid-Point Required Return	20.0%
5a. Minimum Holding Period	4
5b. Maximum Holding Period	10

Reference/Brief Explanation

<i>QMDM Modeling Assumptions</i>	
Dividends Received End of Year ("E") or Mid-Year ("M")	M
Premium(+) / Discount(-) to Marketable Minority Value at Exit	0.0%

Average Indicated Discounts for Selected Holding Periods (Mid-Point Return +/- 1%)

Average of 2-4 Year HP	15%	Average of 5-10 Year HP	28%
Average of 5-7 Year HP	24%	Average of 10-15 Year HP	35%
Average of 8-10 Year HP	31%	Average of 15-20 Year HP	39%
Average of 10-20 Year HP	37%		

Concluded Marketability Discount	28.0%
----------------------------------	-------

		Assumed Holding Periods in Years													
		1	2	3	4	5	6	7	8	9	10	15	20	25	30
		Implied Marketability Discounts													
Required Holding Period Return (Annual %)	16.0%	2%	5%	7%	9%	10%	12%	13%	14%	15%	16%	20%	22%	23%	24%
	17.0%	3%	6%	9%	11%	13%	15%	17%	18%	20%	21%	25%	28%	29%	30%
	18.0%	4%	8%	11%	14%	16%	18%	20%	22%	24%	25%	30%	32%	34%	35%
	19.0%	5%	9%	13%	16%	19%	22%	24%	26%	27%	29%	34%	37%	38%	39%
	20.0%	6%	11%	15%	18%	22%	25%	27%	29%	31%	33%	38%	41%	42%	43%
	21.0%	6%	12%	17%	21%	24%	27%	30%	32%	34%	36%	41%	44%	45%	46%
	22.0%	7%	13%	18%	23%	27%	30%	33%	35%	37%	39%	45%	47%	48%	49%
	23.0%	8%	14%	20%	25%	29%	32%	35%	38%	40%	42%	48%	50%	51%	52%
	24.0%	9%	16%	22%	27%	31%	35%	38%	40%	43%	45%	50%	53%	54%	54%

PV=100%

RETURNS EXPECTED TO BE REALIZED OVER VARIOUS SUBSEQUENT HOLDING PERIODS GIVEN MARKETABILITY DISCOUNT SELECTED

2.5%		<i>Selected Discount Increment</i>													
		Subsequent Holding Period in Years													
		1	2	3	4	5	6	7	8	9	10	15	20	25	30
Discount Applied	18.0%	38.9%	25.9%	21.8%	19.8%	18.6%	17.9%	17.3%	16.9%	16.6%	16.4%	15.7%	15.4%	15.2%	15.1%
	20.5%	43.5%	28.0%	23.2%	20.9%	19.5%	18.7%	18.0%	17.6%	17.2%	16.9%	16.1%	15.8%	15.6%	15.5%
	23.0%	48.4%	30.3%	24.7%	22.1%	20.5%	19.5%	18.8%	18.2%	17.8%	17.5%	16.6%	16.2%	16.0%	15.8%
	25.5%	53.6%	32.6%	26.3%	23.3%	21.5%	20.3%	19.5%	18.9%	18.5%	18.1%	17.1%	16.6%	16.4%	16.2%
	28.0%	59.2%	35.1%	28.0%	24.6%	22.6%	21.3%	20.3%	19.7%	19.2%	18.7%	17.6%	17.1%	16.8%	16.7%
	30.5%	65.2%	37.8%	29.7%	25.9%	23.7%	22.2%	21.2%	20.4%	19.9%	19.4%	18.1%	17.6%	17.3%	17.1%
	33.0%	71.6%	40.6%	31.6%	27.3%	24.8%	23.2%	22.1%	21.3%	20.6%	20.1%	18.7%	18.1%	17.8%	17.6%
35.5%	78.6%	43.6%	33.5%	28.8%	26.1%	24.3%	23.0%	22.1%	21.4%	20.9%	19.3%	18.7%	18.3%	18.2%	
38.0%	86.2%	46.8%	35.6%	30.4%	27.4%	25.4%	24.0%	23.0%	22.3%	21.7%	20.0%	19.3%	18.9%	18.8%	

Note: This exhibit relies upon the methodology of the Quantitative Marketability Discount Model as published in Mercer, Z. Christopher, *Quantifying Marketability Discounts Revised Reprint* (Memphis, TN: Peabody Publishing, LP, 2001, 1997). See Chapter 8.

