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Research Papers in Economics
No. 7/25

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First Draft: September 9, 2025

*This paper builds in part on the first author's Ph.D. thesis. The authors gratefully acknowledge financial support from the German Research Foundation (DFG, grant no. 5086102031).

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Economic Forecast Disagreement and Equity Pricing: International Evidence

Abstract

Economic expectations play a central role in financial markets, yet investors often disagree about the economy's future. This disagreement has long been viewed as a potential driver of asset prices, but it remains unclear whether it reflects mispricing or a priced source of risk. We address this question by constructing monthly disagreement indices from Consensus Economics forecasts from 24 OECD markets. Firm-level exposure to economic disagreement is estimated through return regressions. Results reveal pronounced cross-country heterogeneity. In developed markets, particularly the United States, greater exposure to disagreement consistently predicts lower future returns, supporting the mispricing hypothesis. Smaller markets exhibit mixed patterns, with some evidence of positive risk premia, while other cases show no significant effect. These findings provide new international evidence that the pricing of forecast disagreement is context-dependent, shaped by market structure and institutional depth.

JEL Codes: D84, G12, G14, G15.

Keywords: Asset Pricing, Consensus Economics, Forecast Disagreement, Macroeconomic Forecasts.

1 Introduction

Investors rarely agree on the future state of the economy. Disagreement about growth, inflation, and other macroeconomic fundamentals is ubiquitous, although the implications for asset pricing remain controversial. Some theories, following Miller (1977), argue that greater disagreement leads to overpricing when pessimistic investors are constrained from short-selling, generating subsequent negative returns. In contrast, equilibrium asset pricing models (e.g., Merton 1973; Campbell and Cochrane 1999; Bansal and Yaron 2004) would interpret disagreement as a form of risk, where larger differences in expectations reflect heightened economic uncertainty that commands a positive risk premium. Which of these views better explains the link between forecast disagreement and stock returns is ultimately an empirical question.

Empirical findings provide evidence for both interpretations. Studies of the United States (US) market using firm-level earnings forecasts (e.g. Diether et al. 2002; Johnson 2004; Yu 2011) find that greater forecast dispersion predicts lower future returns, supporting the mispricing hypothesis. More recent research examines macroeconomic forecast disagreement.[1] Bali et al. (2017, 2023) document that innovations in disagreement indexes negatively predict US stock returns. In contrast, studies such as Anderson et al. (2005, 2009) find a positive relationship between high variation in earnings forecasts and expected returns. However, the existing empirical research has several key limitations. First, it is largely US-centric, leaving open whether these patterns generalize internationally. Second, most studies rely on quarterly data, whereas macroeconomic expectations often shift at much higher frequencies. Third, disagreement is usually measured by the standard deviation of forecasts, which can be sensitive to outliers and may not capture the distribution of views appropriately.

In this paper, we address these gaps by providing the first large-scale international analysis of economic forecast disagreement and its pricing implications. We

1. A different strand of the literature focuses on macroeconomic uncertainty, measuring it through the dynamics of economic variables to identify periods of heightened uncertainty or volatility regimes, and examines how these relate to financial market outcomes (e.g., Bekaert et al. 2009; Ozoguz 2009; Jurado et al. 2015; Bali et al. 2017).

construct monthly disagreement indices from Consensus Economics forecasts for 24 OECD countries over the period 1990–2019. Specifically, we measure the dispersion of various macroeconomic indicators through both standard deviations and interquartile ranges, and extract their common components using principal component analysis (PCA). We then estimate firm-level exposures to disagreement shocks through return regressions. Stocks are sorted into tercile portfolios based on these betas, and high-minus-low (HML) portfolio returns are computed, providing a direct test of whether exposure to disagreement predicts future returns. Empirical results reveal heterogeneous effects across markets. In developed economies – particularly the US – stocks with greater exposure to disagreement consistently earn lower subsequent returns. In contrast, results for smaller markets are mixed: some suggest positive risk premia, consistent with risk-based explanations, while others show no significant relationship.

Our analysis, based on a large international dataset, contributes to the growing literature that extends US evidence on equity factors to global markets (e.g. Fama and French 2012; Schmidt et al. 2019; Jacobs and Müller 2020; Hanauer 2024; Xhulaj 2024). Beyond testing whether the results of Bali et al. (2023) replicate internationally, the cross-country dimension allows us to learn from systematic heterogeneity. In developed and liquid markets such as the US, we find significantly negative returns for stocks exposed to disagreement shocks, consistent with the Miller (1977) mispricing hypothesis. However, attributing this entirely to short-sale constraints is questionable: in countries with explicit restrictions, such as South Korea, we do not observe significant negative returns. In smaller markets, the picture is more mixed, with some evidence of positive premia consistent with risk compensation, while others show no significant effects. Thus, we find that pricing of forecast disagreement appears to be context-dependent, shaped by market structure and institutional depth.

The remainder of the paper is organized as follows. Section 2 describes the construction of macroeconomic disagreement measures as well as the stock market data and filtering procedures. Section 3 outlines the econometric framework and the port-

folio-sorting methodology. Section 4 presents the results. Section 5 concludes and discusses implications for theory and practice.

2 Data

Macroeconomic forecasts are obtained from the CE database, which provides monthly projections for a broad range of economic indicators across multiple countries and regions. These forecasts form the basis for the forecast disagreement measures used in the empirical analysis. Risk-free rates are sourced from Refinitiv Datastream and Eurostat.[2] Stock market data – including stock prices and market capitalization – comes from Refinitiv Datastream.

The dataset covers macroeconomic forecasts and stock market data through December 31, 2019, a cutoff selected to avoid distortions caused by Covid 19-related market volatility. Start dates vary by country and are set at the earliest point when both forecast and financial data are simultaneously available. Several OECD member countries are excluded due to fundamental data quality and coverage issues. Exclusion criteria include: (i) limited CE dataset coverage, (ii) missing forecasts for key variables such as interest rates, bond yields, inflation, and the unemployment rate, (iii) interrupted forecast time series, with months of missing data or fewer than five contributing forecasters, (iv) substantial gaps in stock-level data, (v) insufficient historical coverage of risk-free rates, and (vi) unreliable financial market data, where equity returns showed persistent outliers and irregular patterns even after filtering.

The final dataset comprises 24 countries: Australia, Canada, Chile, Colombia, Czechia, France, Germany, Hungary, Italy, Japan, Latvia, Lithuania, the Netherlands, New Zealand, Norway, Poland, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom (UK), and the US.

2. For European countries where short-term government bond yields are missing or inconsistent in Datastream, long-term euro area government bond yields from Eurostat are used as substitutes. For all other countries, the shortest available maturity government bond yields from Datastream approximate the risk-free rate.

2.1 Macroeconomic Forecasts

The CE database provides monthly forecasts of key macroeconomic variables for each country. Table A1 in Appendix A summarizes the number of forecasters, start dates, and regional coverage. G7 and Western European countries have data since 1990, whereas many Eastern European and developing economies were added later. More developed economies generally show more stable coverage, while the other economies have fewer forecasters and higher variability.

Forecasts are published for two horizons: the remainder of the current calendar year (CY) and the next calendar year (NY). Thus, publication month determines horizon length: a January forecast for the CY spans nearly a full year, while a November forecast covers only a short remaining period. To standardize horizons, all forecasts are converted to a 12-month-ahead equivalent using weighted interpolation:

$$F_{i,v,c,t} = \frac{m}{12} F^{\text{CY}}_{i,v,c,t} + \frac{12-m}{12} F^{\text{NY}}_{i,v,c,t}, \tag{1}$$

where i indexes forecasters, v macroeconomic variables, c countries, and t the publication date. The weight m is the number of months remaining in the current year at time t, ensuring comparability of forecasts regardless of issuance month.

To measure forecast disagreement, we compute two dispersion metrics for each variable-country-month triplet (v, c, t). The cross-sectional **standard deviation** (StD) is calculated as:

$$\text{StD}_{v,c,t} = \sqrt{\frac{1}{N_{v,c,t}-1} \sum_{i=1}^{N_{v,c,t}} \left(F_{i,v,c,t} - \bar{F}_{v,c,t}\right)^2}, \tag{2}$$

where $N_{v,c,t}$ is the number of forecasters for variable v in country c at time t and $\bar{F}_{v,c,t}$ the mean forecast. This metric measures overall dispersion around the consensus.

As a robust alternative, we use the **interquartile range** (IQR):

$$\text{IQR}_{v,c,t} = Q_3(F_{i,v,c,t}) - Q_1(F_{i,v,c,t}), \tag{3}$$

where Q_3 and Q_1 are the 75th and 25th percentiles of forecasts. The IQR reflects the spread of the central 50% of forecasts, is insensitive to extreme values, and remains meaningful even in small samples.

