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TRIVARIATE RESEARCH

TMT MACRO THOUGHTS AND IDEAS

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ADAM S. PARKER, Ph.D., FOUNDER
adam@trivariateresearch.com
646-734-7070

COLIN COONEY, HEAD OF SALES
colin@trivariateresearch.com
617-910-7934

ALBERT MISHAAN, SR. ANALYST
albert@trivariateresearch.com
732-710-8996

JONATHAN GILL, SR. ANALYST
jonathan@trivariateresearch.com
203-461-5110

TMT RESEARCH CONCLUSIONS AND IDEAS

- Over the past several months we have done a lot of work on growth stocks, and various frameworks for investing in growth. The result of that has been number of ways to generate ideas in the space. With the Nasdaq down 10% YTD, and many individual name down far more, we have received many investor questions asking for us to contextualize the sell-off. **This short presentation is the “best of” those TMT themes.**
- **Dimensioning the January Growth Stock Sell-Off:** On January 28th, we upgraded the technology sector from underweight to market-weight, based on the context of this recent sell-off versus the prior post-financial crisis sell-offs. In addition, we show which industry and signals worked if we are 80% of the way through the correction until three months after, based on the prior 11 growth stock sell-offs of 10% or more. Software typically led, with revenue growth, earnings acceleration, and expensive on price-to-sales (not cheap) being key attributes. Following the growth stock sell-offs, gross margin expansion and positive free cash flow worked, whereas negative free cash flow lagged, meaning it is unlikely will see a huge rally in the profitless technology stocks, like we saw in the 2H of 2020, lead any eventual recovery. Our view is any directionally dovish commentary could catalyze a growth-stock rotation.
- **The Double Whammy Stocks:** With a strong non-linear relationship between revenue growth and relative price-to-sales, each month we look for mispriced stocks, where the forecasted growth is materially disconnected from the relative valuation of stocks with a similar forecasted revenue outlook, identifying long / short ideas. Those stocks are “double whammy” candidates, meaning they have the potential not only for the higher (lower) growth but also the commensurately higher (lower) multiple as the forecasts unfold.

TMT RESEARCH CONCLUSIONS AND IDEAS

- **Compounders:** Our work shows us that the best way to identify compounders is to look for stocks that have consistent gross margin expansion. This seems particularly relevant in today's inflationary environment. On average, these compounders have 14 consecutive quarters of trailing gross margin expansion today and are projected to continue to have expanding margins for the next quarter. Consistent gross margin expansion is a better predictor of compounding than revenue growth, earnings growth, earnings beats, or prior price momentum.
- **Melting Ice Cubes:** This is conceptually the inverse of compounders, as the goal is to identify laggards, though the signals are entirely different. Melting ice cubes have high accruals (typically large changes in PP&E, inventory, and / or intangibles resulting from deals), and bad relative-to-industry price momentum over the last quarter. Share loss and margin contraction add little if any value above accruals and momentum to identifying melting ice cubes.
- **Semis and Software Playbook:** We identified the key attributes for investing in semiconductors and software stocks through this framework. High gross margin semis that have forecasted further margin expansion outperform, independent of whether they lose or gain revenue share. Prior price momentum and multiple expansion also matter. For software and services, high margin companies need to have above average revenue growth, preferably accelerating, whereas further margin expansion is less useful.
- **Long / Short Ideas – page 13 shows the TMT ideas that come from these frameworks today**

DIMENSIONING MARKET DRAWDOWNS SINCE THE FINANCIAL CRISIS

For the Nasdaq, this drawdown has been lengthier, and one of the worst since the Financial Crisis other than the initial COVID trade. After looking at prior downturns, we thought it was reasonable to assume that this drawdown is 80% over, meaning it would be one of the worst sell-offs (other than COVID) since the Financial Crisis. If we look at these prior drawdowns, there was typically a tangible reason for the scare- COVID in 2020, extended valuation and rising rates in 2018, European crisis in 2011 and US QE in 2012, energy scare into early 2016, etc. **What will be the phrase to describe this sell-off? Our judgment based on history and the prior explanations for the market declines is that this correction is +/- 80% over. As such, on Friday January 28th, we upgraded technology from under-weight to market-weight, believing the risk-reward for growth investing was skewed to the positive.**

QQQ Drawdowns Since the Financial Crisis

Start Date	End Date	Days of Drawdown	Drawdown
2/20/2020	3/23/2020	23	(30.1%)
8/30/2018	12/24/2018	80	(23.6%)
5/2/2011	10/3/2011	108	(18.7%)
7/21/2015	2/11/2016	143	(18.2%)
4/26/2010	7/2/2010	49	(17.3%)
11/22/2021	as of 1/27/2022	44	(16.8%)
3/27/2012	6/1/2012	47	(12.0%)
9/3/2020	9/23/2020	14	(11.8%)
9/17/2012	11/15/2012	42	(10.9%)
10/28/2011	11/25/2011	20	(10.8%)
2/16/2021	3/8/2021	15	(10.5%)

WHAT WORKED TOWARD THE END OF DRAWDOWNS AND AFTER?

