INSIGHT

Addepar Investor Sentiment Index℠

Measuring investor sentiment in private wealth portfolios

ADDEPAR

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Addepar is a wealth management platform that specializes in data aggregation, analytics and reporting for even the most complex investment portfolios. It provides asset owners and advisors a clearer financial picture at every level, allowing them to make more informed and timely investment decisions. The company recently introduced Addepar Marketplace, which allows clients to access a range of alternative financial products and digitally initiate transactions through trusted partners.

Addepar works with over 400 leading financial advisors, family offices and large financial institutions that manage data for over $2 trillion of assets on the company's platform. The company is headquartered in Silicon Valley and has offices in New York City and Salt Lake City.

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Executive Summary

This report introduces Addepar's first proprietary Investor Sentiment Index[SM]. This index measures investor sentiment using detailed portfolio-level data from the Addepar platform, which is currently used to analyze and report more than $2 trillion of total assets for more than 400 wealth advisors, family offices and major financial institutions that oversee individual portfolios—ranging from the affluent to the U/HNW investor segments.

A reliable measure of risk sentiment among investors is a highly coveted, but elusive, resource. Many traders and researchers rely on indicators drawn from investor surveys, aggregated portfolios and option markets. But survey responses may not map to actual behavior, and aggregated market statistics—such as volumes and derivative prices—can reflect market technicals and other distortions.

The detailed data on the Addepar platform enables us to improve on both of these dimensions. We collect anonymized data on portfolio-level equity transactions, allowing us to observe the most immediate measure of risk sentiment: the number of investors adding (or shedding) equity risk through their portfolio allocations.

The Investment Sentiment Index (ISI) is calculated as the relative share of individual investors who are net buyers of U.S. equity securities versus those who are net sellers, or net neutral. A positive reading indicates that relatively more individual investors are adding equity risk, while a negative reading based on more sellers than buyers indicates that investors are reducing risk. We focus our index on the investment behavior of U/HNW investors who have more than $10 million in total net worth across all asset classes on the platform.

To date, we've found that our ISI measure of investor sentiment is closely linked statistically to market performance:

- Investor sentiment and market performance is **negatively** correlated contemporaneously: U/HNW investors tend to be net sellers of stocks in months when markets rally.
- In the pre-pandemic period, the ISI is **positively** correlated with future equity market returns. When U/HNW investors are net buyers of stocks, returns tend to be higher in the following month. This suggests that the ISI, and investor sentiment among U/HNW investors, may be a leading indicator for equity returns under normal market conditions.
- Since April 2020, the relationship has reversed: U/HNW investors have been consistent net sellers of US equities, but markets have continued to rally. We will watch the data carefully if the pre-pandemic relationship reestablishes itself in the data in the months ahead.

To protect the confidentiality of our client data we ensure that no single firm accounts for more than 10% of all portfolios in our ISI. In the instance that a firm breaches this threshold we randomly sample down the portfolios managed by the firm to preserve the structure of the data.

Use of Data

As a company that provides technology for the aggregation and management of financial data, we take the confidentiality of client information very seriously. When creating and publishing analytic content derived from data on the Addepar platform, protecting the information entrusted to us is our topmost priority. We approach all data policy decisions from the perspective of building meaningful analytics that result in industry-relevant insights. Read the Addepar Data Pledge.

Introduction

Among market participants and academic researchers alike, a large cottage industry has developed that aims to quantify investor sentiment in stock markets. But even with the increasing quantification of financial markets, a reliable measure of investors' "animal spirits" remains elusive. Are investors bullish or bearish? Definitive answers are hard to come by.

This is primarily due to a lack of data. Previous studies have proposed a variety of possible proxies, ranging from investor surveys to aggregating market variables, such as total flows or prices (See Exhibit 1). But each of these options has substantial drawbacks that may limit its effectiveness. For example, investor surveys promise helpful insights into individual investors' states of mind, the ultimate goal of any sentiment indicator. But not only do these surveys tend to fall short in producing an appropriate sample size, composition and response rate, they also don't often map into actual behavior. (Election polls in the 2016 presidential election come to mind. Refer to Courtney Kennedy, AAPOR, 2016, for additional discussion).

