Value and interest rates

The data suggest rates are not to blame for value's torments

June 2020

Value stocks sharply underperformed growth stocks from 2017 to early 2020, exacerbating a longer period of lackluster performance that dates back to the Global Financial Crisis for some value factors. Some have blamed the interest rate environment – the low level of interest rates, falling bond yields or the flattening yield curve. We examine these claims in our paper, Value and Interest Rates, and present a summary of our findings below.

Despite some eye-catching patterns in recent years, relating to changes in bond yields or the yield curve slope, we find the relationships are unstable and have limited economic significance. We conclude that the interest rate environment tells us little about value's prospects, and that a change in that environment is not a necessary condition for value's recovery.

Theoretical links are ambiguous

Asset prices are related to interest rates via this formula, which states that an asset's price is the sum of expected cash flows discounted to their present value.

$$\text{price today} \longrightarrow \boldsymbol{P_0} = \frac{\boldsymbol{D_1}}{(1+\boldsymbol{r_1})^1} + \frac{\boldsymbol{D_2}}{(1+\boldsymbol{r_2})^2} + \cdots + \frac{\boldsymbol{D_n}}{(1+\boldsymbol{r_n})^n} \begin{array}{l} \leftarrow \text{expected cash flow} \\ \leftarrow \text{discount rate} \end{array}$$

For a stock, expected cash flow is expected dividend per share. The discount rate, i.e., the required rate of return, is the sum of the real risk-free rate, expected inflation, and a risk premium that reflects the riskiness of the expected cash flows.

When interest rates go up, the discount rate increases and the asset price falls – all else being equal. However, in the case of stocks, all else rarely *is* equal. Changes in interest rates are often accompanied by (or are a response to) changes in expected inflation and/or changes in expected economic growth, and hence expected cashflows are often changing as well. There may also be a change in the required risk premium. All these factors lead to an ambiguous relationship between interest rates and stock prices – even more so when we consider long/short factors such as value.

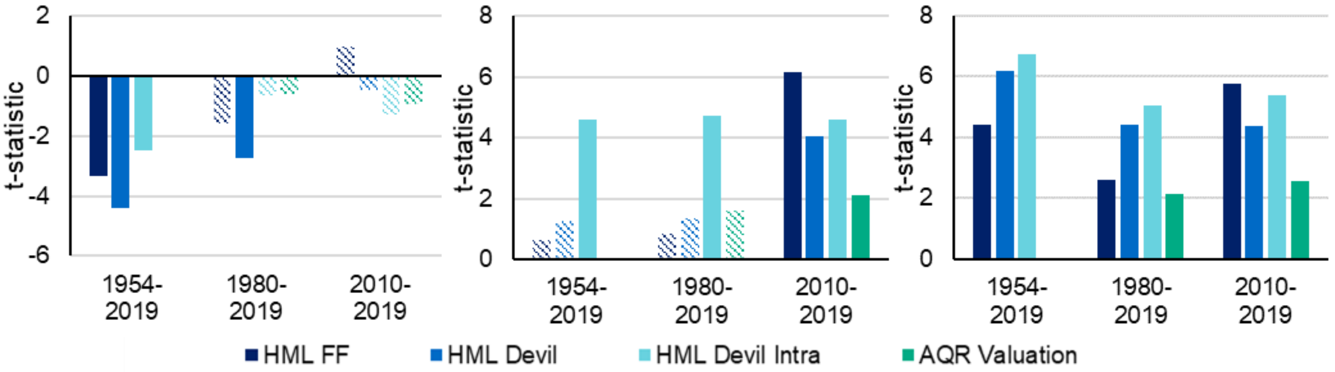
One theory is that growth stocks' expected cash flows are further in the future, implying they have higher duration. Under this theory, growth stock prices could benefit more than value stock prices from falling riskless rates. But, as we just saw, the discount rate is not the only moving part, and it may be overwhelmed by changes in expected cash flows. Another theory suggests value and growth companies have different debt characteristics, or different levels of financial distress. This could lead to different responses to changes in borrowing costs. But this theory is complicated by the fact that rates have tended to rise during benign economic environments when distressed firms are unlikely to suffer disproportionately.

