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TRIVARIATE RESEARCH

THE SP500: A CONSTANTLY ENHANCED MOVING TARGET

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SUMMARY AND INVESTMENT CONCLUSIONS

The SP500 is the most followed benchmark for equity investors. In today's report we take a step back from the recent market turbulence and focus on one of the biggest challenges of beating the SP500 – additions / deletions to the index. For context, over the last 20 years, **on average about 5.5% of SP500 companies are added and deleted each year.** We decomposed the substantial differences between stocks that are added and dropped from the index to understand the impact.

Massive cumulative impact: Only 30% of the companies in the SP500 today were in the SP500 in 1999, and about half are new since 2013. We have heard some more seasoned portfolio managers lament how experience sometimes seems anti-correlated with success in recent years, and perhaps this is partially owed to the massive turnover in companies since these investors originally formulated their investment heuristics. In the more idiosyncratic sectors, for instance in the technology and consumer discretionary sectors, 80% of the stocks in the SP500 today were not in the index in 1999.

Revenue growth materially different: At the time the names are added to the SP500 index, the average stock added to the index (ex-financials) had 15.8% trailing revenue growth, vs. 1.5% growth for the average stock that was deleted. The forecasted revenue outlook is similarly different, with the adds forecasted to grow 13.7% by the median sell-side analyst estimate at the time of inclusion, vs. only 1.2% growth forecasted for the drops. This boosts the median stocks' topline growth in the SP500 by an average of roughly 60 bps each year.

Profitability also substantially higher: Stocks added to the index not only have much higher topline growth - they are also more profitable. The average stock added has net margins of 9.3% at the time of inclusion vs. net margins of 5.0% for drops.

SUMMARY AND INVESTMENT CONCLUSIONS

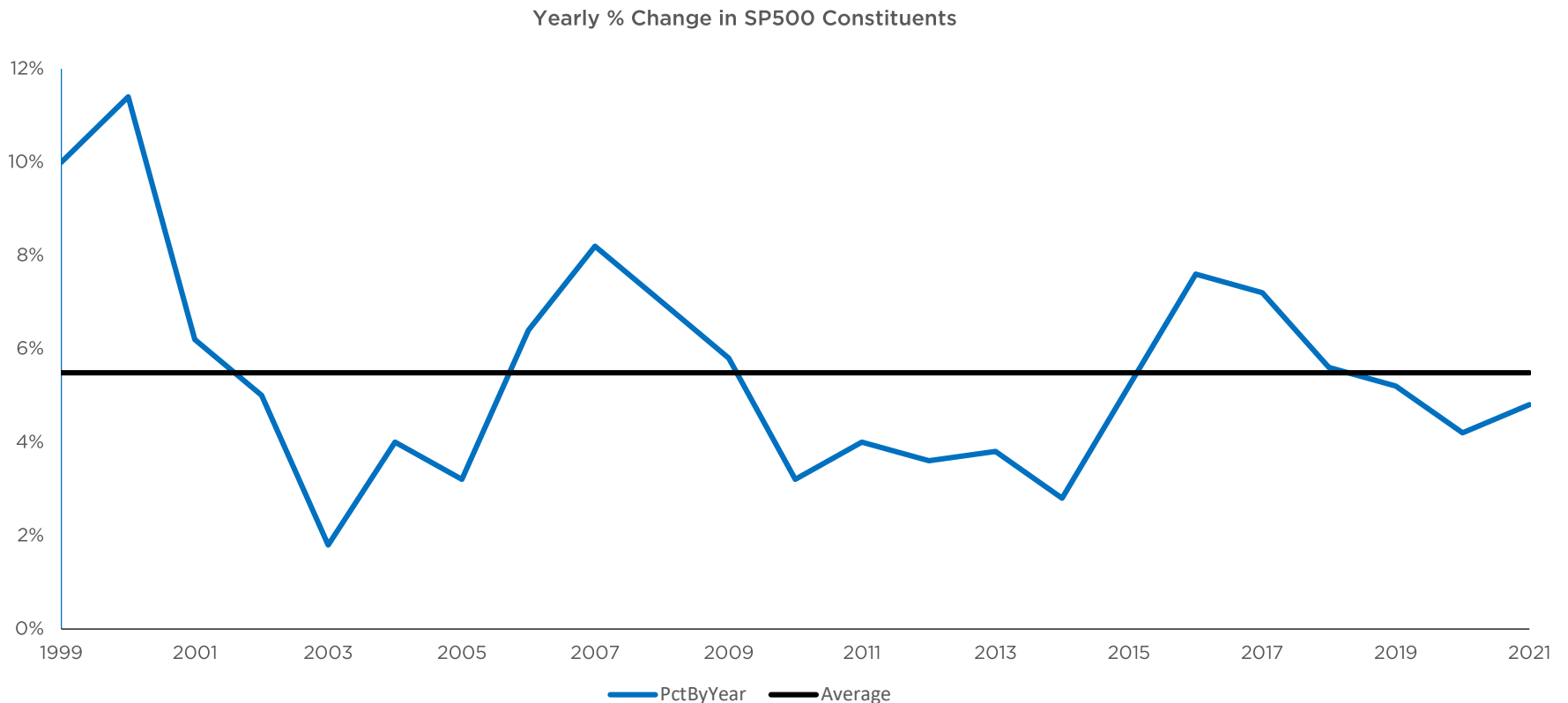
Valuation boost: The overall impact of constantly adding companies that grow faster and have higher profitability ultimately impacts the valuation of the market. Over the last 20 years, the average price-to-sales for a stock added to the SP500 is 3.2x at the time of inclusion vs. only 1.5x sales for the average stock at the time of being dropped, with much of that enormous differential created in the last few years.