Quantifiable market measures—such as trading volumes and option prices—avoid this drawback. However, because these measures fail to provide a differentiated picture of the investor population, they're unable to deliver micro-level dimensionality beyond headline numbers. This is of particular concern when market technicals play a substantial role in price discovery[1].

Exhibit 1 | The ISI is uniquely based on transaction-level data of U/HNW portfolios

Source of Data	Transaction Data	Survey Responses		Market Based	
Category	Addepar Sentiment Index	High Net Worth Investor Sentiment	Retail Investor Sentiment	Industry-Level Fund Flows	Market Pricing-Based Indicators
Examples	Daily/Monthly Addepar UHNW Sentiment Index	UBS Global Wealth Management Investor Sentiment Survey	AAII Sentiment Survey	Morningstar/ Lipper fund flows reports	CBOE VIX, put/call ratios
Asset Classes	Equities	Multi-asset class	Equities	Equity and fixed-income mutual funds and ETFs	Typically, the S&P 500 Index
Investor Segment	U/HNW investors	HNW investors	Retail investors	Mutual funds and ETF investors	Derivatives markets participants

Source: Addepar analysis

[1] *Refer to Baker and Wurgler, Journal of Economic Perspectives, 2007, for a detailed discussion of different approaches.*

In contrast to these established approaches, this study makes use of the unique data environment of the Addepar platform to construct an index that measures investor sentiment based on data that's both "hard,—i.e. reflecting real economic activity—and micro-level, that is, based on surveying individual portfolios.

In this report, we propose a measure that's based on actual investing activity gleaned from anonymized account-level transaction data. We make the straightforward assumption that when individual investors are net buyers of stocks, they're optimistic about future market prospects, and vice versa. Importantly, we're able to observe actual transactions, not simply track price appreciation of underlying assets. As a result, we can clearly identify investor intent.

By aggregating individual investment decisions across a large set of portfolios, our Investor Sentiment Index (ISI) metric exhibits strong statistical links to market performance, especially when we study the investment behavior of U/HNW investors—which we define as those with more than $10 million in total wealth across all asset classes, as captured by the Addepar platform.

First, U/HNW investors tend to be contrarian relative to contemporaneous market movements. In months where U.S. equities deliver gains, the ISI signals that relatively more U/HNW portfolios are net sellers of equities[2].

Second, the ISI appears to lead stock market performance. When U/HNW investors are net sellers of equities in the current month, the following month's equity returns tend to be low (and vice versa). So the investment behavior of U/HNW investors, and hence the performance of our ISI measure, appear to be leading indicators for stock market performance, at least for the time sample under study.

The underlying analysis in this paper strongly suggests that there's important information in the individual investment behavior of individual portfolios held on the Addepar platform—in particular those in the U/HNW segment. While this report focuses exclusively on very cleanly delineated and well-identified asset holdings in U.S. equity markets, we plan to expand our research to other asset classes and more generally answer asset allocation questions in the future.

Understanding the data in this analysis

Addepar is a multi asset class reporting platform that aggregates individual financial accounts to create a consolidated view of an investor's total asset holdings. The platform is designed to model all asset classes in public and private markets as well as non-financial assets. After the source data provider (typically the custodian) has completed reconciliation, Addepar ingests and verifies holdings and transactions from custodians, broker-dealers, clearing agents and fund administrators. Asset allocations and performance are then calculated as needed for analysis and reporting to the end investor.

The total value of all assets reported on the platform has grown from $650 billion in 2016 to more than $2 trillion by mid-2020. As described earlier, portfolios modeled in Addepar tend to capture total wealth/asset holdings for each investor and therefore sub-portfolios are aggregated to the total client level. In the dataset under study, we include portfolios having total value (across all assets) of at least $10 million (our definition of U/HNW segment).

