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TRIVARIATE RESEARCH

TECHNOLOGY STOCKS TO AVOID IN A DOWN MARKET

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BACKGROUND AND RESEARCH CONCLUSIONS

Background: We published three notes focused on the topic of beta over the last two months and we are hosting a Zoom on the optimal portfolio beta on Monday, March 17th at 11 am EDT ([REGISTER HERE](#)). An investor asked us recently about the beta of Technology stocks, and in particular to identify those with asymmetry – meaning the stocks that have measurably higher beta in down markets than in up markets. **We think investors should know which stocks they own are higher beta in down markets than in up markets to more effectively manage risk.**

Methodology: We looked at the betas of all public Technology stocks from 2020 to present. We compute beta for each company as the median of four different time horizons – 3 months, 6 months, 12 months, and 18 months. We then broke the market’s daily returns into three categories- down more than 1%, up more than 1%, and returning between -1% and +1%. Lastly, measured each stock’s average beta in each of these three market conditions.

Elevated and negatively skewed: We analyzed the betas of the Technology stocks in the Top 3000 by market caps. The top quintile (2.07 beta and higher), bottom quintile (0.99 beta and lower), and median (1.44) betas of the Technology sector are all currently above average vs. the five-year history. The median Technology stock has an asymmetric negative beta, meaning slightly higher beta in markets that are down 1% or more versus those that are between -1% and 1%, or those that are up more than 1%. This means Technology does worse in down markets than it does well in up markets since 2020. Obviously, the interest rate sell-off in 2022 impacts these results.

Size isn’t the source of the skew: 68% of all Technology companies have negative asymmetric betas, vs. only 32% with a higher beta on up days than down days since 2000. Interestingly, while modest in size, the percentage of Technology stocks with a negative asymmetric skew is inversely proportional to size, which was NOT our prior expectation.

INVESTMENT CONCLUSIONS

Size and style: Since 2020, growth stocks and high-quality stocks, which nearly every equity manager owns, have the highest average asymmetric negative beta skew. Value stocks, and those in the bottom half of quality have a more minor skew. In fact, the average Value Technology stock has a positive skew – meaning higher beta in up markets than down markets. To be clear though, this is a small group, as at present there are ZERO mega-/large-cap value stocks in the Technology sector.