Aggregate impact: Over the last decade, the impact of the of these add / drops alone has boosted earnings growth by 2.2% annually, and the market multiple by 0.18x. This partially explains higher market valuations today than history, and the challenges of beating the SP500, which is really a constantly enhanced moving target.

Investment conclusion: In order to capture some of the performance of the additions and avoid that of the deletions, we created two proprietary “potential add and potential drop” baskets to the SP500. Our goal is to capture names that are just smaller than the SP500 cut-off on market capitalization that are not melting ice cubes as longs, and short those that are melting ice cubes. Our “potential add” basket strongly outperforms the SP500, whereas our “potential drops” basket underperforms. We think trading these baskets is a good structural alpha-generative hedge. All the SP500 add / drops for illustration are shown on page 10, and the current long / short “potential addition / deletion” names are shown on page 11.

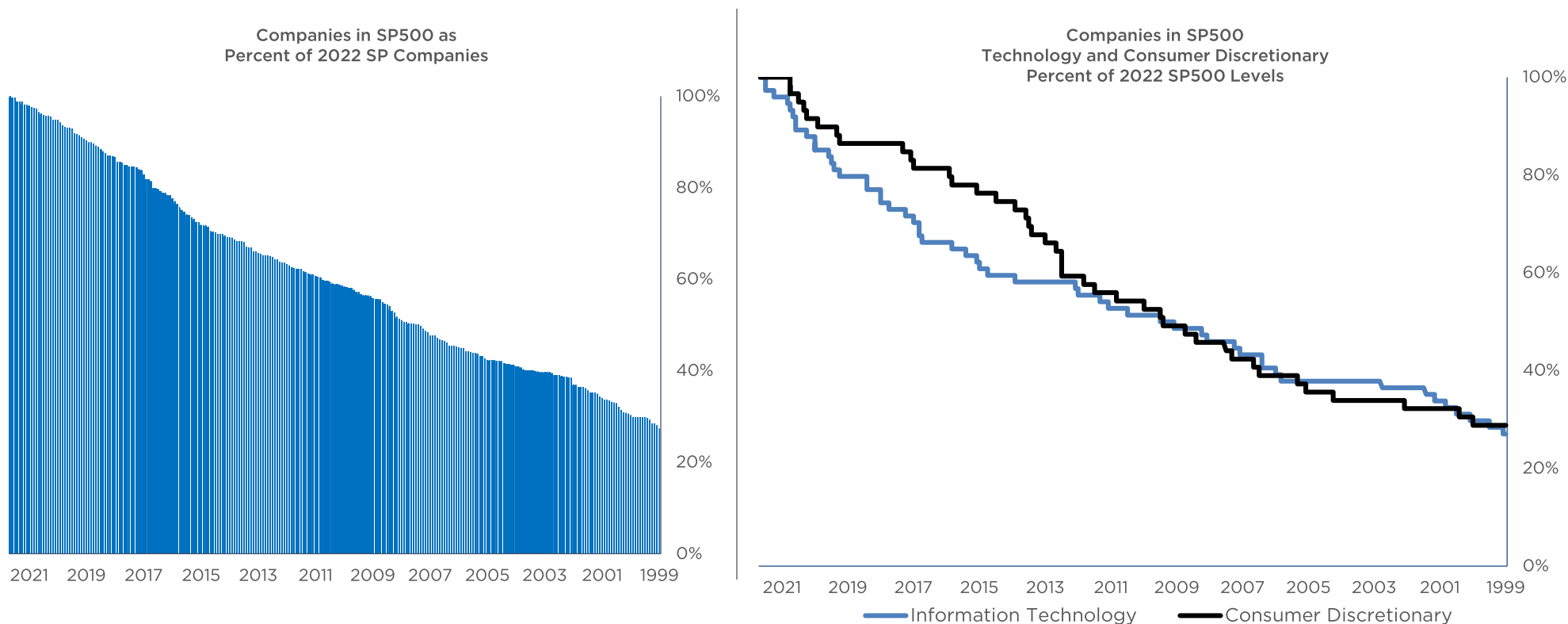
ABOUT 5.5% NEW STOCKS PER YEAR ARE ADDED / DELETED

Over the last 20 years, on average about 5.5% of SP500 companies are added and deleted each year. In years following substantial crises, like the TMT bubble crash or the Financial Crisis that can be as many as 40 new names added and 40 deleted in a single year. Today's report focuses on the financial and valuation impact these consistent additions /deletions have on the aggregate measurements of the index. Given so many investors are benchmarked against the index for performance, understanding how the index is constantly enhanced is crucial.