Cross-sectional measures of forecast dispersion, such as StD and IQR, tend to exhibit strong persistence, often driven by gradual macroeconomic shifts. As noted by Bali et al. (2023), this persistence frequently reflects long-term patterns or habits in how forecasters form expectations. However, such persistence can obscure short-term fluctuations in disagreement that are more relevant for analyzing market reactions. To isolate the innovation component of forecast disagreement, we apply an autoregressive filtering approach. For each variable-country pair (v, c), we estimate a first-order autoregressive (AR(1)) process:

$$Z_{v,c,t} = \omega_{0,v,c} + \omega_{1,v,c} Z_{v,c,t-1} + \epsilon_{v,c,t}, \tag{4}$$

where $Z_{v,c,t}$ represents the forecast disagreement measure ($\text{StD}_{v,c,t}$ or $\text{IQR}_{v,c,t}$), $\omega_{0,v,c}$ captures the baseline level of disagreement for each (v, c) combination, and $\omega_{1,v,c}$ measures its persistence. The innovation term $\epsilon_{v,c,t}$ captures the unpredictable component of disagreement after accounting for these systematic effects. We then compute standardized residuals, denoted $res_{v,c,t}$, to serve as innovation-based measures of forecast disagreement. This filtering removes the predictable autocorrelated component, yielding a stationary series, which is comparable across variables and countries. The standardized residuals $res_{v,c,t}$ thus highlight short-term, unexpected shifts in forecast disagreement not explained by historical dynamics.

To construct a composite measure of forecast disagreement at the country level, based on a broad set of macroeconomic indicators,[3] we build a PCA-based index $\mathcal{I}_{c,t}$:

$$\mathcal{I}_{c,t} = \mathbf{w}_c^\top \mathbf{res}_{c,t}, \tag{5}$$

3. Depending on the country and period, the macroeconomic indicators include, among others, Gross Domestic Product, consumption, investment, corporate profits, industrial production, consumer and producer prices, employment and wage costs, housing starts, unemployment, current account, trade balance, exports, imports, budget balance, monetary aggregates, three-month interest rates, and ten-year government bond yields.

where $\mathbf{res}_{c,t} = [res_{v_1,c,t}, \ldots, res_{v_{N_v},c,t}]^\top$ is the vector of standardized residuals for all macroeconomic variables in country c at time t, and $\mathbf{w}_c$ is the eigenvector corresponding to the largest eigenvalue of the covariance matrix $\Sigma_c = \text{Cov}(\mathbf{res}_c)$. This procedure extracts the dominant latent factor driving shocks in forecast disagreement. The resulting index $\mathcal{I}_{c,t}$ captures unexpected shifts in forecast dispersion after removing persistent components, variable-specific scaling effects, and cross-country differences in volatility. Positive values of $\mathcal{I}_{c,t}$ indicate above-trend disagreement – interpreted as heightened uncertainty – while negative values reflect strong consensus among forecasters.

To avoid look-ahead bias when generating signals for portfolio formation, we re-estimate the disagreement index at each point in time using only information available up to that date. We employ two approaches to assess robustness. First, for each point in time, we calculate StD and IQR using a **rolling window** of the most recent 60 observations. This approach allows the measures to adapt quickly to changes in forecast behavior, capturing potential structural breaks or short-term shifts, but it also makes the index more volatile. Second, we compute both dispersion measures using all available data up to time t, starting with the first estimation after an initial 60-month period. These **expanding windows** preserve early information but react more slowly to regime changes, producing smoother and more persistent indexes that capture long-term disagreement patterns yet may lag in responding to sudden changes.

Figures A1 and A2 in Appendix A present macroeconomic forecast disagreement indexes based on the rolling window specification, while Figures A3 and A4 show the corresponding series for expanding windows.

Across countries, the StD-based indexes (blue) are consistently more reactive – especially during crises – because they are more prone to the influence of outliers. In the UK, for instance, they register sharper swings during both the 2008 financial crisis and the pre-Brexit period. A similar pattern emerges in Japan, where the StD index spikes in 2008 while the IQR-based measure (red) shifts only moderately. This heightened sensitivity is not limited to crises: even in calmer periods, StD-based indexes

remain more volatile, as seen in Australia, France, Germany, the Netherlands, New Zealand, Norway, Spain, the UK, and the US. By contrast, the IQR-based index proves particularly useful in countries with smaller or noisier forecasting panels. In Chile, Czechia, and South Korea, for example, the StD index produces sharp, non-economic reversals that the IQR measure smooths out. Methodologically, rolling-window indexes react quickly to shocks and revert faster to the mean, whereas expanding window indexes, which draw on the full historical sample, display greater persistence.

At the country level, Canada, the UK, and the US stand out with frequent reversals and pronounced short-term volatility in both StD- and IQR-based indexes. Similar, though less pronounced, dynamics are visible in Australia, France, Germany, Italy, the Netherlands, Spain, Sweden, and Switzerland. South Korea shows a distinct pattern: long stretches of stability punctuated by isolated spikes, signaling rare but significant bursts of forecast divergence. Eastern European countries (Czechia, Hungary, Latvia, Lithuania, Poland, Slovenia, and Turkey) tend toward smoother indexes, as do Chile and Colombia, where disagreement shifts more gradually and volatility is lower. Such patterns may reflect lower forecast dispersion, stronger herding behavior among forecasters, or weaker transmission of global shocks.

2.2 Stock Market Data

As mentioned above, stock market data – including stock prices and market capitalization – was sourced from Refinitiv Datastream. Raw Datastream data often presents challenges that require careful preprocessing before use in academic research. To address these issues, we applied the filtering and cleaning procedures developed by Landis and Skouras (2021), which correct data inconsistencies (such as rounding errors), remove survivorship bias, and improve the overall quality of international stock market data by excluding problematic instruments and addressing fundamental inaccuracies. These filters exclude stocks from the dataset based on predefined country- and market-specific conditions.

Static filters rely on information that remains constant over a stock's lifespan.

Specifically, the dataset excludes (i) securities misclassified as common equities (e.g., preferred shares, funds, depositary receipts, warrants, and other equity-like instruments); (ii) cross-listed stocks and multiple listings of the same instrument to avoid duplicate return series, retaining only the primary listing; (iii) stocks traded in non-domestic currencies, except where multiple official currencies exist (e.g., euro transitions, with historical data kept in pre-transition currencies); and (iv) stocks headquartered outside the country of analysis to focus exclusively on domestic securities. Table A2 in Appendix A shows the number of remaining stocks per country after applying the static filters.

Return index-based filters use historical return data to identify and exclude stocks with unusual or unreliable return patterns. These filters remove stocks with extreme, inconsistent, or insufficient return histories, often caused by data errors, corporate actions, or trading irregularities. Specifically, the dataset excludes stocks (i) without return index data; (ii) where 95% or more of non-zero daily returns are all positive or all negative, indicating potential recording errors; (iii) with fewer than 120 valid daily returns (except recently listed stocks); (iv) with over 95% zero returns due to illiquidity, missing data, or padded returns; (v) with daily return volatility above 40%;[4] and (vi) with daily return standard deviation below 0.01, reflecting artificially stable or infrequently traded shares. Table A3 in Appendix A shows the number of remaining stocks per country after applying the return-index based filters.

Stockday filters are applied to the daily returns of individual stocks and address issues arising on specific trading days, without excluding entire stocks. By removing misleading observations or replacing repeated or implausible return series with missing values, these filters reduce noise and enhance the reliability of the data. Specifically, the dataset excludes: (i) delisted stocks after ten consecutive padded observations; (ii) sequences where prices remain unchanged for 30 or more consecutive trading days; (iii) extreme return reversals, such as a sudden positive return over 100% followed by a negative return exceeding 50% (Landis and Skouras 2021), which usually

4. Since the remaining filters already removed all problematic stocks, the high-volatility filter did not exclude any additional stocks.

result from reporting errors or corporate adjustments; (iv) observations from public holidays or days with exceptionally low trading activity, defined as days when fewer than 0.5% of stocks report valid returns; (v) nonsensical entries, such as zero or negative prices; and (vi) penny stocks, defined as stocks with unadjusted closing prices in the lowest monthly quartile, to avoid issues of extreme illiquidity, price manipulation, and excessive volatility.

After applying the three sets of filters, we compute the aggregate stock market return for each country by constructing a capitalization-weighted index of stock prices at monthly frequency. Let $p_{c,j,t}$ denote the price of stock j in country c at time t and $m_{c,j,t}$ its corresponding market capitalization. The capitalization-weighted aggregate stock price level $P_{c,t}$ is then defined as:

$$P_{c,t} = \frac{\sum_{j=1}^{M_c} p_{c,j,t} \cdot m_{c,j,t}}{\sum_{j=1}^{M_c} m_{c,j,t}}, \tag{6}$$

where M_c is the number of available stocks in country c and the denominator represents the total market capitalization of country c at time t. The resulting series $P_{c,t}$ forms the basis for constructing the three-month aggregate market return series used in the empirical analysis.

3 Econometric Framework and Portfolio Sorting

This section outlines the econometric framework used to estimate firm-level exposures to forecast disagreement and describes how these exposures are employed to form portfolios. We first detail the construction of the disagreement index, and then explain how disagreement betas are estimated and used to sort stocks into portfolios for the return analysis.

3.1 Econometric Framework

We estimate the sensitivity of individual stock returns to fluctuations in macroeconomic disagreement using both a rolling regression framework and an expanding regression framework. All macroeconomic disagreement indices are either organized into rolling windows of 60 months or into expanding windows of at least 60 months, in which all available historical data up to period t is included. We apply both window specifications independently to the StD- and IQR-based indices, yielding four distinct time series of disagreement betas, $\beta^{\mathcal{I}}_{c,j}$, for each stock j in country c. These betas are subsequently employed in portfolio sorting exercises to investigate the pricing implications of exposure to macroeconomic forecast disagreement.

