TRIVARIATE RESEARCH

CROWDING: RISK AND OPPORTUNITY
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SUMMARY AND INVESTMENT CONCLUSIONS

For many years prime brokerage firms and quants have separately tried to tackle the issue of investor crowding and its implications. Recently, we have seen an increase in interest in crowding, particularly as investors try to find the bottom on growth stocks that have sold off.

We established a systematic approach to analyzing the high conviction ideas of money managers through their 13F filings. We used this approach to inform recommendations about position sizing, and sometimes whether we would even buy or short a stock. While 13F filing data are lagged, and we do not know any manager's real exposure as we are not assessing the options market or any short positions, we found it instructive to define a proprietary universe of fundamental managers, define high conviction, and use our quantitative models to improve our ability to find superior and inferior groups of equities.

- We first analyzed the high conviction (defined as 3% or more of the long AuM of a manager) of a broad universe of 500+ fund managers. We define "crowded" as any name that was held in high conviction by many managers (names in the top 5% of funds holding in high conviction). **Over time, these crowded names are an inferior asset class, underperforming the SP500 and the QQQ since the Financial crisis and since 2016 in particular.**
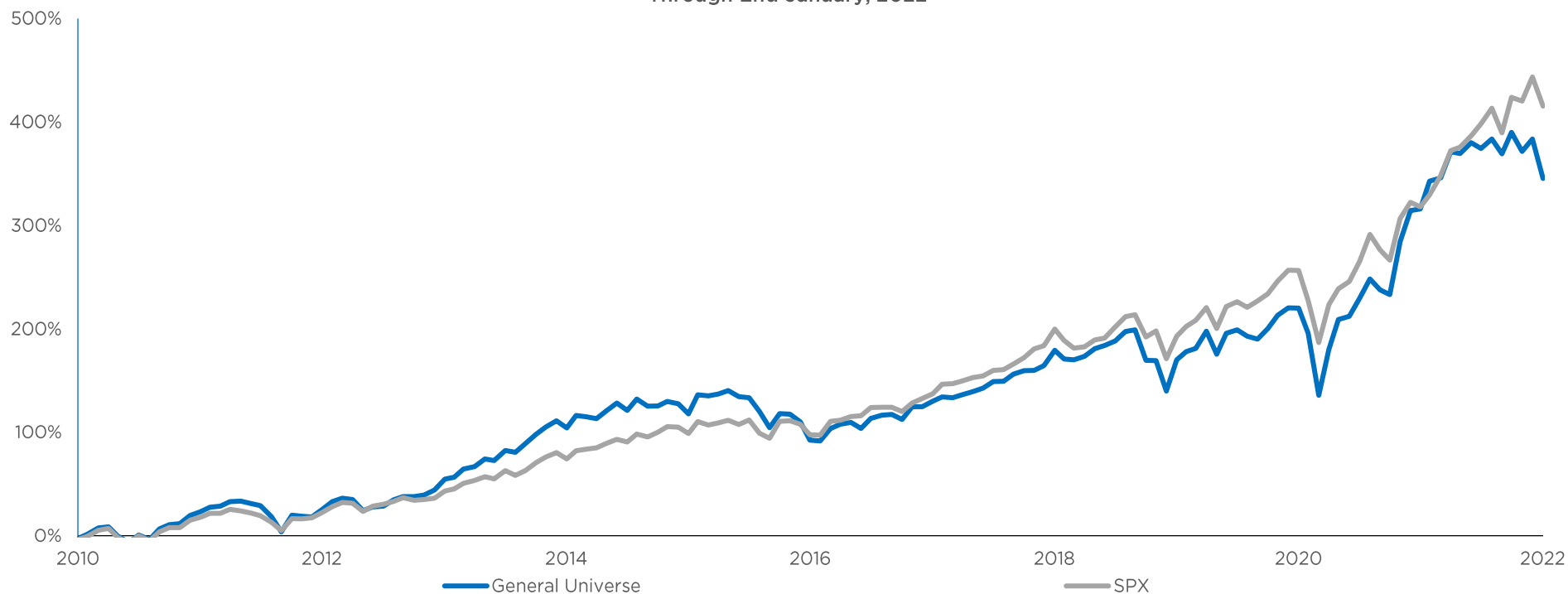
SUMMARY AND INVESTMENT CONCLUSIONS