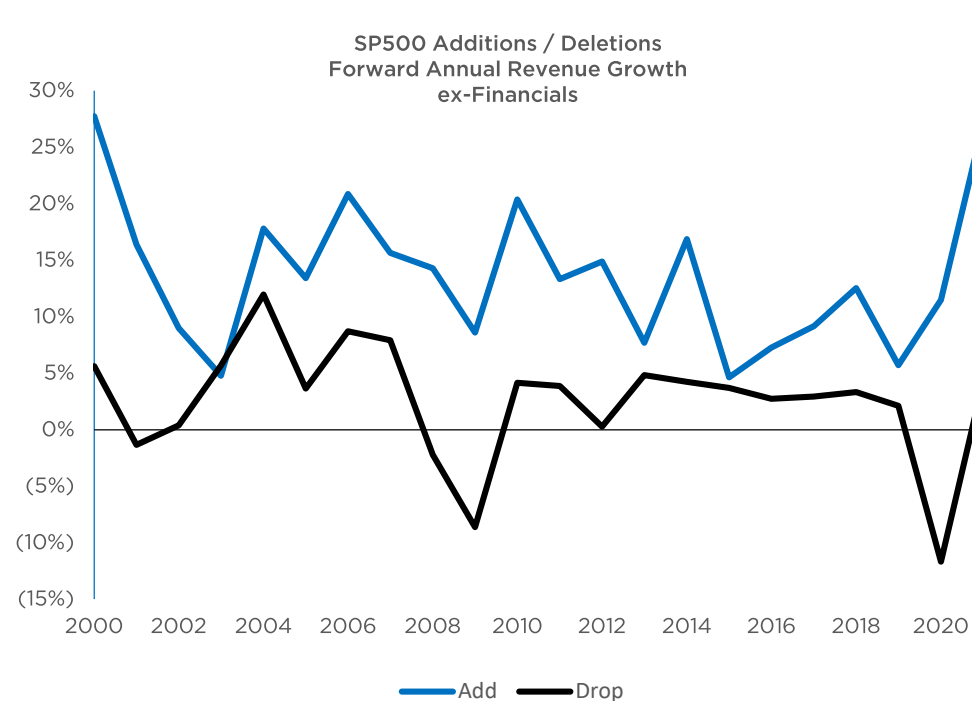
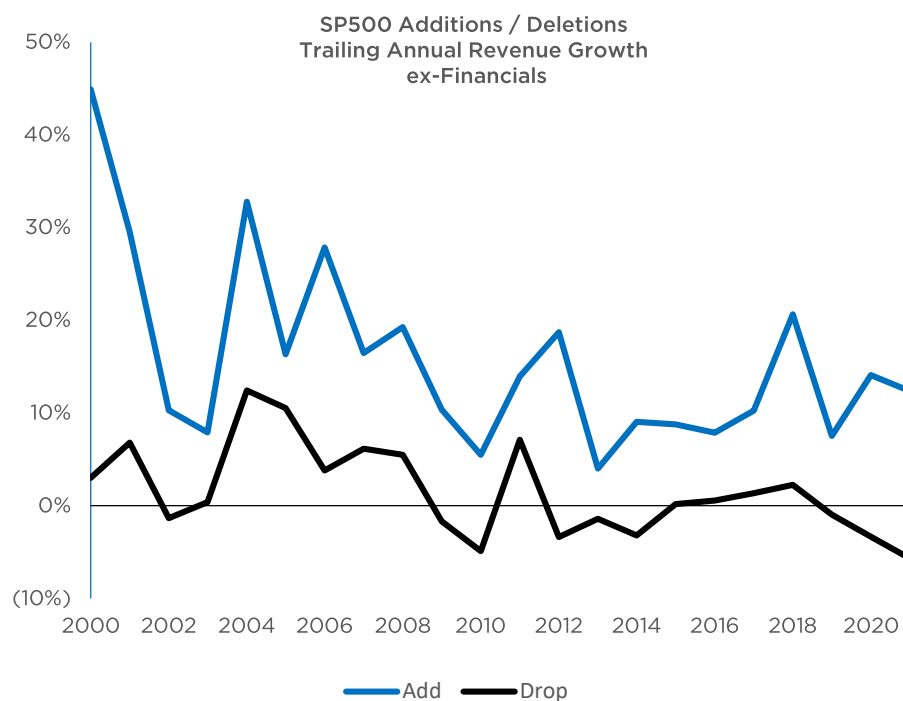
75% OF THE SP500'S CONSTITUENTS HAVE TURNED OVER SINCE 1999

The impact of this constant replacement of existing / poorer companies with new / stronger companies has a massive impact on the market constituents over time. In fact, only 25% of the companies in the SP500 today were in the SP500 in 1999, and about half are new since 2013 (left chart). In certain more idiosyncratic sectors like technology and consumer discretionary, where many managers are over-indexed, nearly 80% of today's index constituents were not there 20 years ago (right chart). We have heard some more experienced portfolio managers lament how experience sometimes seems anti-correlated with success in recent years, and perhaps this is partially merited by the massive turnover in companies since these investors originally formulated their investment heuristics.



