

HKU SPACE TADASI Project

Group 4: NASDAQ Dashboard

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Aim of Dashboard

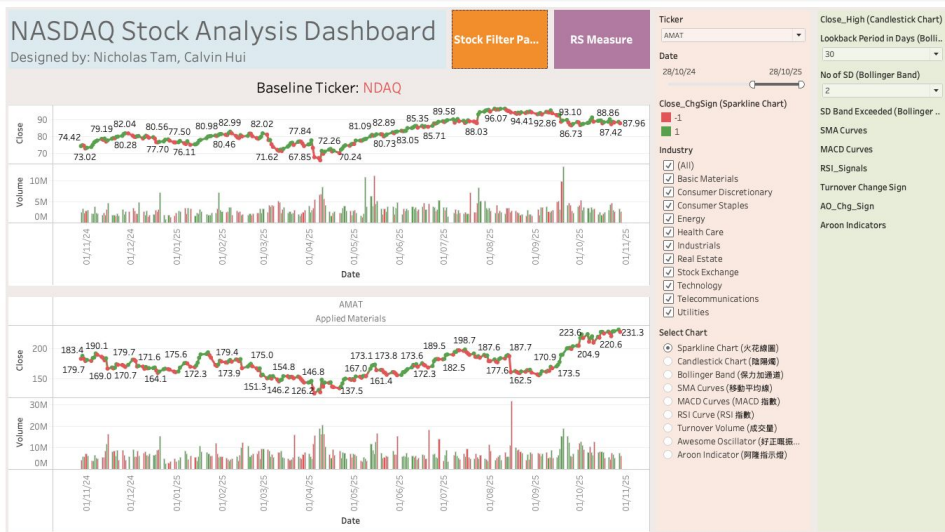
- Given variety of industries among the stocks involved in various indexes, not all stocks will be performing equally well at any given time; profits could be acquired by utilising stocks that perform better than common baseline
- NDAQ index: Stock index that covers 100 largest domestic and international non-financial companies listed on The Nasdaq Stock Market based on market capitalization (NASDAQ-100)
- Multiple types of technical indicator charts are provided to determine trading opportunities over time with high confluence
- Primary target of dashboard: Find NDAQ stocks that perform significantly better compared to baseline of NDAQ itself, especially over extensive periods of time; seeking out outliers among NDAQ stocks

Dataset

- NASDAQ ticker list and details acquired from [Wikipedia](#) by scraping corresponding table (Wikimedia Foundation, 2025)
- OHLCV data sourced from `yfinance` (Yahoo!)
- Calculated the following columns through [Jupyter Notebook](#):
 - $RSI = 100 / [100 / (1 + (14\text{-day avg. gain}) / (14\text{-day avg. loss}))]$
 - $Aroon\ Up/Down = [14 - (Days\ since\ period\ high/low)] / 14$
 - $100\text{-day drawdown} = (Current\ Price - Peak) / Peak$
 - Given $R = \text{Ratio of price between Ticker and NDAQ}$;
 $Relative\ Strength\ to\ NDAQ = [(Current\ R) - (Historical\ R)] / (Historical\ R)$
 - Outliers with all of the following:
 - Ticker is strong (Drawdown $> -5\%$)
 - NDAQ is weak (Drawdown $< -10\%$)
 - Relative strength is high (% change in (Asset Price / Benchmark Price) ratio $> 5\%$)
 - $Awesome\ Oscillator = (5\text{-day SMA}) - (34\text{-day SMA})$
 - Close and volume from previous days and corresponding change
 - Rate of change of Close