User Field 1
 User Field 2
 User Field 3

QUANTITATIVE MARKETABILITY DISCOUNT ANALYSIS

Base Value (Marketable Minority Interest)	\$1.00	
<i>Basic Assumptions of the Model</i>		
1. Expected Growth Rate of Underlying Value	4.5%	<i>All assumptions from QMDM-Analysis tab Print to illustrate detail if desired</i>
2. Expected Dividend Yield	8.0%	
3. Expected Growth Rate of Dividend	4.5%	
4. Mid-Point Required Return	20.0%	
5a. Minimum Holding Period	4	
5b. Maximum Holding Period	10	

<i>QMDM Modeling Assumptions</i>	
Dividends Received End of Year ("E") or Mid-Year ("M")	M
Premium(+) / Discount(-) to Marketable Minority Value at Exit	0.0%

Average of 2-4 Year HP	15%	Average of 5-10 Year HP	28%
Average of 5-7 Year HP	24%	Average of 10-15 Year HP	35%
Average of 8-10 Year HP	31%	Average of 15-20 Year HP	39%
Average of 10-20 Year HP	37%		

Concluded Marketability Discount	28%
----------------------------------	-----

PRESENT VALUES OF DIVIDEND STREAM

Table 1

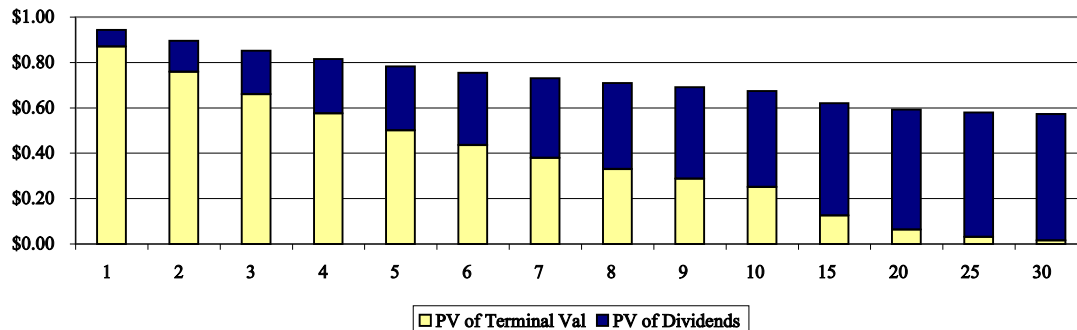
	Assumed Holding Periods													
	1	2	3	4	5	6	7	8	9	10	15	20	25	30
16.0%	\$0.07	\$0.14	\$0.20	\$0.26	\$0.30	\$0.35	\$0.39	\$0.42	\$0.46	\$0.49	\$0.59	\$0.66	\$0.69	\$0.72
17.0%	\$0.07	\$0.14	\$0.20	\$0.25	\$0.30	\$0.34	\$0.38	\$0.41	\$0.44	\$0.47	\$0.57	\$0.62	\$0.65	\$0.67
18.0%	\$0.07	\$0.14	\$0.20	\$0.25	\$0.29	\$0.33	\$0.37	\$0.40	\$0.43	\$0.45	\$0.54	\$0.59	\$0.61	\$0.63
19.0%	\$0.07	\$0.14	\$0.19	\$0.24	\$0.29	\$0.33	\$0.36	\$0.39	\$0.41	\$0.44	\$0.52	\$0.56	\$0.58	\$0.59
20.0%	\$0.07	\$0.14	\$0.19	\$0.24	\$0.28	\$0.32	\$0.35	\$0.38	\$0.40	\$0.42	\$0.49	\$0.53	\$0.55	\$0.56
21.0%	\$0.07	\$0.14	\$0.19	\$0.24	\$0.28	\$0.31	\$0.34	\$0.37	\$0.39	\$0.41	\$0.47	\$0.50	\$0.52	\$0.53
22.0%	\$0.07	\$0.13	\$0.19	\$0.23	\$0.27	\$0.31	\$0.33	\$0.36	\$0.38	\$0.40	\$0.46	\$0.48	\$0.49	\$0.50
23.0%	\$0.07	\$0.13	\$0.19	\$0.23	\$0.27	\$0.30	\$0.33	\$0.35	\$0.37	\$0.39	\$0.44	\$0.46	\$0.47	\$0.48
24.0%	\$0.07	\$0.13	\$0.18	\$0.23	\$0.26	\$0.29	\$0.32	\$0.34	\$0.36	\$0.37	\$0.42	\$0.44	\$0.45	\$0.45

