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2003 SECURITIES INDUSTRY PERFORMANCE AND 2004 OUTLOOK

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VALUE-AT-RISK BACK IN THE HEADLINES

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- 12 **Value-at-Risk Back in the Headlines**, by Kyle L Brandon. Value-at-Risk (VaR) is once again a hot topic following the recent release of financial statements by several securities firms for the quarter ended February 29, 2004, which included exceptionally high trading gains. As is often the case, the meaning and reasonable uses for VaR have been glossed over in the media. Considering the importance of VaR as a risk management tool and its growing use in the calculation of regulatory capital requirements, it seems timely to provide a brief recap of VaR, and what it can and cannot tell us about risk. This piece also serves as an introduction to SIA's forthcoming review of risk disclosures in the annual reports of a select group of major global financial institutions, due out later in 2004.

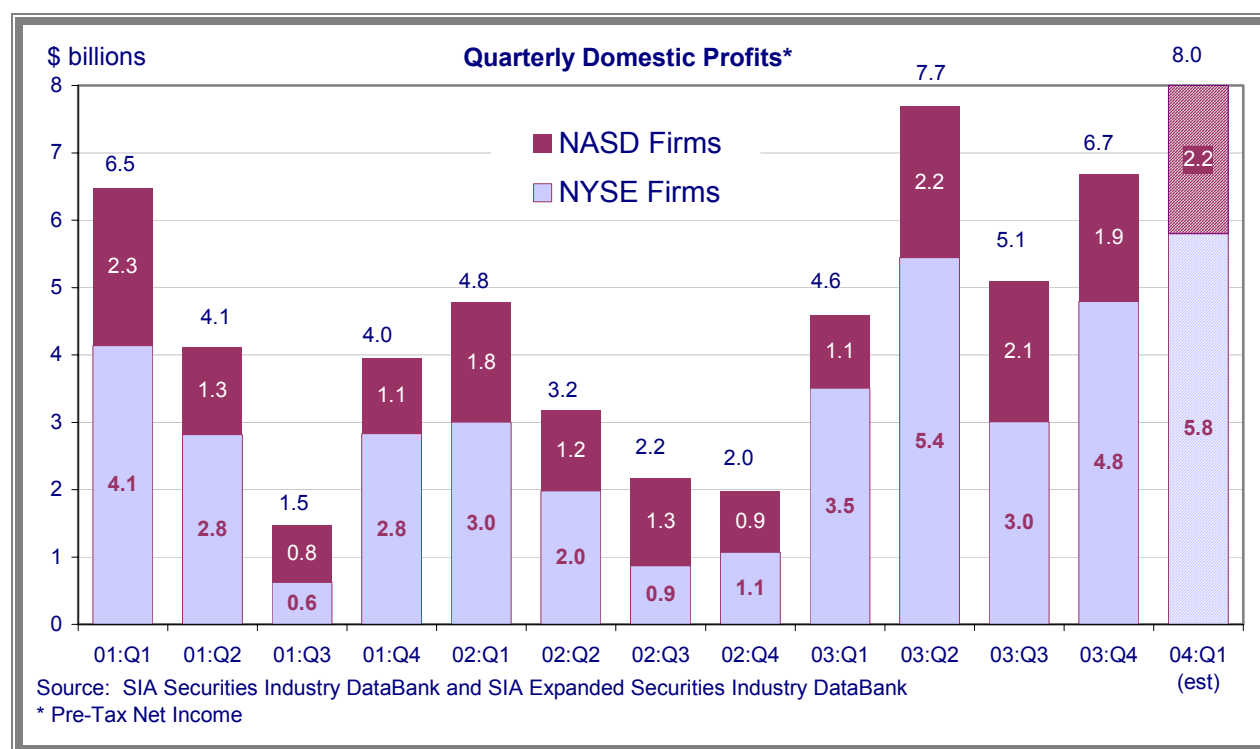
2003 SECURITIES INDUSTRY PERFORMANCE AND 2004 OUTLOOK

Summary: Broad-based, Robust Recovery Extends into 2004

4Q'03 securities industry profits of \$6.69 billion exceeded expectations and boosted full-year 2003 results to \$24.05 billion, nearly double the \$12.09 billion result achieved in 2002.¹ After a three-year downturn, industry revenue growth resumed in 2003 and by year-end had become more robust and broad-based, spreading to virtually every product and service line. The improved results eased the pressure on securities firms to cut costs further after trimming non-interest expense 15.6% over the past three years. 1Q'04 results are estimated to show continued improvement that is expected to extend throughout 2004. The brighter outlook for 2004 is visible in a resumption of job growth in the securities industry² and total employment is expected to rise 3% this year as profits are forecast to reach, if not exceed, \$28.4 billion.

4Q 2003 Results: Securities Industry Reports Profits of \$6.7 Billion

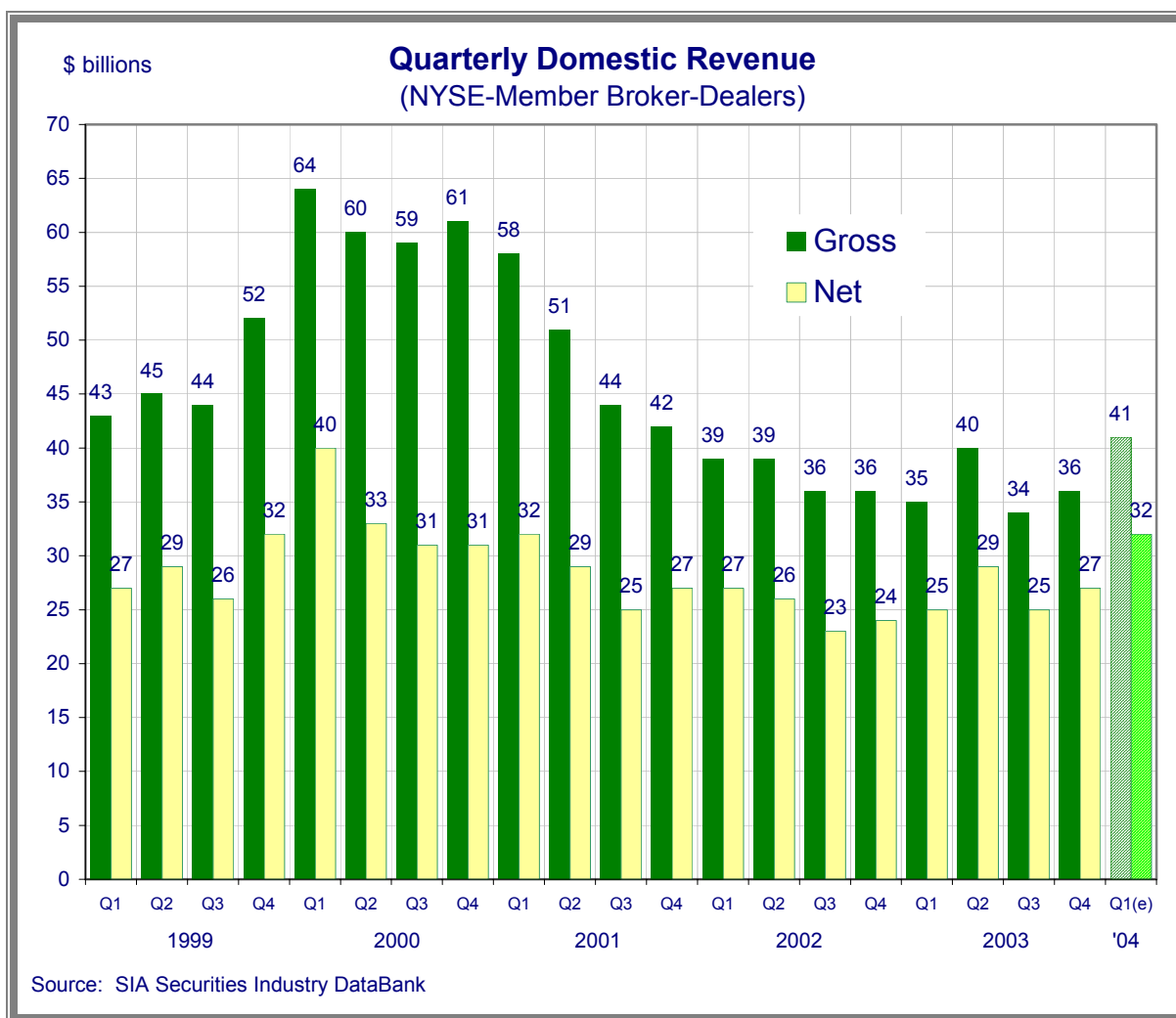
As March 2004 came to a close, 4Q 2003 financial results were reported for both NYSE-reporting and NASD-reporting member firms. The combined total showed that, for all broker-dealers doing a public business in the U.S., profits (**pre-tax net income**) reached \$6.69 billion in 4Q'03, exceeding most analysts' expectations. These results were 31.4% above the \$5.09 billion recorded in 3Q'03, and a whopping 239.4% increase over the \$1.79 billion profit reported in the final quarter 2002. This is the second-best quarterly performance (after the \$7.69 billion result in 2Q'03) the industry has seen in the past 3½ years (since 2Q'00).