Using 80% over as a governor, we looked at which industries typically do best from that point in the past – software leads.

Equal-Weighted Raw Returns after 80% of drawdown is done to 3 months after end of drawdown
GICS Groups

GICS Group	6/21/2010 to 10/4/2010	9/1/2011 to 1/4/2012	11/21/2011 to 2/29/2012	5/22/2012 to 8/31/2012	12/31/2015 to 5/13/2016	2/7/2018 to 5/11/2018	12/6/2018 to 3/28/2019	3/17/2020 to 6/23/2020	9/21/2020 to 12/23/2020	Mean	Median
Software & Services	8.0%	4.3%	12.8%	5.7%	(4.6%)	14.9%	18.4%	62.7%	34.6%	17.4%	12.8%
Health Care Equipment & Services	(1.2%)	2.3%	15.7%	9.3%	(5.8%)	12.5%	0.3%	53.9%	25.3%	12.5%	9.3%
Materials	8.3%	1.2%	15.8%	8.6%	14.3%	3.5%	4.9%	44.3%	24.3%	13.9%	8.6%
Telecommunication Services	8.6%	(3.0%)	12.2%	12.9%	4.9%	5.8%	(3.7%)	34.0%	10.9%	9.2%	8.6%
Real Estate	2.5%	1.8%	14.1%	10.1%	7.6%	8.0%	7.9%	29.1%	18.3%	11.1%	8.0%
Banks	(7.1%)	8.8%	13.6%	7.9%	(3.2%)	6.5%	0.1%	16.5%	33.8%	8.5%	7.9%
Retailing	0.6%	7.4%	16.0%	8.2%	(4.7%)	2.8%	3.3%	74.2%	36.6%	16.0%	7.4%
Insurance	1.1%	8.2%	11.9%	7.0%	0.9%	4.1%	1.6%	23.3%	16.3%	8.2%	7.0%
Media	(3.9%)	4.4%	14.1%	8.9%	(0.7%)	(4.0%)	7.0%	44.6%	30.0%	11.2%	7.0%
Diversified Financials	2.4%	(0.4%)	16.5%	7.5%	(4.8%)	7.0%	3.1%	32.3%	26.5%	10.0%	7.0%
Energy	2.5%	0.2%	12.3%	5.4%	6.8%	12.4%	(2.4%)	51.6%	30.7%	13.3%	6.8%
Semiconductors & Semis Equipment	(3.3%)	(1.1%)	15.8%	2.8%	(7.1%)	6.3%	11.4%	65.3%	41.1%	14.6%	6.3%
Pharma, Biotech & Life Sciences	0.3%	(1.9%)	17.8%	11.9%	(26.4%)	6.1%	3.8%	78.2%	19.2%	12.1%	6.1%
Utilities	5.3%	5.0%	2.6%	5.3%	12.5%	8.9%	6.1%	16.7%	12.3%	8.3%	6.1%
Food, Beverage & Tobacco	0.7%	0.5%	8.7%	5.9%	5.9%	(1.2%)	2.8%	29.0%	14.1%	7.4%	5.9%
Household & Personal Products	5.8%	2.9%	10.2%	10.5%	4.7%	0.7%	2.7%	38.2%	18.1%	10.4%	5.8%
Capital Goods	0.4%	5.2%	16.0%	5.5%	5.3%	3.3%	6.2%	40.9%	29.4%	12.5%	5.5%
Consumer Durables & Apparel	1.7%	5.2%	21.2%	11.6%	(0.9%)	2.2%	5.5%	72.8%	28.2%	16.4%	5.5%
Technology Hardware & Equipment	5.1%	1.0%	12.3%	4.5%	(2.9%)	4.8%	8.1%	46.6%	32.0%	12.4%	5.1%
Commercial & Professional Services	(0.3%)	7.3%	12.1%	4.9%	2.2%	5.0%	4.4%	26.7%	17.8%	8.9%	5.0%
Food & Staples Retailing	4.6%	6.6%	7.4%	4.4%	(1.3%)	(3.8%)	(5.1%)	44.1%	15.8%	8.1%	4.6%
Consumer Services	(0.6%)	4.3%	15.5%	2.4%	(0.1%)	7.6%	2.1%	66.0%	28.8%	14.0%	4.3%
Automobiles & Components	12.2%	(1.0%)	19.2%	4.0%	(5.1%)	(6.5%)	(4.7%)	65.0%	40.3%	13.7%	4.0%
Transportation	1.2%	1.7%	15.0%	(0.6%)	(2.5%)	3.5%	(1.9%)	36.5%	19.4%	8.0%	1.7%

WHICH VARIABLES HELP YOU PICK WINNERS FROM LOSERS NOW?