PRESENT VALUES OF TERMINAL VALUE

Table 2

	Assumed Holding Periods													
	1	2	3	4	5	6	7	8	9	10	15	20	25	30
16.0%	\$0.90	\$0.81	\$0.73	\$0.66	\$0.59	\$0.53	\$0.48	\$0.43	\$0.39	\$0.35	\$0.21	\$0.12	\$0.07	\$0.04
17.0%	\$0.89	\$0.80	\$0.71	\$0.64	\$0.57	\$0.51	\$0.45	\$0.40	\$0.36	\$0.32	\$0.18	\$0.10	\$0.06	\$0.03
18.0%	\$0.89	\$0.78	\$0.69	\$0.62	\$0.54	\$0.48	\$0.43	\$0.38	\$0.34	\$0.30	\$0.16	\$0.09	\$0.05	\$0.03
19.0%	\$0.88	\$0.77	\$0.68	\$0.59	\$0.52	\$0.46	\$0.40	\$0.35	\$0.31	\$0.27	\$0.14	\$0.07	\$0.04	\$0.02
20.0%	\$0.87	\$0.76	\$0.66	\$0.58	\$0.50	\$0.44	\$0.38	\$0.33	\$0.29	\$0.25	\$0.13	\$0.06	\$0.03	\$0.02
21.0%	\$0.86	\$0.75	\$0.64	\$0.56	\$0.48	\$0.41	\$0.36	\$0.31	\$0.27	\$0.23	\$0.11	\$0.05	\$0.03	\$0.01
22.0%	\$0.86	\$0.73	\$0.63	\$0.54	\$0.46	\$0.39	\$0.34	\$0.29	\$0.25	\$0.21	\$0.10	\$0.05	\$0.02	\$0.01
23.0%	\$0.85	\$0.72	\$0.61	\$0.52	\$0.44	\$0.38	\$0.32	\$0.27	\$0.23	\$0.20	\$0.09	\$0.04	\$0.02	\$0.01
24.0%	\$0.84	\$0.71	\$0.60	\$0.50	\$0.43	\$0.36	\$0.30	\$0.25	\$0.21	\$0.18	\$0.08	\$0.03	\$0.01	\$0.01