¹ The financial results discussed in this piece are for the U.S. securities industry as reported by NYSE-reporting and NASD-reporting member firms, unless otherwise noted. Some totals may not appear to match due to rounding.

² See "Securities Industry Employment: Latest Revisions Restore Job Trends Seen in the Labor Department's Old Classification System," SIA's *Securities Industry Trends*, March 17, 2004.

Fourth-quarter profits increased from third-quarter levels as revenue growth, which had resumed earlier in the year in certain sectors, became more broadly based and more robust. This was distinct from the improvements in profitability seen in previous quarters that had been achieved principally through cost cutting. **Total revenue** of \$54.92 billion in 4Q'03 was 5.8% above results for the same year-earlier period and 7.6% above 3Q'03 levels. **Net revenue** (total revenue net of interest payments) of \$44.62 billion was 14.7% above results for the same year-earlier period and 8.8% above the \$40.99 billion recorded in 3Q'03.



The industry's recovery became more generalized across the course of 2003, and by 4Q'03 most product and service lines showed solid, and in some cases exceptional, growth. **Trading gains**, in particular debt trading gains, continued to be a substantial contributor to overall profitability growth. Total trading gains reached \$6.85 billion for 4Q'03, which was 16.8% above the \$5.87 billion in trading gains recorded in 3Q'03, and 16.3% above the result in 4Q'02. Once again debt trading gains accounted for virtually all the improvement in total trading gains over 3Q'03. Debt trading gains were \$4.20 billion in 4Q'03, up 31.9% from the \$3.19 billion registered in 3Q'03, and 8.9% above results for this activity in 4Q'02. Gains from all other types of trading, including principally derivatives and equities, declined fractionally (1.3%) with respect to 3Q'03, but were significantly higher (up 30.3%) when compared to 4Q'02.

Commissions and fee income, whose level is largely a reflection of the volume of secondary market trading, reached \$12.23 billion in 4Q'03. This represented a 5.2% increase over the

\$11.63 billion recorded in 3Q'03, and a 9.4% increase over 4Q'02 results. **Underwriting revenue** continued its positive contribution to overall profitability growth, again led by solid results in bond issuance activity, while aided by a continuing recovery in equity issuance activity from the extremely depressed levels seen in recent years. Total underwriting revenue reached \$4.66 billion in 4Q'03. This was 15.2% above the \$4.05 billion earned during 3Q'03 and 36.3% above the \$3.42 billion in underwriting revenue earned in 4Q'02. Bond issuance activity continued to provide most of the support for growth. Equity underwriting revenue reached \$1 billion in 4Q'03, which although 39.4% above the \$718 million earned from stock issuance activities in 4Q'02, was only 3.8% above results in this sector during 3Q'03.

Mutual fund sales revenue jumped to \$4.62 billion, which was 13.2% above 3Q'03 levels and 25.4% over results in 4Q'02. The resumption of strong net inflows into equity mutual funds drove these positive results, capturing both new investor interest and continuing outflows from both money market mutual funds and, to a lesser extent, from bond funds. Income derived from **asset management fees** also moved higher in 4Q'03 to reach \$4.92 billion. This result was up 10% from 3Q'03 levels and 15.6% from 4Q'02. Higher net assets under management, reflecting both the stock market rebound and net new inflows, accounted for the increase and more than offset a continued, albeit gradual, reduction in average rates charged by asset managers. **Margin interest** earnings rose to \$1.33 billion in 4Q'03. While this result was 3.2% above 3Q'03 levels, it was 5.8% below earnings from these activities during 4Q'02.

Total expenses of \$48.23 billion were 5.0% above 3Q'03 levels but still 3.4% below total spending in 4Q'02. All major expense line items increased from 3Q'03 levels. Total **compensation** reached \$19.06 billion, which was 0.9% above 3Q'03 and 15.5% over 4Q'02, largely reflecting increases in variable compensation in the form of both higher bonuses and larger variable production payouts. Interest expense increased 2.6% relative to 3Q'03 levels to reach \$10.31 billion, as margin utilization and securities lending volume increased. Despite this small increase, total interest expense was still 20.8% below year-earlier levels, and only one-third of total borrowing costs recorded in 1Q'01, when total interest expense reached \$30.96 billion, as interest rates remained at or near 45-year lows.

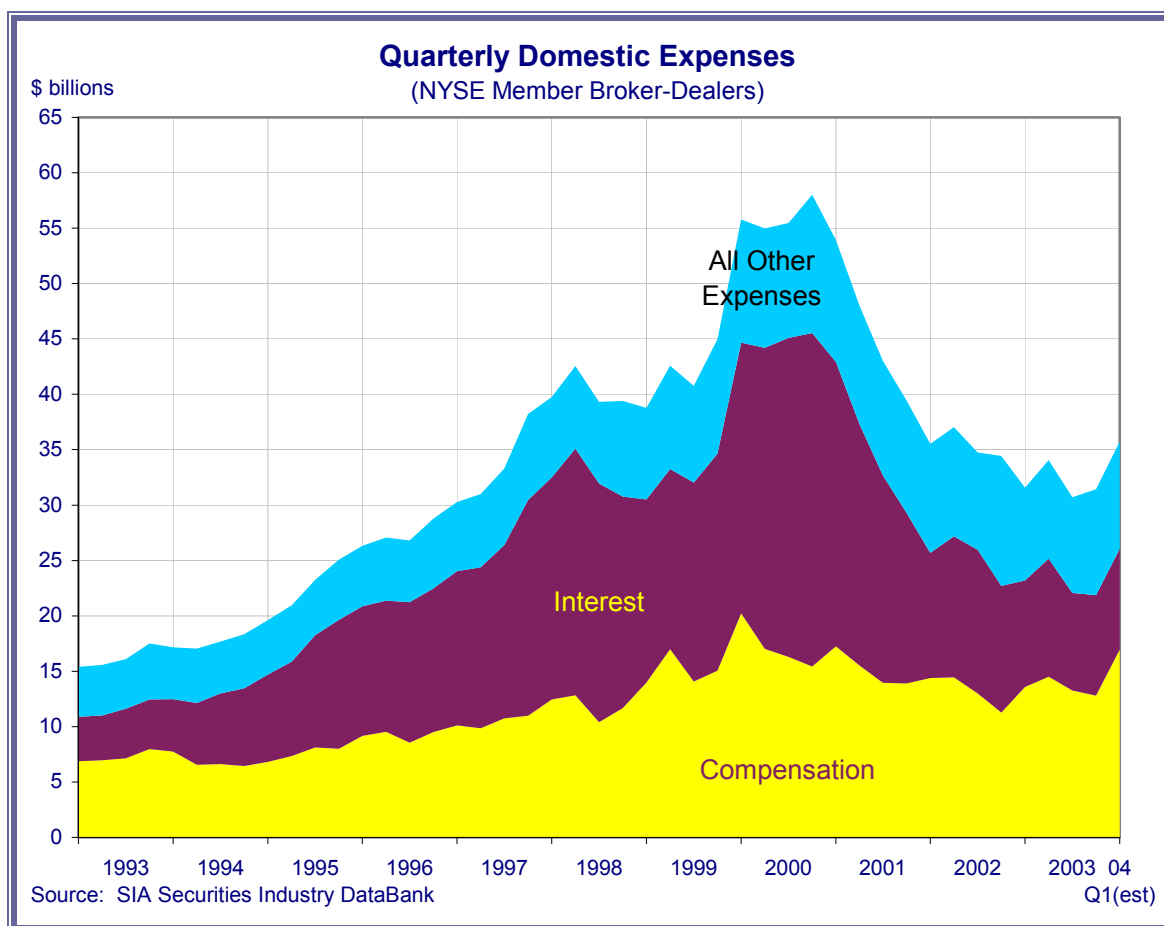
2003 Annual Results: Industry Profits Double, As Growth in Net Revenue Resumes and Interest and Non-Compensation Costs Continue to Decline

