Using Actual Financial Accounting Information To Conduct Financial Ratio Analysis: The Case Of Motorola

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ABSTRACT

In this paper, we demonstrate the use of actual financial data for financial ratio analysis. We construct a financial and industry analysis for Motorola Corporation. The objective is to show students exactly how to compute ratios for an actual company. This paper demonstrates the difficulties in applying the principles of financial ratio analysis when the data are not homogeneous, as is the case in textbook examples. We use Motorola as an example because the firm has several segments, two of which account for the majority of sales and represent two industries (semi-conductor and communications) that have different characteristics. The case illustrates the complexity of financial analysis.

Keywords: Ratio Analysis, Industry Analysis, Financial Accounting Information

INTRODUCTION

Motorola Segment Analysis

Motorola is a global manufacturer of communication products, semiconductors, and embedded electronic solutions. The company is divided into six operating segments that publicly report financial results. Financial data are provided in Appendix A. The Personal Communication Segment (PCS) designs, manufactures, and markets wireless communication products for service subscribers. Products include wireless handsets, personal 2-way radios, and messaging devices, along with the associated accessories. The Personal Communication Segment accounted for 37.8% of 2002 sales, making it the largest of Motorola's operating segments. The Global Telecommunications Segment (GTS) designs, manufactures, and markets the infrastructure communication systems purchased by telecommunication service providers. Products include electronic exchanges, telephone switches, and base station controllers for various wireless communication standards. This segment accounted for 15.8% of Motorola's sales in 2002. The Broadband Communication Segment (BCS) designs, manufactures, and markets a variety of products to support the cable and broadcast television and telephony industries in delivering high speed data, including cable modems, Internet-based telephones, set-top terminals, and digital satellite television systems. This segment accounted for 7.3% of Motorola's sales in 2002. The Commercial, Government, & Industrial Segment (CGIS) designs, manufactures, and markets integrated communication systems for commercial, government, and industrial applications, typically private 2-way wireless networks for voice and data transmissions, such as would be used by public safety authorities in a community. This segment accounted for 13% of Motorola's sales in 2002. The Semiconductor Product Segment (SPS) designs, manufactures, and markets microprocessors and related semiconductors for use in various end products, such as computers, wireless and broadband devices, automobiles, and other consumer electronic devices. Some of the semiconductors produced are used in products marketed by other Motorola segments. This segment accounted for 16.8% of Motorola's sales in 2002. The Integrated Electronic Systems Segment (IESS) designs, manufactures, and markets automotive and industrial electronic systems, single board computer systems, and energy storage products to support portable electronic devices (such as wireless handsets). This segment accounted for 7.6% of Motorola's sales in 2002.

Total Motorola sales and profitability have varied widely over the last five years, as shown in Table 1. Sales peaked at over $37B in 2000 and dropped to less than $27B in 2002. Motorola had a net loss in 2001 and 2002. Motorola's stock price has varied from a high of over $55 in February of 2000 to a low price of less than $8 in January of 2003. Despite the losses incurred recently and the variability of reported income, Motorola has continued to pay a steady dividend of $0.16 per share since 1997. This is a clear indication of the importance that Motorola attaches to the informational content associated with dividends; despite significant losses, dividends have not been reduced. The most recent data indicates that Motorola has returned to profitability, posting a $0.01 per share profit for the first quarter of 2003.

Table 1: Condensed Statement of Financial Performance 1998 to 2002

	2002	2001	2000	1999	1998
Sales	26,679	30,004	37,580	33,075	31,340
Net Earnings	(2,485)	(3,937)	1,318	891	(907)

Note: All figures in millions except per share data, as is typical in this report, unless noted.

Industry Analysis

The Telecommunications Equipment Industry

The telecommunications equipment industry provides the products required to support land-based and wireless communications, both the end-consumer equipment and the infrastructure of the networks that enable the end-consumer products. Data for companies in the telecommunications industry are shown in Appendix B. Nokia is the market leader in the handset portion of this industry, followed by Motorola, Siemens and Sony-Ericsson. Ericsson leads the infrastructure portion of the equipment industry. The five largest companies are Cisco Systems, Nokia, Qualcomm, Motorola, and Ericsson (yahoo.marketguide.com).

