

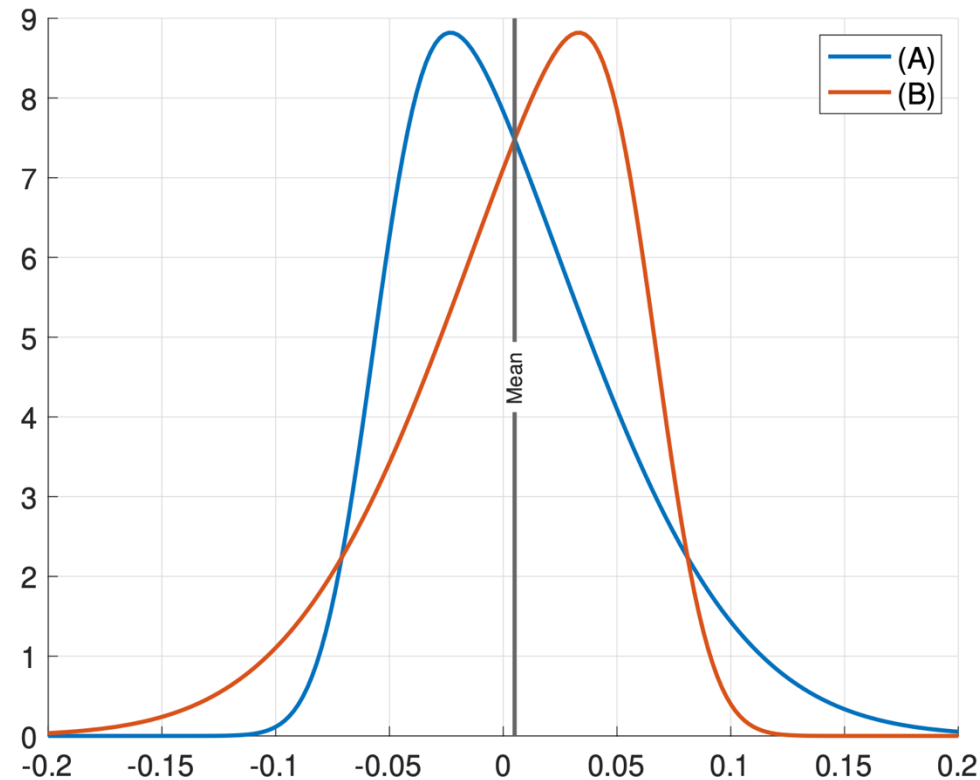
Capital Markets & Investments

Session 15: Beyond CAPM (1) – Anomalies and Alpha

Spring 2025
Professor Simon Oh

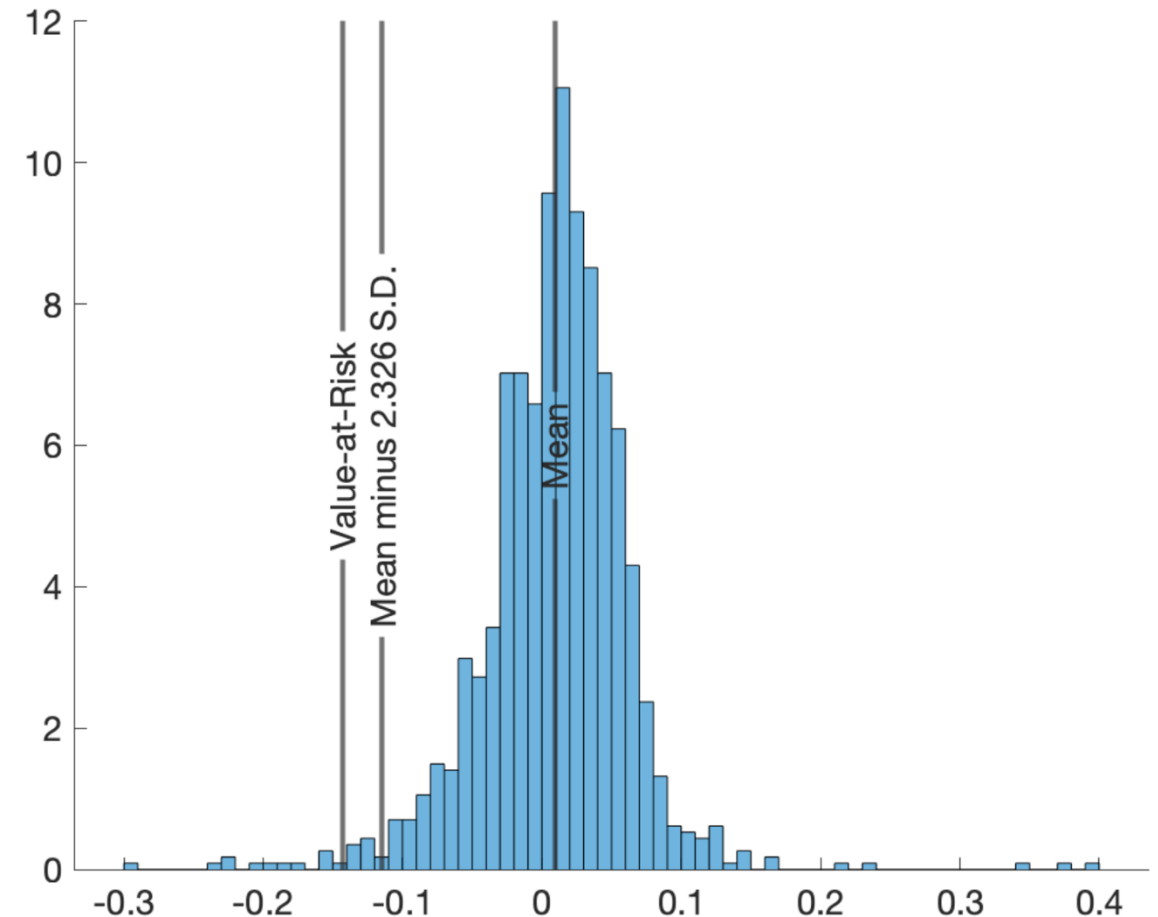
Semi-variance: Downside Risk

$$\text{var}(R)^- = \mathbb{E}[(R - \mathbb{E}[R])^2 \mathbb{1}_{\{R < \mathbb{E}[R]\}}]$$



Value-at-Risk (VaR)

- “You might lose a bunch of money, but probably not more than this (we hope)”
- Expected Shortfall improves upon this measure by computing losses that exceed the VaR



Goldman Sachs 10-K (2021)

Value-at-Risk. VaR is the potential loss in value due to adverse market movements over a defined time horizon with a specified confidence level. For assets and liabilities included in VaR, see “Financial Statement Linkages to Market Risk Measures.” We typically employ a one-day time horizon with a 95% confidence level. We use a single VaR model, which captures risks, including interest rates, equity prices, currency rates and commodity prices. As such, VaR facilitates comparison across portfolios of different risk characteristics. VaR also captures the diversification of aggregated risk at the firmwide level.