Securities industry profits (pre-tax net income) reached \$24.05 billion for 2003, nearly twice (an increase of 98.9%) the \$12.09 billion recorded in 2002, and well above the \$16.02 billion earned in 2001. While still 23.8% below the record \$31.57 billion earned in 2000, profits last year were only 5.1% below the \$25.34 billion registered in 1999, leaving 2003 as the third most profitable year in industry history.

On an annual basis, **total gross revenue** of \$212.73 billion last year was 1.4% below 2002's \$215.73 billion. Last year's gross revenue was 22.1% below 2001's \$273.17 billion results and 35.8% below 2000's record of \$331.10 billion. **Net revenue** of \$169.45 billion last year was 6.6% above 2002's \$158.99 billion, reflecting a 23.7% reduction in the industry's gross interest costs. Last year's net revenue stood 2.8% below 2001's \$174.34 billion result, and 16.9% below 2000's record of \$203.89 billion.

Total expenses in 2003 of \$188.67 billion were down 7.3% from 2002, and 37.0% below the record level of \$299.53 billion in 2000. Although expenses were cut across-the-board, the bulk of the reduction achieved in each of the last three years came on interest expense, which fell by

66.0% to \$43.27 billion in 2003 from \$127.21 billion in 2000. **Non-interest expenses** of \$145.40 billion in 2003 was 1.0% below 2002 levels, but 15.6% below the 2000's peak level of \$172.32 billion. **Compensation** (which is the single largest cost item, currently accounting for 40.7% of total expenses and 52.8% of non-interest expense) increased in 2003 after two years of declines. Total compensation reached \$76.73 billion, a 3.5% increase over 2002 levels, but still 16.6% below the peak levels recorded in 2000. All **other expenses** (other than compensation and interest costs) continued to contract, declining 5.6% from 2002 levels, as communications, occupancy, equipment, promotional and data processing costs were cut further.



Revenue performance of individual product and service lines varied significantly last year. Commissions and fee income, which (along with commodities revenue) was the only service line that grew in 2002 (albeit a modest 1.0%), increased 1.3% to \$45.06 billion last year. This modest growth in commission revenues, which largely reflects the level of activity in secondary markets, was somewhat surprising given that the growth in the volume of program trading (which generates less revenue per trade than traditional trading) in both years outpaced the growth in overall trading volume, and that commission rates in general continued to fall. While commission revenues generated by trading in exchange-listed equities declined 9.1% last year to \$19.16 billion, all other commission revenues rose.

Trading gains totaled \$30.74 billion in 2003, a 60.4% increase over 2002 levels, but still 4.8% below 2001 levels and only about half of the record \$60.72 billion in trading revenues recorded in 2000. Gains from debt trading rose 24.3% and accounted for \$19.74 billion or 64.2% of total trading gains last year. Gains from OTC equity and listed options market making fell, while gains

from all other trading activity jumped to \$10.06 billion last year from \$2.11 billion in 2002 and \$8.94 billion in 2001.

Total underwriting revenue rose to \$17.20 billion in 2003, up 16.9% from \$14.71 billion in 2002. Last year's result was above the \$17.02 billion of underwriting revenue earned in 2001, but still below the two highest annual totals: \$18.72 billion in 2000 and \$17.78 billion in 1999. Last year's strong results reflected a record year in bond issuance activity and the gradual, ongoing recovery in equity underwriting. Equity underwriting revenue reached \$3.72 billion last year, up 14.7% from the \$3.24 billion recorded in 2002.

Margin interest revenue continued to slump last year, reflecting the decline in interest rates to 45-year lows and, to a significantly lesser extent, less customer use of margin lending. Margin interest revenue fell to \$5.23 billion last year, 19.2% below the \$6.48 billion in revenue registered in 2002 and 62.1% below the \$13.79 billion recorded in 2001.

Mutual fund sales revenues increased a modest 2.3% to \$16.20 billion last year, from \$15.83 billion in 2002, but remained 2.7% below the \$16.65 billion result recorded in 2001. Despite strong net inflows into mutual funds and higher asset values on which fees are calculated (reflecting the solid equity market rally across the final nine months of 2003), **asset management fees** declined again last year, as the decades-long decline in rates earned by fund managers continued. **Asset management fees** declined 1.4% to \$17.94 billion last year, from \$18.19 billion in 2002, and were 5.7% below the \$19.03 billion collected in 2001.

1Q 2004: Preliminary Estimates Show Further Improvement Driven by Strong Trading Gains and Continued Recovery in Investment Banking Revenues

Based on primary and secondary market indicators and the results reported by those securities firms whose quarter ended on February 29, 2004, SIA estimates that total industry **profits** (pre-tax net income) reached \$8.0 billion in the first quarter of 2004. Of this total, NYSE-reporting member firms registered pre-tax net income of an estimated \$5.8 billion, 21.1% above their 4Q'03 bottom line, while NASD-reporting member firms are estimated to have recorded pre-tax profits of \$2.2 billion, a 15.9% improvement over the final three months of calendar 2003.

Trading gains (or, more properly, trading gains or losses) by large investment banks showed a substantial increase, and are estimated to have at least matched the \$10.65 billion recorded for the industry as a whole during 2Q'03. When all results are in for 1Q'04, total trading revenue could easily be higher than currently estimated and may well have matched, if not topped, the record level set in 1Q'00 for this principal revenue line.³ Trading gains, while difficult to predict, are anything but random. Most of the difficulty in estimating this income source arises because reported trading gains include revenue from a number of disparate activities, including gains from OTC equity market making, debt trading, market making in listed options, trading in all other products (principally other derivatives and foreign exchange), the effects of securities inventory revaluation and some profits generated from securities origination.