From the signal perspective, there are few signals that always helped investors pick winners from losers from 80% of the way through a drawdown until three months after it ended. Expensive stocks with forecasted earnings acceleration and revenue growth did well. Likely this is because the growth trade worked for most of the time following the Financial Crisis. That means if investors are trying to think about what to buy now if we are near the bottom, history dictates buying cheap stocks probably will not work as EV-to-EBITDA and price-to-sales historically failed. Instead, growthier metrics like 3-year revenue growth, forecast EPS acceleration, and high cash relative to assets help separate winners from losers at this stage, and those are more classic growth-stock metrics.

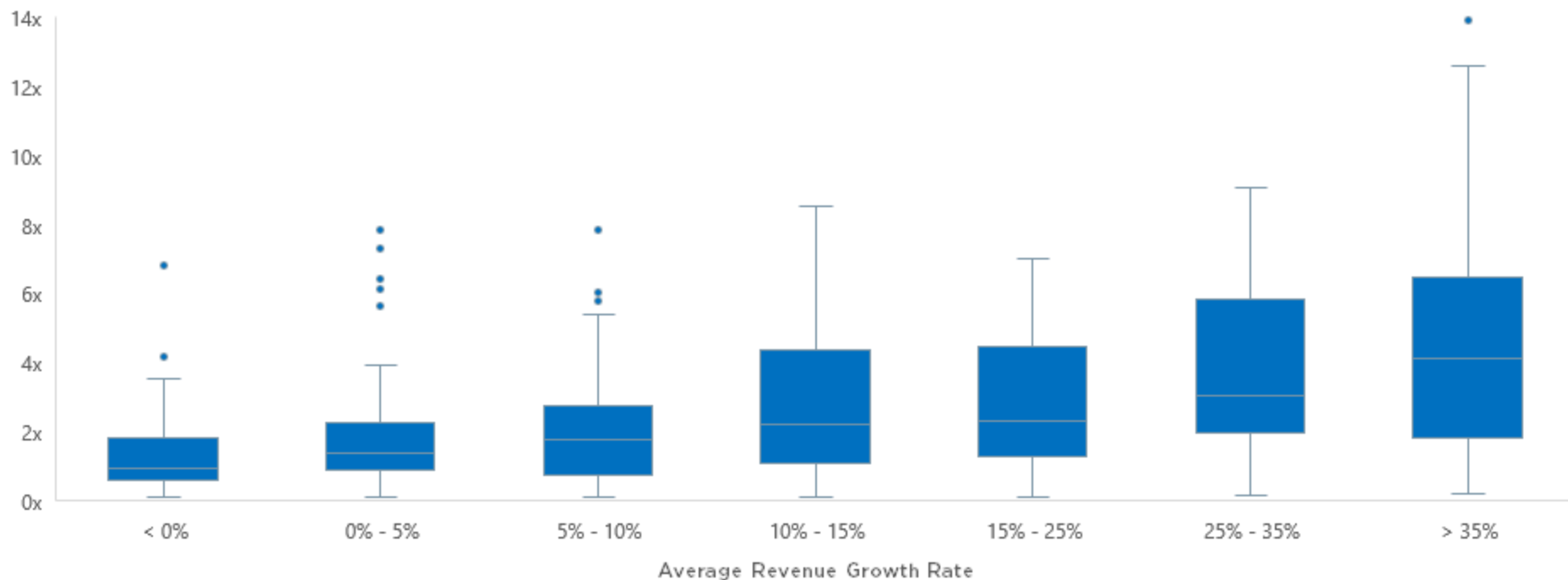
**Beta-Adjusted Spreads after 80% of Drawdown Is Complete to 3 Months After the Drawdown
Select Signals**

Signal	6/21/2010 to 10/4/2010	9/1/2011 to 1/4/2012	11/21/2011 to 2/29/2012	5/22/2012 to 8/31/2012	12/31/2015 to 5/13/2016	2/7/2018 to 5/11/2018	12/6/2018 to 3/28/2019	3/17/2020 to 6/23/2020	9/21/2020 to 12/23/2020	Mean	Median
Distance to Default	5.1%	7.2%	2.2%	1.2%	3.3%	4.5%	7.5%	3.5%	(8.3%)	2.9%	3.5%
Median YoY Revenue Growth over last 3 Years	3.4%	(6.0%)	4.7%	(3.3%)	(6.5%)	1.0%	2.7%	26.2%	9.1%	3.5%	2.7%
Cash to Assets	3.5%	(2.0%)	0.9%	(0.2%)	(4.5%)	3.0%	2.3%	16.2%	10.5%	3.3%	2.3%
Dividend Coverage	3.1%	3.7%	(2.4%)	0.5%	2.3%	0.9%	(0.8%)	2.4%	2.2%	1.3%	2.2%
Forecast EPS Acceleration	0.0%	(3.6%)	3.6%	0.1%	(3.0%)	3.5%	1.8%	14.9%	6.7%	2.7%	1.8%
Stability of YoY ROE Growth	3.2%	6.2%	(0.3%)	(0.1%)	7.9%	3.3%	2.6%	(4.2%)	(1.4%)	1.9%	2.6%
Price-to-Sales	(6.6%)	2.8%	(0.5%)	1.4%	(3.7%)	(2.4%)	(5.9%)	(12.0%)	(8.0%)	(3.9%)	(3.7%)
EV-to-EBITDA	(4.3%)	5.0%	1.6%	3.9%	2.6%	(4.8%)	(8.0%)	(26.1%)	(10.9%)	(4.6%)	(4.3%)