Average Daily VaR

The table below presents our average daily VaR.

<i>\$ in millions</i>	Year Ended December	
	2021	2020
Categories		
Interest rates	\$ 60	\$ 71
Equity prices	43	55
Currency rates	13	23
Commodity prices	25	20
Diversification effect	(55)	(75)
Total	\$ 86	\$ 94

Within-Year Fluctuations in VaR

The table below presents our high and low VaR.

<i>\$ in millions</i>	Year Ended December			
	2021		2020	
	High	Low	High	Low
Categories				
Interest rates	\$ 74	\$49	\$120	\$46
Equity prices	\$ 71	\$30	\$116	\$23
Currency rates	\$ 20	\$ 8	\$ 53	\$ 8
Commodity prices	\$ 45	\$14	\$ 54	\$ 9
Firmwide				
VaR	\$105	\$69	\$195	\$58

Is this large?

<i>\$ in millions</i>	Average for the Year Ended December		
	2021	2020	2019
Total shareholders' equity	\$101,705	\$ 91,779	\$ 90,297
Preferred stock	(9,876)	(11,203)	(11,203)
Common shareholders' equity	91,829	80,576	79,094
Goodwill	(4,327)	(4,238)	(3,965)
Identifiable intangible assets	(536)	(617)	(499)
Tangible common shareholders' equity	\$ 86,966	\$ 75,721	\$ 74,630