Within each window, we estimate the following regression:

$$R^{\text{excess}}_{c,j,t} = \alpha_{c,j} + \beta^{\mathcal{I}}_{c,j} \cdot \mathcal{I}_{c,t} + \beta^{\text{MKT}}_{c,j} \cdot R^{\text{MKT}}_{c,t} + \varepsilon_{c,j,t}, \tag{7}$$

where $R^{\text{excess}}_{c,j,t}$ denotes the three-month-ahead excess return of stock j, computed monthly as the simple return from time t to $t+3$. The key independent variable, $\mathcal{I}_{c,t}$, represents the country-level macroeconomic forecast disagreement index, constructed as the first principal component of the standardized AR(1) residuals of forecast disagreement measures (StD- or IQR-based) across all macroeconomic variables. The variable $R^{\text{MKT}}_{c,t}$ captures the three-month-ahead excess return on the aggregate market index for country c and is based on $P_{c,t}$ from Eq. (6). The coefficients $\beta^{\mathcal{I}}_{c,j}$ and $\beta^{\text{MKT}}_{c,j}$ represent, respectively, the exposure of stock j to innovations in macroeconomic forecast disagreement and to broad market movements, while $\varepsilon_{c,j,t}$ denotes the idiosyncratic error term.

This regression is estimated separately for each stock in each country, with the coefficients updated on a monthly basis. For each month, the regression uses the most recent 60 (or more, in the case of expanding windows) observations of overlapping three-month-ahead excess returns, resulting in overlapping return windows. To ac-

count for the autocorrelation induced by the overlapping returns, all standard errors are computed using the Newey and West (1987) estimator with a lag length of 2.

We also explored two alternative approaches for estimating the disagreement betas. First, we constructed a global measure of macroeconomic disagreement by taking a weighted average of GDP forecast disagreement across the G7 members, which replaced the country-specific indexes in Eq. (7). Second, we used US forecast disagreement, reflecting the central role of the US economy in shaping global asset prices. These alternative results are not reported here (available upon request), as those based on our country-specific disagreement indexes exhibited superior model fit. This is likely because, even though the country-specific indexes are influenced by global developments, they better capture the specific combination of global and local conditions that drive asset prices in each market.

3.2 Portfolio Formation Based on Disagreement Betas

To ensure that each portfolio has a sufficient number of stocks per country and time period, and to mitigate idiosyncratic return variation, we form three portfolios based on disagreement betas, $\beta^{\mathcal{I}}_{c,j}$. For each country and month, stocks are sorted into terciles according to the distribution of their disagreement betas, which are estimated from Eq. (7). Stocks with a $\beta^{\mathcal{I}}_{c,j}$ below the 33rd percentile are assigned to the first portfolio. Stocks between the 33rd and 66th percentiles enter the second portfolio, and stocks above the 66th percentile are allocated to the third.[5]

The portfolios are constructed using market-capitalization weights. The value of each portfolio k in country c at time t, denoted by $P_{c,k,t}$, is computed as:

$$P_{c,k,t} = \frac{\sum_{j \in \mathcal{P}_{c,k,t}} p_{c,j,t} \cdot m_{c,j,t}}{\sum_{j \in \mathcal{P}_{c,k,t}} m_{c,j,t}}, \tag{8}$$

where $k \in \{1, 2, 3\}$ indexes the three tercile portfolios, $\mathcal{P}_{c,k,t}$ is the set of stocks in the k-th portfolio, $m_{c,j,t}$ is the market capitalization of stock j, and $p_{c,j,t}$ is the return index of

5. We chose tercile portfolios over quintiles because the limited number of listed stocks in smaller economies would result in some portfolios having too few observations.

stock j. For each portfolio, we calculate the excess return by subtracting the risk-free rate.

This portfolio formation procedure is applied separately to disagreement betas estimated using both the StD and IQR disagreement measures, and under both rolling and expanding window specifications. This yields four distinct sets of portfolio returns for each country, which allows us to comprehensively evaluate how the method of constructing the disagreement index affects its asset pricing implications. Tables A4 and A5 in the Appendix provide a detailed view of the disagreement beta distributions used for portfolio formation.

These tables reveal several insights. First, the sorting procedure consistently produces a negative median for disagreement betas in the first portfolio. For the second portfolio, the median betas are mostly positive or near zero, particularly in the expanding window specification. A notable difference emerges between markets: major developed economies like Germany, France, the UK, and the US show smaller ranges and more stable breakpoints. In contrast, smaller markets such as Colombia, Latvia, and Slovenia exhibit wider min-max spreads and more extreme beta values. This likely reflects their thinner equity markets or greater exposure to idiosyncratic macroeconomic shocks.

Second, while the sorting thresholds generally align for both disagreement measures, the choice between StD and IQR can significantly alter the dispersion and magnitude of the breakpoints. StD-based breakpoints typically have larger absolute values and wider ranges, a trend particularly visible in countries like Canada, the Netherlands, and Sweden. Conversely, IQR-based breakpoints are usually more compressed and centered closer to zero, reaffirming that this measure is more robust to outlier forecasts.

Third, the expanding window structure results in smoother beta distributions compared to the rolling window structure. This is particularly evident in countries such as Canada, Germany, Japan, and the Netherlands. This finding supports the idea that

expanding-window specifications provide more stable long-term estimates of exposure to forecast disagreement shocks by using the full historical information set.

4 Results

In the following, we present results across four specifications: two windowing methods (rolling and expanding windows) and two cross-sectional disagreement measures (StD and IQR).

4.1 Rolling Window Results

Table 1 reports value-weighted portfolio returns based on 60 months rolling windows and the StD disagreement index, while Table 2 presents results using the IQR index. Stocks are sorted into three portfolios by their estimated disagreement betas, and HML long-short returns are computed to assess the pricing effects of exposure to macroeconomic forecast disagreement.

The StD-based results reveal pronounced cross-country variation. In most large developed markets, HML returns are negative. For instance, the US shows a mean HML return of –0.83% per overlapping three-month period (t = –2.41), indicating that stocks with high disagreement exposure earn systematically lower subsequent returns. Similar but largely insignificant negative spreads appear in Australia, France, Germany, and Italy, suggesting limited compensation for disagreement risk in these markets.

In contrast, several smaller developed markets show positive HML returns, pointing to a potential uncertainty premium. Hungary's return of 1.57% (t = 1.96) is significant at the 5% level, while Czechia, Latvia, and Sweden also display positive but weaker spreads. These results suggest that disagreement pricing varies across markets, likely reflecting differences in investor structure, liquidity, or sensitivity to macroeconomic shocks.

Table 1: Portfolio Returns Based on Rolling Windows and StD Measure

Country	Portfolio 1	Portfolio 2	Portfolio 3	HML
Australia	1.005%	0.441%	0.390%	–0.615%
	2.47**	1.45	0.92	–1.43
Canada	0.614%	–0.171%	–0.412%	–1.026%
	0.98	–0.31	–0.67	–1.44
Chile	0.843%	–0.267%	–0.171%	–1.014%
	1.15	–0.70	–0.34	–1.37
Colombia	–0.915%	–0.082%	–0.568%	0.347%
	–1.72*	–0.16	–1.14	0.78
Czechia	0.359%	0.488%	1.932%	1.573%
	0.72	0.79	1.83*	1.56
France	0.795%	0.715%	0.643%	–0.152%
	2.16**	1.95*	1.82*	–0.44
Germany	0.860%	0.442%	0.559%	–0.300%
	1.79*	1.18	1.51	–0.77
Hungary	0.118%	1.609%	1.691%	1.573%
	0.21	2.87***	2.99***	1.96**
Italy	0.509%	–0.148%	–0.015%	–0.524%
	0.99	–0.32	–0.03	–1.48
Japan	0.193%	0.132%	0.154%	–0.039%
	0.41	0.36	0.38	–0.12
Latvia	–0.630%	3.136%	1.038%	1.669%
	–1.22	1.55	1.29	1.79*
Lithuania	0.742%	0.321%	0.620%	–0.122%
	1.69*	0.53	1.48	–0.29
Netherlands	0.138%	0.278%	0.163%	0.026%
	0.29	0.66	0.42	0.06
New Zealand	0.715%	0.470%	0.581%	–0.134%
	2.34**	1.73*	1.75*	–0.38
Norway	0.963%	0.962%	1.182%	0.219%
	1.86*	1.91*	1.96**	0.49
Poland	0.515%	0.510%	–0.213%	–0.728%
	0.84	1.02	–0.34	–0.86
Slovenia	1.480%	0.649%	0.422%	–1.059%
	2.21**	1.00	0.97	–1.50
South Korea	0.363%	1.430%	0.632%	0.269%
	0.74	3.55***	1.30	0.54
Spain	0.131%	0.127%	–0.306%	–0.437%
	0.34	0.34	–0.87	–1.33
Sweden	–0.195%	0.533%	0.718%	0.913%
	–0.32	1.29	2.05**	1.85*
Switzerland	0.646%	0.624%	0.726%	0.081%
	2.02**	1.85*	2.16**	0.24
Turkey	0.137%	0.007%	0.323%	0.185%
	0.14	0.01	0.37	0.19
United Kingdom	0.486%	0.154%	0.331%	–0.154%
	1.56	0.47	1.38	–0.63
United States	1.217%	0.592%	0.393%	–0.825%
	3.90***	1.85*	1.05	–2.41**

Notes: Portfolio returns (monthly percentage changes) and Newey and West (1987) t-statistics across countries based on rolling window disagreement betas constructed with the StD measure. ***/**/* indicates significance at the 1%/5%/10% level.