Historical patterns: some nuanced long-term relationships and a lot of variation

We examined historical patterns across many different dimensions – different interest rates, different value factors, different periods and geographies. We also looked at both contemporaneous patterns (in an attempt to explain past performance) and predictive relationships (to evaluate current prospects).

Importantly, we found no evidence that links the size of the value premium to the *level* of interest rates, and therefore our results do not support assertions that a change in interest rate environment is a necessary condition for value's recovery. We did find some mild patterns relating to *changes* in rates, and some of these results are summarized in **Exhibit 1**. A positive t-statistic indicates higher value returns coincided with rate increases. Some value factors had higher returns when short rates were falling (less so recently), some when long rates were rising (more so recently), and most when the yield curve slope was steepening.

Exhibit 1: Average sensitivities of hypothetical U.S. long/short value factors to interest rate factors

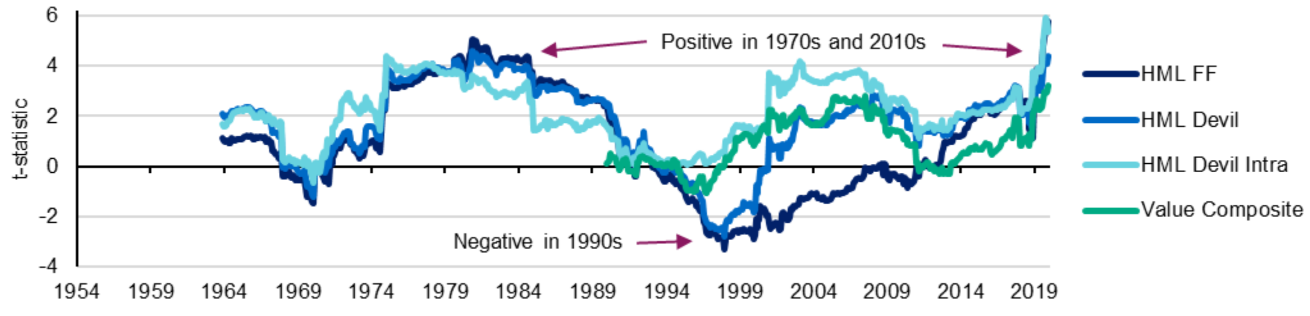


a. Change in 3-month rate **b. Change in 10-year rate** **c. Change in 10Y-3M slope**

Sources: Ken French data library, AQR data library, FRED data library and AQR. Regressions based on monthly USD returns; each includes two RHS variables: the market as control variable (not shown), and one interest rate variable. Shading indicates not significant at 95% confidence. Value factors described in appendix. Hypothetical data has inherent limitations, some of which are disclosed in the appendix.

Exhibit 2 shows how yield curve sensitivities have varied through time. The 2010s show stronger relationships than the long-term average, but this is not the only peak. T-statistics were at similar levels for the 1970s, which was certainly not a period of low interest rates, challenging the narrative that the low rates environment is responsible for the stronger recent relationship. The relationships have also reversed in some periods such as the 1990s, giving us less confidence that recent relationships will persist.

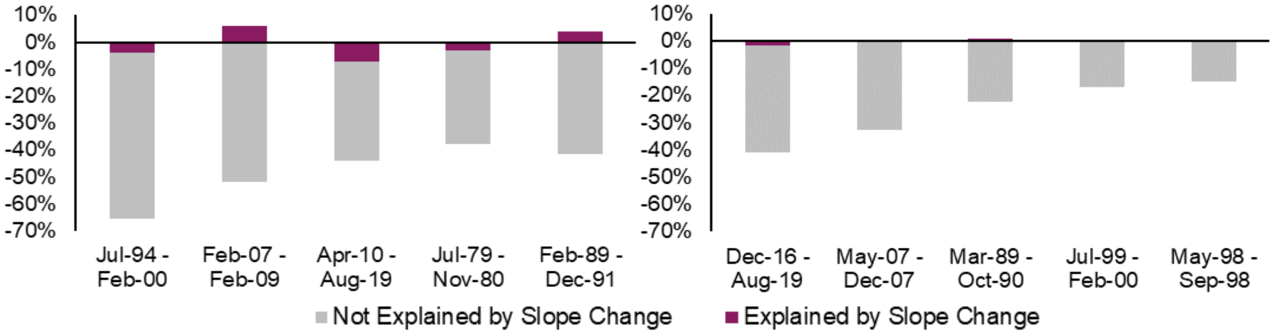
Exhibit 2: Time variation in sensitivity to yield curve slope changes 1954-2019