- We then defined a subset of managers, the Trivariate universe (TV managers) of 60 fundamental hedge fund managers that we believe do deep fundamental research, run relatively concentrated portfolios, and do not trade quarterly results as the core part of their strategy. We then systematically access the high conviction long ideas from this group of TV managers. We evaluated whether adding information about high conviction from this subset could help when used in conjunction with high conviction from the broader universe. We found that there is information in the high conviction positions of our subset. **Contrary to the outcomes observed from the general universe, when *none* of our managers have high conviction, this is bad crowding - the returns on these stocks are inferior. On the other hand, when the TV managers do have high conviction in a stock, the performance is superior to the market and to basket of high conviction stocks from the general universe.** Therefore, there is not only information when none of the TV managers have conviction ("bad" crowding), but also when these managers do have high conviction ("good" crowding).

- Our quantitative framework ranks stocks on common attributes like valuation, sentiment, accounting, balance sheet, income statement, cash flow statement and other key metrics. We evaluated whether these models added incremental information to the fundamental high conviction ideas from our TV universe of fund managers. Again, the answer is yes. **Our models, when combined with high conviction names from the TV universe, add incremental value.** When our models disagree with the TV managers, our models are on average correct. Good and bad crowded names from this framework are shown on page 7.

HIGH CONVICTION IN THE GENERAL UNIVERSE IS RISKY

We analyzed the high conviction (3% or more of long AuM) of a broad universe of 500+ hedge fund managers. We regard as crowded any name that was held in high conviction by the broad universe of over 500 managers from the SP Global database (names in the top 5% of funds holding in high conviction). **Over time, these crowded names are an inferior asset class, underperforming the SP500 and the QQQ since the Financial crisis and since 2016 in particular, and providing downside protection during the recent sell-off.**

Mean Compounded Returns
High Conviction Holdings
Through End-January, 2022

Legend: — General Universe   — SPX

"BAD" CROWDING OCCURS IF OUR GROUP SHOWS NO CONVICTION

We have a separate proprietary Trivariate universe (TV) of 60 fundamental hedge fund managers that we believe do deep fundamental research, run relatively concentrated portfolios, and do not trade quarterly results as the core part of their strategy. In essence, we are systematically accessing the high conviction long ideas from this group of TV managers. We evaluated whether adding information about high conviction from the TV universe could help when used in conjunction with high conviction from the broader universe. We found that there is meaningful information in the TV universe of managers. **When *none* of our Trivariate managers have high conviction, this is "bad" crowding - the returns are materially lower.** This is a risk that managers can systematically track.

