## How to Mitigate Murphy's Law in
Portfolio Diversification: Forecasted Correlations

An extended Murphy's Law states "Anything that can go wrong, will go wrong, and at the worst possible time." In asset management, Murphy's Law is when everything in your client's portfolio goes down at once. That's why financial advisers aim to diversify their clients' portfolios. But looking at past performance may not provide much insight into whether funds will move together in the future. So how can you analyze mutual fund correlations on a forward-looking basis?

For stock funds and ETFs, Causeway Risk Lens has a tool to help forecast a fund's active return correlation with another fund. It's called *predicted active return correlation* or "PARC" for short.

Let's say you use one of the classic methods of diversifying – pairing a Value fund with a Growth fund. As seen below, the SPDR Portfolio S&P 500 Value ETF (SPYV) has historically delivered a different return profile than the SPDR Portfolio S&P 500 Growth ETF (SPYG) based on calendar year performance.
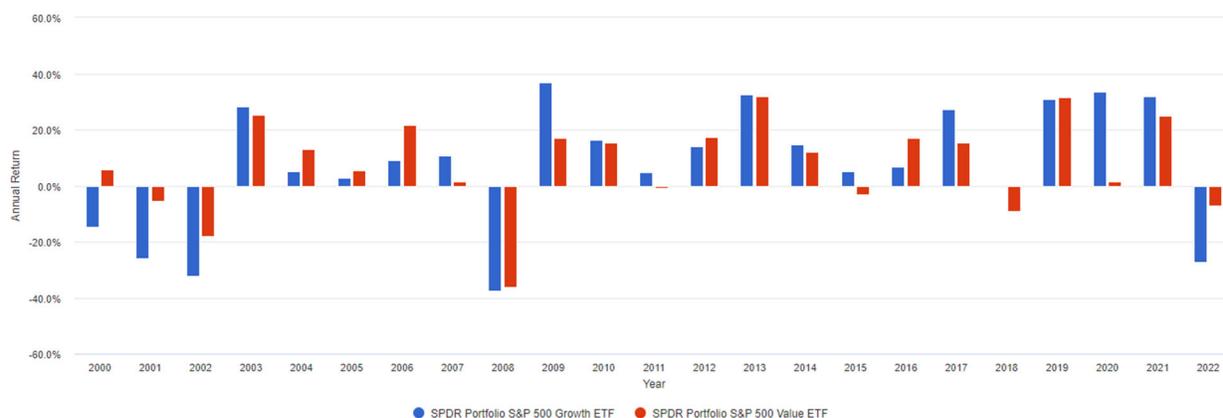
For illustrative purposes only. Should not be relied on as research or investment advice regarding any investment. SPYV and SPYG seek to provide investment results that, before fees and expenses, correspond generally to the total return performance of the S&P 500 Value Index and S&P 500 Growth Index, respectively, and are selected by Causeway solely for illustrative purposes. The performance data quoted herein represents past performance. Past performance is not a guarantee of future results. Total returns assume reinvestment of dividends and capital gains distributions at net asset value when paid. High relative or absolute performance may not be repeatable. The expense ratio for each ETF is 0.04%. Source: portfoliovisualizer.com

Let's apply PARC to SPYV and SPYG. Using their latest publicly available holdings, our tool predicts they will have a -1 PARC. In fact, in the last 12, 36, and 60 months, they've had an actual active return correlation of -0.99 (although past correlations do not necessarily predict future correlations). -1 PARC is an exact opposite correlation – as low as you can go – indicating that these funds are complementary. Correlations range from -1, exact opposite correlation, to 0, no correlation, to +1, exact correlation.