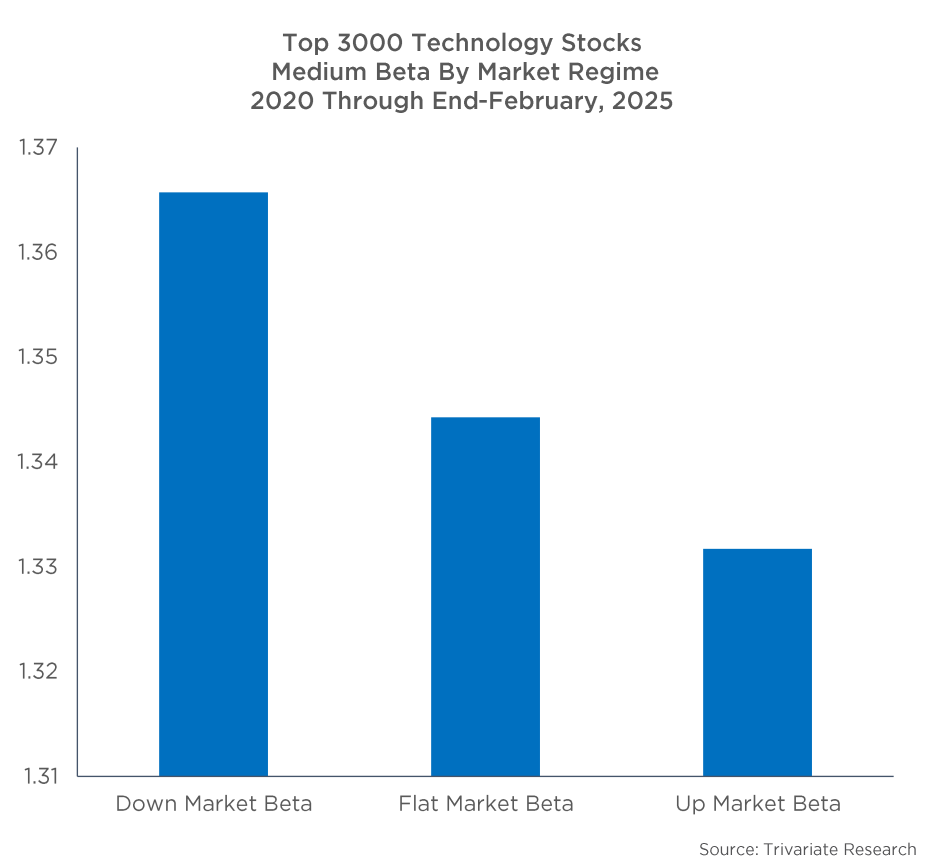
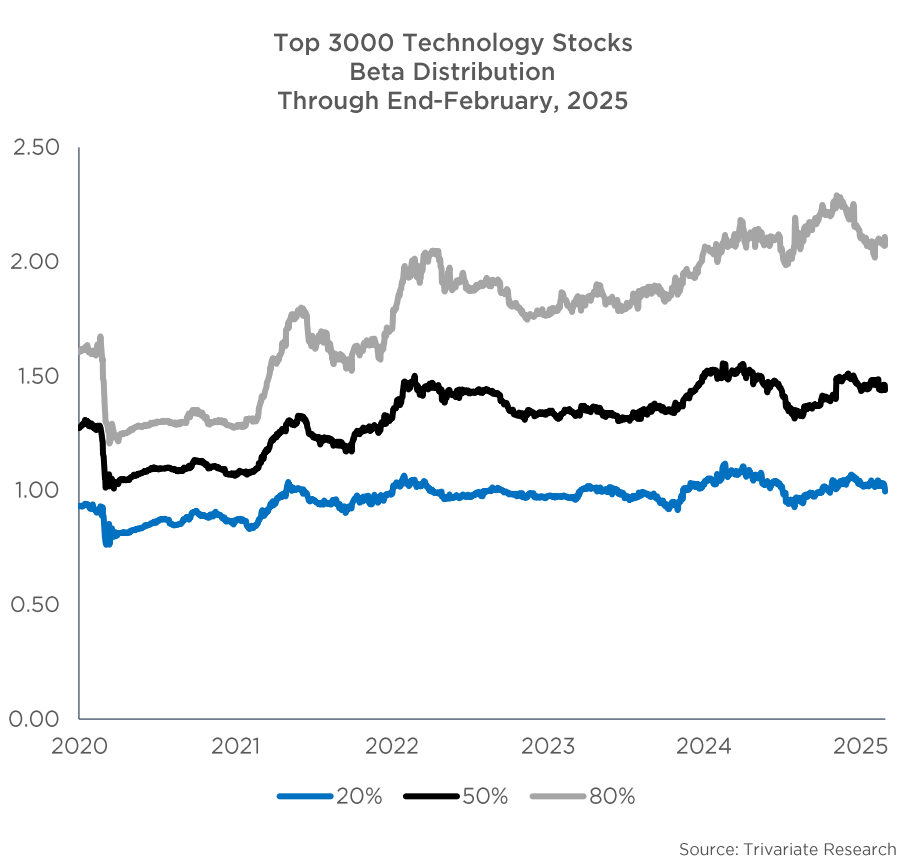
Technology sub-industries: At the sub-industry level, IT services and Software have a higher average negative skew to their betas in down vs. up markets than other parts of Technology. Electronic Equipment Instruments & Components average a higher skew in markets up more than 1% than those down more than 1%. While the average skew was higher for IT Services and Software, the highest percentage of stocks with a negative asymmetric beta was in Semiconductors, a behavior we have certainly seen in the most recent sell-off.

Negative asymmetric beta stocks: On Slide 8 we show stocks with negative asymmetric beta, both high and low beta. Stocks that are high beta and tend to have a higher beta when the market goes down than when it goes up include **SHOP, MSTR, and COHR, among others**. These are risky stocks that will likely underperform on big down days. We also show low beta stocks that also have a negative asymmetric beta. These might be less defensive in a down market than investors anticipate and include **FTNT, WDAY, and TYL, among others**.