Sources: Ken French data library, AQR data library, FRED data library and AQR. Regressions based on monthly USD returns and each includes two RHS variables: the market as a control variable (t-statistic not shown), and one interest rate variable. The value factors are described in the appendix. Hypothetical data has inherent limitations, some of which are disclosed in the appendix.

It is important to assess the economic as well as the statistical significance of these relationships. In **Exhibit 3** we take the most reliable relationship we found above, which relates to changes in the slope of the yield curve. The chart shows the worst five drawdowns for two value factors, and, using the long-term regression coefficients we found in our statistical analysis, calculates the portion explained by changes in yield curve slope. Slope changes are not a major driver of any of the drawdowns. Despite the yield curve having flattened in recent years while value performed poorly, the one explains very little of the other.

Exhibit 3: Attribution of hypothetical worst value drawdowns to slope change



a. HML Devil **b. Value Composite (1980-2019)**

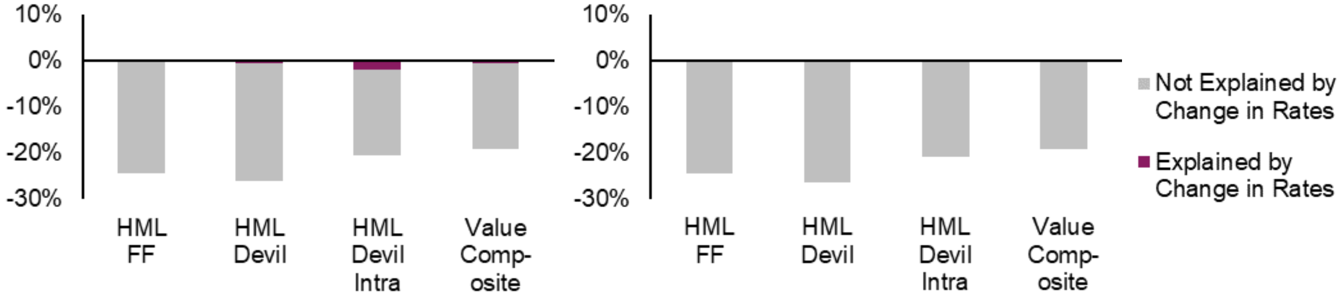
Sources: FRED data library and AQR. Cumulative arithmetic USD returns gross of transaction costs and fees. Attributions calculated by multiplying net change during period by long-term regression coefficient. Value factor variants are described in appendix. For results for other value factors, see Maloney and Moskowitz (2020). Hypothetical data has inherent limitations, some of which are disclosed in the appendix.

Case study: value and rates in Q1 2020

Our main analysis examined data through December 2019 and was motivated by poor value performance from 2017-2019. But during the first quarter of 2020, value suffered even more sharply. We use this short and extreme time period as a case study for examining value's relationship with interest rates.

During this time, monetary and fiscal policies were changing rapidly in response to the coronavirus crisis, providing variation in interest rate news that we can compare to value's performance. **Exhibit 4** shows attributions based on net changes in the interest rate variables over the quarter, using the long-term regression coefficients estimated earlier. The yield curve actually steepened during this time, so value's mild positive long-term relationship with slope changes cannot explain any of value's deep losses over the period. Treasury yields fell by around 1.2%, but based on our long-term estimates of the relationship between value and Treasury rates, this can only explain a tiny portion of the large losses.