The telecommunications equipment industry, in particular, has seen difficult operating conditions among the technology industries over the last several years. The difficult operating conditions are the result of two underlying issues. First, after a rapid build-up of wireless network infrastructure by the service providers (firms such as Verizon Wireless that provide telecommunication services to the end-consumer) in 2000, the demand for equipment by the service providers dropped some 15% in 2001 and likely dropped by even a higher percentage in 2002 (Yahoo.finance). Second, the demand for third generation (3G) wireless technologies (which includes mobile data services that can combine voice, data, email, PDA, and other features) has not evolved as quickly as expected. Wireless subscribers have chosen not to replace their handsets with the new 3G technologies in anticipation of the price of the equipment dropping (Yahoo.finance).

The telecommunication equipment industry has a beta coefficient of 2.09, explaining, in part, the difficult operating conditions in the industry as a magnification of the poor conditions in the economy as a whole (yahoo.marketguide.com). A key segment within the telecommunications industry is the wireless handset (cellular phone) segment, both because of its size and because of its visibility to end-consumers. In this wireless handset segment, Nokia is the clear market leader, with a substantial 35.8% market share in 2002 and a strong presence in the critical European market. This is important because Europe is where much of the technological innovation in the industry occurs. Motorola is in second place in this industry segment with a market share of 15.3%, less than half of Nokia's share. Third place belongs to Samsung, with a 9.8% market share, but Samsung's strong technology and significant resources pose significant challenges to Motorola and Nokia's leadership positions. Siemens held an 8.4% market share in 2002, while the joint venture between Sony and Ericsson held a 5.5% market share in the industry segment (Reiter, 2003).

The Semiconductor Industry

The semiconductor industry provides the semiconductor "chips", which are integral to consumer electronics, such as PC's, PDA's, audio, visual and entertainment equipment, and cellular phones. Data for

companies in the semiconductor industry are shown in Appendix C. These chips are also used in commercial electronics, such as network servers, communication switch equipment, and industrial controls. Intel is the largest firm in the industry. Intel is known, in particular, for supplying the microprocessors used in PC's. The top five companies in this industry, in order of descending market capitalization, are Intel, Texas Instrument, Taiwan Semiconductor, Advanced Materials, and ST-Microelectronics (yahoo.marketguide.com).

The semiconductor industry experienced a record year in 2000 with worldwide sales of $200B. Sales experienced a significant declined in 2001, down some 30% to $140B. The decline in 2001 was attributed to weak sales in nearly every consumer electronics segment and to weak sales in commercial electronic segments, resulting in low demand for semiconductors (yahoo.finance). The year 2002 brought only a slight recovery in the semiconductor industry, with an expected worldwide sales increase likely to be only several percentage points higher than 2001 levels. November 2002 sales only increased by 1.3%, less than the 1.8% increase in October 2002. This low increase is significant because November sales have historically averaged larger increases as electronic manufacturers prepare for the holiday season (Value Line, January 17, 2003, p 1051). The semiconductor industry has a Beta coefficient of 2.17, which, like the telecommunication equipment industry, explains, in part, the severe downturn in the industry as the entire economy took a downturn over the last several years (yahoo.marketguide.com).

Financial Ratio Analysis

Financial ratios for Motorola, for the semiconductor industry, and for the telecommunications industry are provided in Table 2. The firms in the semiconductor industry subset represent 87% of the estimated total semiconductor industry sales of $100 billion in 2002 (Value Line, January 3, 2003, pp. 744 and pp. 770). The firm's telecommunications equipment industry represented 91% of telecommunication equipment industry sales of $277 billion in 2002 (Value Line, January 17, 2003, p 1051).

Table 2: 2002 Ratio Analysis

	Motorola	**Semiconductor Industry**	**Telecommunication Equipment Industry**
Current Ratio	1.77	2.44	1.52
Quick Ratio	1.47	2.08	1.23
Average Collection Period	61 days	50 days	73 days
Inventory Turnover	6.25	6.01	5.66
Fixed Asset Turnover	4.37	1.58	6.24
Total Asset Turnover	0.86	0.61	0.90
Debt Ratio	0.64	0.34	0.65
Debt to Equity Ratio	1.77	0.52	1.82
Times Interest Earned	NA	NA	NA
Gross Profit Margin	32.76%	37.49%	29.52%
Net Profit Margin	-9.31%	-3.00%	-1.24%
Return on Investment	-7.98%	-1.82%	-1.11%
Return on Equity	-22.11%	-2.78%	-3.14%
Assets / Equity	2.77	1.52	2.82

Note: Ratios are derived from the data in Appendices A, B, and C.