Table 2: Portfolio Returns Based on Rolling Windows and IQR Measure

Country	Portfolio 1	Portfolio 2	Portfolio 3	HML
Australia	0.515%	0.413%	0.715%	0.199%
	1.43	1.34	1.71*	0.51
Canada	0.918%	–0.748%	–0.144%	–1.062%
	1.51	–1.18	–0.28	–1.55
Chile	0.699%	–0.162%	–0.383%	–1.082%
	1.19	–0.41	–0.68	–1.66*
Colombia	–0.725%	–0.427%	–0.390%	0.335%
	–1.59	–0.80	–0.76	0.79
Czechia	1.760%	1.247%	0.421%	–1.339%
	1.32	1.97**	0.84	–0.88
France	1.041%	0.811%	0.456%	–0.585%
	2.42**	2.10**	1.34	–1.67*
Germany	0.715%	0.460%	0.496%	–0.218%
	1.56	1.28	1.25	–0.60
Hungary	0.769%	1.914%	1.122%	0.353%
	1.11	2.63***	2.71***	0.49
Italy	0.630%	0.015%	–0.080%	–0.710%
	1.28	0.03	–0.18	–2.08**
Japan	0.243%	0.321%	0.118%	–0.125%
	0.59	0.83	0.26	–0.35
Latvia	1.710%	3.187%	0.364%	–1.345%
	1.93*	1.26	0.56	–1.34
Lithuania	0.483%	0.108%	0.904%	0.421%
	0.80	0.25	1.64*	0.74
Netherlands	0.514%	0.231%	0.054%	–0.460%
	1.17	0.59	0.14	–1.50
New Zealand	0.713%	0.321%	0.741%	0.028%
	2.30**	1.05	2.31**	0.09
Norway	0.498%	1.145%	1.043%	0.545%
	1.07	2.02**	1.94*	1.32
Poland	0.956%	0.215%	–0.258%	–1.214%
	1.65*	0.35	–0.34	–1.40
Slovenia	1.603%	–0.312%	0.728%	–0.875%
	2.94***	–0.51	1.46	–1.59
South Korea	0.551%	0.819%	0.982%	0.431%
	1.26	1.83*	2.08**	0.91
Spain	0.409%	0.126%	–0.062%	–0.472%
	1.15	0.31	–0.17	–1.28
Sweden	0.583%	–0.155%	0.585%	0.002%
	1.13	–0.37	1.33	0.00
Switzerland	0.829%	0.676%	0.579%	–0.250%
	2.41**	1.89*	1.80*	–0.78
Turkey	1.387%	–0.332%	0.315%	–1.072%
	1.57	–0.36	0.37	–1.32
United Kingdom	0.343%	0.242%	0.554%	0.210%
	0.88	0.95	1.95**	0.59
United States	1.317%	0.383%	0.364%	–0.953%
	3.84***	1.26	0.97	–2.73***

Notes: Portfolio returns (monthly percentage changes) and Newey and West (1987) t-statistics across countries based on rolling window disagreement betas constructed with the IQR measure. ***/**/* indicates significance at the 1%/5%/10% level.

IQR-based estimates broadly confirm these findings but yield narrower spreads and fewer extreme values. For example, US and Italian HML returns remain negative and significant (–0.95%, t = –2.73; –0.71%, t = –2.08), while positive spreads in smaller markets are less pronounced. This aligns with IQR's robustness to outlier forecasts, producing more stable beta estimates and portfolio rankings.

4.2 Expanding Window Results

Table 3 reports value-weighted portfolio returns based on expanding windows and the StD disagreement index, while Table 4 presents results using the IQR index. Expanding windows incorporate all available historical data at each point in time, reducing the impact of temporary shocks that can distort rolling-window estimates. This smoothing effect makes expanding windows particularly useful for identifying persistent, long-term relationships between disagreement exposure and return premia.

StD-based results under this specification are broadly consistent with those from rolling windows. Large developed markets continue to exhibit negative or near-zero HML returns. In the US and Germany, returns are significantly negative (–0.68%, t = –2.20; –0.76%, t = –2.20), and Italy reports negative values near conventional significance thresholds. These findings reinforce the conclusion that disagreement exposure is not rewarded in these markets and may even be penalized.

Smaller and less capitalized markets remain more heterogeneous. Latvia shows a positive and marginally significant HML return (1.33%, t = 1.84), while Colombia and Lithuania report positive but statistically insignificant values. Overall, expanding windows compress the range of HML estimates relative to rolling windows, reducing the influence of short-lived shocks and emphasizing persistent cross-market relationships between disagreement and returns.

Table 3: Portfolio Returns Based on Expanding Windows and StD Measure

Country	Portfolio 1	Portfolio 2	Portfolio 3	HML
Australia	0.764%	0.452%	0.487%	–0.277%
	2.00**	1.48	1.13	–0.67
Canada	0.704%	–0.271%	–0.045%	–0.749%
	1.11	–0.48	–0.08	–1.04
Chile	0.883%	–0.301%	–0.179%	–1.061%
	1.22	–0.85	–0.35	–1.51
Colombia	–0.944%	–0.097%	–0.477%	0.467%
	–1.80*	–0.19	–0.95	1.11
Czechia	0.692%	0.459%	1.148%	0.457%
	1.29	0.76	2.64***	0.80
France	0.810%	0.728%	0.719%	–0.091%
	2.16**	2.09**	2.02**	–0.25
Germany	0.983%	0.590%	0.219%	–0.764%
	2.18**	1.59	0.56	–2.20**
Hungary	0.746%	0.944%	1.151%	0.405%
	1.27	1.64*	2.85***	0.62
Italy	0.551%	–0.215%	–0.101%	–0.652%
	1.08	–0.48	–0.21	–1.82*
Japan	0.146%	0.179%	0.156%	0.010%
	0.31	0.50	0.38	0.03
Latvia	–0.385%	3.398%	0.946%	1.331%
	–0.65	1.70*	1.32	1.84*
Lithuania	0.567%	0.235%	0.511%	–0.056%
	1.27	0.42	1.17	–0.13
Netherlands	0.081%	0.443%	0.046%	–0.035%
	0.17	1.16	0.12	–0.08
New Zealand	0.718%	0.637%	0.545%	–0.173%
	2.44**	2.31**	1.72*	–0.52
Norway	1.097%	0.624%	1.265%	0.167%
	2.18**	1.21	2.17**	0.38
Poland	0.941%	0.508%	–0.577%	–1.519%
	1.65*	0.89	–0.91	–1.98**
Slovenia	1.382%	0.319%	0.465%	–0.917%
	2.33**	0.43	1.06	–1.47
South Korea	0.305%	1.289%	0.684%	0.379%
	0.63	3.20***	1.44	0.84
Spain	0.217%	0.193%	–0.370%	–0.587%
	0.57	0.51	–1.09	–1.67*
Sweden	0.084%	0.635%	0.606%	0.522%
	0.14	1.55	1.62	1.02
Switzerland	0.655%	0.726%	0.745%	0.090%
	2.11**	2.16**	2.27**	0.29
Turkey	0.142%	–0.018%	0.354%	0.213%
	0.16	–0.02	0.40	0.24
United Kingdom	0.416%	0.135%	0.375%	–0.041%
	1.10	0.42	1.63	–0.13
United States	1.161%	0.519%	0.479%	–0.682%
	3.86***	1.61	1.36	–2.20**

Notes: Portfolio returns (monthly percentage changes) and Newey and West (1987) t-statistics across countries based on expanding window disagreement betas constructed with the StD measure. ***/**/* indicates significance at the 1%/5%/10% level.