Technology stocks with no negative beta asymmetry: On Slide 9 we show Technology stocks that are high beta that do not show a negative skew. This means the beta is as high or higher when the market goes up 1% or more as it is on days it goes down 1% or more. **Investors who own high beta growth stocks might want to add exposure to stocks on this list for risk management purposes.** Stocks include **IBM, MSI, CTSH, and CHKP, among others**.

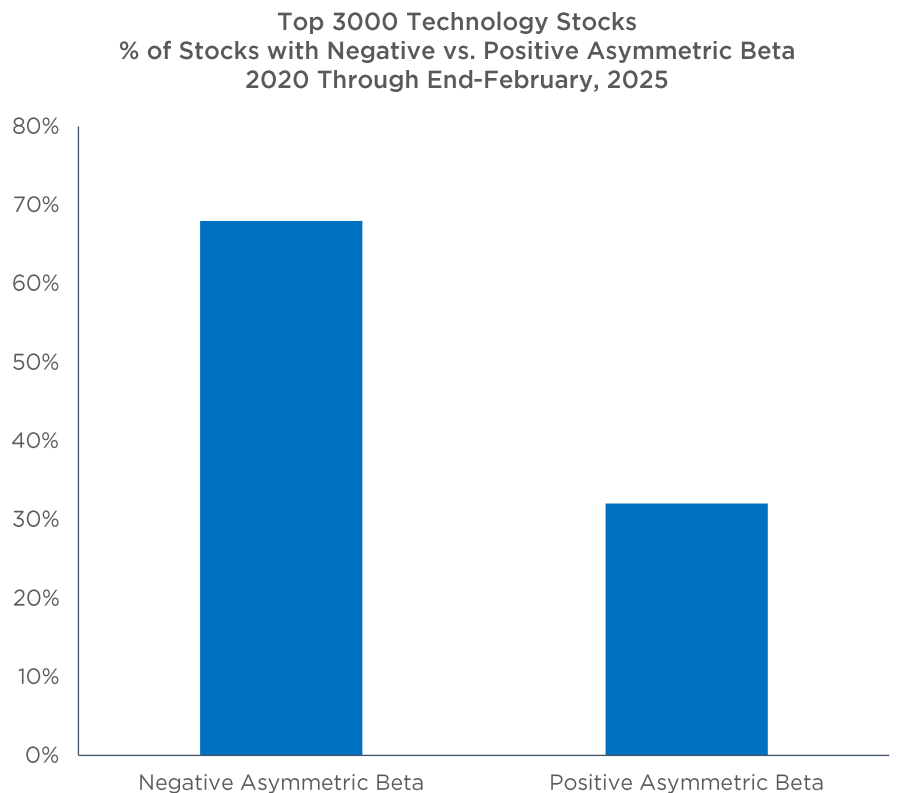
TECH BETAS ARE ELEVATED VS. HISTORY AND HAVE A NEG. SKEW

We analyzed the betas of the Technology stocks in the Top 3000 by market cap. The top quintile (2.07 and higher), bottom quintile (0.99 and lower), and median (1.44) betas of the Technology sector are all above average vs. the five-year history (left). We then studied the median beta in different market regimes and found that the median Technology stock has an asymmetric negative beta, meaning slightly higher beta in markets that are down 1% or more, versus those that are between -1% and 1%, or those that are up more than 1%. This means Technology performs worse in down markets than it does well in up markets since 2020. Obviously, the interest rate sell-off in 2022 impacts these results.