Mean Compounded Returns
High Conviction Holdings
Through End-January, 2022

General Universe · · · · · · General Universe ex-TV Universe ——— SPX

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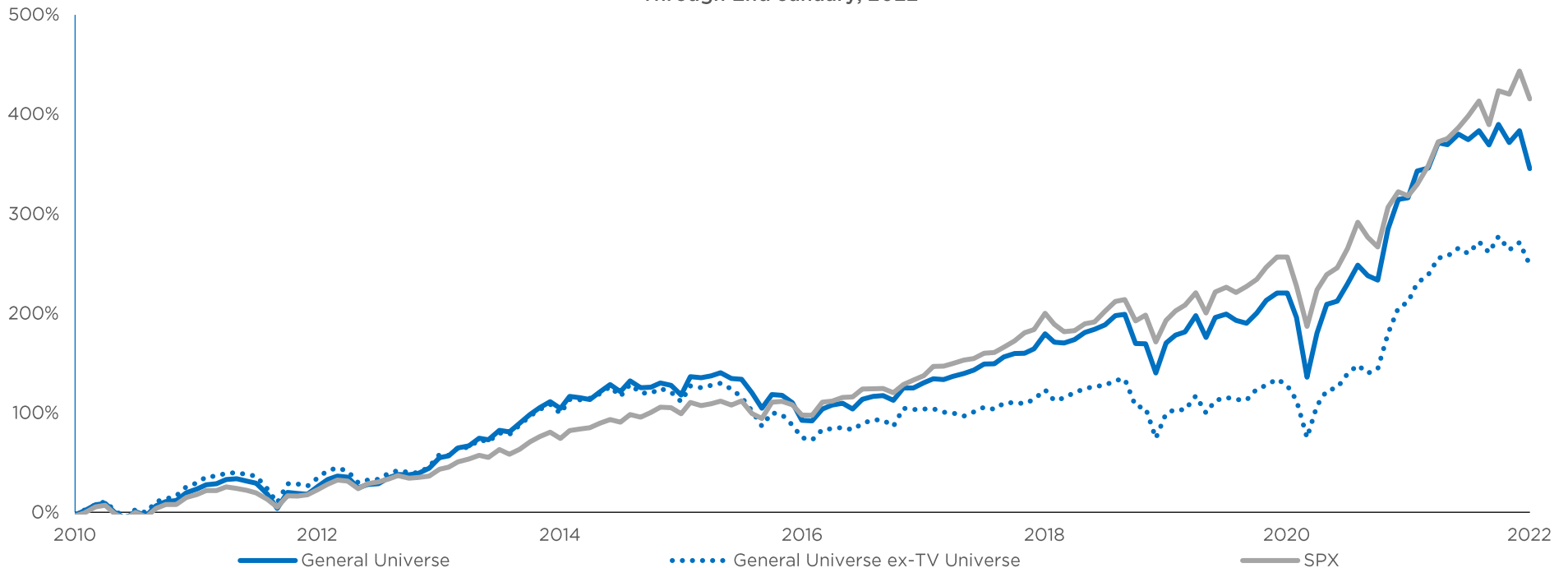
WHEN THE TV UNIVERSE ALSO HAS CONVICTION, CROWDING IS OK

On the other hand, when our universe of managers *does* have high conviction in a stock, the performance is superior to the market and to basket of high conviction stocks from the general universe. Therefore, there is not only information when *none* of our managers have conviction (bad crowding), but also when these managers *do* have high conviction (good crowding). Our group's high conviction names have failed of late, as there is certainly a recent correlation between high conviction and growth stocks. Hence, buying this high conviction list from our managers and shorting (under-weighting) the high conviction from the broader universe is prudent risk management.