**COMPOSITION OF NONMARKETABLE MINORITY VALUE
 OVER POTENTIAL HOLDING PERIODS AT REQUIRED HOLDING PERIOD RETURN OF 20%**



User Field 1
 User Field 2
 User Field 3

QUANTITATIVE MARKETABILITY DISCOUNT ANALYSIS

Scenario #1 - Initial Public Offering or Sale in Short Term

Base Value (Marketable Minority Interest)		\$1.00	Quarterly Rates	Reference/Brief Explanation
<i>Basic Assumptions of the Model</i>				
1. Expected Growth Rate of Underlying Value	15.0%	3.6%		
2. Expected Dividend Yield	0.0%	0.0%		
3. Expected Growth Rate of Dividend	0.0%	0.0%		
4. Mid-Point Required Return	20.0%	4.7%		
5a. Minimum Holding Period (Months)	12			
5b. Maximum Holding Period (Months)	24			
<i>QMDM Modeling Assumptions</i>				
Dividends Received End of Year ("E") or Mid-Year ("M")	E			
Premium(+) / Discount(-) to Marketable Minority Value at Exit	0.0%			
Minimum Holding Period (Months)	12	Minimum Holding Period Return	19%	Minimum 16% in Table
Maximum Holding Period (Months)	24	Maximum Holding Period Return	21%	Maximum 24% in Table
Average Marketability Discount (from selected range):		6%		
Selected Marketability Discount - Scenario #1		10%		

Scenario #2 - IPO/Sale Does Not Occur / Continue to Operate for a Longer Term

Base Value (Marketable Minority Interest)		\$1.00	Reference/Brief Explanation	
<i>Basic Assumptions of the Model</i>				
Expected Growth Rate of Underlying Value	10.0%			
Expected Dividend Yield	0.0%			
Expected Growth Rate of Dividend	0.0%			
Mid-Point Required Return	21.0%			
Minimum Holding Period	5			
Maximum Holding Period	10			
<i>QMDM Modeling Assumptions</i>				
Dividends Received End of Year ("E") or Mid-Year ("M")	E			
Premium/Discount to Marketable Minority Value at Exit	0.0%			
Minimum Holding Period (Years)	5	Minimum Holding Period Return	20%	Minimum 17% in Table
Maximum Holding Period (Years)	10	Maximum Holding Period Return	22%	Maximum 25% in Table
Average Marketability Discount (from selected range):		50%		
Selected Marketability Discount - Scenario #2		50%		

Scenario #3 - Near-Term Liquidation

Base Value (Marketable Minority Interest)	\$1.00
Estimated % of Marketable Minority Value Received Upon Liquidation	80% <i>1-Effective Marketability Discount</i>

Selection of Marketability Discount

	Assumed Probabilities	(From Above) Assumed Discounts	Product
Scenario #1: IPO/Sale	20%	10%	2.0%
Scenario #2: Remain Privately Held	80%	50%	40.0%
Scenario #3: Near-Term Liquidation	0%	20%	0.0%
	100%		42.0%
Selected Marketability Discount	30%		

User Field 1
 User Field 2
 User Field 3

QUANTITATIVE MARKETABILITY DISCOUNT ANALYSIS
SCENARIO #1 - NEAR-TERM IPO OR SALE

Base Value (Marketable Minority Interest)	\$1.00	Quarterly
<i>Basic Assumptions of the Model</i>		
1. Expected Growth Rate of Underlying Value	15.0%	3.6%
2. Expected Dividend Yield	0.0%	0.0%
3. Expected Growth Rate of Dividend	0.0%	0.0%
4. Mid-Point Required Return	20.0%	4.7%
5a. Minimum Holding Period (Months)	12	
5b. Maximum Holding Period (Months)	24	

All assumptions from Multi-Scenario QMDM tab
Print to illustrate detail if desired

QMDM Modeling Assumptions

Dividends Received End of Quarter ("E") or Mid-Quarter ("M")	E
Premium(+) / Discount(-) to Marketable Minority Value at Exit	0.0%

Average of 6-12 Month HP	3%
Average of 15-21 Month HP	6%
Average of 24-30 Month HP	9%
Average of 24-36 Month HP	10%

Average of 12-18 Month HP	5%
Average of 18-24 Month HP	7%
Average of 30-36 Month HP	11%