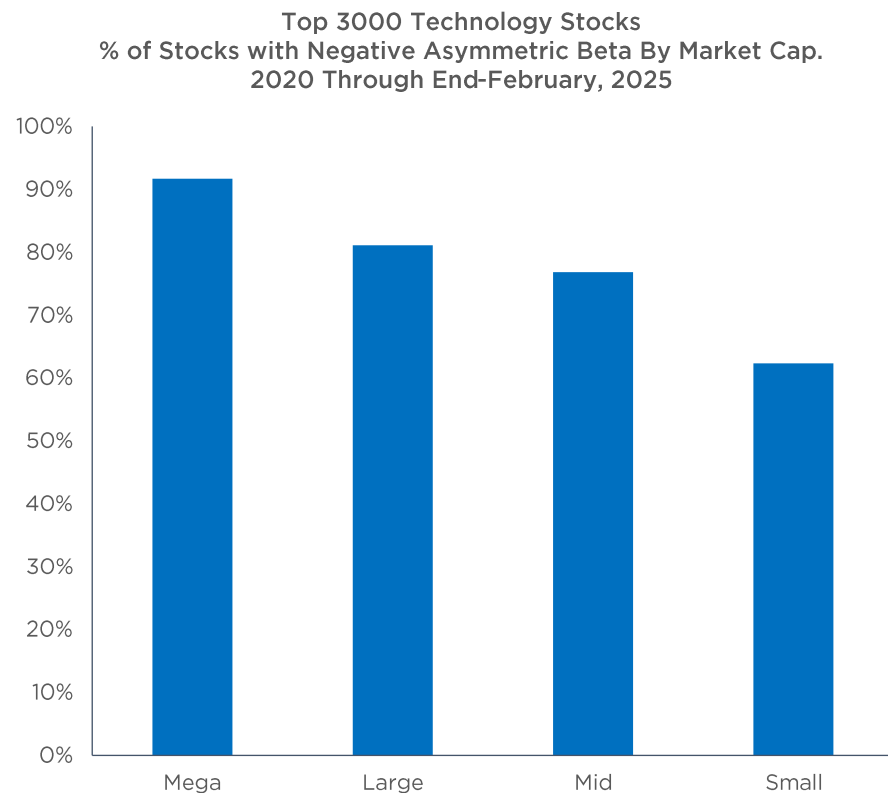


68% OF TECHNOLOGY STOCKS HAVE A NEGATIVE ASYMMETRIC BETA

In fact, 68% of all Technology companies have a negative asymmetric betas, vs. only 32% with a higher beta on up days than down days (left). Interestingly, while modest in size, the percentage of Technology stocks with a negative asymmetric skew is inversely proportional to size (right), which is NOT our prior expectation.