Evaluating Motorola relative to the semiconductor industry, we first note that Motorola is slightly less liquid than the average firm in the industry, with both a current ratio and a quick ratio that is lower than the industry average. Motorola's average collection period, at 61 days, is lower than the industry average of 50 days, indicating Motorola should evaluate its credit policies. Both fixed asset turnover and total asset turnover are above the semiconductor industry averages, indicating that Motorola is using its assets more efficiently than the industry average in generating sales. Motorola's debt ratio and debt-to-equity ratio indicate that Motorola is more leveraged than the average firm in the industry. This higher leverage, in part, explains Motorola's poor financial performance relative to the semiconductor industry because the leverage commits Motorola to interest payments that must be paid

regardless of economic and market conditions. The ratios indicate that Motorola has a higher cost of sales than the average firm in the semiconductor industry, resulting in a lower gross profit margin and higher indirect costs, resulting in lower net profit margin performance relative to the semiconductor industry.

The situation is different when evaluating Motorola relative to the telecommunications equipment industry and, considering that the majority of Motorola's business is in this industry rather than the semiconductor industry, this is the more interesting and relevant story. Relative to the telecommunications equipment industry, Motorola has a better liquidity position, with both the current ratio and the quick ratio being higher than the industry average. Motorola collects receivables quicker than the average firm in this industry. Relative to this industry, Motorola may want to evaluate credit policies to determine if perhaps strict credit policies are negatively impacting sales. Motorola uses its total assets slightly less efficiently than the average firm in the telecommunications equipment industry and its fixed asset turnover is significantly less than the industry average, at 4.37 compared to the industry average of 6.24. Motorola is more highly leveraged than the average firm in the telecommunications industry. Motorola may want to examine its capital structure policy to ensure it has the right balance of benefit from the tax shield of increased debt relative to the bankruptcy and related financial distress costs associated with increased debt.

Several explanations are possible for the deviation from industry norms. Perhaps this is the result of a conscious choice to invest heavily in technology and automation in its manufacturing processes (as opposed to a more labor-intensive manufacturing strategy). While such fixed investments will yield significant gains in good market conditions, the investments commit the firm to fixed costs (depreciation), even in bad economic conditions. Alternatively, the poor fixed asset turnover may indicate overcapacity caused by extremely poor forecasts of future sales. Or, the poor ratio may indicate a fundamental inability or inefficiency in using the deployed assets. Motorola is slightly less leveraged, with a lower debt and debt-to-equity ratio. Keep in mind, though, that the debt ratios used in the ratio analysis above used total liabilities as a measure of debt. In contrast, capital structure analysis focuses specifically on long-term debt in calculating leverage.

Motorola has a higher gross profit margin than the average firm in the telecommunications equipment industry (32.8% versus 29.5%), but has a lower net margin. Motorola has a higher fixed and indirect cost structure. As an illustration of the potential fixed and indirect cost issues, consider the productivity, which for this purpose is defined as sales per employee, of Motorola relative to its chief competitor in the telecommunications equipment industry - Nokia. In 2001, Motorola generated sales of $31,191M with 111,000 employees for a productivity of $0.27M per employee. In contrast, Nokia generated sales of $27,645M with just 53,800 employees, for a productivity of $0.53M per employee - nearly double the productivity of Motorola. Clearly, Motorola has significant costs associated with its level of employment that are not being returned in sales. This is interesting because Motorola, as observed earlier, also has poor fixed asset use in addition to this effective and/or efficient use of human assets. Perhaps contributing to the poor fixed and indirect cost structure is that Motorola has elements of being a conglomerate that most of the other firms in the industry do not have. Motorola is involved in diverse business segments – telecommunications, semiconductors, automotive components, and batteries, to name a few – and must evaluate whether the administrative and infrastructure costs of managing these diverse segments are less than the benefits of having the segments under one corporate umbrella. It is not obvious that the diverse business segments within Motorola are being used synergistically to increase overall value. If there are not synergies between the business segments, Motorola shareholders should prefer that Motorola divest the segments as investors can diversify their portfolios more efficiently than Motorola can. Most of the other firms in the industry do not have to absorb the costs associated with managing such diverse business activities.