Mean Compounded Returns
High Conviction Holdings
Through End-January, 2022

Legend: General Universe — General Universe ex-TV Universe — TV Universe — SPX
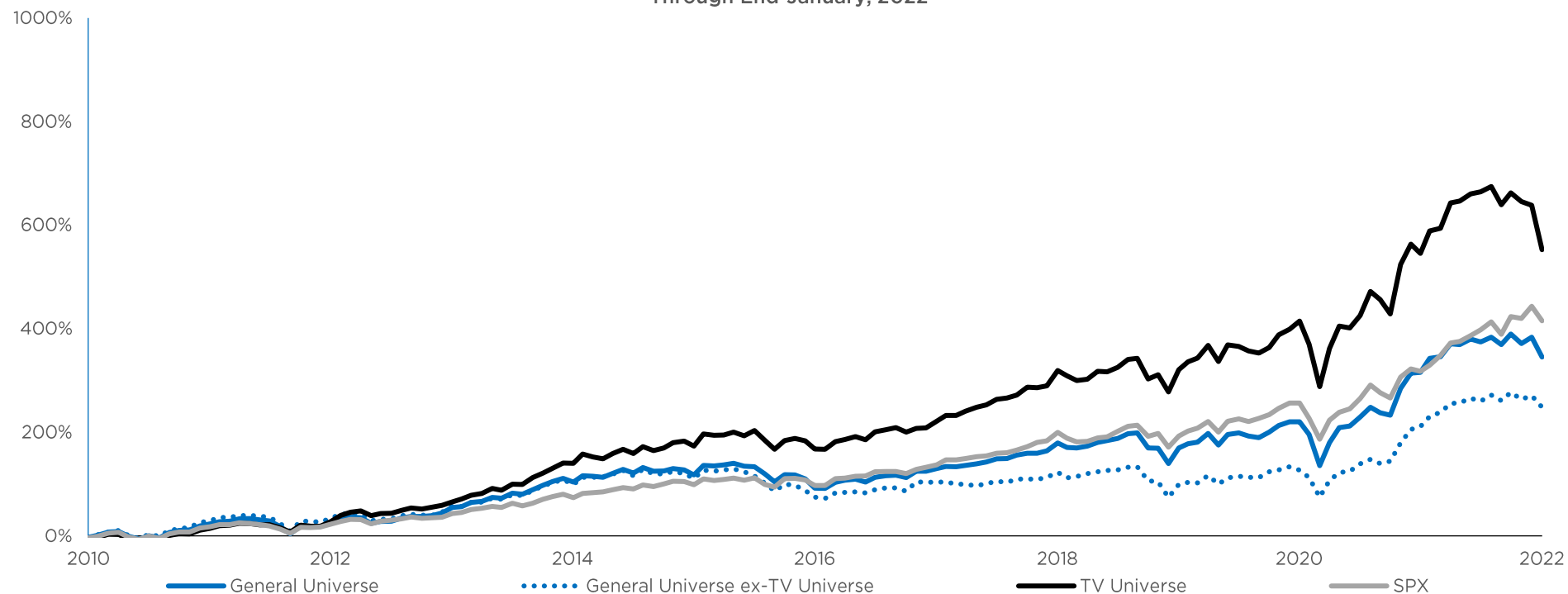
RESULTS ARE BEST WHEN OUR FUND UNIVERSE AND MODELS AGREE

Our quantitative framework ranks stocks on common attributes like valuation, sentiment, accounting, balance sheet, income statement, cash flow statement and other key metrics. We evaluated whether these models added incremental information to the fundamental high conviction ideas from our Trivariate universe of fund managers. Again, the answer is yes. **Our models, when combined with high conviction names from 13F filings, add incremental value.** When our models disagree with our universe of managers, our models provide substantial additional information. "Good" crowding happens when the TV universe has high conviction in a stock and our quant models rank that stock in the top quintile. A good hedge is to short the names that rank poorly in the model.

Mean Compounded Returns
High Conviction Holdings
Through End-January, 2022

Legend: - - - TV Universe, Low MDL Rank   ——— TV Universe   ······ TV Universe, High MDL Rank   ——— SPX
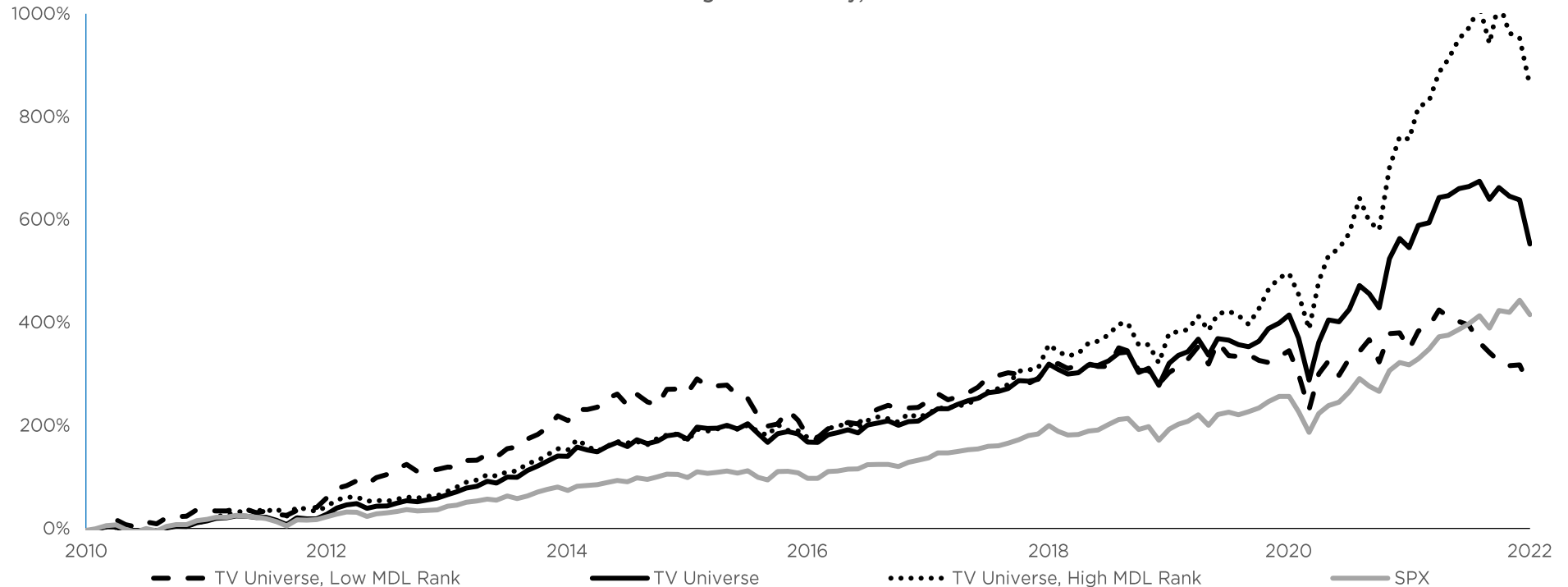
BUY / SHORT IDEAS BASED ON GOOD / BAD CROWDING FRAMEWORK