Table 4: Portfolio Returns Based on Expanding Windows and IQR Measure

Country	Portfolio 1	Portfolio 2	Portfolio 3	HML
Australia	0.641%	0.366%	0.792%	0.151%
	1.68*	1.27	1.99**	0.39
Canada	0.998%	–0.901%	0.233%	–0.765%
	1.81*	–1.40	0.45	–1.21
Chile	0.555%	–0.167%	–0.219%	–0.774%
	1.03	–0.41	–0.40	–1.22
Colombia	–0.849%	–0.239%	–0.496%	0.353%
	–1.77*	–0.44	–1.08	0.89
Czechia	1.489%	1.543%	0.435%	–1.054%
	1.10	2.34**	0.83	–0.68
France	0.849%	0.915%	0.482%	–0.367%
	2.19**	2.27**	1.50	–1.21
Germany	0.706%	0.542%	0.412%	–0.294%
	1.58	1.60	0.92	–0.78
Hungary	0.672%	1.846%	1.077%	0.405%
	0.96	2.54***	2.79***	0.56
Italy	0.318%	0.144%	0.028%	–0.290%
	0.64	0.35	0.06	–0.80
Japan	0.301%	0.224%	0.137%	–0.164%
	0.70	0.60	0.31	–0.47
Latvia	1.562%	3.351%	0.483%	–1.079%
	1.70*	1.32	0.83	–1.04
Lithuania	0.621%	0.075%	1.066%	0.445%
	1.05	0.17	1.97**	0.79
Netherlands	0.600%	0.053%	0.232%	–0.368%
	1.37	0.14	0.60	–1.25
New Zealand	0.569%	0.329%	0.824%	0.255%
	1.87*	1.07	2.86***	0.85
Norway	0.755%	1.096%	1.238%	0.483%
	1.64*	1.89*	2.39**	1.13
Poland	1.030%	0.379%	–0.163%	–1.193%
	2.02**	0.61	–0.21	–1.40
Slovenia	1.445%	–0.255%	0.676%	–0.769%
	2.59***	–0.39	1.39	–1.39
South Korea	0.509%	1.037%	0.932%	0.424%
	1.14	2.41**	2.19**	1.06
Spain	0.103%	0.157%	–0.021%	–0.124%
	0.28	0.39	–0.06	–0.36
Sweden	0.401%	–0.039%	0.740%	0.339%
	0.77	–0.09	1.70*	0.70
Switzerland	0.865%	0.524%	0.567%	–0.298%
	2.60***	1.41	1.74*	–0.90
Turkey	1.315%	–0.436%	0.342%	–0.973%
	1.46	–0.47	0.40	–1.21
United Kingdom	0.324%	0.351%	0.325%	0.001%
	0.86	1.31	1.22	0.00
United States	1.241%	0.538%	0.404%	–0.837%
	3.81***	1.71*	1.11	–2.99***

Notes: Portfolio returns (monthly percentage changes) and Newey and West (1987) t-statistics across countries based on expanding window disagreement betas constructed with the IQR measure. ***/**/* indicates significance at the 1%/5%/10% level.

The IQR-based analysis using expanding windows further squeezes estimates. Negative HML returns persist in major developed markets, with the US remaining significantly negative (–0.84%, t = –2.99), while spreads in smaller countries become more muted. For example, previously large or volatile estimates in Czechia, Hungary, Latvia, and Sweden decrease substantially in absolute magnitude, reflecting IQR's robustness to outliers combined with the smoothing from expanding windows.

Taken together, both rolling- and expanding-window specifications indicate that macroeconomic forecast disagreement is not uniformly priced across countries. In more developed markets, higher exposure to disagreement is generally associated with lower subsequent returns, consistent with Miller (1977), who argues that disagreement under short-selling constraints leads to overpricing of optimistic views and subsequent corrections. However, the short-selling explanation is not fully convincing empirically: in South Korea, a highly developed market where short-selling is strongly restricted, disagreement-sensitive stocks do not earn significantly negative returns but instead display small, statistically insignificant positive returns. Moreover, some smaller markets exhibit tentative evidence of a positive uncertainty premium. Differences in market structure, information environments, and investor composition likely explain this heterogeneity. These findings suggest that the asset-pricing role of forecast disagreement is shaped by country-specific factors, particularly market development and institutional frameworks, and cannot be attributed to a single universal mechanism.

4.3 Sensitivity of Results to Modeling Choices

Estimation window specification. Rolling windows emphasize shorter-term variation, while expanding windows incorporate all historical data, dampening transitory effects. In large markets, both approaches yield consistently negative HML returns across both disagreement measures, with the US results being highly significant and stable. For Germany, expanding windows strengthen statistical significance, especially under StD, while Italy's returns remain negative but only marginally significant. In smaller and less capitalized markets, rolling windows often generate larger

positive HML returns, sometimes significant, suggesting potential compensation for uncertainty exposure. However, these effects largely disappear under expanding windows, implying they may reflect temporary episodes of elevated disagreement rather than persistent relationships.

Disagreement measures. Across developed markets, results are broadly consistent between StD- and IQR-based measures. The US exhibits robust, significantly negative HML returns under all specifications, while Germany and Italy also display negative returns, though statistical significance varies by measure. France's returns are consistently negative but rarely significant. These patterns indicate stable disagreement pricing in major developed markets, with some sensitivity in significance levels. In contrast, smaller markets show greater dependence on the disagreement metric: several, including Hungary, Latvia, Czechia, and Sweden, display positive HML returns under StD, suggesting a potential uncertainty premium, but these effects weaken or reverse under IQR. This divergence is most pronounced in rolling-window estimates, which are more affected by transitory spikes in forecast disagreement. IQR generally produces more stable and conservative estimates, particularly in markets with smaller forecast panels where outliers distort StD-based measures. When combined with expanding windows, the gap between StD- and IQR-based results narrows further.

Overall, negative disagreement premia in major developed markets are robust to both window specifications and disagreement measures. In smaller or less liquid markets, however, the magnitude and significance of disagreement effects are more sensitive to modelling choices.

4.4 Analysis of Cumulative HML Returns

Analyzing cumulative HML portfolio returns provides additional insight into the persistence, magnitude, and dynamics of disagreement-based return spreads. By tracking the cumulative performance of long-short strategies that buy stocks with high disagreement betas and sell those with low betas, we assess whether these spreads com-

pound into sustained gains or losses or exhibit mean reversion. Figures 1–4 plot cumulative HML returns across the 24 countries using rolling windows and both StD- and IQR-based disagreement measures, while Figures A5–A8 in the Appendix present corresponding results for expanding windows.

The results confirm the pronounced cross-country variation documented earlier. Several smaller markets, including Colombia, Hungary, and Latvia, show steadily rising cumulative HML returns, suggesting that in markets with greater trading frictions, lower informational efficiency, or higher investor heterogeneity, macroeconomic uncertainty may be a priced source of risk or create opportunities for abnormal returns.

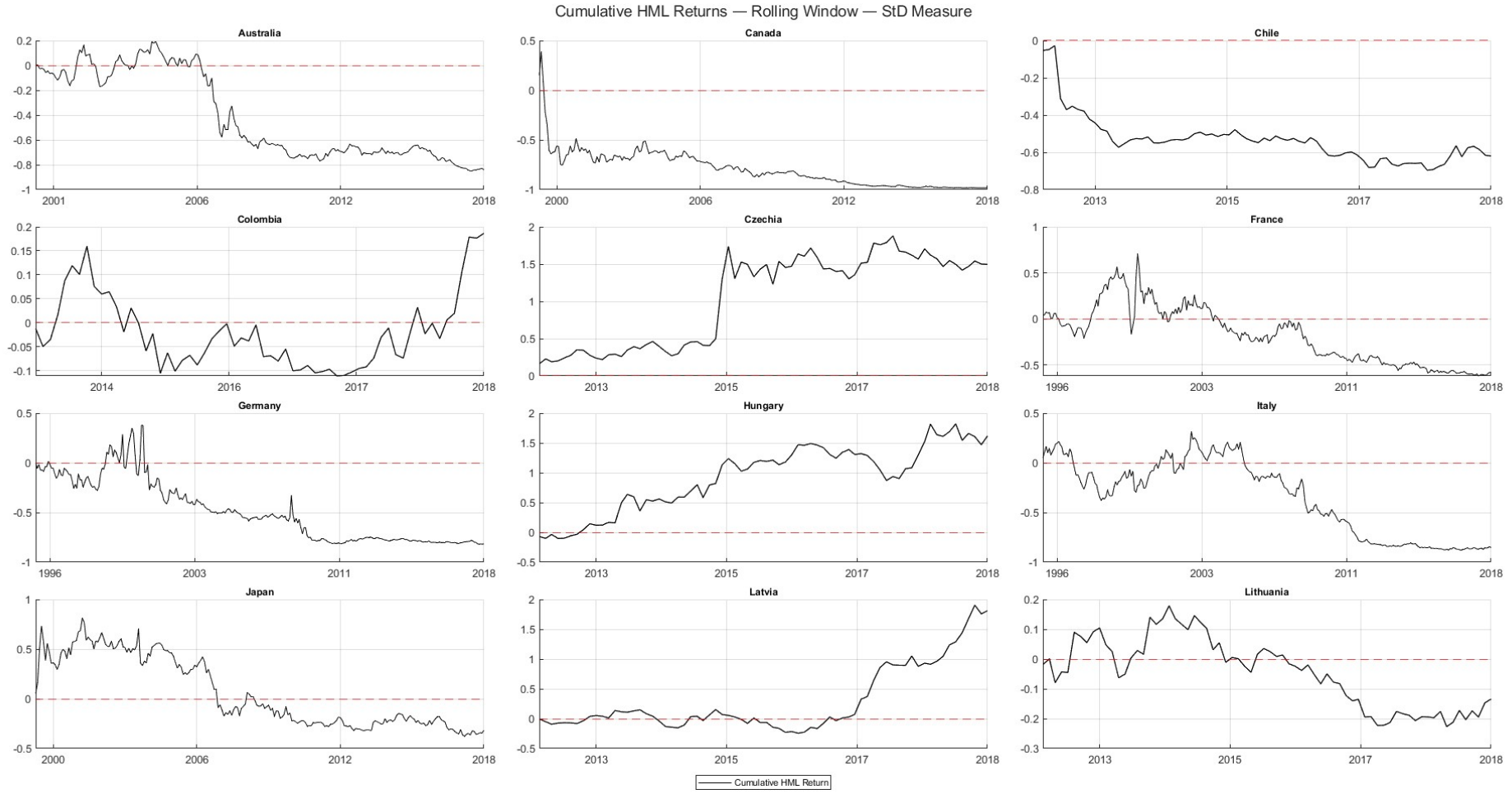
In contrast, many large markets – such as Canada, France, Germany, Italy, Japan, the Netherlands, Spain, and the US – display negative or declining cumulative returns. This pattern indicates that in highly institutionalized and information-rich markets, exposure to macroeconomic disagreement is not rewarded. Instead, heightened uncertainty often coincides with risk aversion and short-sale constraints, leading optimistic investors to drive temporary overpricing of disagreement-sensitive stocks.