DuPont System of Financial Analysis

A DuPont analysis of Motorola, the semiconductor industry, and the telecommunications equipment industry is shown in Table 3. The story told by the DuPont analysis is similar to the story told by analyzing ratios; i.e., Motorola must focus on controlling operating costs. Relative to the semiconductor industry as a whole, Motorola has an advantage in its leverage ratio (Assets to Equity of 2.77 compared to 1.52 for the industry) and in its use of assets (Total Asset Turnover of 0.86 compared to 0.61), yet has a poorer return on equity due to its low net profit margin. While one would expect a somewhat lower net profit margin for a firm with a higher leverage ratio (the firm has to pay interest to service the debt that gives the higher leverage ratio), in the Motorola case there are

apparently other operational inefficiencies impacting the net profit margin because the overall return on equity is less than the industry average. A similar story, though not quite as obvious, is told by comparing Motorola to the telecommunications equipment industry averages for the DuPont analysis, where Motorola again stands out as being deficient in its ability to generate profits from its sales.

Table 3: The DuPont Analysis of Motorola and Industries

	Motorola	Semiconductor Industry	Telecommunication Equipment Industry
ROE (Return on Equity)	-22.11%	-2.78%	-3.14%
=	=	=	=
NPM (Net Profit Margin)	-9.31%	-3.00%	-1.24%
X	X	X	X
TAT (Total Asset Turnover)	0.86	0.61	0.90
X	X	X	X
A/E (Assets/Equity)	2.77	1.52	2.82

Figure 1: ROA Analysis for Motorola - 2002

Figure 1 shows the Return on Asset (ROA) portion of the DuPont analysis

$$ROE = NPM * TAT * A/E = ROA * A/E \quad (1)$$

and helps to illustrate Motorola's situation. Large variable and fixed expenses (relative to the level of sales) are negatively impacting ROA, and these expenses, especially variable expenses (selling, general, and administrative expenses) since they are perceived to be more easily controllable, need to be closely evaluated. Increases in sales

revenues may also help the ROA situation. Although poor overall market conditions can be blamed for a portion of Motorola's low sales figure, Motorola also needs to critically evaluate why it has lost market share in some of its key business areas over the last several years (for example, Nokia's and Samsungs market share in wireless handsets has improved while Motorola's has declined) making the operating results from poor market conditions even worse. The impact of Motorola's decision early in the lifecycle of the cellular industry not to participate in developing digital cellular technology likely opened the door for firms such as Nokia to gain significant market positions, and Motorola's sales – and its financial position - still suffer from this decision. New product development investments must be closely evaluated to assure that Motorola is developing products that will be valued in the marketplace. However, competitors will not simply let Motorola gain sales and market share at their expense. Nokia capitalized on Motorola's incorrect earlier strategic decision to forego entry in the digital wireless handset arena. Nokia gained a dominant position in Europe and is now clearly aiming to challenge Motorola's leadership in CDMA wireless handset technology in the United States through the introduction of multiple new handset models based on the CDMA technology prevalent in America (*Nokia Unveils New Phones to Crack CDMA).* Motorola and Nokia are also losing share in foreign markets, such as China, because domestic firms in those markets use price advantages to drive sales (*Nokia, Motorola Lose China Market Share to Domestic Companies*). Motorola must develop a product and business strategy to increase sales in the midst of these threats, while at the same time controlling variable and fixed expenses.

Short Term Liquidity Management

As shown in Table 4, the telecommunication equipment industry averages a current ratio of 1.52 and a quick ratio of 1.23, so Motorola's current ratio and quick ratio of 1.77 and 1.47, respectively, compares favorably to the industry. This, combined with the observation that both ratios are above one, leads to the conclusion that Motorola is in a solid short-term liquidity position. While this favorable absolute liquidity position is important, perhaps just as important to debt investors in Motorola is the trend over time in the ratios. In Motorola's case, there have been very solid improvements in its liquidity position since 1999 and 2000. Some of this improvement in liquidity comes from reductions in notes payable and the current portion of long-term debt. But a significant portion of the improvement is attributable to large increases in cash and cash equivalents. The cash and cash equivalent balance increased 97% percent during period. In addition to the cash increases seen above. Motorola has very recently taken additional steps to "further boost" its cash position by selling $325M of Nextel stock (*Motorola Sells $325M of Nextel Stock*). This sale of 25 million of Motorola's 108 million Nextel shares was completed "to realize the price appreciation of some of its investment in the wireless communications services provider and to enhance its already strong cash position" (*Motorola Completes Sale of 25 Million of Its 108 Million Shares of Nextel*). After the sale, Motorola will remain one of Nextel's largest shareholders, retaining over a 9% stake in Nextel (*Motorola Sells $325M of Nextel Stock*).