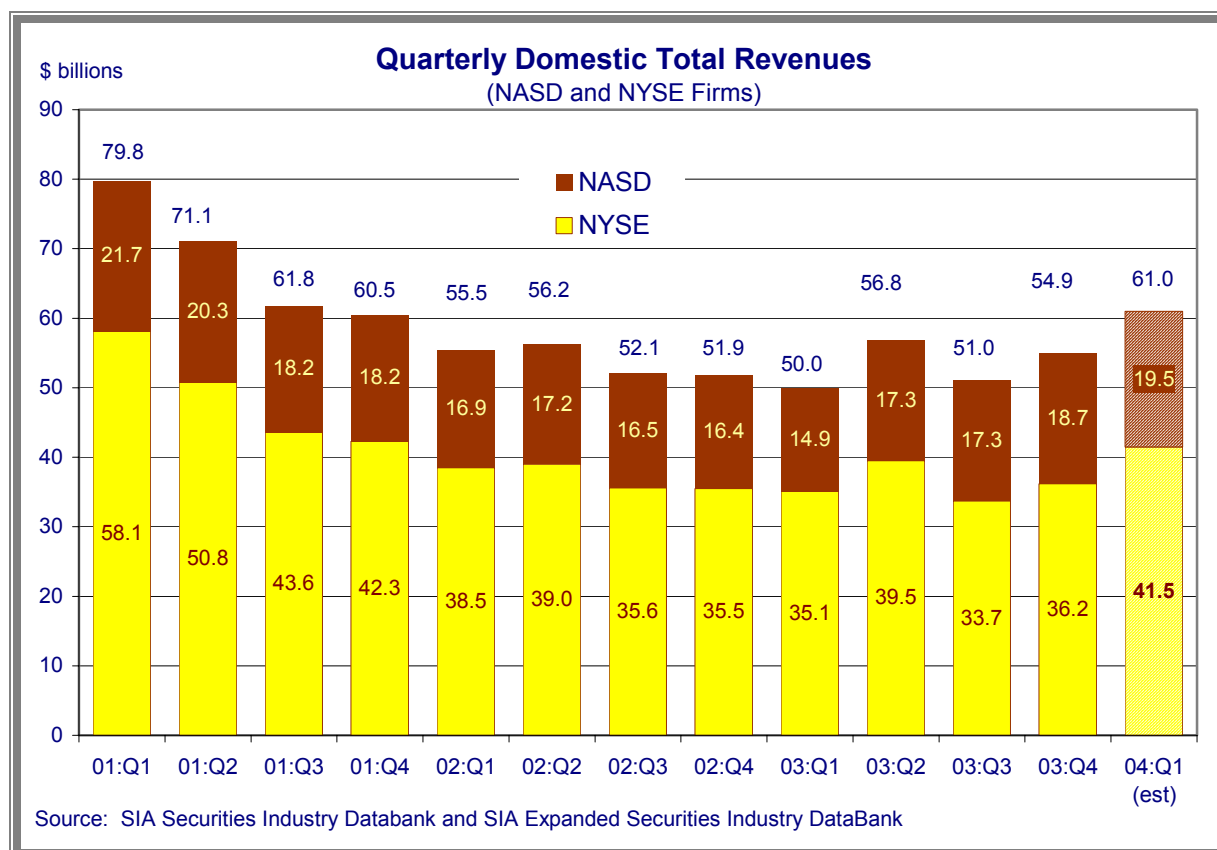
Market forces conspired to drive the size of trading gains higher over the past four quarters. At times when the markets have a strong, sustained move in one direction, as bond markets did in

³ See, for example, Michael Hecht, CFA, "Capital Markets Monthly Picture Book: Trading Revenues Surpass 2000 Peak Levels," Industry Overview, Brokers and Asset Managers, Bank of America Securities, Equity Research, April 1, 2004, where trading revenues for U.S. investment banks were estimated at \$14.4 billion in 1Q'04, or 9% above the prior peak reached in 1Q'00.

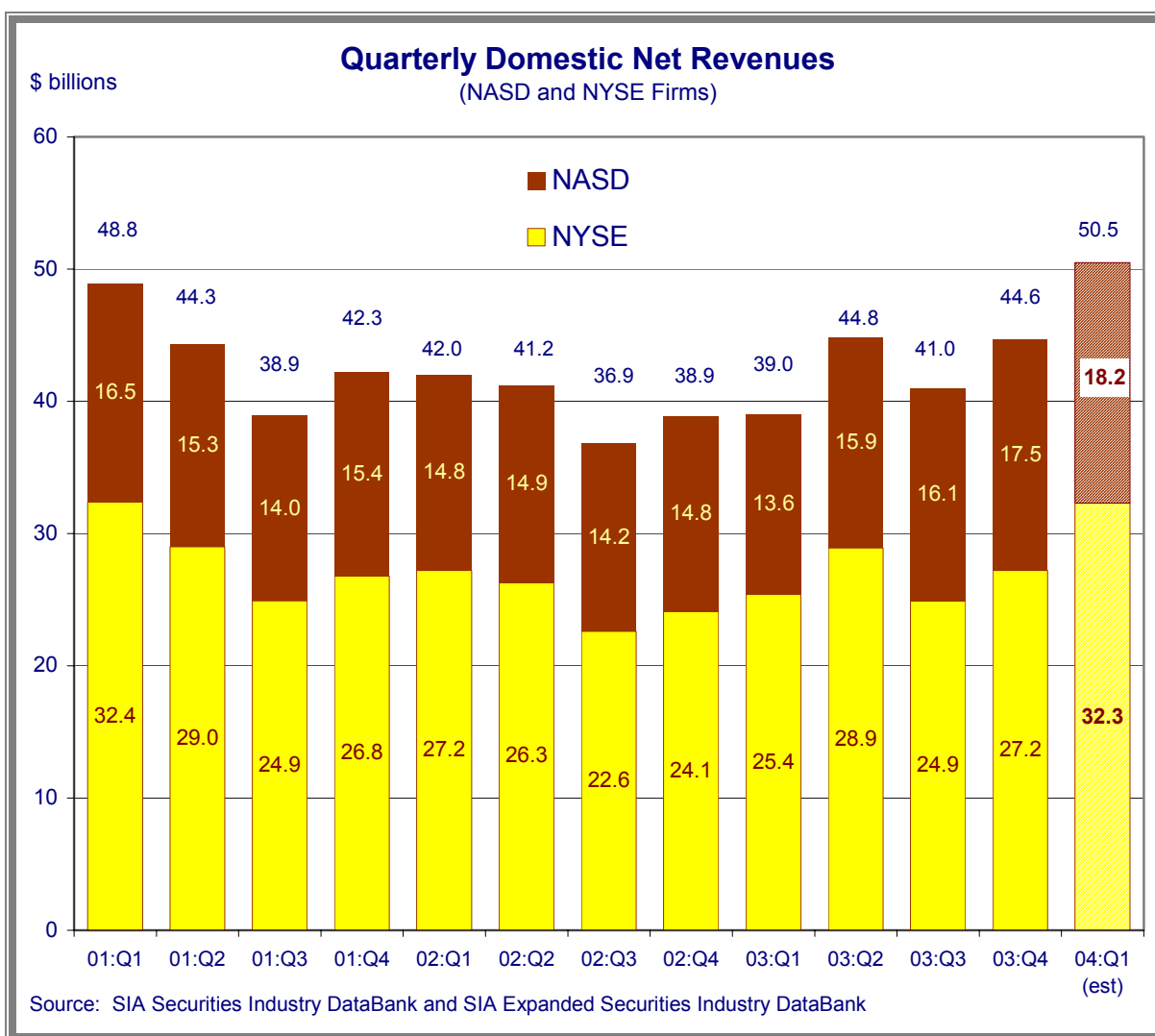
the first half of last year and equity markets did in their uninterrupted rally that began at end-March 2003 and extended until early March 2004, accommodating the flow generated by the expanding trading demands of their customers can provide a reliable source of revenue and an important contributor to overall growth in profitability. Improved valuation techniques and risk management systems employed by large investment banks also seem to confer an advantage in trading operations and contributed to a jump in trading profits in recent quarters.⁴

Underwriting revenue also made a solid contribution to 1Q'04 results, reaching an estimated \$5.3 billion, a 13.7% increase over 4Q'03 results. While underwriting revenues, both debt and equity, slipped in March, strong results in January and February were sufficient to extend the recovery of this business line off its cyclical lows reached in 2Q'03. A full pipeline as the current quarter opened suggests that equity and bond underwriting activity, and revenues, will continue to rise in 2Q'04. Similarly, **mergers and acquisitions** (M&A) activity showed solid growth in 1Q'04, although it is less advanced in recovering from the trough of its cycle and has a longer lag between the announcement of a deal and when revenues are booked. This, along with prospective deal flow, suggests even more robust growth in M&A revenues in the quarter now underway.