FASTER GROWTH MEANS DISPROPORTIONATELY HIGHER MULTIPLES

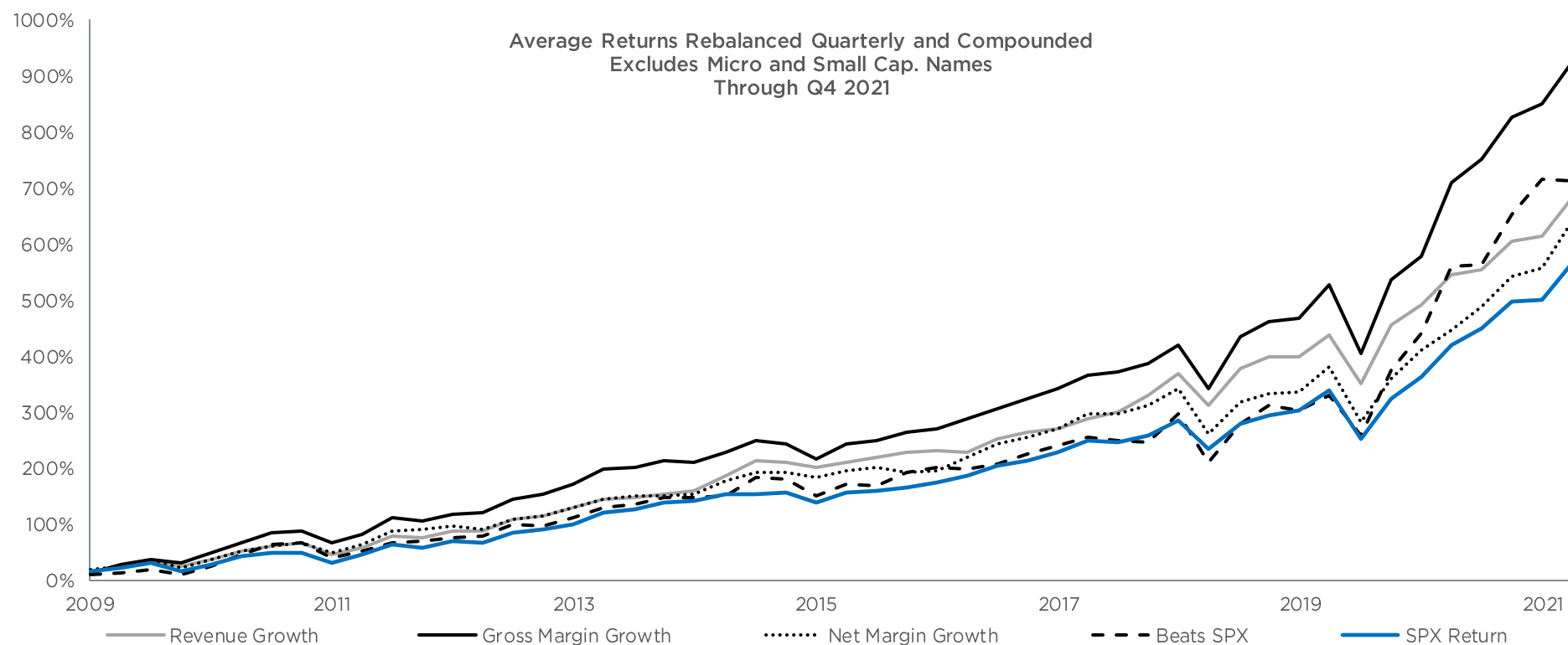
We analyzed the growth rates and relative to SP500 price-to-sales multiples for US stocks (excluding small / micro caps and value stocks). Growth / neither stocks with revenue growth below 0% have a relative price-to-sales multiple close to the market level, but as annual revenue growth exceeds 10%, the relative multiple begins to incrementally expand. Companies that grow 25-35% annual trade at nearly 4x the market multiple on sales on average, vs. 2x on average at 5-10% annual growth. **Higher growth means disproportionately higher multiples – the Double Whammy!**

Distribution of Relative to T500 Price-to-Forward Sales Multiple
By Growth Rate Bucket
End-January, 2022