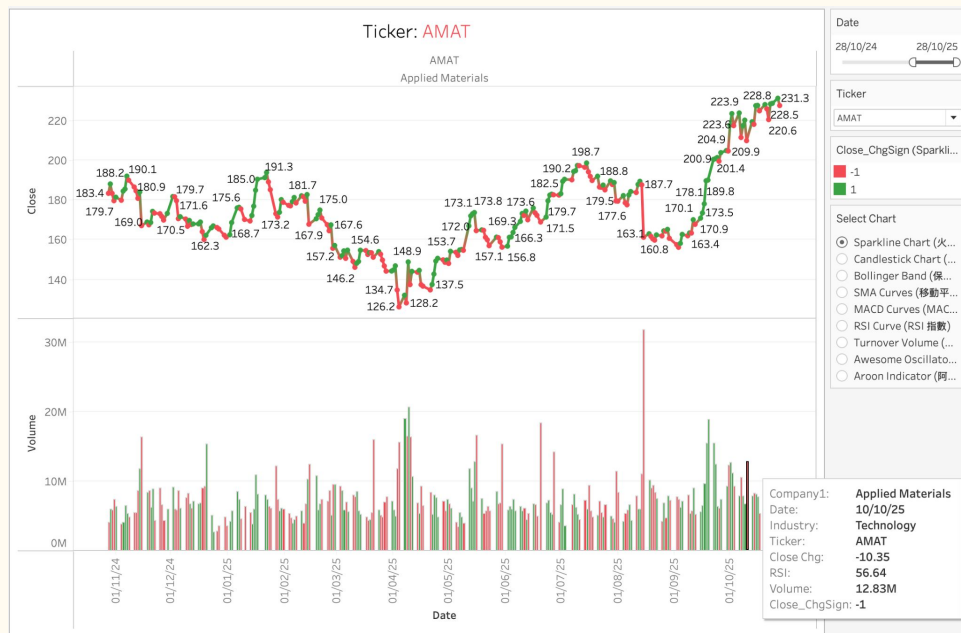
Base Dashboard

- Top sparkline chart is for NASDAQ
- Orange sidebar shows filter for Ticker, Industry, Timeframe and Chart, with corresponding chart displayed at the bottom
- Green sidebar is used for specific charts
- Orange button redirects to Stock Filter Panel table
- Purple button redirects to Relative Strength Measure chart



Sparkline Chart

- Chart of close and volume over time
- Colour mark for change in close for both Close and Volume, similar to most price charts



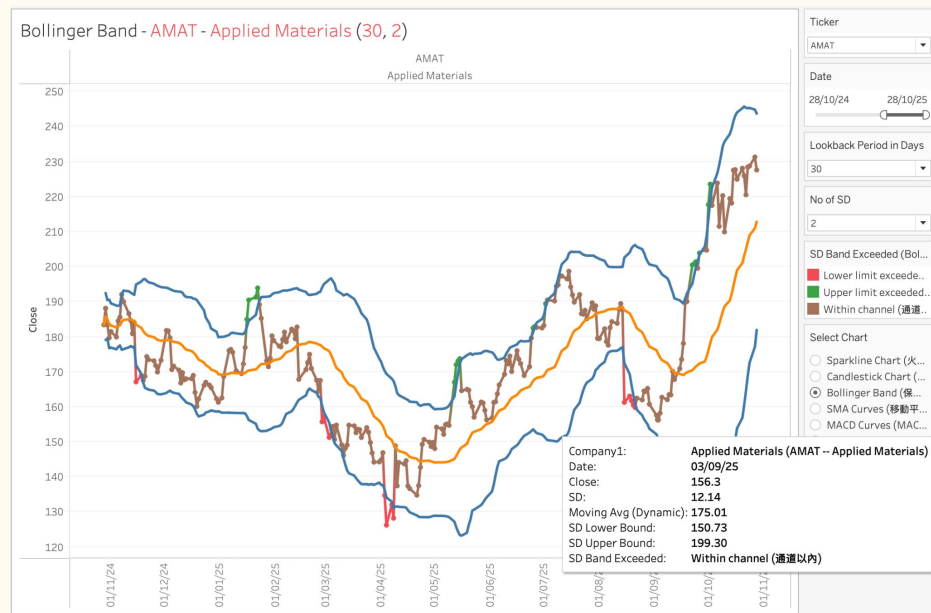
Candlestick Chart

- Values represented by Gantt Bars
- Open and Close represented with boxes, High and Low represented with candle wicks
- Coloured based on price change from Open to Close
- Date treated as discrete to allow for consistent spacing between candles (Gantt Bars do not allow for such with continuous date)