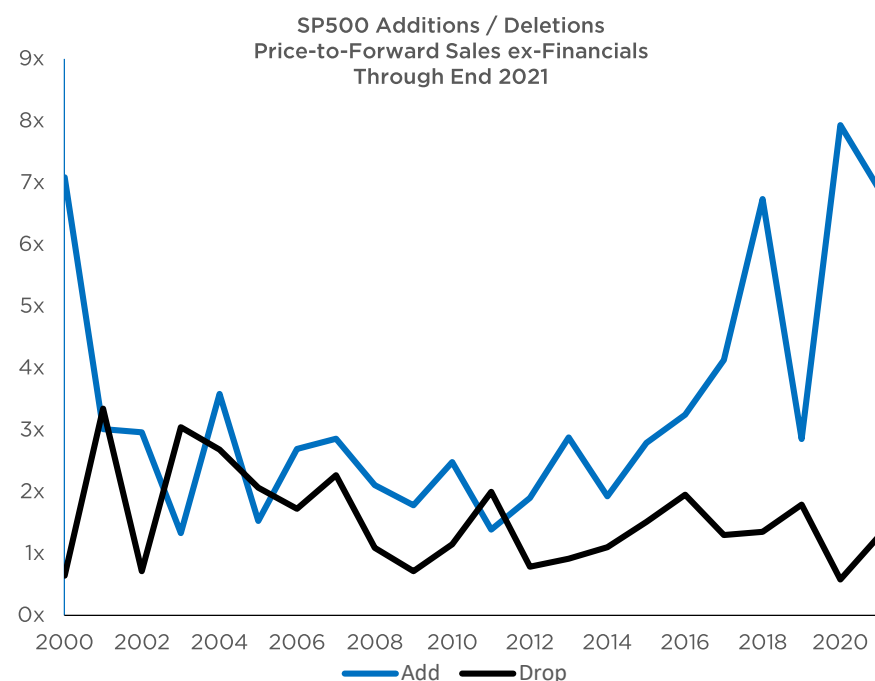
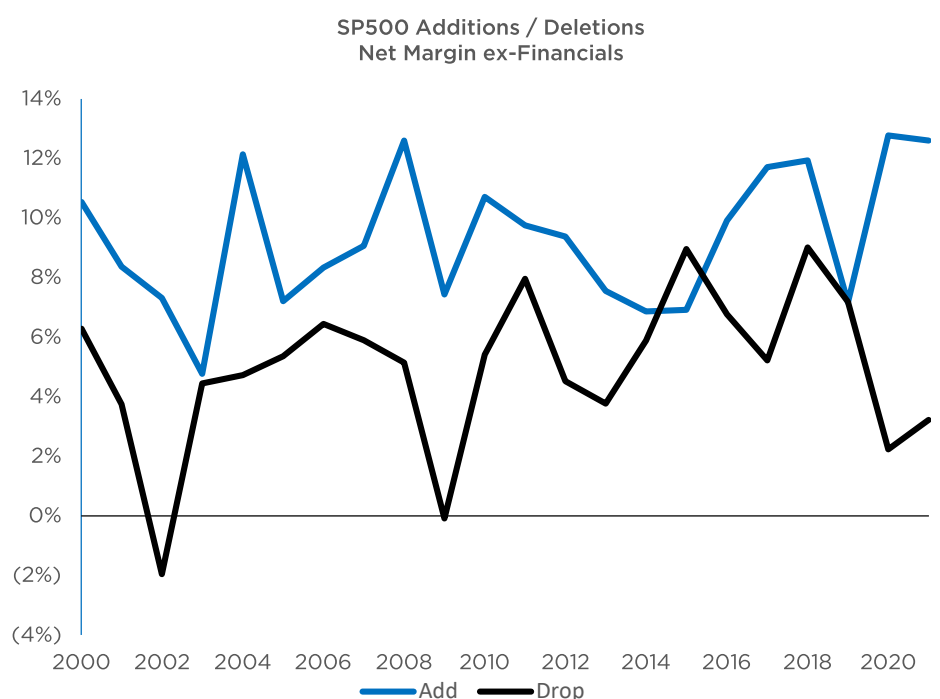
ADDS GROW MORE THAN 10% FASTER THAN DROPS

At the time the names are added to the SP500 index, the average stock added to the index (ex-financials) had 15.8% trailing revenue growth, vs. 1.5% for the average stock that was deleted (left chart). The forecasted revenue outlook is similarly different, with the adds forecasted to grow 13.6% by the median sell-side analyst estimate at the time of inclusion, vs. the deletions having consensus expectations of 3.6% growth (right chart). When 5.5% of the index is changed each year, and the ones added are growing materially faster than the ones being deleted, this boosts the median stocks' topline growth in the SP500 by an average of roughly 60 bps each year.