Not all markets exhibit monotonic patterns. Norway and Switzerland experience temporary surges followed by reversals, while South Korea and New Zealand display intermittent gains interrupted by drawdowns. These fluctuations highlight that disagreement-based strategies can be episodic, with performance concentrated in specific periods rather than persistent over time.

Rolling and expanding window results are broadly consistent: rolling windows emphasize short-term variation and can exaggerate performance swings, whereas expanding windows smooth these fluctuations and highlight longer-run relationships. Similarly, IQR-based measures produce more conservative and stable cumulative return profiles than StD, particularly in smaller markets where extreme forecasts have disproportionate influence.

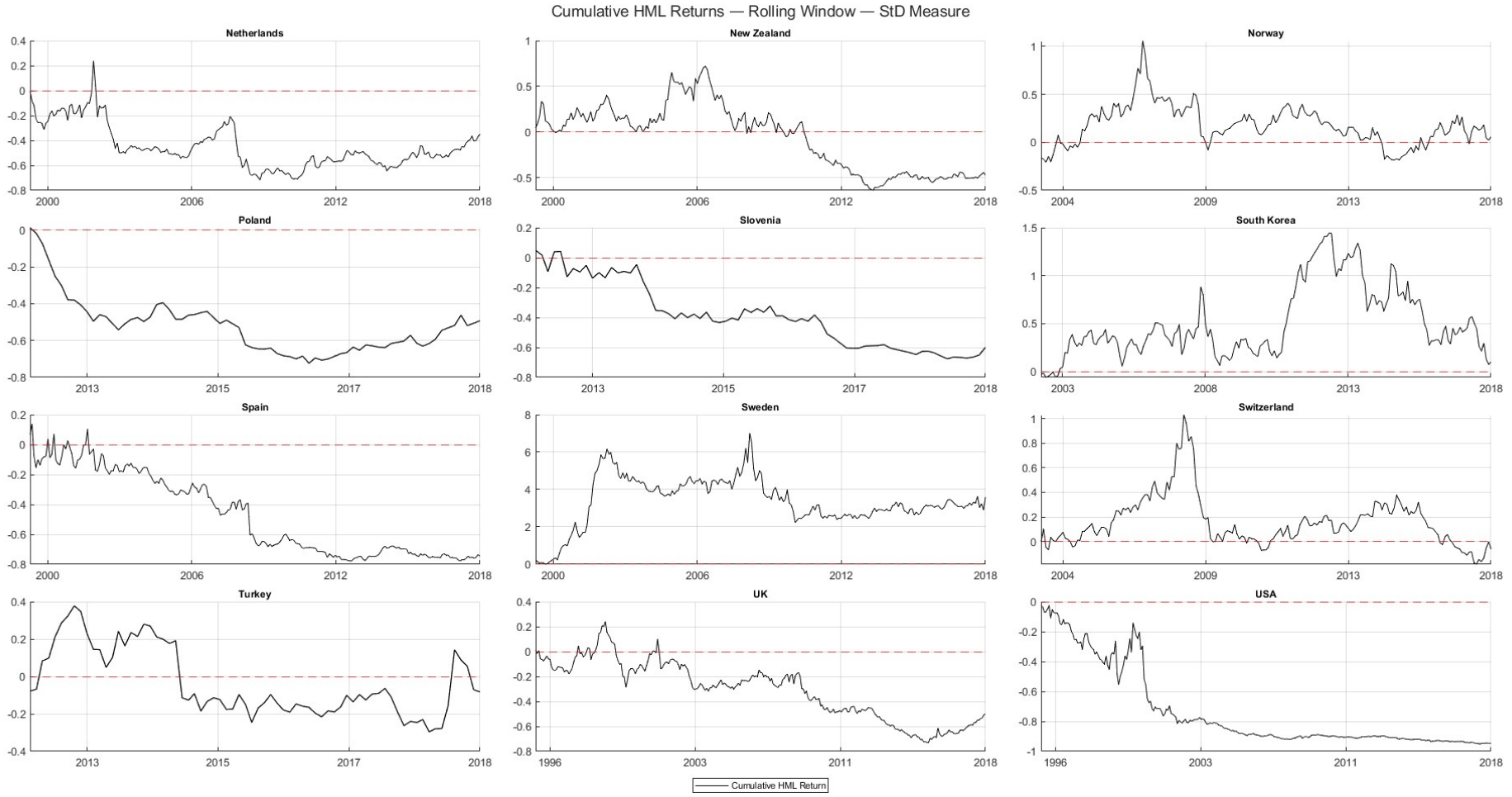
Overall, the cumulative return analysis reinforces earlier findings: disagreement exposure is consistently linked to underperformance in large, more developed markets but may occasionally command a premium in smaller, less capitalized ones.

Figure 1: Cumulative HML Returns Based on Rolling Windows and StD Measure (1/2)



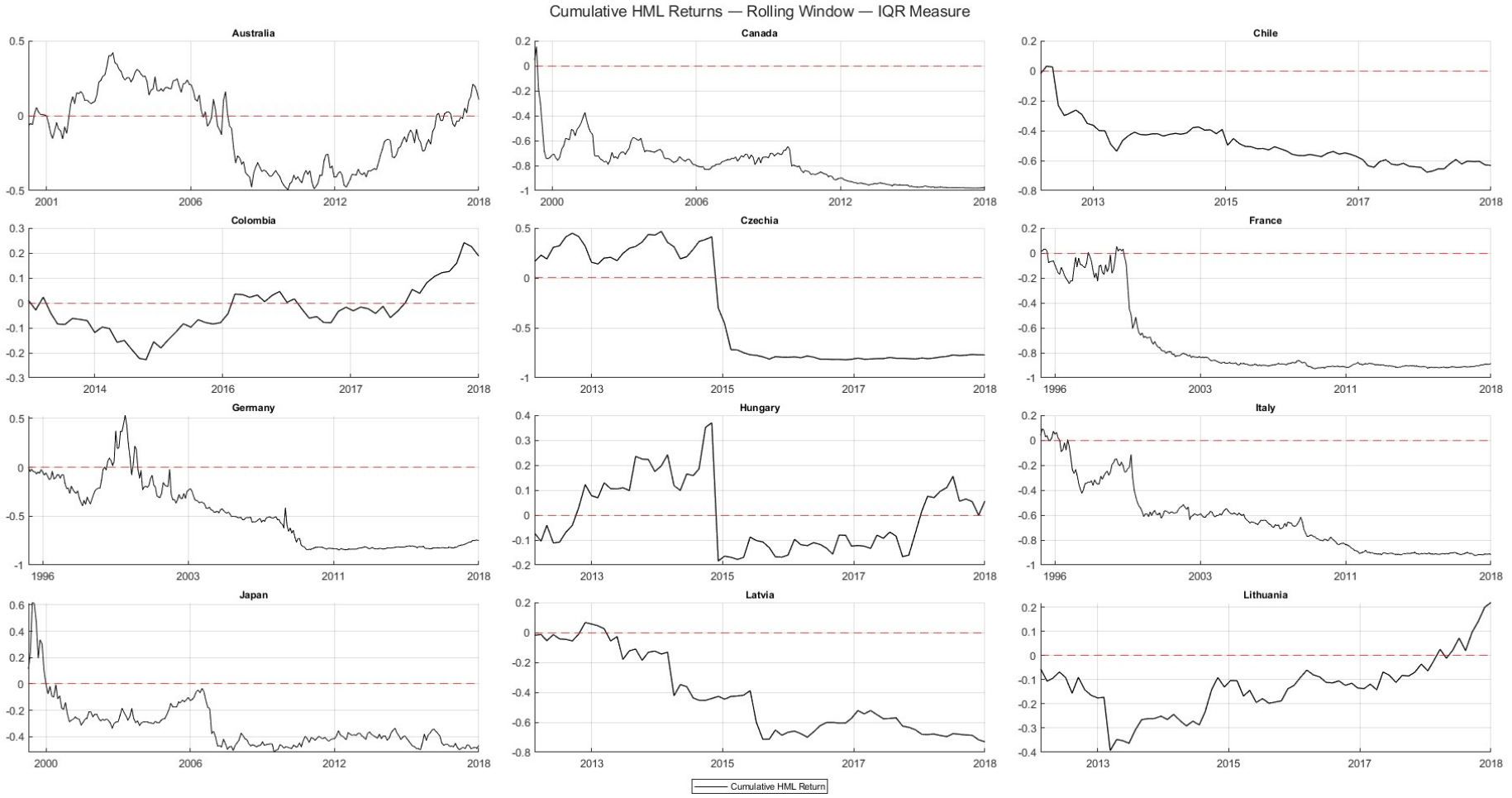
Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from rolling window regressions with the StD measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.