Table 4: Short-term Liquidity Analysis

	2002	2001	2000	1999
Cash and cash equivalents	6,507	6,082	3,301	3,537
Short-term investments	59	80	354	699
Accounts receivable, net	4,437	4,583	7,092	5,627
Inventories, net	2,869	2,756	5,242	3,707
Other current assets	3,262	3,648	3,896	4,015
Total current assets	**17,134**	**17,149**	**19,885**	**17,585**
Notes payable & current portion of long-term debt	1,524	870	6,391	2,504
Accounts payable	2,268	2,434	3,492	3,285
Accrued liabilities	5,913	6,394	6,374	7,117
Total current liabilities	**9,705**	**9,698**	**16,257**	**12,906**
Current Ratio	**1.77**	**1.77**	**1.22**	**1.36**
Quick Ratio	**1.47**	**1.48**	**0.90**	**1.08**
Net Working Capital	**7,429**	**7,451**	**3,628**	**4,679**

Capital Structure & Debt Management

From Table 5, it is evident that there has been a significant change in Motorola's capital structure over the last several years. When viewed from either a book value or market value basis, there is a significant increase in leverage. Motorola's long-term debt increased by more than 85% from 2000 to 2001, while equity dropped on both a book value and market value basis. From the data, it does not appear that Motorola has a strict or a tight target debt-equity ratio that they maintain to balance the benefits of debt (primarily, the tax savings due to interest) with the cost of debt (primarily, financial distress costs), unlike many large firms (Graham and Harvey, 2001). It is unclear whether Motorola has a strategy to minimize their weighted average cost of capital.

Table 5: Financial Leverage Analysis for Motorola

	2002	**2001**	**2000**	**1999**
Long Term Debt, Book Value ($M)	7,779	8,857	4,778	3,573
Long Term Debt, Market Value ($M)	7,722	8,857	4,778	3,573
Stockholders Equity, Book Value ($M)	11,239	13,691	18,612	18,693
# Shares (M)	2,301	2,213	2,257	2,202
Share Price ($)	8.01	16.05	19.59	44.72
Stockholders Equity, Market Value ($M)	18,431	35,523	44,207	98,473
Debt/Equity (Book Value)	**0.69**	**0.65**	**0.26**	**0.19**
Debt/Equity (Market Value)	**0.42**	**0.25**	**0.11**	**0.04**

Note: 2001, 2000, 1999 market value of debt is assumed to be the same as book value of debt.

Some of the increase in long-term debt from 2000 to 2001 was used to replace short-term debt (Motorola 2001 Proxy Statement). However, we observed earlier that cash balances increased significantly in the same time period, indicating that some of the long-term financing was used to improve the short-term liquidity position. But these improvements in the short-term liquidity position came at the expense of an increase in operating risk. The increased leverage committed the company to increase interest payments to service the long-term debt. Interest payments increased from $529M to $844M from 2000 to 2001, increasing Motorola's losses in 2001 as economic and market conditions worsened (Motorola 2001 Proxy Statement). The significant amount of debt added in 2001 could also impact Motorola's ability to acquire long-term debt at favorable rates in the future. If funds are needed beyond what are available internally, Motorola may have no choice but to turn to the equity market, which is generally considered to be unfavorable at this point in time. The increase in long-term debt may, in part, support the free cash flow hypothesis, which asserts that bad investment decisions are often made in the presence of a large amount of free cash flow.

While we have examined Motorola's capital structure from an absolute perspective, it is worthwhile to look at the capital structure relative to the industry segment that Motorola primarily participates in - the telecommunications equipment industry. Company-wide financial structure data are shown in Table 6.