Exhibit 4: Attribution of hypothetical Q1 2020 value returns to rates and credit factors



i. Change in 10Y rate **ii. Change in 10Y-3M slope**

Sources: Ken French data library, AQR data library, FRED data library and AQR. Cumulative arithmetic USD returns gross of transaction costs and fees. Attributions are calculated by multiplying net change during the period by the long-term regression coefficient. Value factor variants are described in the appendix. Hypothetical data has inherent limitations, some of which are disclosed in the appendix.

We also studied the relationships between daily value returns and rates changes during this volatile quarter. For both long rate changes and slope changes, there was a mild *negative* relationship over this period, with value's worst losses tending to occur on days when yields went up and/or the yield curve steepened. These results are the opposite sign to the average relationships observed over the previous decade, and support our skepticism that interest rates are to blame for value's poor performance.

Conclusion

We cannot rule out the possibility that the rates environment had some role in the complex circumstances leading to value's sustained losses. But our analysis does not support assertions that interest rates have been a major driver of value underperformance during the sharp drawdown from 2017 to 2020 or over the past decade. Nor does it support the idea that a change in the rates environment is required for a change in value's fortunes. Large drawdowns have been a feature of long/short factor premia (and market premia), and may be one reason why the premia exist and unlikely to be arbitraged away.

For further discussion and analysis, please see the full-length paper Value and Interest Rates. And for a broader examination of systematic value investing, see Is (Systematic) Value Investing Dead?

Appendix: data and factor construction

Interest rates: Short-term interest rate is represented by 3-month Treasury Bill yield, and long-term rate by 10-year constant maturity Treasury Bond yield. Daily data from the FRED data library are used to derive month-end and quarter-end series from January 1954 to December 2019 (daily data do not exist for 10-year yields from 1954 to 1961 so we use month-average data as a proxy for month-end values, but the results do not change if we drop these seven years). The yield curve slope is defined as the 10-year yield minus the 3-month yield. We use the same data at daily frequency for the Q1 2020 case study.

U.S. value equity factors: 'HML FF', is the classic HML factor from Fama and French (1993, 1996, 2020), obtained from the Ken French data library. 'HML Devil' follows the same procedure as Fama and French (1993), but updates BE/ME ratios using more timely price information as described in Asness and Frazzini (2013) and is available from the AQR data library. 'HML Devil Intra' is an alternative construction designed to be industry-neutral. This construction is designed to make more meaningful comparisons across firms since book values and accounting statements provide different information across industries. The 'Value Composite' factor uses multiple measures of value in addition to BE/ME to sort stocks. Specifically, stocks are ranked on each of five measures: BE/ME, earnings-to-price, forecast earnings-to-price, cash flow-to-price, and sales-to-enterprise value. The Value Composite is an equal risk-weighted combination of the five industry-neutral long/short portfolios, constructed to be beta-neutral and dollar-neutral and to target a constant volatility. The Value Composite factor is only available since 1980 due to data availability.

Disclosures

This document has been provided to you solely for information purposes and does not constitute an offer or solicitation of an offer or any advice or recommendation to purchase any securities or other financial instruments and may not be construed as such. The factual information set forth herein has been obtained or derived from sources believed by the author and AQR Capital Management, LLC ("AQR"), to be reliable, but it is not necessarily all-inclusive and is not guaranteed as to its accuracy and is not to be regarded as a representation or warranty, express or implied, as to the information's accuracy or completeness, nor should the attached information serve as the basis of any investment decision. This document is not to be reproduced or redistributed without the written consent of AQR. The information set forth herein has been provided to you as secondary information and should not be the primary source for any investment or allocation decision.

Past performance is not a guarantee of future performance.

This presentation is not research and should not be treated as research. This presentation does not represent valuation judgments with respect to any financial instrument, issuer, security, or sector that may be described or referenced herein and does not represent a formal or official view of AQR.

The views expressed reflect the current views as of the date hereof, and neither the author nor AQR undertakes to advise you of any changes in the views expressed herein. It should not be assumed that the author or AQR will make investment recommendations in the future that are consistent with the views expressed herein, or use any or all of the techniques or methods of analysis described herein in managing client accounts. AQR and its affiliates may have positions (long or short) or engage in securities transactions that are not consistent with the information and views expressed in this presentation.