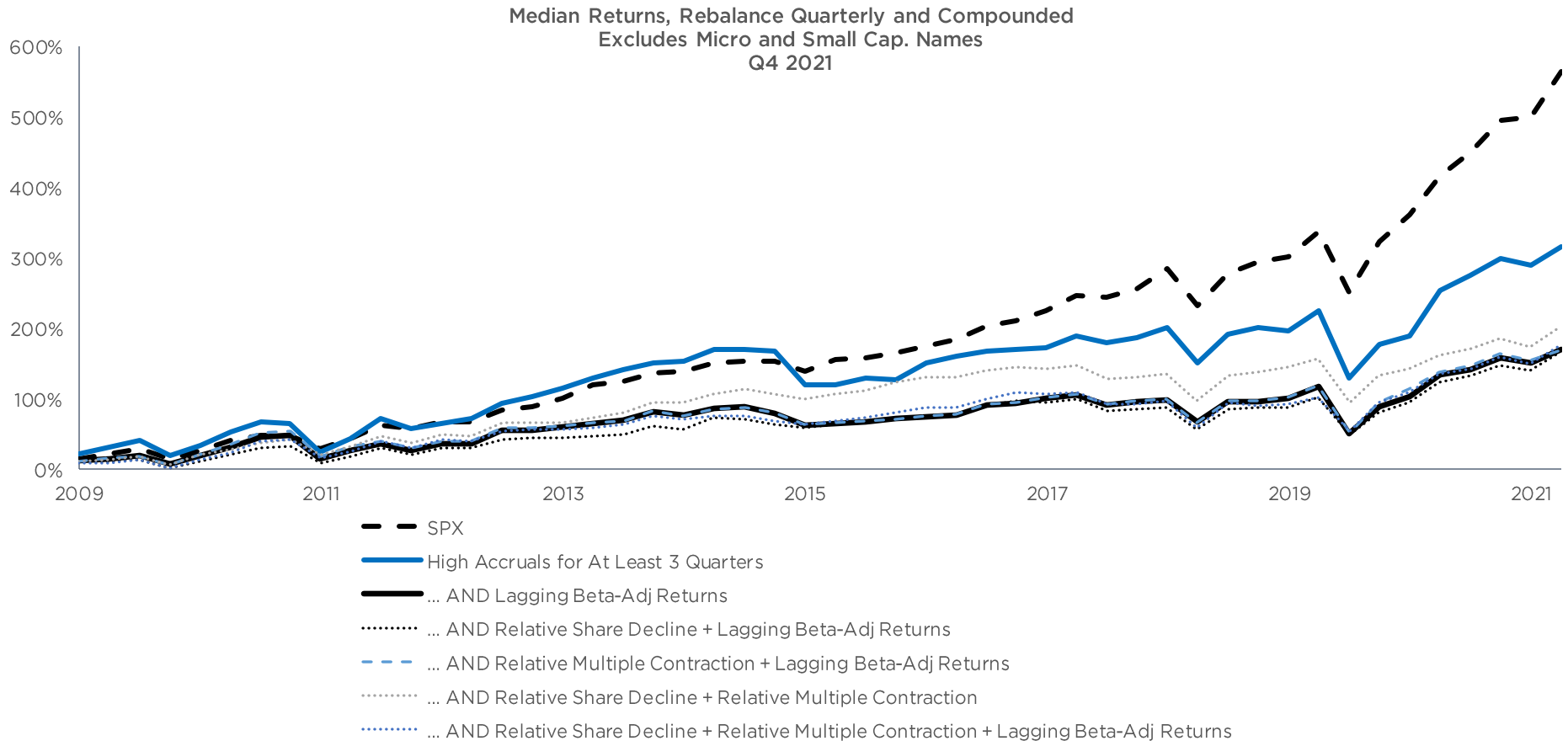
COMPOUNDERS: BUY CONSISTENT GROSS MARGIN EXPANDERS

Of the four signals we studied (prior relative stock performance, revenue growth, gross margin expansion, and net margin expansion) buying stocks in the top 10% of consistent previous gross margin expansion resulted in the best subsequent stock performance. While all four approaches beat the SP500, the consistency and total performance of the gross margin approach far bested the others. Net margin growth was clearly the weakest. Prior stock performance was strong, but much of this was generated since COVID.