Bollinger Bands

- Dynamic Moving Average (DMA) = Average of Close over last (Lookback Period) days
- Upper/Lower Bollinger Bands = $(DMA) \pm (No\ of\ SD) * (SD\ of\ DMA)$
- Upper limit exceeded → Overbought
- Lower limit exceeded → Oversold



SMA Curves

- SMAs of differing timeframes (e.g. 10, 20, 200)
- Note: In dataset, SMAs only begin to be calculated once there are sufficient number of days
- Short-timeframe SMA cross over long-timeframe SMA: Bullish signal
- Short-timeframe SMA cross under long-timeframe SMA: Bearish signal



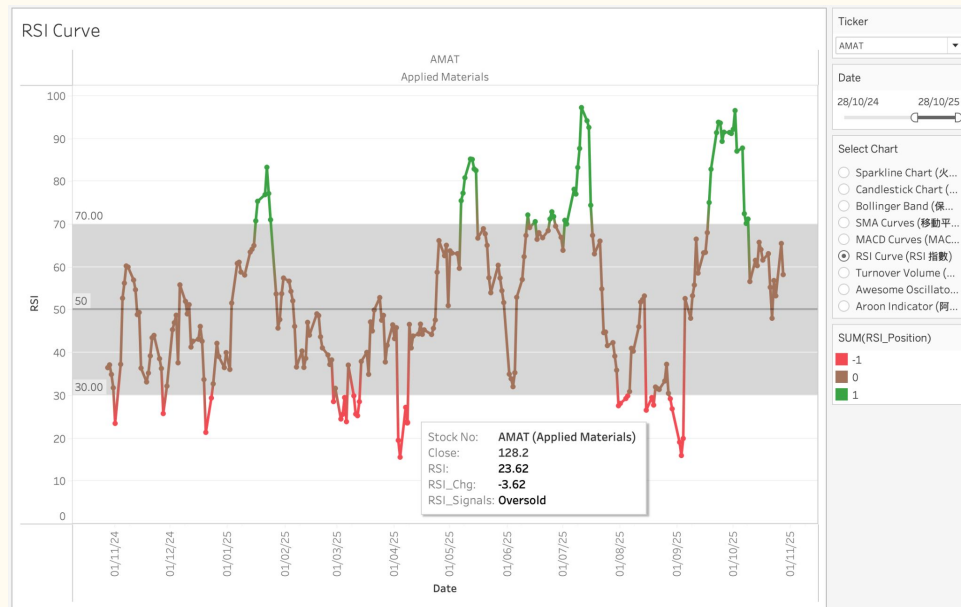
MACD Curves

- $MACD = (12\text{-day Close EMA}) - (26\text{-day Close EMA})$
- $MACD\ Signal = 9\text{-day EMA of MACD}$
- MACD cross above Signal: Bullish signal
- MACD cross below Signal: Bearish signal