Concluded Marketability Discount 10%

Required Holding Period Return (Annual %)	Assumed Holding Periods in Months													
	3	6	9	12	15	18	21	24	27	30	33	36	39	42
	1	2	3	4	5	6	7	8	9	10	15	20	25	30
Implied Marketability Discounts														
16.0%	0%	0%	1%	1%	1%	1%	2%	2%	2%	2%	2%	3%	3%	3%
17.0%	0%	1%	1%	2%	2%	3%	3%	3%	4%	4%	5%	5%	5%	6%
18.0%	1%	1%	2%	3%	3%	4%	4%	5%	6%	6%	7%	7%	8%	9%
19.0%	1%	2%	3%	3%	4%	5%	6%	7%	7%	8%	9%	10%	11%	11%
20.0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%
21.0%	1%	3%	4%	5%	6%	7%	9%	10%	11%	12%	13%	14%	15%	16%
22.0%	1%	3%	4%	6%	7%	8%	10%	11%	12%	14%	15%	16%	17%	19%
23.0%	2%	3%	5%	7%	8%	10%	11%	13%	14%	15%	17%	18%	20%	21%
24.0%	2%	4%	5%	7%	9%	11%	12%	14%	16%	17%	19%	20%	22%	23%

PV=100%

Note: This exhibit relies upon the methodology of the Quantitative Marketability Discount Model as published in Mercer, Z. Christopher, *Quantifying Marketability Discounts Revised Reprint* (Memphis, TN: Peabody Publishing, LP, 2001, 1997). See Chapter 8.

User Field 1

User Field 2

User Field 3

QUANTITATIVE MARKETABILITY DISCOUNT ANALYSIS

SCENARIO #2 - CONTINUED PRIVATE OWNERSHIP

Base Value (Marketable Minority Interest)	\$1.00	
<i>Basic Assumptions of the Model</i>		
1. Expected Growth Rate of Underlying Value	10.0%	<i>All assumptions from Multi-Scenario QMDM tab</i>
2. Expected Dividend Yield	0.0%	
3. Expected Growth Rate of Dividend	0.0%	
4. Mid-Point Required Return	21.0%	<i>Print to illustrate detail if desired</i>
5a. Minimum Holding Period	5	
5b. Maximum Holding Period	10	

QMDM Modeling Assumptions

Dividends Received End of Year ("E") or Mid-Year ("M")	E
Premium(+) / Discount(-) to Marketable Minority Value at Exit	0.0%

Average of 2-4 Year HP	25%
Average of 5-7 Year HP	43%
Average of 8-10 Year HP	57%
Average of 10-20 Year HP	74%

Average of 5-10 Year HP	50%
Average of 10-15 Year HP	69%
Average of 15-20 Year HP	80%

Concluded Marketability Discount | **50%**

	Assumed Holding Periods in Years													
	1	2	3	4	5	6	7	8	9	10	15	20	25	30
	Implied Marketability Discounts													
17.0%	6%	12%	17%	22%	27%	31%	35%	39%	43%	46%	60%	71%	79%	84%
18.0%	7%	13%	19%	24%	30%	34%	39%	43%	47%	50%	65%	75%	83%	88%
19.0%	8%	15%	21%	27%	33%	38%	42%	47%	51%	54%	69%	79%	86%	91%
20.0%	8%	16%	23%	29%	35%	41%	46%	50%	54%	58%	73%	82%	89%	93%
21.0%	9%	17%	25%	32%	38%	44%	49%	53%	58%	61%	76%	85%	91%	94%
22.0%	10%	19%	27%	34%	40%	46%	52%	56%	61%	64%	79%	87%	92%	96%
23.0%	11%	20%	28%	36%	43%	49%	54%	59%	63%	67%	81%	89%	94%	96%
24.0%	11%	21%	30%	38%	45%	51%	57%	62%	66%	70%	83%	91%	95%	97%
25.0%	12%	23%	32%	40%	47%	54%	59%	64%	68%	72%	85%	92%	96%	98%

PV=100%

Note: This exhibit relies upon the methodology of the Quantitative Marketability Discount Model as published in Mercer, Z. Christopher, *Quantifying Marketability Discounts Revised Reprint* (Memphis, TN: Peabody Publishing, LP, 2001, 1997). See Chapter 8.