Figure 2: Cumulative HML Returns Based on Rolling Windows and StD Measure (2/2)



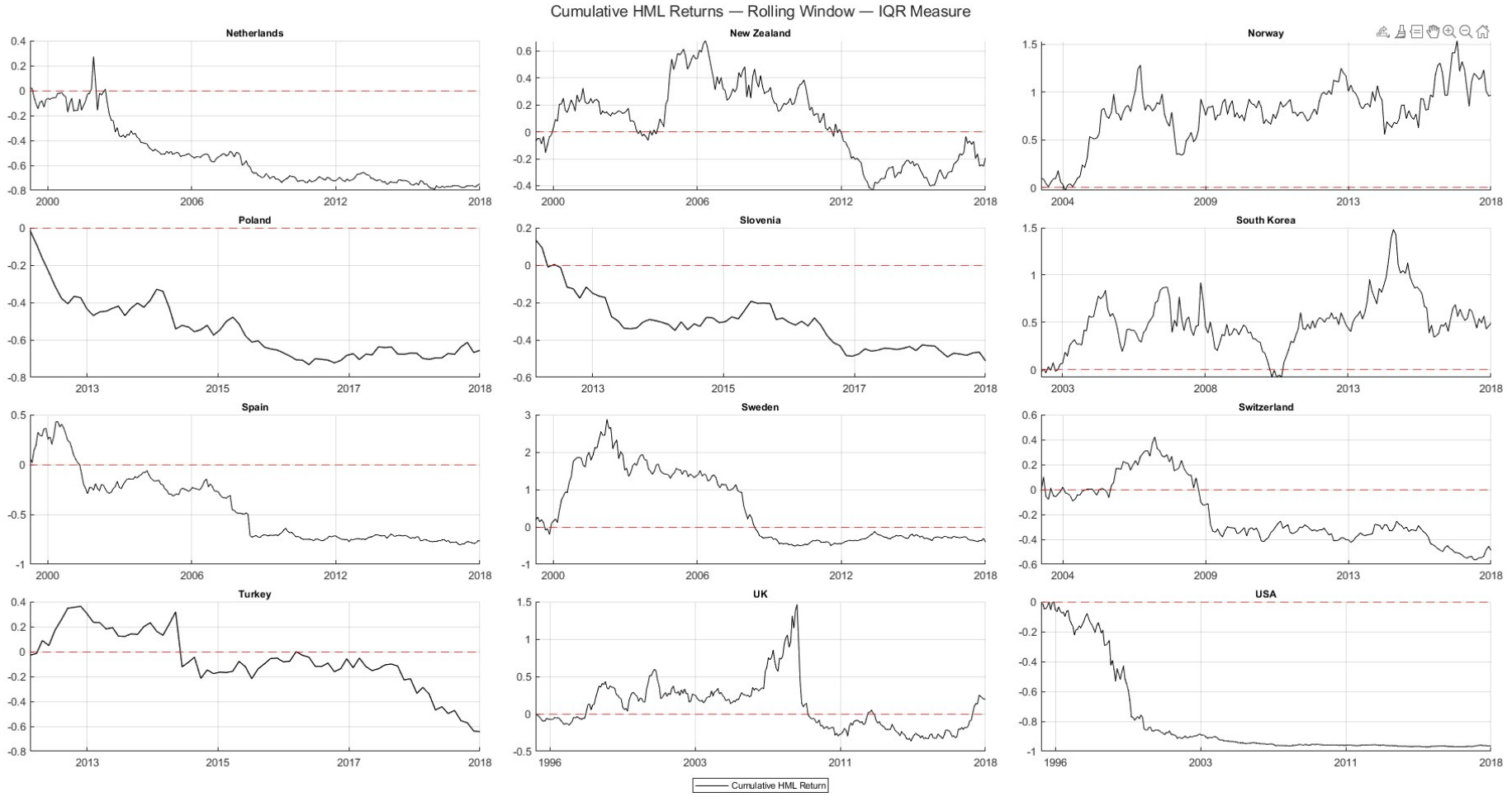
Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from rolling window regressions with the StD measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.

Figure 3: Cumulative HML Returns Based on Rolling Windows and IQR Measure (1/2)



Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from rolling window regressions with the IQR measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.

Figure 4: Cumulative HML Returns Based on Rolling Windows and IQR Measure (2/2)



Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from rolling window regressions with the IQR measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.

5 Conclusions

In this paper, we provide international evidence on the pricing of macroeconomic forecast disagreement in equity markets. Using monthly Consensus Economics forecasts for 24 OECD member countries, we construct disagreement indices and estimate firm-level exposures to test whether and how forecast dispersion affects stock returns. Our results show a clear divide: in developed and liquid markets, especially the US, disagreement-sensitive stocks systematically underperform, consistent with the mispricing view of Miller (1977). However, our international evidence suggests that short-sale constraints are not the sole explanation for this mispricing. In markets such as South Korea, where short-selling is restricted, we do not observe significant negative returns for disagreement-sensitive stocks. In smaller and less developed markets, patterns are more heterogeneous, with occasional evidence of positive premia that point to a risk-based interpretation.

Overall, our findings demonstrate that the asset-pricing role of economic forecast disagreement is context-dependent, shaped by market structure and institutional depth. By moving beyond U.S.-centric evidence and incorporating richer measures of disagreement, our study contributes to the broader debate on whether return predictability reflects mispricing or compensation for risk. Future research should examine more closely the sources of mispricing in developed markets and the institutional conditions that explain why it appears strongly in some countries, such as the US, but is absent in others.

References

Anderson, E. W., E. Ghysels, and J. L. Juergens. 2005. "Do Heterogeneous Beliefs Matter for Asset Pricing?" *Review of Financial Studies* 18 (3): 875–924.

———. 2009. "The Impact of Risk and Uncertainty on Expected Returns." *Journal of Financial Economics* 94 (2): 233–263.

Bali, T. G., S. J. Brown, and Y. Tang. 2017. "Is Economic Uncertainty Priced in the Cross-section of Stock Returns?" *Journal of Financial Economics* 126 (3): 471–489.

———. 2023. "Disagreement in Economic Forecasts and Equity Returns: Risk or Mispricing?" *China Finance Review International* 13 (3): 309–341.

Bansal, R., and A. Yaron. 2004. "Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles." *Journal of Finance* 59 (4): 1481–1509.

Bekaert, G., E. Engstrom, and Y. Xing. 2009. "Risk, Uncertainty, and Asset Prices." *Journal of Financial Economics* 91 (1): 59–82.

Campbell, J. Y., and J. H. Cochrane. 1999. "By Force of Habit: A Consumption-Based Explanation of Aggregate Stock Market Behavior." *Journal of Political Economy* 107 (2): 205–251.

Diether, K. B., C. J. Malloy, and A. Scherbina. 2002. "Differences of Opinion and the Cross Section of Stock Returns." *Journal of Finance* 57 (5): 2113–2141.

Fama, E. F., and K. R. French. 2012. "Size, Value, and Momentum in International Stock Returns." *Journal of Financial Economics* 105 (3): 457–472.

Hanauer, M. X. 2024. "A Comparison of Global Factor Models." *SSRN Scholarly Paper*, https://papers.ssrn.com/abstract=3546295.

Jacobs, H., and S. Müller. 2020. "Anomalies across the Globe: Once Public, no Longer Existent?" *Journal of Financial Economics* 135 (1): 213–230.

Johnson, T. C. 2004. "Forecast Dispersion and the Cross Section of Expected Returns." *Journal of Finance* 59 (5): 1957–1978.

Jurado, K., S. C. Ludvigson, and S. Ng. 2015. "Measuring Uncertainty." *American Economic Review* 105 (3): 1177–1216.

Landis, C., and S. Skouras. 2021. "Guidelines for Asset Pricing Research Using International Equity Data from Thomson Reuters Datastream." *Journal of Banking & Finance* 130:106128.

Merton, R. C. 1973. "An Intertemporal Capital Asset Pricing Model." *Econometrica* 41 (5): 867.

Miller, E. M. 1977. "Risk, Uncertainty, and Divergence of Opinion." *Journal of Finance* 32 (4): 1151.

Newey, W. K., and K. D. West. 1987. "A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix." *Econometrica* 55 (3): 703–708.

Ozoguz, A. 2009. "Good Times or Bad Times? Investors' Uncertainty and Stock Returns." *Review of Financial Studies* 22 (11): 4377–4422.

Schmidt, P. S., U. von Arx, A. Schrimpf, A. F. Wagner, and A. Ziegler. 2019. "Common Risk Factors in International Stock Markets." *Financial Markets and Portfolio Management* 33 (3): 213–241.

Xhulaj, E. 2024. "International Fama-French Factors: Constructability and Dispersion in Average Returns." *SSRN Scholarly Paper*, https://papers.ssrn.com/abstract=4980623.