The information contained herein is only as current as of the date indicated and may be superseded by subsequent market events or for other reasons. Charts and graphs provided herein are for illustrative purposes only. The information in this presentation has been developed internally and/or obtained from sources believed to be reliable; however, neither AQR nor the author guarantees the accuracy, adequacy, or completeness of such information. Nothing contained herein constitutes investment, legal, tax, or other advice, nor is it to be relied on in making an investment or other decision.

There can be no assurance that an investment strategy will be successful. Historic market trends are not reliable indicators of actual future market behavior or future performance of any particular investment, which may differ materially, and should not be relied upon as such. Target allocations contained herein are subject to change. There is no assurance that the target allocations will be achieved, and actual allocations may be significantly different from those shown here. This presentation should not be viewed as a current or past recommendation or a solicitation of an offer to buy or sell any securities or to adopt any investment strategy.

The information in this presentation might contain projections or other forward-looking statements regarding future events, targets, forecasts, or expectations regarding the strategies described herein and is only current as of the date indicated. There is no assurance that such events or targets will be achieved and might be significantly different from that shown here. The information in this presentation, including statements concerning financial market trends, is based on current market conditions, which will fluctuate and may be superseded by subsequent market events or for other reasons. Performance of all cited indices is calculated on a total return basis with dividends reinvested.

The investment strategy and themes discussed herein may be unsuitable for investors depending on their specific investment objectives and financial situation. Please note that changes in the rate of exchange of a currency might affect the value, price, or income of an investment adversely. Neither AQR nor the author assumes any duty to, nor undertakes to update forward-looking statements. No representation or warranty, express or implied, is made or given by or on behalf of AQR, the author, or any other person as to the accuracy and completeness or fairness of the information contained in this presentation, and no responsibility or liability is accepted for any such information. By accepting this presentation in its entirety, the recipient acknowledges its understanding and acceptance of the foregoing statement. Diversification does not eliminate the risk of experiencing investment losses. Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index.

HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH, BUT NOT ALL, ARE DESCRIBED HEREIN. NO REPRESENTATION IS BEING MADE THAT ANY FUND OR ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN HEREIN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY REALIZED BY ANY PARTICULAR TRADING PROGRAM. ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS THAT CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM, WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS, ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS. The hypothetical performance results contained herein represent the application of the quantitative models as currently in effect on the date first written above, and there can be no assurance that the models will remain the same in the future or that an application of the current models in the future will produce similar results because the relevant market and economic conditions that prevailed during the hypothetical performance period will not necessarily recur. Discounting factors may be applied to reduce suspected anomalies. This backtest's return, for this period, may vary depending on the date it is run. Hypothetical performance results are presented for illustrative purposes only. In addition, our transaction cost assumptions utilized in backtests, where noted, are based on AQR Capital Management LLC's, ("AQR's") historical realized transaction costs and market data. Certain of the assumptions have been made for modeling purposes and are unlikely to be realized. No representation or warranty is made as to the reasonableness of the assumptions made or that all assumptions used in achieving the returns have been stated or fully considered. Changes in the assumptions may have a material impact on the hypothetical returns presented. Actual advisory fees for products offering this strategy may vary.

Gross performance results do not reflect the deduction of investment advisory fees, which would reduce an investor's actual return. For example, assume that $1 million is invested in an account with the Firm, and this account achieves a 10% compounded annualized return, gross of fees, for five years. At the end of five years that account would grow to $1,610,510 before the deduction of management fees. Assuming management fees of 1.00% per year are deducted monthly from the account, the value of the account at the end of five years would be $1,532,886 and the annualized rate of return would be 8.92%. For a ten-year period, the ending dollar values before and after fees would be $2,593,742 and $2,349,739, respectively. AQR's asset based fees may range up to 2.85% of assets under management, and are generally billed monthly or quarterly at the commencement of the calendar month or quarter during which AQR will perform the services to which the fees relate. Performance fees are generally equal to 20% of net realized and unrealized profits each year, after restoration of any losses carried forward from prior years. In addition, AQR funds incur expenses (including start-up, legal, accounting, audit, administrative and regulatory expenses) and may have redemption or withdrawal charges up to 2% based on gross redemption or withdrawal proceeds. Please refer to the Fund's Private

Offering Memoranda and AQR’s ADV Part 2A for more information on fees. Consultants supplied with gross results are to use this data in accordance with SEC, CFTC, NFA or the applicable jurisdiction’s guidelines.