ADDS ARE MORE PROFITABLE AND AS RESULT MORE EXPENSIVE

In addition to the stocks added to the index having much higher topline growth, they are also more profitable. The average stock added has net margins of 9.3% at the time of inclusion vs. net margins of 5.0% for drops (left chart). The overall impact of constantly adding companies that grow faster and have higher profitability ultimately impacts the valuation of the market. The price-to-forward sales of the additions was similar to the deletions, with some volatility, until about 2005, but has moved materially higher over the past decade (right chart). Over the last 20 years, the average price-to-sales for a stock added to the SP500 is 3.2x at the time of inclusion vs. only 1.5x sales for the average stock at the time of being dropped, with much of that enormous differential created in the last decade (right chart).



THE IMPACT OF CONSTANTLY IMPROVING THE INDEX IS MASSIVE

The impact of constantly improving the index might seem small on a short-term basis but over time the constant upward bias of adding faster growing and more profitable names makes a big difference. Over the last 20 years, the SP500 has grown revenue 6.6% and earnings 11.5% per annum ex-Financials. Stocks being added to the index grow earnings 31.4%, vs. those being deleted having declining earnings of 15% (left chart). Additions / deletions alone add 2% per year to the SP500 earnings growth. Since 2012 (right chart), the average addition traded at 4.13x sales vs. the average deletion at 1.26x and a market at 2.2x sales.

Avg Annual Contribution of Adds/Drops to SP500 Attributes, Last 20 Years

Attribute	SP500	Adds	Drops	Net Contribution of Adds/Drops
YoY Revenue Growth	6.6%	13.7%	1.2%	0.6%
Gross Margin	47.8%	42.7%	42.6%	0.1%
Net Margin	11.5%	9.3%	5.0%	0.2%
YoY Earnings Growth	10.6%	31.4%	-15.0%	2.2%
Price-to-Forward-Sales	2.04x	3.20x	1.50x	0.16x
Price-to-Forward-Earnings	17.96x	22.05x	18.78x	0.18x

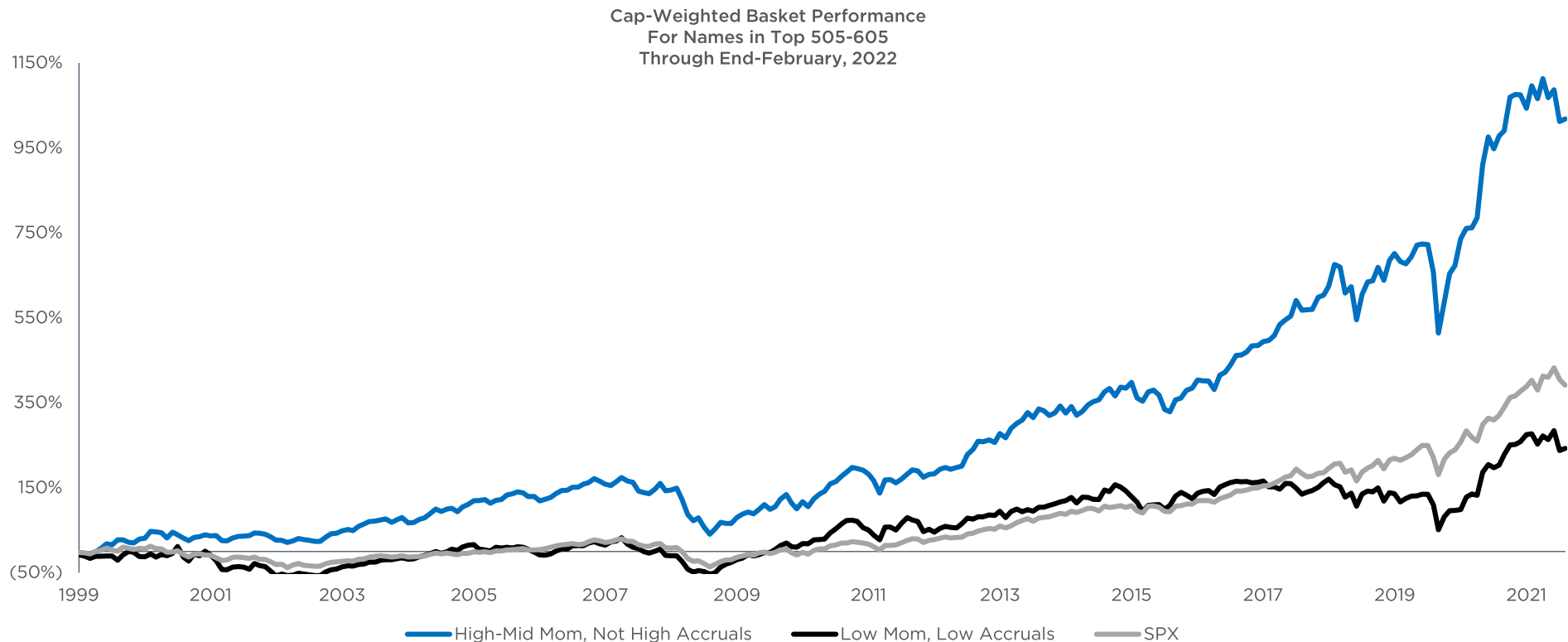
Avg Annual Contribution of Adds/Drops to SP500 Attributes, Last 10 Years