The sample of portfolios under study grows from more than 1,500 to more than 10,000 by mid-

[2] *Some of this may be due to mechanical portfolio readjustment, although it's unclear if this typically takes place on a monthly basis for many investors.*

2020. We begin collecting transaction data in the quarter after an account has been established on the platform, in order to avoid any discrepancies due to onboarding of accounts. To protect the confidentiality of our client data we ensure that no single firm accounts for more than 10% of all portfolios in our ISI. In the instance that a firm breaches this threshold we randomly sample down the portfolios managed by the firm to preserve the structure of the data. This yields a dataset of approximately 300 thousand monthly portfolio observations. We confirm that our results hold in a balanced panel setting so that our findings are not influenced by the addition of portfolios over time.

For the purposes of this paper, we look exclusively at outright transactions of U.S. cash equity securities, including ETFs and mutual funds. We exclude derivative transactions because these tend to be more indicative of hedging activity rather than direct asset allocation decisions. Across portfolios, non-U.S. equities account for less than 20% of total equity holdings for most portfolios. Investor portfolios display a lot of activity—with an average of 35% of all portfolios exhibiting a net change in exposure in a given month, with a minor bias to net buying. (On average, there are 1% more portfolios that are net buyers of equities relative to net sellers.)

For consistency we consider all types of flows above a certain size threshold discussed below. This leads us to potentially include passive flows like the flows behind portfolio rebalancing and dividend reinvestments which can lead to some seasonality in the data. We plan on studying this phenomenon in the future.

The dataset we analyze runs from April 2016 to June 2020 (51 monthly data points) as an unbalanced panel. While the time frame under study is limited and principally represents an upward-trending market environment, we note that our empirical findings persist after the inclusion of the 2020 data points, which represent a very different market environment due to the onset of the coronavirus pandemic.

Building the Indicator

The key advantage of analyzing the portfolio-level data on the Addepar platform is the ability to study additional information beyond the aggregate level of dollar flows. To illustrate: the total net purchases of equity securities may sum up to a large positive figure across the platform. At first glance, we might interpret this to say that investors are adding to their equity allocations—i.e. they're expressing optimism. But this figure would also be consistent with activity caused by a small group of high value portfolios making large concentrated bets, while all other investors stay on the sidelines. Unlike aggregated dollar flows, a big ISI reading can only happen when a large percentage of the investors have expressed the same sentiment, whether that be positive or negative.

To correctly interpret market sentiment, this is an important distinction: a broad-based shift toward larger equity positions may signal a more substantive shift in allocations (and hence may predict a more robust increase in equity prices) than an increase driven by a small group of investors, which may not reflect market consensus.

As a result, we formalize this distinction in our ISI. Instead of aggregating total dollar amounts, which would disproportionately reflect very large portfolios, we assign a score to each individual portfolio and then calculate an even-weighted average, scaled by 100 for readability. In particular, every month in which an investor is a net buyer of U.S. equities, we assign a score of 1, while net sellers are assigned a score of -1. For portfolios that are net neutral during the month, we assign a score of 0.

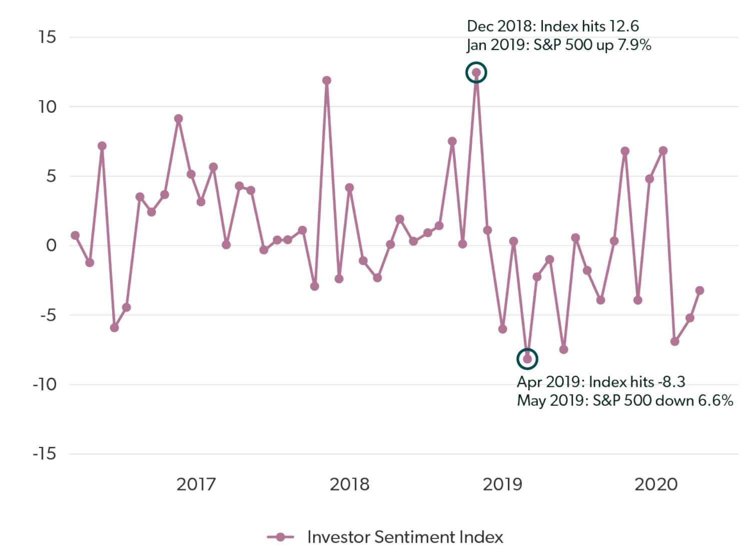
While this scoring does not account for the size of a net purchase, we consider any monthly net transaction that accounts for less than 0.1% of the total asset holdings to be net neutral, in order to reduce (though not eliminate) the effect of inadvertent or mechanical portfolio activity that likely doesn't represent substantive changes in investor sentiment. For example, for an investor with $10 million in total assets (including cash, bonds, alternatives and real estate), only those net transactions with a value of $10,000 or more in a given month would be counted as a net buy or sell.