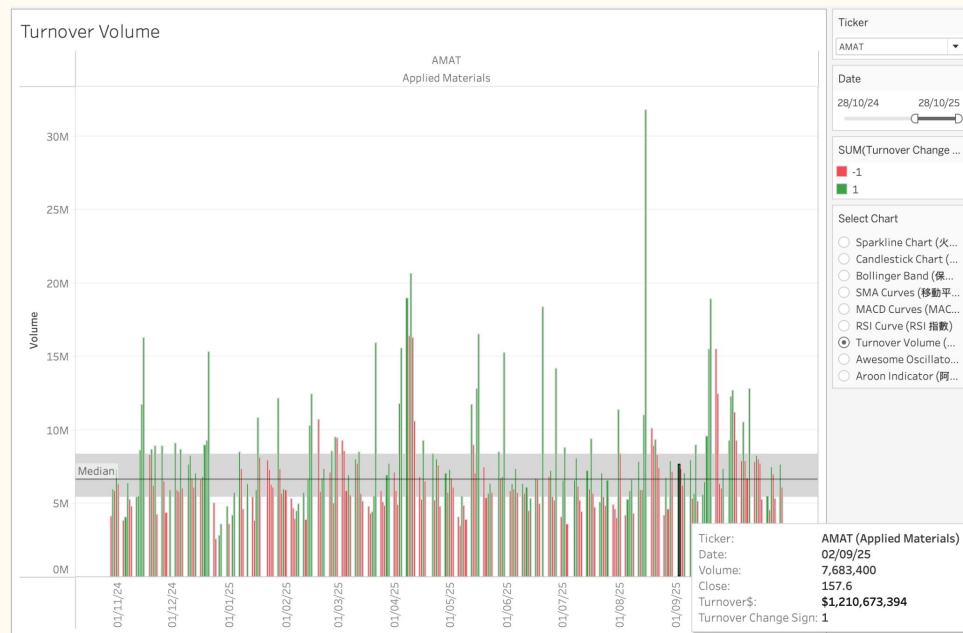
RSI Curve

- $RSI = 100 - [100 / (1 + RS)]$
 - $RS = (\text{Avg. Gain over 14 days}) / (\text{Avg. Loss in 14 days})$
- RSI_Position and RSI_Signals to indicate if Ticker is overbought/oversold



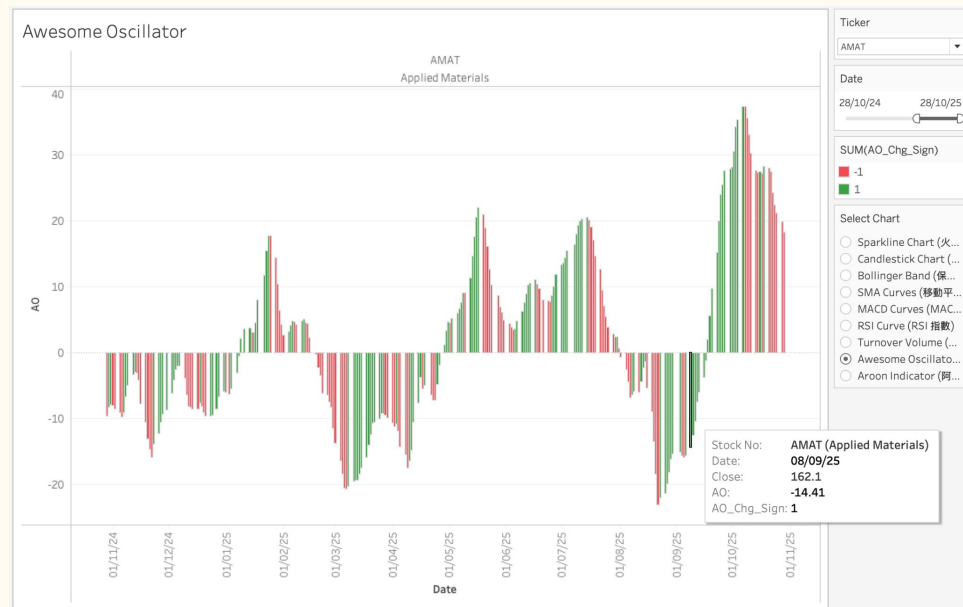
Turnover Volume

- Volume can be used as indicator of volatility of price within the day
- $\text{Turnover\$} = \text{Price} * \text{Volume}$
- Volume bars coloured by change in $\text{Turnover\$}$