Table 6: Financial Leverage Analysis for Industry

	Industry
Long Term Debt, Book Value ($M)	56,347
Stockholders Equity, Book Value ($M)	119,349
Stockholders Equity, Market Value ($M)	270,389
Debt/Equity (Book Value)	**0.47**
Debt/Equity (Market Value)	**0.21**

In Table 5, Motorola's debt-equity ratio, on a book value basis, is 0.69, which is higher than the industry average of 0.42, from in Table 6 and Motorola's debt-equity ratio on a market value basis is 0.47, double the industry average of 0.21. So, Motorola has not only increased its leverage, it has increased its leverage well above the industry average leverage ratio. Is this bad in the sense that the higher leverage level is detracting from firm value? We believe that this question is difficult to answer with information from publicly available sources. The

appropriate amount of leverage is unique to each firm based on the firm balancing the tax benefits of increased debt against the financial distress costs associated with increased debt. However, the deviation from the industry average leverage ratio should be closely examined as, on average, other firms in similar business situations see the appropriate balance between the tax shelter benefit and distress costs at much lower levels of leverage.

SUMMARY AND CONCLUSIONS

In this paper, we demonstrate that financial ratio analysis using data for an actual company – Motorola - and industry - telecommunications and semiconductor - is complicated and is further complicated for companies that do not readily fall into a single industry. Motorola has six operating units that fall into several industries with two industries accounting for most of the sales – telecommunications and semi-conductor. The differences in the industry characteristics of these two industries complicate the financial ratio analysis of Motorola. However, a more relevant picture of the operating characteristics of Motorola is achieved by increasing the complexity of the analysis; that is, by comparing Motorola to both industries.

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REFERENCES

1. Brigham, Eugene F. and Joel F. Houston. *Fundamentals of Financial Management*, Ninth Edition, Harcourt College Publishers, Fort Worth, 2001.
2. Graham, John R. and Campbell R. Harvey. "The Theory and Practice of Corporate Finance: Evidence from the Field," *Journal of Financial Economics*, 60, 2001, pp. 187-243.
3. *Motorola Completes Sale of 25 Million of Its 108 Million Shares of Nextel*, retrieved from http://biz.yahoo.com/prnews/030304/cgtu025_1.html
4. *Motorola Sells $325M of Nextel Stock*, retrieve from http//biz.yahoo.com/ap/030305/Motorola_Nextel_1.html
5. *Nokia Unveils New Phones to Crack CDMA Market*, retrieved from http://biz.yahoo.com/rc/030317_tech_nokia_handsets_2.html
6. *Nokia, Motorola Lose China Market Share to Domestic Companies*, retrieved from http://biz.yahoo.com/djus/030314/0020000011_1.html
7. Reiter, Chris. *Mobile Phone Sales Rose 6% to 423 Million Units Last Year*, Dow Jones Business New, retrieved from http://biz.yahoo.com/djus/030309/2037000327_3.html
8. Yahoo.finance.com
9. Yahoo.marketguide.com

APPENDIX A
Motorola
Segment Sales and Earnings

	2002				2001				
Segment	**Sales**	**%Sales**	**OE**	**OM**	**Sales**	**%Sales**	**OE**	**%OE**	**d(Sales)**
PCS	10847	37.8%	804	7.4%	10436	33.2%	-318	-3.0%	3.9%
SPS	4818	16.8%	-283	-5.9%	4936	15.7%	-1000	-20.3%	-2.4%
GTSS	4540	15.8%	-11	-0.2%	6442	20.5%	32	0.5%	-29.5%
CGISS	3729	13.0%	361	9.7%	3850	12.3%	350	9.1%	-3.1%
BCS	2087	7.3%	257	12.3%	2854	9.1%	450	15.8%	-26.9%
IESS	2189	7.6%	115	5.3%	2239	7.1%	-12	-0.5%	-2.2%
OPS	486	1.7%	-267	-54.9%	658	2.1%	-212	-32.2%	-26.1%
Total	28696	100.0%	976		31415	100.0%	-710		-8.7%

OE	**Operating Earnings**
OM	**Operating Margin**
PCS	Personal Communications Segment
SPS	Semiconductor Products Segment
GTSS	Global Telecom Solutions Segment
CGISS	Commercial, Government, and Industrial Solutions Segment
BCS	Broadband Communications Segment
IESS	Integrated Electronic Systems Segment
OPS	Other Products Segment