There is a risk of substantial loss associated with trading commodities, futures, options, derivatives, and other financial instruments. Before trading, investors should carefully consider their financial position and risk tolerance to determine whether the proposed trading style is appropriate. Investors should realize that when trading futures, commodities, options, derivatives, and other financial instruments, one could lose the full balance of their account. It is also possible to lose more than the initial deposit when trading derivatives or using leverage. All funds committed to such a trading strategy should be purely risk capital.

AQR Capital Management, LLC, is exempt from the requirement to hold an Australian Financial Services License under the Corporations Act 2001 (Cth). AQR Capital Management, LLC, is regulated by the Securities and Exchange Commission (“SEC”) under the United States of America laws, which differ from Australian laws. Please note that this document has been prepared in accordance with SEC requirements and not Australian laws. Canadian recipients of fund information: These materials are provided by AQR Capital Management (Canada), LLC, Canadian placement agent for the AQR funds. Please note for materials distributed through AQR Capital Management (Asia): This presentation may not be copied, reproduced, republished, posted, transmitted, disclosed, distributed, or disseminated, in whole or in part, in any way without the prior written consent of AQR Capital Management (Asia) Limited (together with its affiliates, “AQR”) or as required by applicable law.

This presentation and the information contained herein are for educational and informational purposes only and do not constitute and should not be construed as an offering of advisory services or as an invitation, inducement, or offer to sell or solicitation of an offer to buy any securities, related financial instruments, or financial products in any jurisdiction.

Investments described herein will involve significant risk factors, which will be set out in the offering documents for such investments and are not described in this presentation. The information in this presentation is general only, and you should refer to the final private information memorandum for complete information. To the extent there is any conflict between this presentation and the private information memorandum, the private information memorandum shall prevail.

Please note for materials distributed through AQR Capital Management (Asia): This presentation may not be copied, reproduced, republished, posted, transmitted, disclosed, distributed or disseminated, in whole or in part, in any way without the prior written consent of AQR Capital Management (Asia) Limited (together with its affiliates, “AQR”) or as required by applicable law. This presentation and the information contained herein are for educational and informational purposes only and do not constitute and should not be construed as an offering of advisory services or as an invitation, inducement or offer to sell or solicitation of an offer to buy any securities, related financial instruments or financial products in any jurisdiction. Investments described herein will involve significant risk factors which will be set out in the offering documents for such investments and are not described in this presentation. The information in this presentation is general only and you should refer to the final private information memorandum for complete information. To the extent of any conflict between this presentation and the private information memorandum, the private information memorandum shall prevail. The contents of this presentation have not been reviewed by any regulatory authority in Hong Kong. You are advised to exercise caution and if you are in any doubt about any of the contents of this presentation, you should obtain independent professional advice.

The information set forth herein has been prepared and issued by AQR Capital Management (Europe), LLP, a UK limited liability partnership with its registered office at Charles House 5–11 Regent Street, London, SW1Y 4LR, which is authorized by the UK Financial Conduct Authority (“FCA”) . This factsheet is a financial promotion and has been approved by AQR Capital Management (Europe) LLP.

AQR, a German limited liability company (Gesellschaft mit beschränkter Haftung; “GmbH”), is authorized by the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, „BaFin”) to provide the services of investment advice (Anlageberatung) and investment broking (Anlagevermittlung) pursuant to the German Banking Act (Kreditwesengesetz; “KWG”). The Complaint Handling Policy for German investors can be found here: https://ucits.aqr.com/.

Request ID 297855