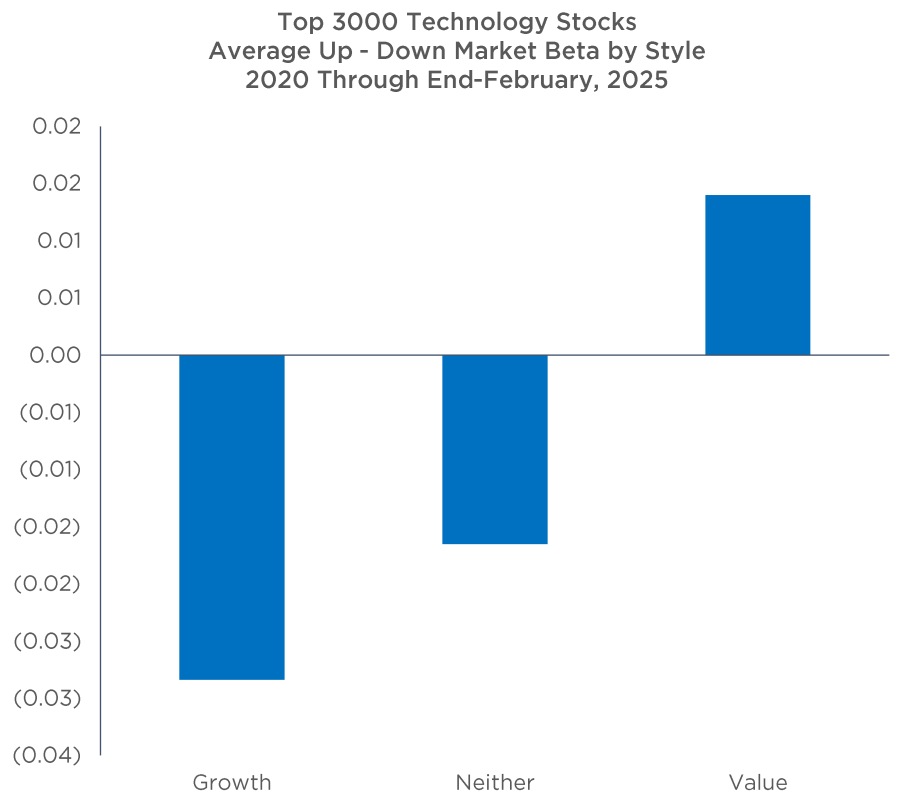
Source: Trivariate Research



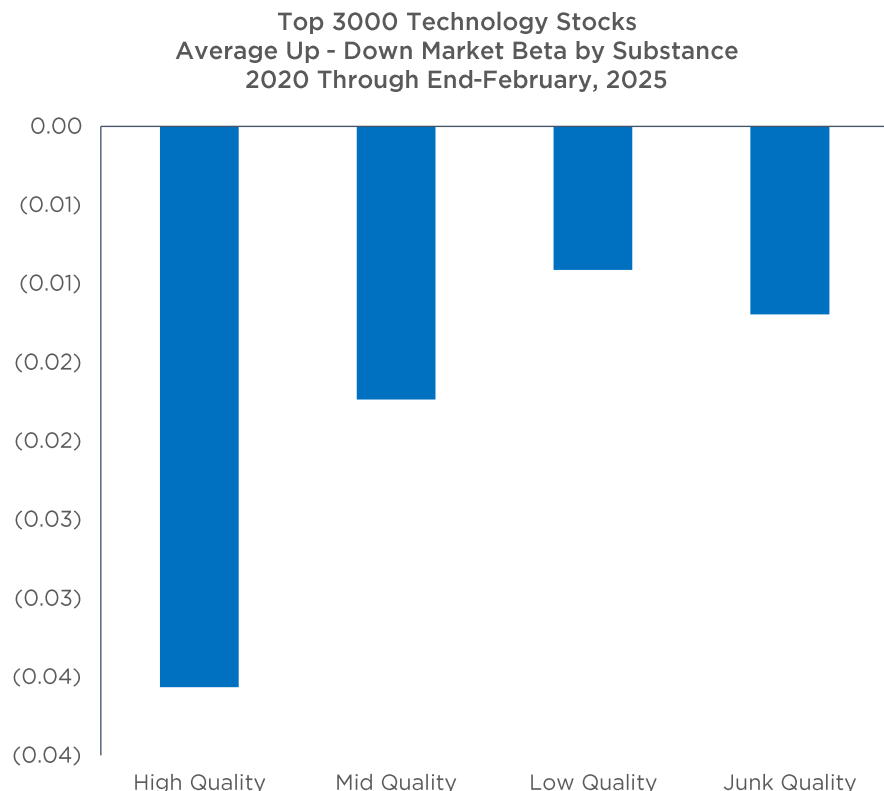
Source: Trivariate Research

HIGH-QUALITY GROWTH STOCKS HAVE A MORE NEGATIVE BETA SKEW

Since 2020, within Technology growth stocks (left) and high-quality stocks (right) have the highest average asymmetric negative beta skew. Value stocks, and those in the bottom half of quality have a more minor skew. In fact, the average Value Technology stock has a positive skew - meaning higher beta in up markets than down markets. To be clear though, this is a small group, as at present there are ZERO mega-/large-cap value stocks in the Technology sector.