Commissions and fees also showed stronger growth, reaching \$13.5 billion, up an estimated 10.5% from 4Q'03 levels. This improvement largely reflected increased retail brokerage activity and the deployment of strong net inflows into equity mutual funds during 1Q'04. Strong net inflows and higher average net asset values helped boost both **mutual fund sales revenues** and **asset management fees**, where double digit increases from 4Q'03 levels are estimated.



⁴ For more detail see "Trading Gains" by Kyle Brandon and Frank Fernandez, in *SIA Research Reports*, Vol. IV, No. 11, December 8, 2003, and the following article on Value-at-Risk in this report.

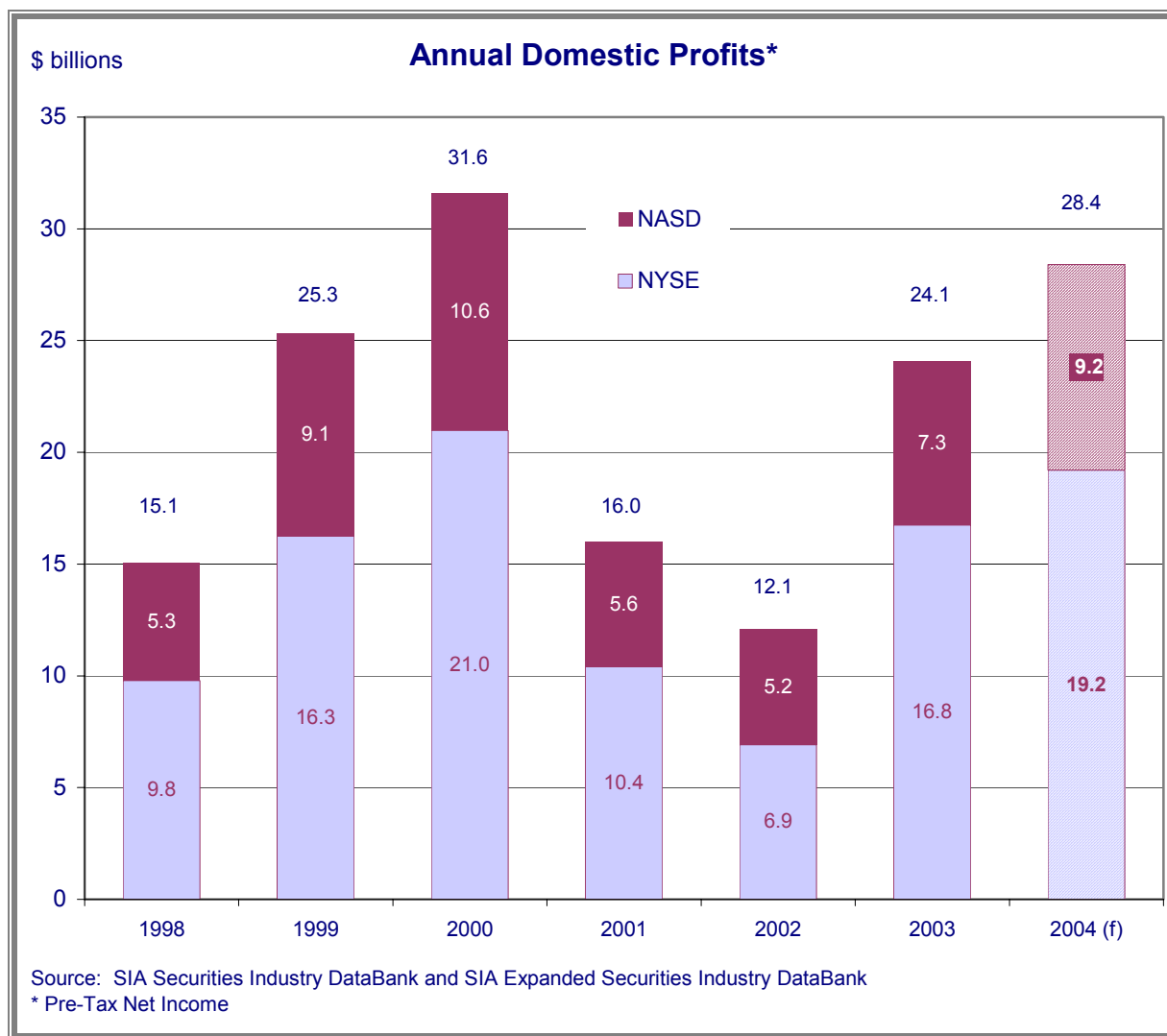


Total expenses also rose sharply in 1Q'04, mostly reflecting larger-than-anticipated annual bonus compensation. **Total compensation** is estimated to have increased at least 27% from the same year-earlier period. Most of the increase came from a jump in variable compensation, as fixed compensation increased an estimated 5%. Interest expense increased only slightly from 4Q'03 levels, while all other expense items showed growth in line with the growth in net revenues.

Full Year 2004: First Look Forward

Even though estimated results for 1Q'04 are based on partial data and hence are extremely preliminary, the overall direction of the industry thus far in 2004 is clear. Revenue growth is robust and although a significant decline in highly volatile sources of income, such as trading gains, is conservatively anticipated, earnings from other core activities are expected to be more sustainable. Interest rates, and hence interest expenses, are expected to remain stable across the course of the year. Compensation expenses are expected to grow, reflecting higher variable compensation and a 2.5% to 3.5% increase in total employment in the industry during 2004. All other expenses are expected to increase to accommodate higher activity levels, but the release of tight cost control measures will be slow in coming and these expense items are expected to rise in line with net revenue, but only with a lag. While forecasting full-year results this early in any

year, much less a year with as much potential volatility as this one, is likely to be a humbling experience, our best guess is that the industry will continue its gradual recovery from a three-year recession. Industry profits for full-year 2004 are expected to reach, if not exceed, \$28.4 billion, an 18.1% increase over the \$24.05 billion pre-tax net income figure recently reported for 2003.



Frank A. Fernandez

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NYSE and NASD Reporting Firms Income Statement
(\$ millions)