Correlation Analysis

Benchmark or Index ETF: SPDR S&P 500 ETF TRUST

Reference Date: Oct 31, 2022

PREDICTED ACTIVE RETURN CORRELATION - PROPRIETARY TO RISK LENS

	SPYV	SPYG
SPYV		
SPYG	-1.00	

REALIZED ACTIVE CORRELATION - LAST 60 MONTHS

	SPYV	SPYG
SPYV		
SPYG	-0.99	

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Now let's take a look at actively managed funds or ETFs. Let's say your Growth fund is the ARK Innovation ETF (ARKK), which is in Morningstar's US Fund Mid-Cap Growth category and you're looking for a Value fund to pair with ARKK. If you are looking for a complementary fund from scratch, PARC's "Complements and Substitutes" screen conveniently lists the top ten complementary and substitute funds like this:

Complements and Substitutes

Benchmark: SPDR S&P 500 ETF TRUST
Reference Date: Oct 31, 2022

ARKK - ARK Innovation ETF

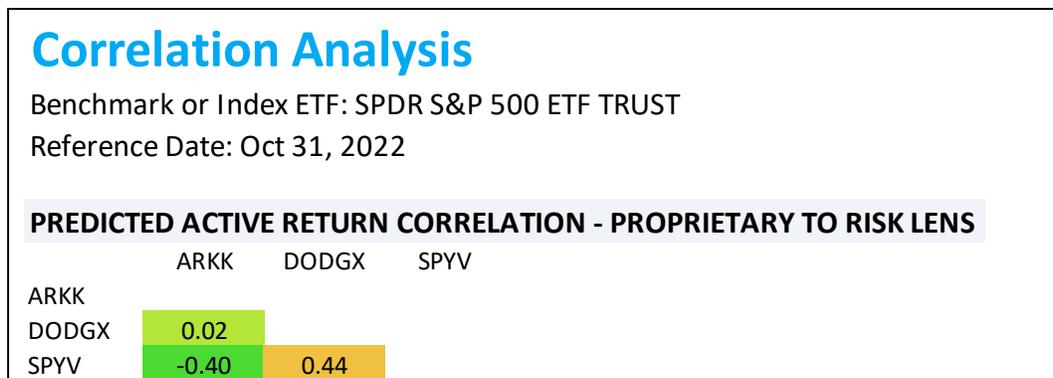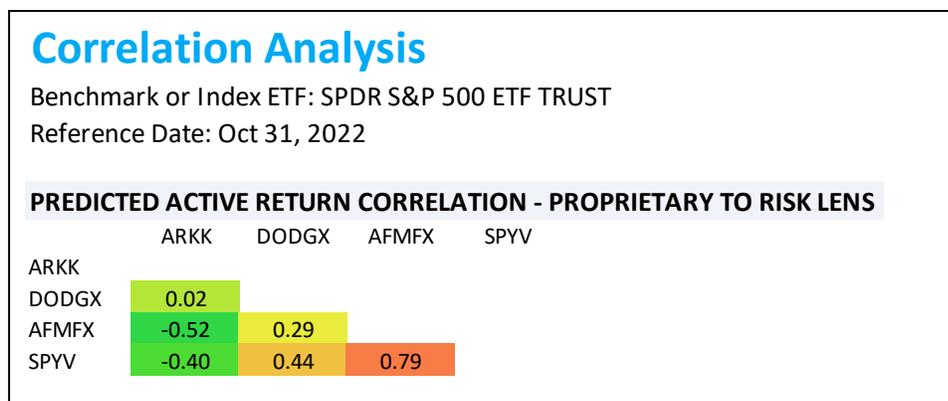| Top Complementary Funds		Top Substitute Funds	
Fund	**Predicted Active Return Correlation**	**Fund**	**Predicted Active Return Correlation**
LMESX ClearBridge Appreciation Fund Class I!	-0.58	**ARKW** ARK Next Generation Internet ETF	0.92
HUSV First Trust Horizon Managed Volatility	-0.55	**AFAAX** Yorktown Capital Appreciation Fund In	0.82
PDGIX T Rowe Price Dividend Growth Fund In	-0.53	**ARKF** ARK Fintech Innovation ETF	0.74
HDCTX Rational Equity Armor Fund Institution:	-0.53	**VLLIX** Value Line Larger Companies Focused	0.71
AFMFX American Mutual Fund - Class F-3	-0.52	**HNMGX** Harbor Disruptive Innovation Fund Ret	0.69
AUUIX AB Cap Fund Inc - AB Select US Equity	-0.52	**VOTE** Engine No 1 Transform 500 ETF	0.63
GFCIX Guggenheim Capital Stewardship Fund	-0.51	**IMPLX** ERShares US Large Cap Institutional Cl	0.57
AGIZX Alger Growth & Income Fd Cl Z	-0.51	**IPO** Renaissance IPO ETF	0.55
CCOR Core Alternative ETF	-0.50	**LMNOX** Miller Opportunity Trust - CL I	0.55
MLVTX MFS Low Volatility Equity Fund Class F	-0.50	**ARKQ** ARK Autonomous Technology & Robot	0.54