The index is hence constructed as:

$$ISI = \frac{100}{N}\sum_{i}^{N}\begin{cases} 1 & \text{if } x_i > 0.1\% \\ -1 & \text{if } x_i < 0.1\% \\ 0 & \textit{otherwise} \end{cases}$$

Where x denotes the net purchase of U.S. equities within a given portfolio over the course of a month, scaled by the portfolio's total value, across all assets, in percentage points.

Exhibit 2 | The ISI shows sizeable swings in UHNW investor sentiment over time



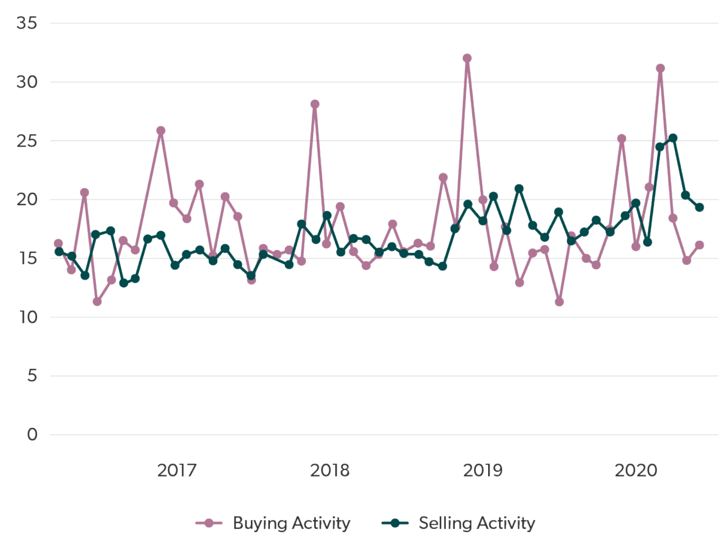
Source: Addepar Insights as of June 30, 2020

Exhibit 2 shows the time series of the resulting indicator constructed using U/HNW portfolios with a total size of at least $10 million, which we find to be most informative for asset markets, as discussed below. The line shows that U/HNW investor sentiment shifts rapidly over time but has generally been centered around 0—the net neutral reading—over the course of the last four years.

The index reached its highest value at 12.6 in December 2018, and its lowest in April 2019, at -8.3. Intriguingly, U.S. equities jumped higher in January 2019 (the S&P 500 was up 7.9%), the month following the ISI peak, and plummeted in May, following the indicator's low point (down 6.6%). At least anecdotally, this suggests that U/HNW investor behavior appears to lead stock market returns: U/HNW portfolios are relative net buyers of U.S. stocks before a subsequent rally.

Our sample of U/HNW portfolios shows a high level of activity. We observe that, on average, 34% of all portfolios make net changes to their aggregate equity position. While there is some evidence of higher net buying activity at year-end the total of net sellers is roughly matched by the number of net buyers. This shows that UHNW investors do not all follow the same investment behavior and that the predictive power of the ISI comes from the (substantially smaller) net difference between buyers and sellers in the sample (see following section). As a result, while the relative investment decisions of the sum of all UHNW portfolios contains information about market performance, this doesn't necessarily mean that individual UHNW investors can time the market consistently better than other investors (we look to study this question in future work).