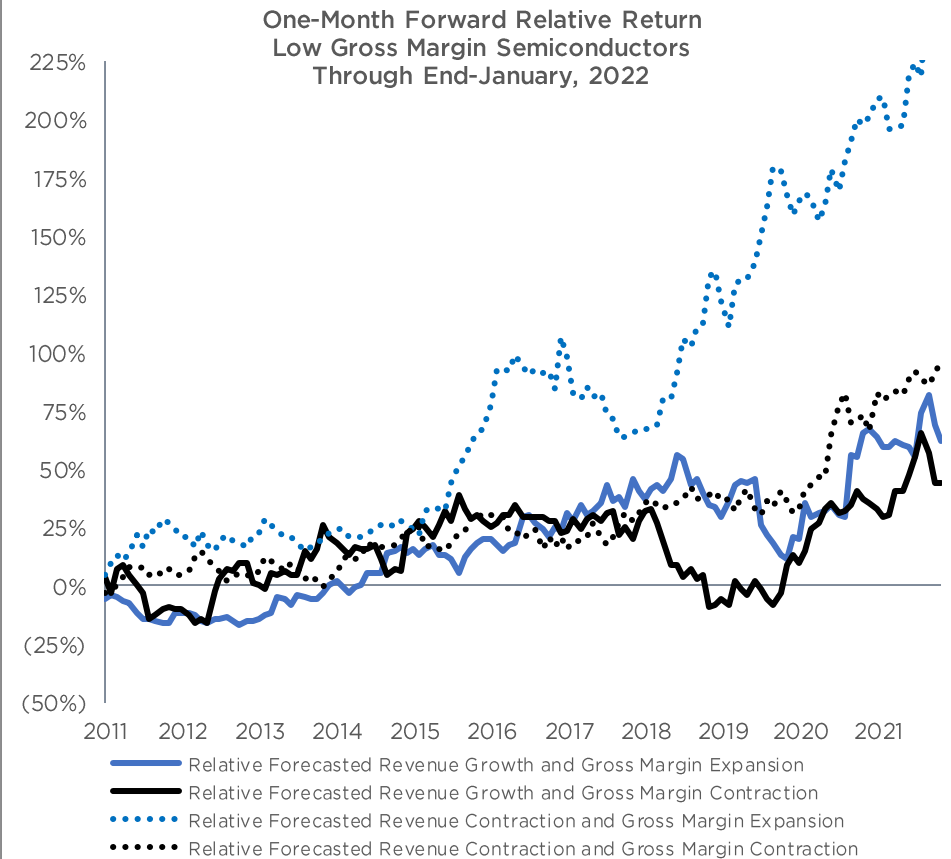
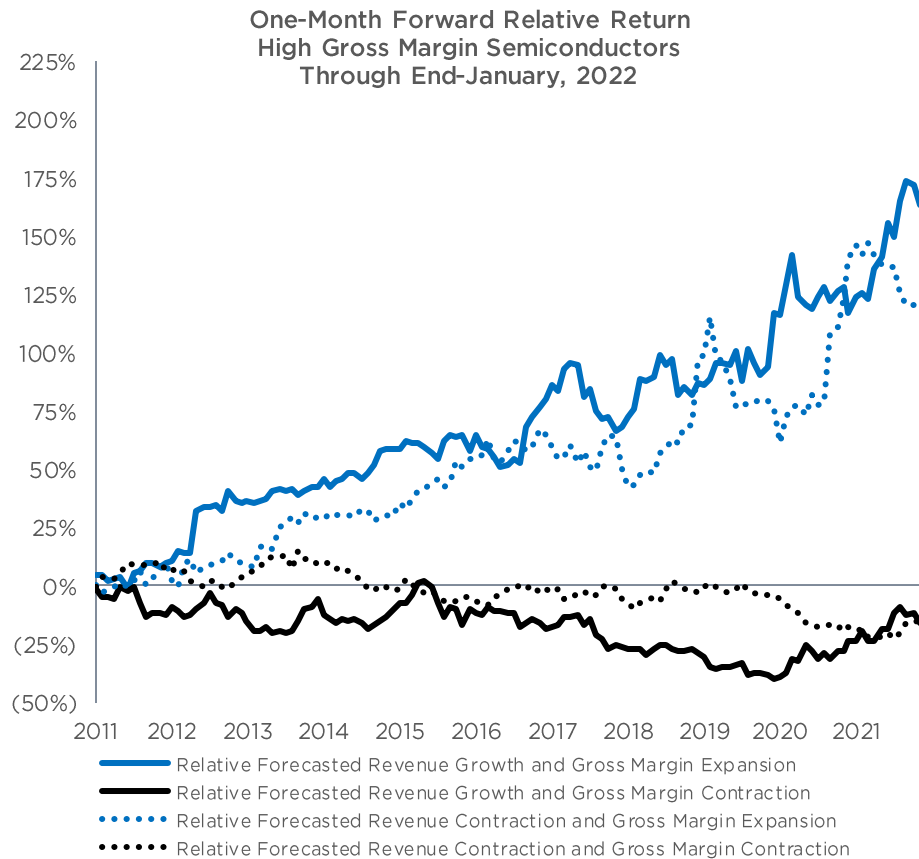
MELTING ICE CUBES: HIGH ACCRUALS WITH BAD MOMENTUM

The combination of high accruals and relative prior underperformance is compelling. By selecting only those names with high accruals for the previous three quarters that also have returns lagging their industry group and similarly-sized peers, performance can be cut nearly in half (solid blue line to solid black line compared to the SP500 returns that are the dotted black line). Further sub-setting, using changes in valuation or share, for example, have proven detrimental (in the case of forecasted share decline and prior relative contraction) or not accretive.