Attribute	SP500	Adds	Drops	Net Contribution of Adds/Drops
YoY Revenue Growth	5.3%	11.3%	-1.4%	0.6%
Gross Margin	49.2%	46.6%	42.7%	0.2%
Net Margin	13.2%	9.7%	5.7%	0.2%
YoY Earnings Growth	11.2%	29.3%	-12.5%	2.0%
Price-to-Forward-Sales	2.20x	4.13x	1.26x	0.21x
Price-to-Forward-Earnings	18.42x	26.78x	17.64x	0.44x

Note: Metrics ex-financials

WE CREATED PROPRIETARY “POTENTIAL ADD / DROP” BASKETS

In order to capture some of the performance of the additions and avoid that of the deletions, we created two proprietary “potential add and potential drop” baskets to the SP500. This is not a predictive model where we back-test whether names were ultimately included, and names in both baskets could already be in the official index. The point is to capture names that are just smaller than the SP500 cut-off on market capitalization that are not melting ice cubes as long, and short those that are melting ice cubes. Recall our prior work shows that avoiding stocks with high accruals and poor relative price momentum is prudent. Below notice our inclusion basket in blue, vs. the SP500 and the melting ice cubes among the 100 stocks just below the top 500 by market-capitalization.



BASKETS THAT ARE PROXIES FOR POTENTIAL ADDS/DROPS

If investors want to trade this basket, or short the melting cube stocks just below the top 500, please reach out.
Buy Non-Low Momentum, Non-High Accruals, Short Low Momentum, High Accruals for names in Top 505-605.
End-February, 2022

Long				Short			
Ticker	Company Name	Industry Group	Market Cap (\$ US. Bil)	Ticker	Company Name	Industry Group	Market Cap (\$ US. Bil)
FMC	FMC Corporation	Materials	14.83	CRL	Charles River Laboratories International, Inc.	Pharma Biotech	14.95
IPG	The Interpublic Group of Companies, Inc.	Media & Entertainment	14.77	QRVO	Qorvo, Inc.	Semis & Semis Equipment	14.94
TRGP	Targa Resources Corp.	Energy	14.59	SEDG	SolarEdge Technologies, Inc.	Semis & Semis Equipment	14.68
LNT	Alliant Energy Corporation	Utilities	14.50	MKTX	MarketAxess Holdings Inc.	Diversified Financials	14.35
AA	Alcoa Corporation	Materials	14.43	BMRN	BioMarin Pharmaceutical Inc.	Pharma Biotech	14.35
FWONK	Formula One Group	Media & Entertainment	14.41	CVNA	Carvana Co.	Retailing	13.75
EVRG	Evergy, Inc.	Utilities	14.34	CPB	Campbell Soup Company	Food, Beverage & Tobacco	13.64
WLK	Westlake Corporation	Materials	14.08	PTC	PTC Inc.	Software & Services	13.04
ARES	Ares Management Corporation	Diversified Financials	13.64	WOLF	Wolfspeed, Inc.	Semis & Semis Equipment	12.49
FNF	Fidelity National Financial, Inc.	Insurance	13.58	MPW	Medical Properties Trust, Inc.	Real Estate	12.40
HAS	Hasbro, Inc.	Consumer Durables & Apparel	13.44	OTEX	Open Text Corporation	Software & Services	11.77
WRK	WestRock Company	Materials	13.35				
RHI	Robert Half International Inc.	Commercial & Prof. Services	13.17				
XRAY	DENTSPLY SIRONA Inc.	Health Care Equip & Services	12.83				
JKHY	Jack Henry & Associates, Inc.	Software & Services	12.82				
CMA	Comerica Incorporated	Banks	12.52				
CBOE	Cboe Global Markets, Inc.	Diversified Financials	12.52				
AAP	Advance Auto Parts, Inc.	Retailing	12.45				
FCNCA	First Citizens BancShares, Inc.	Banks	12.40				
JLL	Jones Lang LaSalle Incorporated	Real Estate	12.31				
FFIV	F5, Inc.	Tech Hardware	12.29				
MORN	Morningstar, Inc.	Diversified Financials	12.14				
APA	APA Corporation	Energy	11.68				
DAR	Darling Ingredients Inc.	Food, Beverage & Tobacco	11.43				