REVENUE	2002				2003				Percent Change 03:4Q vs.		% Chg. 2003 vs. 2002		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	03:3Q	02:4Q	2002	2003	2002
Commissions	11,148.7	11,329.3	10,817.8	11,175.1	9,728.1	11,473.6	11,629.8	12,229.2	5.2%	9.4%	44,470.8	45,060.7	1.3%
–Listed Equity on an Exchange	5,353.4	5,290.8	5,272.6	5,166.9	4,375.7	5,042.0	4,819.2	4,920.5	2.1%	-4.8%	21,083.6	19,157.4	-9.1%
–Listed Equity OTC	605.5	629.8	589.2	559.9	490.4	665.5	710.1	774.4	9.1%	38.3%	2,384.4	2,640.5	10.7%
–Listed Options	451.1	430.4	407.9	407.2	374.9	461.3	459.2	470.8	2.5%	15.6%	1,696.7	1,766.1	4.1%
–All Other	4,738.7	4,978.3	4,548.0	5,041.0	4,487.0	5,304.9	5,641.2	6,063.5	7.5%	20.3%	19,306.0	21,496.7	11.3%
Trading Gains (Losses)	7,422.1	3,468.7	2,379.6	5,892.9	7,367.9	10,646.3	5,871.1	6,854.8	16.8%	16.3%	19,163.3	30,740.1	60.4%
–OTC Market Making	566.1	327.6	238.9	257.8	236.6	477.9	226.3	113.0	-50.1%	-56.2%	1,390.5	1,053.7	-24.2%
–OTC Market Making in Listed Equity	33.0	-6.1	1.1	0.0	-2.5	-4.5	1.5	3.9	160.0%	NM	28.0	-1.6	-105.7%
–Debt Trading	4,523.8	4,319.5	3,177.6	3,858.4	5,843.9	6,506.9	3,186.1	4,203.7	31.9%	8.9%	15,879.3	19,740.6	24.3%
–Listed Options Market Making	-19.6	100.8	-70.2	-225.9	-188.4	71.4	-123.0	124.0	NM	NM	-214.9	-116.0	NM
–All Other Trading	2,351.8	-1,279.1	-966.7	2,002.5	1,475.8	3,590.2	2,581.7	2,414.0	-6.5%	20.5%	2,108.5	10,061.7	377.2%
Investment Account Gains (Losses)	444.8	-117.1	-52.0	829.9	244.4	1,479.7	579.9	716.4	23.5%	-13.7%	1,105.6	3,020.3	173.2%
–Realized	119.1	123.3	159.1	180.1	163.1	230.4	89.3	135.3	51.5%	-24.9%	581.6	618.1	6.3%
–Unrealized	140.9	-438.5	-256.5	321.3	-6.7	901.8	319.3	413.9	29.6%	28.8%	-232.8	1,628.4	NM
Underwriting	4,050.0	4,348.7	2,895.2	3,418.4	3,591.9	4,906.1	4,045.5	4,660.9	15.2%	36.3%	14,712.2	17,204.4	16.9%
–Equity Underwriting	1,005.2	894.0	623.2	717.7	660.6	1,090.3	963.9	1,000.5	3.8%	39.4%	3,240.2	3,715.3	14.7%
Margin Interest	1,793.9	1,734.6	1,540.6	1,408.8	1,290.2	1,329.1	1,285.0	1,326.7	3.2%	-5.8%	6,477.9	5,231.0	-19.2%
Mutual Fund Sale Revenue	4,198.0	4,247.2	3,699.6	3,685.2	3,568.6	3,927.0	4,080.6	4,621.2	13.2%	25.4%	15,830.1	16,197.4	2.3%
Fees, Asset Management	4,720.8	4,704.9	4,507.2	4,254.1	4,227.9	4,322.8	4,469.3	4,917.6	10.0%	15.6%	18,187.1	17,937.6	-1.4%
Research	35.9	64.1	26.5	31.8	33.1	40.2	41.7	57.0	36.7%	79.2%	158.3	172.0	8.7%
Commodities	421.0	3,146.8	3,156.1	-576.8	942.0	-2,095.2	245.5	-950.8	-487.3%	NM	6,147.1	-1,858.4	-130.2%
Other (Related to Securities Business)	15,065.0	17,035.1	16,868.2	15,179.4	12,940.4	14,673.8	12,843.1	13,837.4	7.7%	-8.8%	64,147.7	54,294.7	-15.4%
Other	6,182.4	6,260.6	6,272.1	6,610.7	6,050.9	6,077.6	5,945.8	6,652.0	11.9%	0.6%	25,325.7	24,726.3	-2.4%
TOTAL REVENUE	55,482.5	56,223.0	52,110.9	51,909.3	49,985.3	56,781.1	51,037.2	54,922.5	7.6%	5.8%	215,725.5	212,726.5	-1.4%
NET REVENUE	42,044.4	41,167.7	36,878.6	38,902.6	39,049.5	44,795.8	40,992.3	44,615.4	8.8%	14.7%	158,993.3	169,453.3	6.6%
EXPENSES	02:Q1	02:Q2	02:Q3	02:Q4	03:Q1	03:Q2	03:Q3	03:Q4	3Q03	4Q02	2002	2003	2002
Compensation	19,658.2	19,848.7	18,105.1	16,511.1	18,667.8	20,101.2	18,895.2	19,064.5	0.9%	15.5%	74,123.1	76,728.6	3.5%
–Registered Representative	7,259.8	7,353.7	6,788.2	6,355.1	6,695.0	7,406.9	7,317.4	7,301.8	-0.2%	14.9%	27,756.8	28,721.1	3.5%
–Clerical Employee	8,501.1	8,666.6	7,667.7	6,714.1	8,463.6	8,841.3	7,622.5	7,241.4	-5.0%	7.9%	31,549.6	32,168.8	2.0%
–Voting Officer	1,170.8	1,002.5	986.0	651.6	922.5	962.6	935.7	1,291.2	38.0%	98.2%	3,810.8	4,111.9	7.9%
–Other Employee (FOCUS IIA Only)	2,726.6	2,825.9	2,663.2	2,790.2	2,586.7	2,890.5	3,019.7	3,230.0	7.0%	15.8%	11,005.9	11,726.8	6.6%
Floor Costs	3,340.9	3,675.3	3,483.0	3,805.6	3,421.6	3,867.6	3,960.4	4,361.9	10.1%	14.6%	14,304.8	15,611.4	9.1%
–Floor Brokerage Paid to Brokers	363.8	367.6	390.7	385.0	318.7	335.2	333.0	341.8	2.6%	-11.2%	1,507.1	1,328.6	-11.8%
–Commissions/Clearance Paid Other Brokers	746.1	850.7	808.8	824.9	837.5	960.3	978.0	980.9	0.3%	18.9%	3,230.5	3,756.7	16.3%
–Clearance Paid to Non-Brokers	300.8	307.1	320.5	305.9	266.5	298.6	294.3	303.3	3.1%	-0.8%	1,234.4	1,162.6	-5.8%
–Commissions Paid Broker-Dealers (FOCUS IIA Only)	1,930.2	2,149.9	1,963.0	2,289.8	1,998.9	2,273.5	2,355.1	2,735.9	16.2%	19.5%	8,332.8	9,363.4	12.4%
Communications Expense	1,298.3	1,272.7	1,203.9	1,224.8	1,119.2	1,094.9	1,068.1	1,093.4	2.4%	-10.7%	4,999.8	4,375.6	-12.5%
Occupancy & Equipment Costs	1,837.3	1,783.8	1,769.7	1,869.2	1,694.7	1,664.2	1,685.9	1,748.2	3.7%	-6.5%	7,260.0	6,793.0	-6.4%
Promotional Costs	653.9	671.3	573.7	589.0	532.6	502.3	442.0	557.8	26.2%	-5.3%	2,487.9	2,034.7	-18.2%
Interest Expense	13,438.1	15,055.3	15,232.4	13,006.7	10,935.9	11,985.3	10,044.9	10,307.1	2.6%	-20.8%	56,732.5	43,273.2	-23.7%
Error Accounts & Bad Debts	117.2	115.1	130.2	149.3	11.0	117.2	106.6	120.8	13.3%	-19.1%	511.8	355.6	-30.5%
Data Processing Costs	809.9	882.8	773.5	809.1	662.5	784.8	738.8	849.2	14.9%	5.0%	3,275.2	3,035.3	-7.3%
Regulatory Fees & Expenses	284.1	322.2	289.2	310.5	280.9	331.1	339.2	345.5	1.9%	11.3%	1,206.0	1,296.8	7.5%
Non-Recurring Charges	37.4	635.2	-68.7	123.6	77.5	23.2	69.4	103.7	49.4%	-16.1%	727.5	273.9	-62.4%
Other Expenses	9,228.3	8,788.4	8,448.5	11,539.6	7,991.8	8,622.6	8,597.4	9,682.0	12.6%	-16.1%	38,004.8	34,893.8	-8.2%
TOTAL EXPENSES	50,703.6	53,050.8	49,940.6	49,938.5	45,395.5	49,094.4	45,948.0	48,234.0	5.0%	-3.4%	203,633.5	188,671.9	-7.3%
PROFITS (PRE-TAX NET INCOME)	4,778.9	3,172.2	2,170.3	1,970.8	4,589.8	7,686.7	5,089.2	6,688.5	31.4%	239.4%	12,092.3	24,054.2	98.9%

VALUE-AT-RISK BACK IN THE HEADLINES

*Value-at-Risk (VaR)*¹ is once again a hot topic following the recent release of financial statements by several securities firms for the quarter ended February 29, 2004, which included exceptionally high trading gains. As is often the case, the meaning and reasonable uses for VaR have been glossed over in the media. Considering the importance of VaR as a risk management tool and its growing use in the calculation of regulatory capital requirements, it seems timely to provide a brief recap of VaR, and what it can and cannot tell us about risk (see insert Box 1 on Basel II and Box 2 on the SEC's recent CSE proposal). This piece also serves as an introduction to SIA's forthcoming review of risk disclosures in the annual reports of a select group of major global financial institutions, due out later in 2004.