The top complementary funds range from -0.58 to -0.50 PARC correlations with ARKK. Our analysis provides 10 candidates to research as possible complements to your ARKK investment.

What if you are not working from scratch, but have already paired ARKK with another Value fund? First, let's assume you paired it with SPYV, the SPDR Portfolio S&P 500 Value ETF. We would expect that SPYV, a passive Value index ETF, would be very negatively correlated with ARKK, a tech growth ETF, right? Well, at -0.40, it is negatively correlated – but not negative enough to make the PARC top ten complementary funds list.
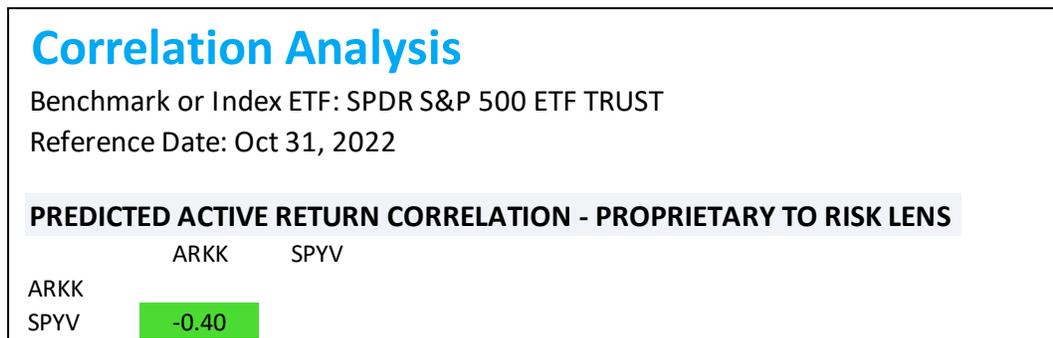
Correlation Analysis

Benchmark or Index ETF: SPDR S&P 500 ETF TRUST

Reference Date: Oct 31, 2022

PREDICTED ACTIVE RETURN CORRELATION - PROPRIETARY TO RISK LENS

	ARKK	SPYV
ARKK		
SPYV	-0.40	

That's a surprising result. Now let's try pairing ARKK with an active fund. Assume we paired ARKK with the largest fund in the Morningstar Large Value category as of 9/30/22, the Dodge & Cox Stock Fund (DODGX), a $79.3 billion actively-managed fund. One may assume that would be an effective complement to ARKK. When we ran ARKK and DODGX in PARC, we found that – based on the latest available public fund holdings – they are predicted to have a very small positive correlation.

Correlation Analysis

Benchmark or Index ETF: SPDR S&P 500 ETF TRUST

Reference Date: Oct 31, 2022

PREDICTED ACTIVE RETURN CORRELATION - PROPRIETARY TO RISK LENS

	ARKK	DODGX	SPYV
ARKK			
DODGX	0.02		
SPYV	-0.40	0.44	

What does this mean? DODGX is still a diversifier with ARKK, but there might be other complementary funds to better diversify your portfolio.