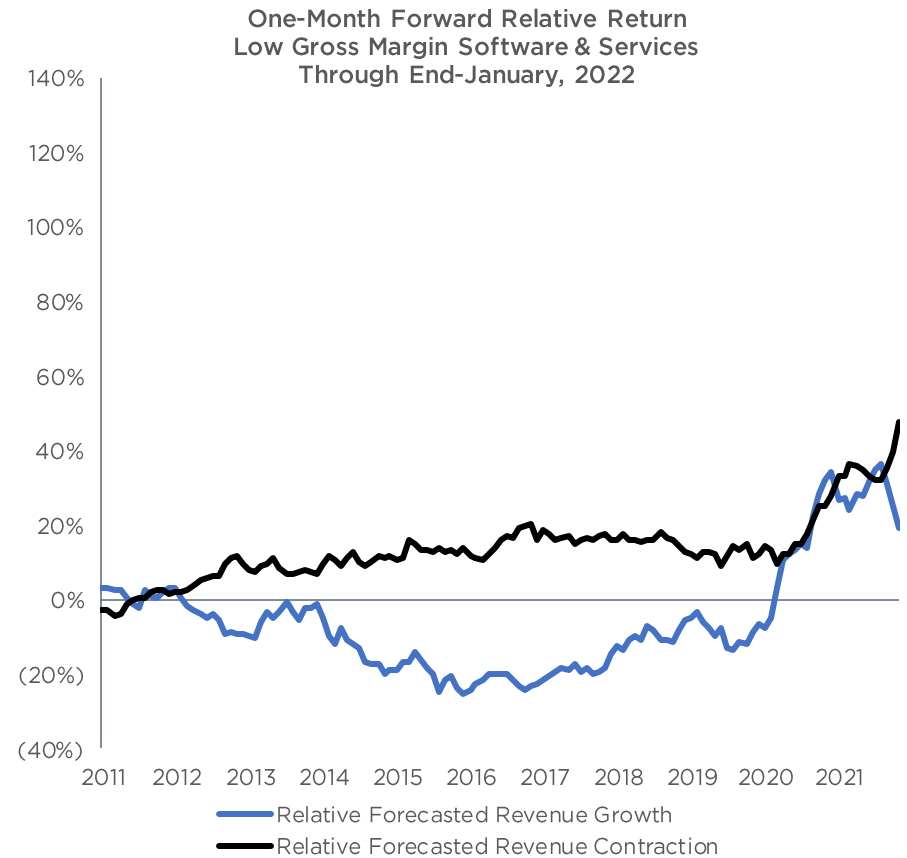
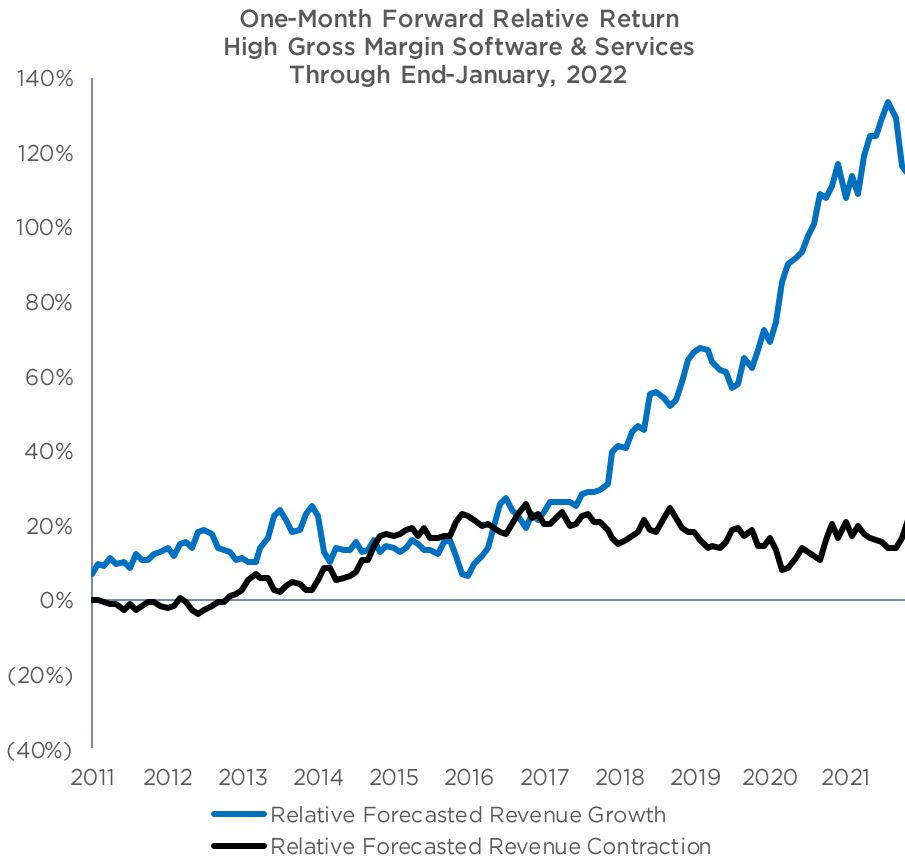
MARGIN EXPANSION MORE IMPORTANT THAN SHARE GAIN FOR CHIPS