Recent Trading Results Put VaR in the Headlines

Several bulge bracket firms recently released their results for the quarter ending February 29, 2004 – and they were noteworthy. Trading gains, in particular, were very high and prompted suggestions that the firms were taking outsized, proprietary risk in order to achieve their results. That accusation can be broken into two main questions:

1. Is proprietary trading riskier than other activities?
2. Does increased average daily VaR numbers necessarily mean that firms are engaged in riskier behavior?

The first question was the topic of an article in an earlier SIA Research Report,² which discussed the point in detail and concluded that there is plenty of evidence to suggest that a well managed proprietary trading business is a reliable, although variable, source of profits on a risk-adjusted basis over the long term. Trading for customers, while being a benefit for a trading operation in that it allows the desk to gather information, can also be very costly as the desk is expected to take large capital risks to facilitate clients' trades. The trades are often undesirable, but necessary from a client relations and retention point of view. According to one analyst, "[o]ur view is that customer trading can actually be riskier than proprietary. After all, a proprietary trader needn't fall on his/her sword for anyone."³ Being required to put capital at risk in order to serve your customers is hardly less risky than putting capital to work on trades you think will make money.

The second question is the heart of this piece, and to answer it one must look at how firms measure risk. The simple answer is that firms report and use VaR calculations to estimate their exposure to *market risk*. Market risk is generally broken down into several categories, although not all firms use all categories: interest rate; foreign exchange rate; equity price; commodity price; real estate/other; and portfolio diversification benefit. That final category accounts for the fact that the portfolio as a whole has a lower VaR than the sum of its parts, with some positions offsetting the risk of other positions. However, VaR measurements of market risk are only one way of looking at risk. The next section describes how VaR is calculated and goes on to sections discussing what VaR tells us about risk taking.

¹ Words or terms in bold italics are defined in the glossary provided at the end of this piece.

² Frank A. Fernandez and Kyle L. Brandon, "Trading Gains," *SIA Research Report*, Volume IV, No. 11, December 8, 2003, pp. 8-13.

³ David Wells, "Goldman is a Far Cry from a Hedge Fund," *Financial Times*, March 27 and 28, 2004, p. 11 (quoting Guy Moszkowski, a Merrill Lynch analyst).

Box 1: Basel II

Issue: How does the Basel II proposal integrate VaR into capital allocation calculations?

Background: The Bank of International Settlements' ("BIS") Basel Committee's new Capital Accords ("Basel II") will replace the static measurements and requirements of the Basel I Capital Accords, issued in 1988 and amended to incorporate market risk in 1996, with a more flexible and forward looking approach, which was laid out in the BIS's April 2003 Consultative Paper 3 ("CP3").

Proposal Highlights: Pillar I of CP3 requires the calculation of minimum capital requirements based on **Market Risk**, **Credit Risk**, and **Operational Risk**. For market risk, institutions will choose their calculation method: the standardized approach using credit rating agencies' ratings to calculate risk weighting or the internal ratings-based approach ("IRB"). Under IRB, institutions may choose the foundation approach, which allows them to use their internally generated risk calculations (using their own, **back tested** VaR models), or the advanced approach, which additionally allows the use of other internally generated variables, instead of those provided by the BIS.

Box 2: The SEC's Consolidated Supervisory Entities (CSE) Proposal

Issues: How does the SEC's CSE proposal integrate VaR into capital allocation calculations?

Background: The SEC issued a proposed framework for comprehensive regulation of qualifying (\$1 billion+ in "tentative net capital") broker-dealers and their holding companies and affiliates ("CSE proposal") in late 2003. Firms registering under the proposal would be required to demonstrate group-wide adherence to rigorous risk-management practices. While likely reducing broker-dealer regulatory capital requirements, the SEC would for the first time acquire supervisory oversight of group-wide risk-management practices, thereby reinforcing the financial integrity of securities firms.

Proposal Highlights: The SEC's proposal would permit broker-dealers to largely determine their regulatory capital requirements by means of approved internal VaR models rather than by compliance with the current Net Capital Rule's "haircut" requirements. This will more accurately reflect the firms' own risk assessment of their businesses, permit more efficient capital allocation, and both modernize the SEC's capital rules and harmonize them with global standards as represented by Basel II.

Calculating VaR

VaR "seeks to predict risk of loss based on historical and/or market implied price and volatility patterns... The calculation [of VaR] uses the simulated changes in value of the market risk-sensitive financial instruments to estimate the amount of change in the current value that could occur at a specified probability level."⁴ Simulated changes used in the VaR calculation may be *historical simulations*, which use actual historical changes in the underlying risk factors, or *Monte Carlo* simulations, which involve the generation of price movements using a random number generator. These models also take into account *linear risk* and *non-linear risk*, which include exposures to implied volatility risks.

⁴ Bear Stearns, 2003 Annual Report, p. 48.

What VaR Can Do

VaR estimates provide a useful number to evaluate portfolios for many purposes, including managing risk, setting trading limits, allocating capital, determining regulatory capital levels, measuring risk-adjusted returns, and determining compensation. “Among their benefits, VaR models: permit estimation of a portfolio’s aggregate market risk exposure, incorporating a range of varied market risks; reflect risk reduction due to portfolio diversification or hedging activities; and can cover a wide range of portfolio assets.”⁵

The most commonly used method to keep an eye on whether or not a VaR model is doing a good job in predicting the maximum expected loss over a given period of time for a given level of confidence is to compare the estimated VaR to the actual profit and loss (P&L) results. Firms do just that by *backtesting* VaR estimates against P&L results and report their backtesting results along with the VaR estimates. From our initial survey of 10 of the largest investment and commercial banks’ 2003 annual reports, there were no instances where the actual number of days with VaR-exceeding losses was larger than predicted by the *confidence interval*. For example, a confidence interval of 99% means that one expects actual losses to exceed VaR estimates on one day out of 100, or 2-3 trading days per year. However, since the amounts disclosed refer to trading businesses as a whole, they do not directly answer the question whether VaR estimates are adequately providing guidance specifically for risk taking in proprietary trading activity. Firms do not disclose such proprietary information, except to regulators, so it is not a judgment that can be made superficially with public information.

A deeper investigation of the relationship between publicly disclosed VaR measures and the volatility of trading revenues published in 2002 suggests that the publicly disclosed VaR numbers are “informative measures of risks in that they can be used to predict the variability of banks’ trading revenue.”⁶ The investigation examined quarterly and annual disclosures of eight U.S. commercial banks. The eight banks were chosen because they had the largest derivatives positions and the longest record of public VaR disclosure (most from 1994). In addition to finding the required VaR disclosures informative, the study went on to say that just being required to report VaR numbers publicly imposes greater discipline on trading, and offers the view that the “quality of VaR disclosure should improve over time as methodologies become more consistent.”⁷

What VaR Can’t Do

VaR models are powerful modern tools for measuring market risk in an integrated manner across a range of trading activities. However, the use of VaR models raises complex issues concerning the appropriate parameters and assumptions underlying the models. Inherent limitations to VaR models include the reliance on historical data, which may not accurately predict future market risks, and the VaR model itself is limited by the parameters used to create it.⁸

VaR is the beginning of risk analysis, not the end. While VaR is a powerful tool, it is not all-knowing, nor all informing. In particular, market risk in extreme situations and crises, with

⁵ Morgan Stanley, 2003 Annual Report and 10K, p. 72.

⁶ Phillipe Jorion, “How Informative are Value-at Risk Disclosures?” October 2002, p. 2.