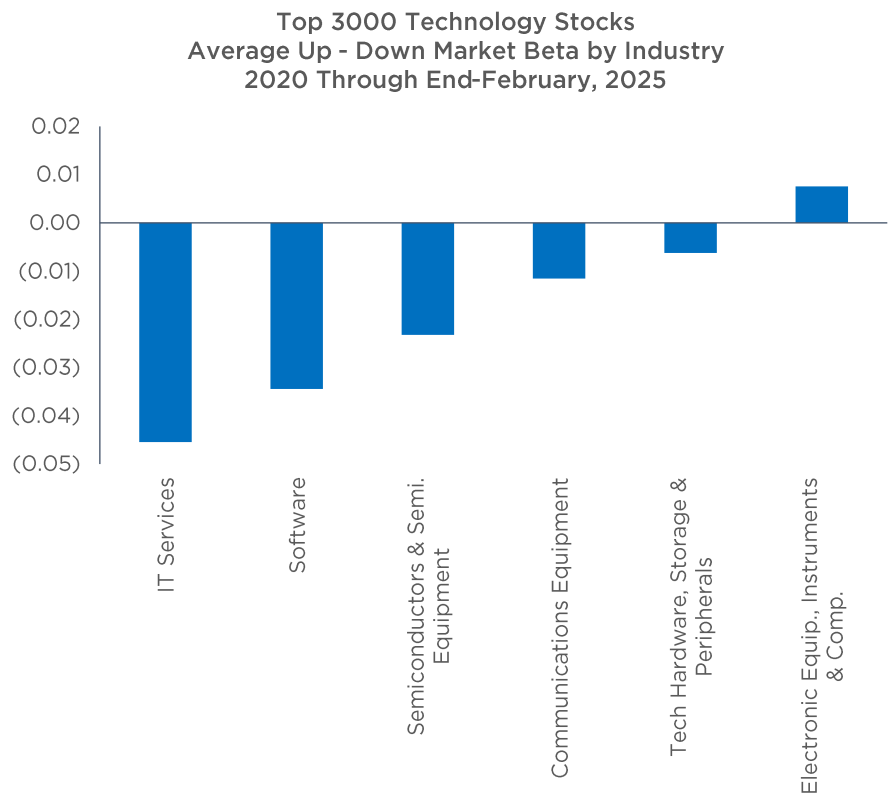
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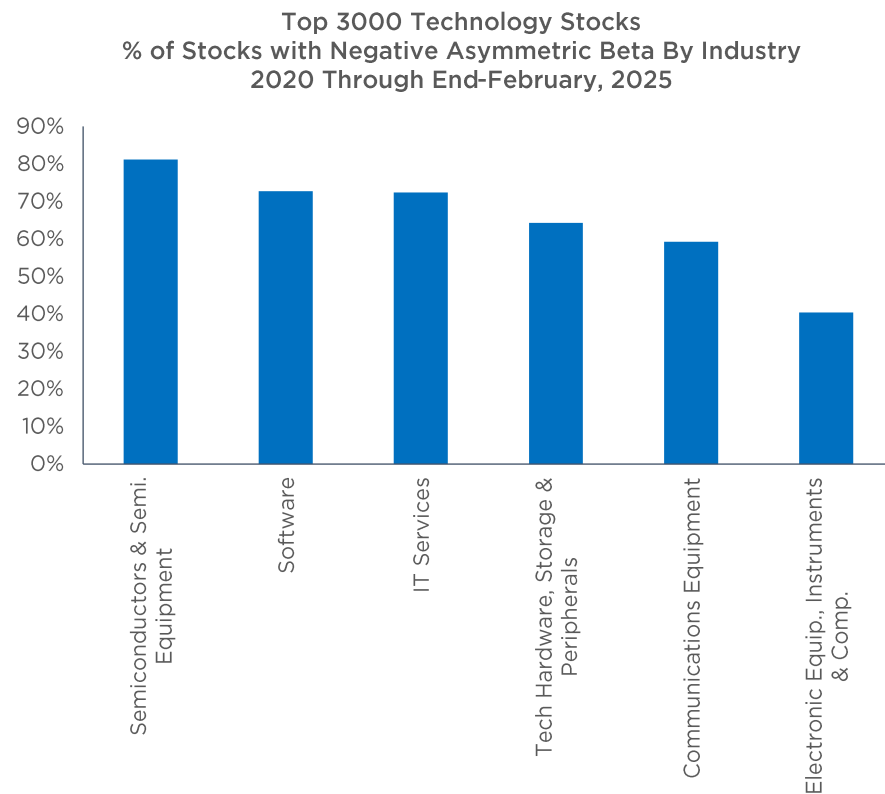
Source: Trivariate Research

IT SERVICES AND SOFTWARE HAVE HIGHER BETAS ON DOWN DAYS

At the sub-industry level, IT services and Software have a higher average negative skew to their betas in down vs. up markets than other parts of Technology (left). Electronic Equipment Instruments & Components average a higher skew in markets up more than 1% than those down more than 1%. Semiconductors have the highest percentage of stocks with a negative skew (right).



Source: Trivariate Research



Source: Trivariate Research

TECH STOCKS THAT MIGHT BE RISKIER THAN THEY APPEAR

On the left, we show Technology stocks that are high beta and tend to have a higher beta when the market goes down than when it goes up. These are risky stocks that will likely underperform on big down days. On the right, we show stocks that are in the lowest quintile of beta that also have a negative asymmetric beta. These might be less defensive in a down market than investors anticipate.