Exhibit 3 | Activity



Source: Addepar Insights as of June 30, 2020

ISI & Stock Market Performance

In some instances, measures of investor sentiment turn out to be contrarian indicators: investors may turn bullish when prices rise, only to be caught in a swift market reversal. Based on the relatively short sample under study, this does not appear to be the case for the ISI. While total dollar flow measures don't appear to have any statistical relationship to stock market returns, contemporaneous or otherwise, the ISI based

Exhibit 4 | The ISI is negatively correlated with contemporaneous returns, but shows a positive correlation with future returns

Source: Addepar analysis, Fama/French Data Library, data sample from 04/2016-06/2020

on U/HNW portfolios is negatively correlated with contemporaneous monthly returns on U.S. equities, as illustrated in Exhibit 4.

As the graph shows, when equities rally, private wealth investors appear to sell into a rising market. This generates a strong negative correlation between the ISI indicator and returns on the U.S. equity market, as shown by the line of best fit (in green). Simple regression analysis estimates a beta coefficient of -0.45, so an ISI reading of 10 would be consistent with a contemporaneous equity market return of -4.5%.

In contrast, the ISI indicator appears to exhibit a **positive** correlation with stock market returns in the following month (Exhibit 4) in data through June 2020. A high ISI reading in the current month, i.e. broad-based buying by private wealth accounts, is generally followed by positive returns on U.S. equities in the following month, consistent with the anecdotal evidence discussed above. This suggests that the investment behavior of U/HNW investors is a **leading** indicator for equity markets - or at least that it was up until the onset of the Covid-19 pandemic this year.

Notably, the relationship between investor behavior and future market returns has since flipped. Since April, U/HNW investors have been consistent net sellers of US equities even as markets have continued to rally. This link is also beginning to show up in the data. Regression analysis estimates a beta coefficient of 0.26, so that an ISI reading of 10 in the current month predicts a 2.6% higher excess return on U.S. stocks in the following month (Exhibit 5). While the regression coefficients are broadly stable if we exclude data from 2020 (column (3)), the statistical significance is much stronger when the latest months are excluded.

This indicates that the ISI can be a useful gauge for market participants in normal times but may do less well in extraordinary market environments. We will examine the incoming data closely to see if the pre-pandemic relationship reestablishes itself in the coming months.

Furthermore, while on first look, the R-squared of the regression appears relatively low in absolute terms (0.07 for the full sample, and 0.15 for data up through 2019), in the context of alternative predictors for future stock market returns, these figures are rather large[3].

[3] *The efficient market hypothesis would indeed predict an R-squared of 0 for any variable.*

Exhibit 5 | Statistical Significance

	US Equity Return (next month)			
	(1)	(2)	(3)	(4)
ISI (current month)	0.255* (0.132)	0.26** (0.118)	0.29*** (0.097)	0.25** (0.102)
Equity Ret. (current month)		0.011 (0.275)		-0.147 (0.165)
N	50	50	44	44
R-Sq	0.07	0.07	0.15	0.17
Sample	2016-2020		2016-2019	

Note: Heteroskedasticity-robust standard errors in parentheses: Equity returns are monthy excess stock returns on US equities, in percent.
* p<0.1, **p<0.05, ***p<0.01

Source: Addepar analysis

Given that the ISI shows a negative correlation with market returns, we next tested whether investor behavior still predicts future stock returns when we control for contemporaneous returns. As the regression results in columns 2 and 4 in Exhibit 5 show, the estimated beta coefficients are broadly unchanged relative to the regressions without the control.

This suggests that the predictive qualities of the ISI are not just due to simple mean reversion in market returns, for example, and that U/HNW investor sentiment provides new information. As discussed, while the limited sample size and the reversal in recent data certainly suggests caution should be exercised in making overly broad interpretations, the documented relationship is clearly not due to simple autoregressive behavior in the return series[4].

In conclusion, we find that the unique data universe of the Addepar platform can be used to construct a risk sentiment indicator that captures portfolio-level investor activity. In particular, the activity of U/HNW investors appears to be directly linked to market dynamics. Most notably, our analysis indicates that, at least over the course of our sample and before the onset of the pandemic, U/HNW investor behavior has tended to lead stock market performance, which suggests that our indicator is a valuable data point to watch for market participants. We will look to the incoming data to confirm our findings in the future.

[4] *The results are robust to heteroskedasticity in the standard errors, and, as we find in additional tests, also to autocorrelation.*

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