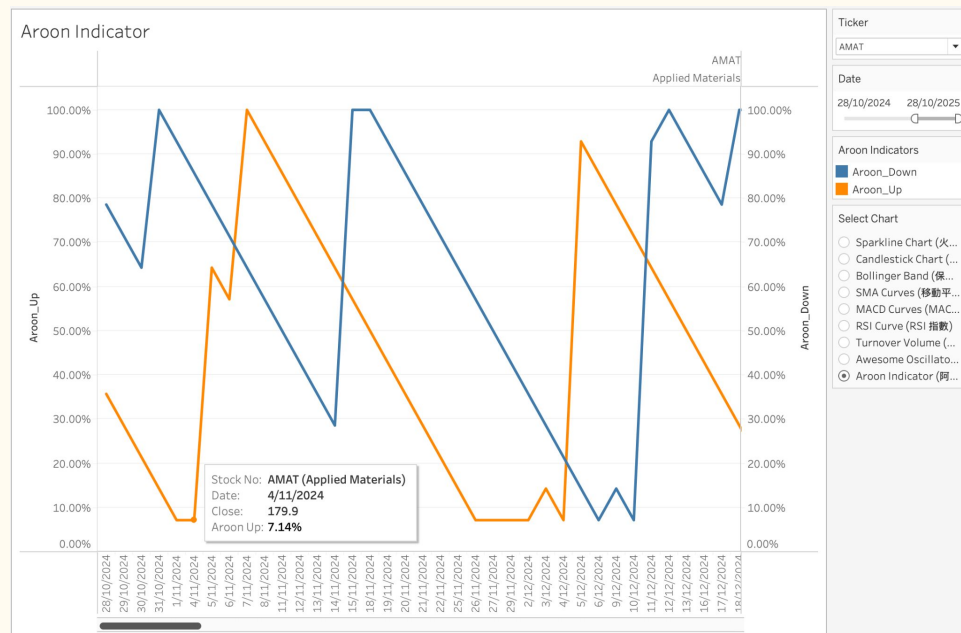
Awesome Oscillator (AO)

- $AO = 5\text{-day SMA} - 34\text{-day SMA}$
 - $AO > 0$: Overall momentum is bullish
 - $AO < 0$: Overall momentum is bearish
 - $AO \approx 0$: Overall momentum is low
- $AO_Chg_Sign = -1$: Bullish momentum decreasing
- $AO_Chg_Sign = 1$: Bearish momentum decreasing



Aroon Indicator

- $\text{Aroon Up/Down} = [14 - (\text{Periods since 14-day high})]/14$
- Aroon Up/Down are indicators for bullish/bearish momentum
 - < 50 for both: Unclear trend; consolidation
 - > 70 for one, < 30 for another: Strong trend in corresponding direction



Stock Filter Panel

- Displays % change in close for each ticker and date; each ticker shown with corresponding company
- Tickers can be filtered by industry and one of the following:
 - Price changes
 - Volume changes
 - MACD
 - RSI
 - SMAs relative to Price or each other
 - Drawdown %
 - Relative Strength %
 - Outliers