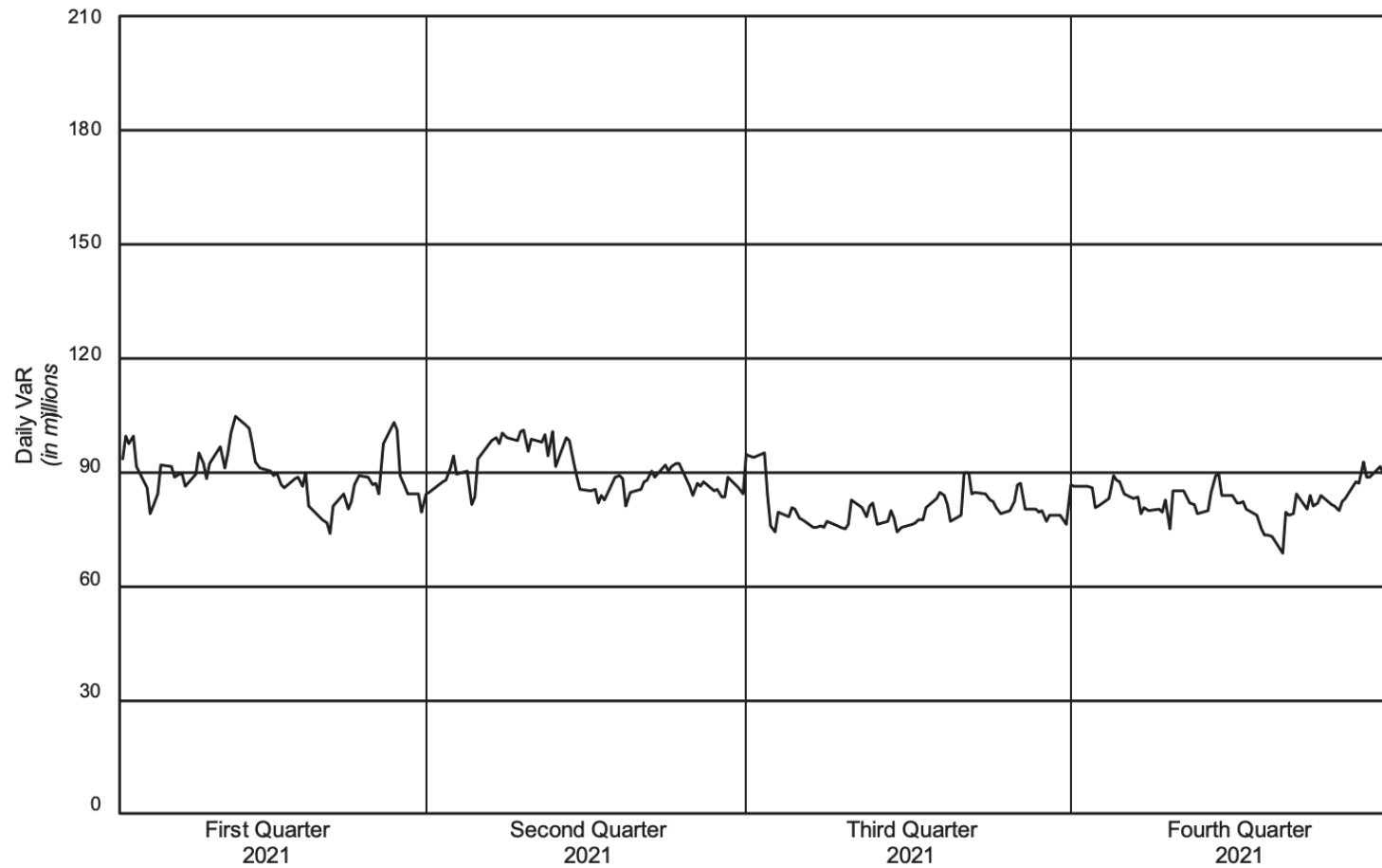
Is this large?

Net Revenues

The table below presents our net revenues by line item.

<i>\$ in millions</i>	Year Ended December		
	2021	2020	2019
Investment banking	\$14,168	\$ 9,141	\$ 6,798
Investment management	8,059	6,923	6,189
Commissions and fees	3,619	3,548	2,988
Market making	15,352	15,546	10,157
Other principal transactions	11,671	4,651	6,052
Total non-interest revenues	52,869	39,809	32,184
Interest income	12,120	13,689	21,738
Interest expense	5,650	8,938	17,376
Net interest income	6,470	4,751	4,362
Total net revenues	\$59,339	\$44,560	\$36,546

Daily VaR for 2021



Daily VaR from 2001 to 2024