**Technology Stocks With High Beta and Negative Beta Skew
As of End-February, 2025**

Ticker	Company	Market Cap. (\$Bn)	Beta
SHOP	Shopify Inc.	145.02	2.18
MSTR	MicroStrategy Incorporated	66.48	3.30
COHR	Coherent Corp.	11.65	2.76
MARA	MARA Holdings, Inc.	4.72	3.47
ASAN	Asana, Inc.	4.40	2.39
ZETA	Zeta Global Holdings Corp.	4.09	2.04
SITM	SiTime Corporation	3.66	2.83
SMTC	Semtech Corporation	3.29	2.88
RIOT	Riot Platforms, Inc.	3.25	3.69
FORM	FormFactor, Inc.	2.58	2.14
AMBA	Ambarella, Inc.	2.56	2.36
CLSK	CleanSpark, Inc.	2.24	3.81
ACLS	Axcelis Technologies, Inc.	1.78	2.14
AAOI	Applied Optoelectronics, Inc.	1.09	3.44

Source: Trivariate Research

**Technology Stocks With Low Beta and Negative Beta Skew
As of End-February, 2025**

Ticker	Company	Market Cap. (\$Bn)	Beta
FTNT	Fortinet, Inc.	83.06	0.97
WDAY	Workday, Inc.	70.05	0.97
TYL	Tyler Technologies, Inc.	26.17	0.76
ZM	Zoom Communications	22.50	0.88
FFIV	F5, Inc.	16.86	0.98
GWRE	Guidewire Software, Inc.	16.81	0.80
CCCS	CCC Intelligent Solutions Holdings Inc.	6.70	0.67
BOX	Box, Inc.	4.70	0.42
YOU	Clear Secure, Inc.	2.29	0.73
RPD	Rapid7, Inc.	1.86	0.88
GDYN	Grid Dynamics Holdings, Inc.	1.58	0.89
MLNK	MeridianLink, Inc.	1.38	0.96

Source: Trivariate Research

TECH STOCKS WITH NO NEGATIVE BETA SKEW

On the left, we show Technology stocks that are high beta that do not show a negative skew. This means the beta is as high or higher when the market goes up 1% or more as it is on days it goes down 1% or more. Hence, if you own a high beta name, this list will underperform in a down tape, but should recover at least as much on big up days. On the right, we show low beta stocks that don't have a negative skew. Investors who own high beta growth stocks might want to add exposure to stocks on this list for risk management purposes.

Technology Stocks With High Beta and Positive Beta Skew
As of End-February, 2025

Ticker	Company	Market Cap. (\$Bn)	Beta
INTC	Intel Corporation	102.75	2.06
CRDO	Credo Technology Group Holding Ltd	9.23	3.57
FN	Fabrinet	7.20	2.31
PATH	UiPath Inc.	6.76	2.10
SOUN	SoundHound AI, Inc.	4.26	3.27
AI	C3.ai, Inc.	3.03	2.34
CIFR	Cipher Mining Inc.	1.48	3.95
BBAI	BigBear.ai Holdings, Inc.	1.30	2.92
CRSR	Corsair Gaming, Inc.	1.23	2.07

Source: Trivariate Research

Technology Stocks With High Beta and Positive Beta Skew
As of End-February, 2025

Ticker	Company	Market Cap. (\$Bn)	Beta
IBM	International Business Machines Corporation	234.08	0.72
MSI	Motorola Solutions, Inc.	73.49	0.59
CTSH	Cognizant Technology Solutions Corporation	41.22	0.73
CHKP	Check Point Software Technologies Ltd.	24.22	0.61
CDW	CDW Corporation	23.61	0.91
DOX	Amdocs Limited	9.79	0.51
DLB	Dolby Laboratories, Inc.	7.87	0.60
INFA	Informatica Inc.	5.80	0.95
CLBT	Cellebrite DI Ltd.	4.05	0.89
JAMF	Jamf Holding Corp.	1.77	0.91
VYX	NCR Voyix Corporation	1.57	0.99

Source: Trivariate Research

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