Our buy list of "good crowded" names are one that funds in our proprietary universe own in high conviction and screen well in our quantitative model. Short ideas are owned in high conviction and screen poorly in our quantitative models

Buy High Conviction by Trivariate Universe with High Model Rank
Short High Conviction and Have a Low Model Rank
February 11, 2022

	Longs				Shorts		
Ticker	Company Name	Industry Group	Market Cap ($ US. Bil)	Ticker	Company Name	Industry Group	Market Cap ($ US. Bil)
MSFT	Microsoft Corporation	Software & Services	2,211.88	NKE	NIKE, Inc.	Consumer Durables & App.	221.67
GOOGL	Alphabet Inc.	Media & Entertainment	1,774.17	TMUS	T-Mobile US, Inc.	Telecommunication Services	155.51
UNH	UnitedHealth Group Incorporated	Health Care Equip. & Serv.	450.33	BMY	Bristol-Myers Squibb Company	Pharma Biotech	145.78
MA	Mastercard Incorporated	Software & Services	361.44	FIS	Fidelity National Information Services	Software & Services	68.15
ADBE	Adobe Inc.	Software & Services	223.57	FISV	Fiserv, Inc.	Software & Services	64.31
SHOP	Shopify Inc.	Software & Services	107.26	SQ	Block, Inc.	Software & Services	62.39
BKNG	Booking Holdings Inc.	Consumer Services	103.89	MCO	Moody's Corporation	Diversified Financials	61.67
SNAP	Snap Inc.	Media & Entertainment	64.14	KMX	CarMax, Inc.	Retailing	17.54
WDAY	Workday, Inc.	Software & Services	58.19	LSXMK	The Liberty SiriusXM Group	Media & Entertainment	16.82
PANW	Palo Alto Networks, Inc.	Software & Services	50.33	CVNA	Carvana Co.	Retailing	12.10
RH	RH	Retailing	8.77	VST	Vistra Corp.	Utilities	10.53
WSC	WillScot Mobile Mini Holdings Corp.	Capital Goods	8.47	VRT	Vertiv Holdings Co	Capital Goods	7.94
				BC	Brunswick Corporation	Consumer Durables & Apparel	7.36
				NXST	Nexstar Media Group, Inc.	Media & Entertainment	7.32
				VICR	Vicor Corporation	Capital Goods	4.38
				VAL	Valaris Limited	Energy	3.11
				HMHC	Houghton Mifflin Harcourt Company	Consumer Services	2.29

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