For example, let's take a complementary fund from our PARC top ten list, such as American Mutual Fund (AFMFX), a $77.8 billion fund in Morningstar's Large Value category, and the second largest fund in the category after DODGX at 9/30/22. You can see that at -0.52, it is much more negatively correlated with ARKK than DODGX or even SPYV.

Correlation Analysis

Benchmark or Index ETF: SPDR S&P 500 ETF TRUST
Reference Date: Oct 31, 2022

PREDICTED ACTIVE RETURN CORRELATION - PROPRIETARY TO RISK LENS

	ARKK	DODGX	AFMFX	SPYV
ARKK				
DODGX	0.02			
AFMFX	-0.52	0.29		
SPYV	-0.40	0.44	0.79	

For illustrative purposes only. Should not be relied on as research or investment advice regarding any investment. Based on most recent publicly available portfolio holdings as of 10/31/22. ARKK, DODGX, AFMFX, and SPYV selected by Causeway solely for illustrative purposes. Source: Causeway Risk Lens. Causeway Risk Lens Is For Investment Professional Use Only – Investor Distribution Prohibited. See attached Disclosures

We know to avoid Murphy's Law, we should not put all our eggs in one basket. But we still need effective tools to help. As shown above, one fund may not differ from another fund as much as we expect. To help diversify, use Causeway Risk Lens' *predicted active return correlation* or PARC tool. We believe PARC can help financial advisers find complementary funds to better diversify client portfolios in a unique, forward-looking framework. And remember, ***Risk Lens is free***.

updates the Upload Funds input by Causeway, historical analysis is available in Risk Lens. Except as explained above, references to "funds" herein include custom Upload Funds as applicable, unless the context otherwise requires.

Risk Model. Causeway's risk model analyzes multiple factors for each fund holding (excluding certain portfolio ETFs, fixed income, and commodities and other derivatives) to calculate the fund's style exposures, forecast the fund's volatility, and forecast the fund's beta.

Fund Descriptions. Fund descriptions, including the fund name, assets under management (AUM), benchmark, net and gross expense ratio, waiver date, manager name and location, and inception date, are as of the latest month end date and based on data provided by FactSet.

Predicted Active Return Correlation (PARC) Analysis. Fund return correlations are predicted based on each fund's aggregate exposures to the factors in the risk model ("systematic sources of risk"). These include style, country, sector, and currency exposures. "Idiosyncratic risk" refers to sources of risk not specified by the factors in the risk model. A covariance matrix of the funds' historical returns to these risk factors is then used to generate the correlation forecasts. Correlations range from –1 to +1. A score of 0 means the funds have no correlation, a score of 1 means the funds are exactly correlated, and a score of –1 means the funds are exactly oppositely correlated. Predictions of excess return correlations represent relative-to-index return correlations based on these systematic sources of risk. Causeway Risk Lens uses data from the past 156 weeks to identify historical relationships between risk factors.

Complements and Substitutes. The top complementary and substitute funds are based on the predicted active return correlations. The funds with the lowest predicted active return correlations are included in the top complements or best diversifiers while the funds with the highest predicted active return correlations are listed as the top substitutes. The universe of funds used for comparison is based on the benchmarks provided by FactSet.

Active Correlation. Active correlations are based on each fund's actual returns, as reported by FactSet, measured over the 12, 36, and 60-month period ended at the reference date. Past performance or past correlations are not a guarantee of future results. Correlation Spread is the difference between Predicted Active Return and Active Correlation. A positive number signifies that the analysis forecasts correlations greater than have been realized while a negative number signifies that the analysis forecasts correlations lower than have been realized. These results may differ if a different period were used.

Complements and Substitutes. The top complementary and substitute funds are based on the predicted active return correlations. The funds with the lowest predicted active return correlations are included in the top complements or best diversifiers while the funds with the highest predicted active return correlations are listed as the top substitutes. The universe of funds used for comparison is based on the benchmarks provided by FactSet.

There is no guarantee that the Causeway Funds will meet their stated objectives. The Funds are available to U.S. investors only.