Stock Filter Panel -- All

Ticker	Company1	28/10/2..	29/10/2..	30/10/2..	31/10/2..	1/11/20..	4/11/20..	5/11/20..	6/11/20..	7/11/20..	8/11/20..	11/11/2..	12/11/2..	1
AAPL	Apple Inc.	0.86%	0.12%	-1.53%	-1.82%	-1.33%	-0.40%	0.65%	-0.33%	2.14%	-0.12%	-1.20%	0.00%	
ADSK	Autodesk	0.17%	1.10%	-0.29%	-1.74%	0.98%	0.37%	1.45%	3.61%	1.05%	0.02%	2.73%	-1.33%	
AEP	American El..	0.94%	-1.74%	0.01%	1.39%	-1.52%	1.18%	2.03%	-4.13%	0.08%	1.05%	-1.96%	-1.64%	
AMAT	Applied Ma..	-0.63%	2.58%	-2.54%	-2.01%	0.99%	-0.85%	2.56%	0.56%	3.50%	-1.06%	-1.81%	-1.03%	
AMD	Advanced ..	2.36%	3.96%	-10.62%	-3.05%	-1.53%	-0.81%	0.68%	2.43%	3.25%	-1.25%	-0.41%	-2.52%	
AMGN	Amgen	0.06%	-0.37%	-0.15%	1.46%	-0.29%	-0.72%	0.75%	0.78%	0.04%	1.05%	-1.07%	-7.14%	
AMZN	Amazon	0.30%	1.30%	1.00%	-3.28%	6.19%	-1.09%	1.90%	3.80%	1.43%	-0.89%	-0.64%	1.00%	
ARM	Arm Holdin..	4.36%	4.77%	-1.76%	-8.48%	0.13%	-2.79%	2.27%	2.87%	4.13%	-2.10%	-3.74%	-1.44%	
ASML	ASML Holdi..	-0.43%	1.15%	-4.38%	-1.65%	0.32%	-0.53%	0.79%	-2.22%	2.39%	-1.14%	0.27%	-0.32%	
AVGO	Broadcom	-0.57%	4.20%	-1.45%	-3.89%	-0.50%	-0.22%	3.17%	3.25%	2.37%	-0.09%	-2.58%	-1.50%	
AZN	AstraZeneca	1.28%	-1.04%	-3.18%	-2.31%	0.38%	0.01%	-7.22%	-3.65%	1.32%	-0.31%	0.47%	0.62%	
CEG	Constellati..	0.97%	-0.74%	-1.22%	0.45%	-1.85%	-12.46%	3.45%	0.53%	2.81%	-0.92%	-0.88%	-3.61%	
CRWD	CrowdStrike	0.23%	3.19%	-1.12%	-3.44%	2.11%	-1.40%	2.91%	4.04%	3.37%	-0.23%	3.75%	0.32%	
CSCO	Cisco	-0.83%	0.72%	-0.16%	-1.48%	1.33%	0.59%	0.59%	3.04%	0.36%	-0.03%	0.98%	0.14%	
CSX	CSX Corpor..	-0.03%	-0.03%	0.87%	0.30%	-0.74%	-0.09%	1.98%	8.41%	-3.58%	1.24%	1.44%	-1.07%	
DDOG	Datadog	-0.18%	1.89%	-0.47%	-2.12%	-1.74%	1.87%	-0.41%	2.64%	1.12%	-4.11%	-1.68%	0.86%	
EA	Electronic A..	-0.70%	1.00%	2.42%	1.15%	0.27%	1.08%	1.71%	1.58%	1.29%	-1.31%	0.94%	2.18%	
EXC	Exelon	0.40%	-1.69%	0.38%	-1.01%	-2.93%	-0.47%	1.32%	-0.39%	-0.60%	1.06%	0.76%	-0.63%	
GEHC	GE HealthC..	-2.8	Date:	28/10/2024						1.79%	-2.71%	-0.64%	-0.55%	
GILD	Gilead Scie..	-0.2	Close:	39 (0.40%)						6.77%	-1.36%	0.48%	-2.76%	
GOOG	Alphabet In..	0.8	RSI:	57.87						2.21%	-1.33%	1.17%	0.74%	
GOOGL	Alphabet In..	0.8	SMA10:	39						2.40%	-1.33%	1.12%	0.70%	
INTC	Intel	1.0	SMA50:	38						4.71%	-0.11%	-4.39%	-3.55%	
ISRG	Intuitive Su..	-0.0	Stock Filter:	Drawdown > -5% (抽籤 > -5%)						1.69%	2.32%	-0.13%	0.25%	
KLAC	KLA Corpor..	0.1	Price Description:							2.46%	0.18%	-3.11%	-0.19%	
LRCX	Lam Resear..	-2.8	Price Increased (價升)							3.16%	-1.28%	-2.60%	-0.62%	
META	Meta Platfo..	0.8	Current Price > 50-day SMA (現價 > 50天平均價)							3.44%	-0.40%	-1.05%	0.28%	
MNST	Monster Be..	-0.5	10-day SMA > 50-day SMA (10天平均價 > 50天平均價)							0.53%	-1.08%	2.96%	0.50%	
MRVL	Marvell Tec..	2.2	MACD Bearish Crossover (MACD 熊交差)							3.65%	-0.15%	-1.65%	0.57%	
MSFT	Microsoft	-0.3	Drawdown > -5% (抽籤 > -5%)							1.25%	-0.68%	-1.07%	1.20%	