RECENT ADDITIONS / DELETIONS EXCLUDING ACQUIRED COMPANIES

SP500 Adds/Drops Since 2021 (ex-Acquired Companies) by Market Cap

Additions				Deletions			
Ticker	Company Name	Industry Group	Current Market Cap (\$ US. Bil)	Ticker	Company Name	Industry Group	Current Market Cap (\$ US. Bil)
MRNA	Moderna, Inc.	Pharma and Biotech	63.34	CEG	Constellation Energy	Energy	14.99
NXPI	NXP Semiconductors N.V.	Semis & Semi Equipment	50.26	WU	The Western Union Company	Software & Services	7.33
MTCH	Match Group, Inc.	Media & Entertainment	32.23	NOV	NOV Inc.	Energy	6.59
EPAM	EPAM Systems, Inc.	Software & Services	21.73	UNM	Unum Group	Insurance	5.53
MPWR	Monolithic Power Systems, Inc.	Semis & Semi Equipment	21.05	GPS	The Gap, Inc.	Retailing	5.35
SBNY	Signature Bank	Banks	20.19	HBI	Hanesbrands Inc.	Consumer Durables & Apparel	5.31
ENPH	Enphase Energy, Inc.	Semis & Semi Equipment	19.74	SLG	S.L. Green Realty Corp.	Real Estate	5.20
GNRC	Generac Holdings Inc.	Capital Goods	19.22	VSCO	Victoria's Secret & Co.	Retailing	4.91
BRO	Brown & Brown, Inc.	Insurance	18.69	DTM	DT Midstream, Inc.	Energy	4.84
CZR	Caesars Entertainment, Inc.	Consumer Services	18.13	LEG	Leggett & Platt, Incorporated	Consumer Durables & Apparel	4.83
TRMB	Trimble Inc.	Tech Hardware	16.96	HFC	HollyFrontier Corporation	Energy	4.82
TECH	Bio-Techne Corporation	Pharma and Biotech	16.22	PRGO	Perrigo Company plc	Pharma and Biotech	4.68
FDS	FactSet Research Systems Inc.	Diversified Financials	14.85	FLS	Flowserve Corporation	Capital Goods	3.87
CRL	Charles River Laboratories International, Inc.	Pharma and Biotech	14.64	VNT	Vontier Corporation	Tech Hardware	3.87
SEDG	SolarEdge Technologies, Inc.	Semis & Semi Equipment	14.32	XRX	Xerox Holdings Corporation	Tech Hardware	3.09
NDSN	Nordson Corporation	Capital Goods	12.90	FTI	TechnipFMC plc	Energy	3.00
PTC	PTC Inc.	Software & Services	12.85				
CDAY	Ceridian HCM Holding Inc.	Software & Services	10.77				
OGN	Organon & Co.	Pharma and Biotech	9.14				
PENN	Penn National Gaming, Inc.	Consumer Services	8.40				
VSCO	Victoria's Secret & Co.	Retailing	4.91				
DTM	DT Midstream, Inc.	Energy	4.84				

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