APPENDIX B
Motorola
Telecommunications Industry

	Alcatel ALA	**Cisco CSCO**	**Ericcson-Sony EDICY**	**Lucent Lucent**	**NEC NIPNY**	**Nortel Networks NT**	**Nokia NOK**	**Qualcomm QCOM**	**Siemens**	**Motorloa MOT**	**Tele Comm Industry**
Assets											
Accts Receivable	14956	1105	2923	1647	7737	2923	6143	925	16358	4437	59154
Inventory	4681	880	6741	1363	5366	1579	1920	88	11462	2869	36950
Current Assets	24650	17433	22926	7629	19854	11762	16664	4384	47325	17134	189760
Net Fixed Assets	4202	4102	1887	3503	9206	2571	2700	686	12612	6104	47573
Total Assets	36549	37795	29345	17791	41365	21137	24088	6510	83711	31152	329443
Liabilities											
Current Liabilities	15547	8375	10754	6326	16148	9611	10275	675	37283	9705	124698
Long Term Debt	5879	0	6118	4986	15013	4094	304	94	11002	8857	56347
Total Liabilities	26700	9124	20882	20845	29451	15676	11015	1073	57867	19913	212546
Shareholder Equity	9849	28671	8464	-3054	11914	5461	13074	5437	25844	11239	116897
L&SE	36549	37795	29345	17791	41365	21137	24088	6510	83711	31152	329443
Revenues	25353	18915	27208	12321	42109	17511	33501	3040	90238	26679	296874
COGS	19074	6902	20408	10769	32287	14167	21252	1137	65314	17938	209248
Gross Profit	6279	12013	6799	1552	9822	3344	12249	1902	24925	8741	87626
Interest			679	382	2060	311	167	26	101	356	4081
Taxes	-1261		-1034	4757	-1231	-3252	1280	101	912	-961	-689
Net Income	-4963		-2495	11753	-2576	-8414	2363	360	2789	-2485	-3668
Price	7	13	6	2	3	2	13	34	39	8	
Shares Outstanding (M)	1260	7110	1660	3910	1650	3850	4790	789	888	2301	
Market Capitalization	8253	92501	6100	6100	5726	7970	60689	27012	34329	18431	270389

APPENDIX C
Motorola
Semi-Conductor Industry Data

	Advance Micro AMD	Analog Devices ADI	Atmel ATML	Fairchild FCS	Intel INTC	Maxim MXIM	Micron MU	National Semi	NVIDIA NVDA	ST Micro STM	Staiwan Semi TSM	Texas Inst Instrument TXN	XILINK XLNX	Motorola MOT MOT	Semi Conductor Industry
Assets															
Accts Receivable	660	218	187	134	2607	130	538	132	147	902	571	1198	148	4437	12008
Inventory	381	247	302	209	2253	139	545	145	214	743	281	751	79	2869	9157
Current Assets	2353	3435	1189	875	17633	1236	2119	1073	1234	4558	2024	5775	999	17134	61636
Net Fixed Assets	2739	908	1652	660	18121	746	4700	737	120	5888	7183	5589	450	6104	55596
Total Assets	5647	4885	3024	2149	44395	2011	7555	2289	1503	10798	11262	15779	2335	31152	144784
Liabilities															
Current Liabilities	1314	528	735	199	6570	229	753	404	434	1687	953	1580	196	9705	25286
Total Liabilities	2092	2042	1538	1341	8565	270	1189	508	739	4687	2617	3900	432	19913	49831
Shareholder Equity	3555	2843	1487	808	35830	1741	6367	1781	764	6111	8645	11879	1904	11239	94953
L&SE	5647	4885	3024	2149	44395	2011	7555	2289	1503	10798	11262	15779	2335	31152	144784
Revenues	3892	2277	1472	1408	26539	1025	2589	1495	1370	6357	3675	8201	1016	26679	87993
COGS	2590	1008	1058	1054	13487	312	2700	941	850	4047	2636	5824	558	17938	55003
Gross Profit	1302	1269	415	354	13052	713	-111	553	519	2310	1039	2377	458	8741	32991
Interest	61	63	57	104			17		16	13	90	61	0	356	838
Taxes	-15	151	-113	-22	892	128	-92	-2	76	61	-107	-225	-79	-961	-308
Net Income	-61	356	-418	-42	1291	259	-907	-122	177	257	-628	-201	-114	-2485	-2637
Price	4.94	23.4	2.01	10.55	15.43	30.75	8.16	13	10.03	17.65		15.46	18.76	8.01	