SUM(Close CngPct)

-20.85% 28.95%

Date

28/10/2024 28/10/2025

Industry

☒ (All)

☒ Basic Materials

☒ Consumer Discretio...

☒ Consumer Staples

☒ Energy

☒ Health Care

☒ Industrials

☒ Real Estate

Stock_Selection_Flag

☐ (All)

☐ False

☒ True

Stock_Filter

☐ SMA-10 < SMA-50 (..)

☐ Filter A2 (A2 組合)

☐ Filter A3 (A3 組合)

☐ Filter A4 (A4 組合)

☐ Filter A5 (A5 組合)

☒ Drawdown % > -5%

☐ Relative Strength ...

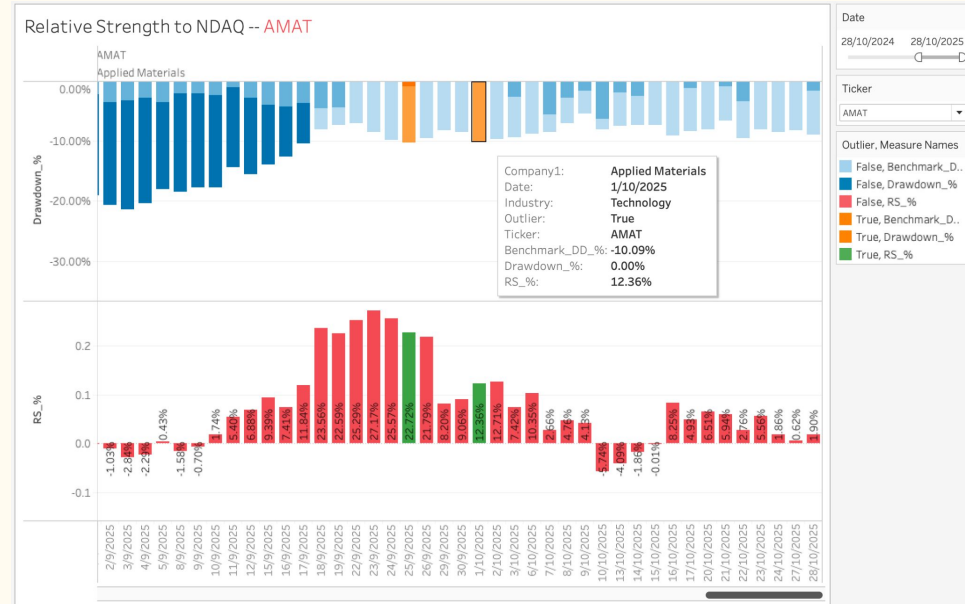
☐ Outlier (偏差值)

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Relative Strength to NASDAQ

- $\text{Drawdown}_{\%} = \% \text{ drop from highest price within lookback window (100 days)}$; $\text{Benchmark_DD}_{\%}$ shown alongside it
- $\text{RS}_{\%} = \text{Relative strength of Ticker relative to NDAQ}$; $\% \text{ change in (Asset Price / Benchmark Price) ratio}$
- Outlier has all of the following:
 - Ticker is strong ($\text{Drawdown}_{\%} > -5\%$)
 - NDAQ is weak ($\text{Benchmark_DD}_{\%} -10\%$)
 - Relative strength is high ($\text{RS}_{\%} > 5\%$)



Sources

- NASDAQ-100. Nasdaq GIW. (n.d.).
<https://indexes.nasdaqomx.com/Index/Overview/NDX>
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