⁷ Ibid, p. 18.

⁸ Bear Stearns, 2003 Annual Report, pp. 48-49.

market breaks and no liquidity, are not likely to be captured by a model that is based on price behavior in normal trading markets. *Stress testing* and *scenario analysis*, which measure the risk of loss over a variety of extreme market conditions that are defined in advance, are performed by most firms to examine less liquid and more exotic positions and portfolios.

Average daily VaR is the most often discussed risk number, which demonstrates yet another reason why VaR is not the end of the story. Imagine if someone wanted to know what the winter was like in Moscow and he was given the average daily temperature for the season in reply. While the average temperature would give the questioner some general idea of what to expect, it would not give him an inkling that there would be days when the temperature reached minus 40 degrees Fahrenheit, nor that there would be weeks in which it snowed 3 to 5 inches every day.

Where Do We Go From Here?

Since the use and disclosure of VaR measurements have become more prevalent over the past decade, the numbers have been used and misused in a variety of forums. However, market participants are committed to their use and even regulators have grown comfortable enough to allow VaR measurements to be used in the calculation of regulatory capital. Since the introduction of required public disclosure of VaR, there have been several attempts within the financial industry to agree on a single set of disclosures for reporting purposes.

In early 2001, the Working Group on Public Disclosure, headed by Walter Shipley, issued a letter that has become known as the Shipley report.⁹ The letter outlines four principles for strong disclosure practices (see Box 3) and highlights six disclosures, of which three concern market risk, that the participating firms agreed to include in their own disclosure as soon as practicable. Of particular importance to this article are the three recommended disclosures on market risk:

1. Aggregate, high, average and low trading VaR over the quarter.
2. High, average and low trading VaR by major risk category (e.g., fixed income, currency, commodity and equity) over the quarter, including diversification effect.
3. Quantification of how well market risk models performed (e.g., histogram of daily trading revenues compared to average VaR over the quarter).

In the coming months, SIA will be publishing the results of a study of the so-called Shipley disclosures for market and credit risk in the 2003 annual reports by the original Shipley group members and other major securities dealers. This study should help further refine the answer to the question of how useful is VaR and VaR disclosure in explaining the risks taken by major securities firms. The firms themselves are pushing the development of more robust estimates of risk, and as long as we are not blinded by a single number, VaR disclosure should continue to be an ever more informative practice, contributing to improved risk management and enhanced public disclosure.

⁹ A copy of the letter can be found on the Federal Reserve web site:
<http://www.federalreserve.gov/boarddocs/press/general/2001/20010111/DisclosureGroupLetter.pdf>

Box 3: Working Group on Public Disclosure (Shipley Group)
Summary of Principles for Strong Disclosure Practices

The following principles should be at the centerpiece of any effort to enhance public disclosure:

1. Disclosures should reflect information that is consistent with management's approach to risk management.
2. Disclosures should focus on how risk within a firm changes over time.
3. Disclosures should be responsive to changes in internal practices.
4. Disclosures should be properly balanced between quantitative and qualitative information.

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Back testing is a statistical process for validating the accuracy of a VaR model. It essentially compares actual losses to the losses predicted by the VaR model, and tells you how many times the VaR model under-predicted actual losses versus the number of times such an under-prediction is expected. For example, for a VaR model that predicts a given loss level using a one-day holding period and 99% confidence interval, one would expect to see two or three under-predictions per year. Back testing is often required by regulators to validate the accuracy of a model before it is approved for use in regulatory calculations.

Confidence interval is a measure of the probability that there will be price movements within a given range, which can be expressed in a number of ways. Perhaps most common is reference to a percentage: calculating a VaR number of \$1 million at a 97.5% confidence interval means that there is only a 2.5% chance that losses on the portfolio in question will exceed \$1 million. The confidence interval can also be expressed in terms of how often the maximum loss is expected to exceed: \$1 million VaR at a 97.5% confidence interval also means (using a one-day holding period) that a loss greater than \$1 million will occur, on average, approximately once every 40 trading days. Thus the choice of a confidence interval is, to a large extent, a choice about an institution's appetite for risk.

Credit risk comprises risk of loss resulting from counterparty default on loans, swaps, options, and during settlement.

Fat Tails refer to a distribution having more frequent extreme price movements than would be predicted in a normal distribution.

Historical observation period is another important parameter that should be carefully assessed. In particular, questions such as weighting of data and the appropriate length of the observation period have to be considered. In the latter decision, the quality and availability of data will be an important consideration. As a result, thought may be given to different observation periods for different portfolios depending on data availability. However, a common observation period is needed for recognizing correlations when calculating a portfolio VaR number.

Historical simulation is a simulation technique that uses price sensitivities and the historical movements of the underlying risk factors to which the securities are sensitive to generate movements in a portfolio.

Holding period is an important quantitative parameter of a VaR model, and its choice requires careful deliberation. The holding period chosen will need to reflect the uses of the VaR model in question and the liquidity profile of the institution's trading activity. A ten-day holding period means that the model operates on the assumption that it would take a minimum of ten days before the institution can trade out of or hedge a position, during which time losses could accumulate. Also, different holding periods can reflect the uses of the model: a trader may be interested in normal trading market conditions and therefore a one-day holding period, while a risk manager who is more concerned by the prospect of illiquid markets may use a longer holding period.

Linear risk is one in which the change in the value of a position in response to a change in a market price or rate is a constant proportion to the change in the market price or rate.

Market risk involves the risk that prices or rates will adversely change due to economic forces. Such risks include adverse effects of movements in equity and interest markets, currency exchange rates, and commodity prices. Market risk can also include the risks associated with the cost of borrowing securities, dividend risk and correlation risk.

¹⁰ Definitions were sourced from a variety of resources, such as financial firms' annual reports, *The Practice of Risk Management* (Euromoney Publications, 1998), www.gloriamundi.org, and <http://www.gsm.uci.edu/~jorion/index.htm>.

Monte Carlo is a simulation technique that uses assumptions about the distribution of changes in market prices and rates to produce successive sets of possible future realizations of changes in those prices and rates. These sets of possible changes are used to calculate a more robust VaR estimate than is possible with limited historical data.

Non-linear risk is associated with instruments such as options and instruments with embedded options features because they respond differently to change in the underlying instrument depending on whether they are in-the-money, at-the-money, or out-of-the-money.

Operational risk encompasses the risk of loss due to the breakdown of controls within the firm including, but not limited to, unidentified limit excesses, unauthorized trading, fraud or system failure in trading or back office functions, inexperienced personnel, and unstable and easily accessed computer systems.

Scenario analysis is a risk exposure tool, by which potential loss as a result of a given event is measured. For example: what would happen to the value of the portfolio for a given economic event such as the 1987 stock market crash? Scenario analysis typically goes beyond the impact of discrete changes in market parameters on a portfolio of investments. It attempts to examine how the event would impact revenue streams and help the institution evaluate its more strategic vulnerabilities.

Stress testing is a risk exposure tool, by which potential losses as a result of changes in major market parameters are measured. For example: what would happen to the value of the portfolio for a given change in interest rates, foreign exchange rates or equity prices? Stress testing may involve relatively few changes or it may take a matrix approach in which multiple parameters are changed to see how they impact the portfolio. Choosing what to stress (i.e., the variables), the range of stress and the usefulness of the stress information (versus simply producing data overload) is only the beginning of the difficult decisions required for meaningful stress test results.

Value-at-Risk (VaR) is the maximum loss over a target horizon such that there is a low, pre-specified probability that the actual loss will be larger than the maximum estimated. In order to calculate VaR, historical returns (of a pre-specified holding period) are compiled and plotted into a distribution. Simply put, from this distribution, if it is normal, one can calculate the probability of returns being greater or less than a certain amount. Since distributions of returns are unlikely to be either normal or linear, more sophisticated computation methods (Monte Carlo simulations being very common) are used to account for risk and correlations.



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