Combining share gain / loss and margin expansion / contraction, we notice that among high margin semis (left chart) margin contraction is punished, independent of the forecasted revenue outlook, and margin expansion is rewarded. For low margin chip makers (right chart), forecasted share loss and gross margin expansion yields by far the best return – meaning the market wants low margin companies to chase higher margin revenue and improve their mix



SHARE GAIN IS IMPORTANT FOR HIGH MARGIN SOFTWARE

For high gross margin software companies, it is extremely important for forecasted revenue growth to be faster than average (left chart), with strong outperformance for share gainers among the high margin software companies relative to those high margin software companies forecasted to be share losers. The recent growth scare caused a correction. Low gross margin software companies are generally weak stocks, whether forecasted revenue is high or low (right chart).



STRATEGY TMT IDEAS

In addition to these frameworks, as part of our year ahead outlook in mid-January, we highlighted a few ideas in the TMT sector as worthy of consideration.

1. Longs: **DELL** (old technology), **CRM** (software with price power & positive free cash flow)
2. Shorts: **BILL** (profitless software with decelerating revenue growth & negative FCF), **ZM**, **DOCU**, **PTON** (low-quality work from home stocks, though with PTON now “in play” we would cover the short)

QUANTITATIVELY DERIVED STOCK IDEAS IN TMT

These stock ideas are either double whammy (long / short), compounders (long), melting ice cubes (short), or software / semis (long / short) from our margin / share gain framework.

Long and Shorts for TMT As of February 14, 2022

Longs				Shorts			
Ticker	Company Name	Industry Group	Market Cap (\$ US. Bil)	Ticker	Company Name	Industry Group	Market Cap (\$ US. Bil)
IBM	International Business Machines Corp.	Software & Services	116.72	ADP	Automatic Data Processing, Inc.	Software & Services	84.84
MU	Micron Technology, Inc.	Semis & Semi. Equip.	100.62	CTSH	Cognizant Technology Solutions Corp.	Software & Services	45.30
SNAP	Snap Inc.	Media & Entertainment	64.35	ANSS	ANSYS, Inc.	Software & Services	27.67
NXPI	NXP Semiconductors N.V.	Semis & Semi. Equip.	49.43	IT	Gartner, Inc.	Software & Services	23.73
ON	ON Semiconductor Corporation	Semis & Semi. Equip.	25.37	MPWR	Monolithic Power Systems, Inc.	Semis & Semi. Equip.	19.97
CDW	CDW Corporation	Tech Hardware & Equip	23.90	ENPH	Enphase Energy, Inc.	Semis & Semi. Equip.	19.28
SWKS	Skyworks Solutions, Inc.	Semis & Semi. Equip.	22.10	TER	Teradyne, Inc.	Semis & Semi. Equip.	18.31
TYL	Tyler Technologies, Inc.	Software & Services	19.15	CHKP	Check Point Software Technologies	Software & Services	17.22
AKAM	Akamai Technologies, Inc.	Software & Services	17.98	NLOK	NortonLifeLock Inc.	Software & Services	17.15
PINS	Pinterest, Inc.	Media & Entertainment	16.26	BR	Broadridge Financial Solutions, Inc.	Software & Services	16.91
QRVO	Qorvo, Inc.	Semis & Semi. Equip.	14.02	PTC	PTC Inc.	Software & Services	13.09
JNPR	Juniper Networks, Inc.	Tech Hardware & Equip	10.91	JKHY	Jack Henry & Associates, Inc.	Software & Services	12.39
JBL	Jabil Inc.	Tech Hardware & Equip	8.67	WOLF	Wolfspeed, Inc.	Semis & Semi. Equip.	11.99
SYNA	Synaptics Incorporated	Semis & Semi. Equip.	8.59	DOX	Amdocs Limited	Software & Services	9.83
G	Genpact Limited	Software & Services	8.22	AVLR	Avalara, Inc.	Software & Services	8.63
LSCC	Lattice Semiconductor Corporation	Semis & Semi. Equip.	7.61	MANH	Manhattan Associates, Inc.	Software & Services	8.19
NCR	NCR Corporation	Software & Services	5.54	WU	The Western Union Company	Software & Services	7.80
ALGM	Allegro MicroSystems, Inc.	Semis & Semi. Equip.	5.26	FYBR	Frontier Communications Parent, Inc.	Telecom Services	6.81
POWI	Power Integrations, Inc.	Semis & Semi. Equip.	5.02	OLED	Universal Display Corporation	Semis & Semi. Equip.	6.67
MXL	MaxLinear, Inc.	Semis & Semi. Equip.	4.51	SLAB	Silicon Laboratories Inc.	Semis & Semi. Equip.	5.82
MNDT	Mandiant, Inc.	Software & Services	4.38	TDC	Teradata Corporation	Software & Services	5.36
MTSI	MACOM Technology Solutions	Semis & Semi. Equip.	4.04	VG	Vonage Holdings Corp.	Software & Services	5.28

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