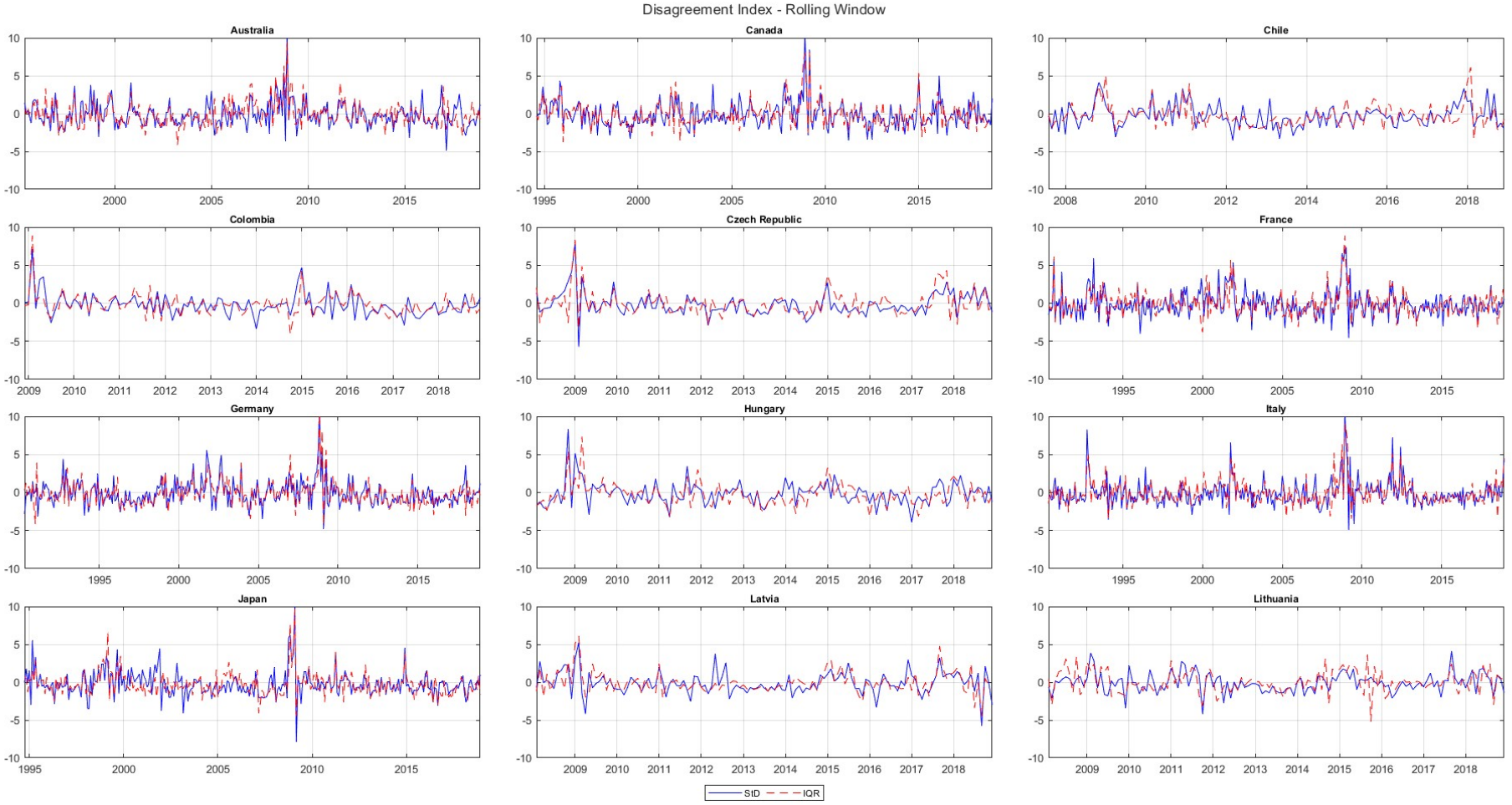
Yu, J. 2011. "Disagreement and Return Predictability of Stock Portfolios." *Journal of Financial Economics* 99 (1): 162–183.

Appendix

Table A1: Number of Forecasters in the CE Panel

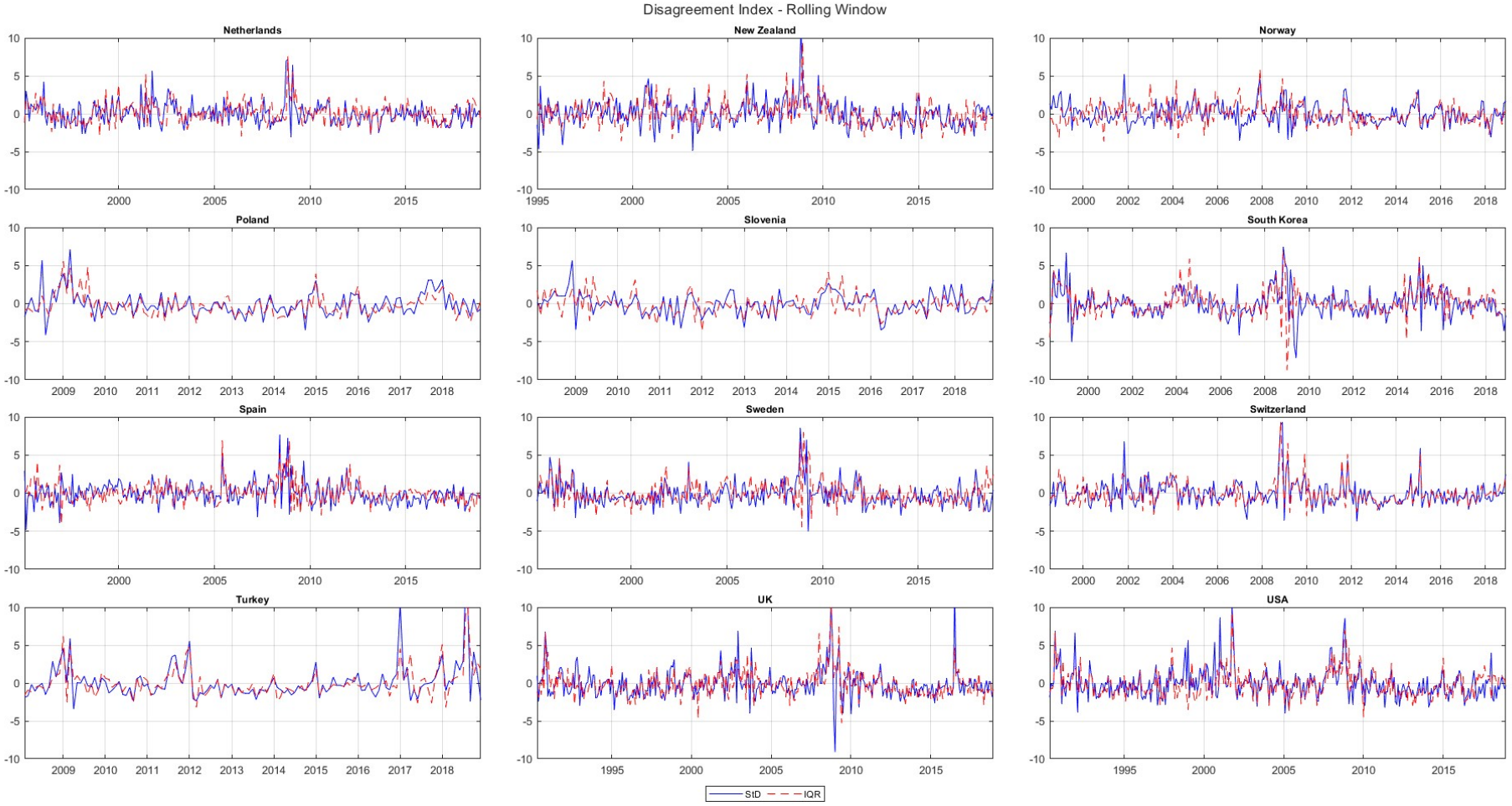
Country	Start	Mean	Median	Min	Max	StD
Australia	11/1990	17.3	17	12	23	2.2
Canada	01/1990	15.9	16	11	20	2.1
Chile	01/2002	18.4	18	10	27	3.1
Colombia	01/2002	14.4	14	8	24	3.4
Czechia	01/2008	18.3	18	12	22	2.5
France	01/1990	19.7	19	11	26	3.3
Germany	01/1990	27.9	28	20	33	2.3
Hungary	01/2008	18.3	19	11	25	3.4
Italy	01/1990	15.5	15	6	26	3.9
Japan	01/1990	20.9	21	12	26	2.5
Latvia	01/2008	10.1	10	7	14	1.4
Lithuania	01/2008	8.8	9	6	12	1.4
Netherlands	01/1995	10.6	10	7	16	2.3
New Zealand	12/1994	13.3	13	8	17	1.4
Norway	06/1998	9.5	10	6	13	1.4
Poland	01/2008	19.7	19	12	26	3.8
Slovenia	01/2008	11.6	12	7	17	2.2
South Korea	12/1994	16.5	17	9	22	2.2
Spain	01/1995	15.9	16	7	26	3.3
Sweden	01/1995	13.6	14	7	18	2.0
Switzerland	06/1998	14.2	15	6	21	2.9
Turkey	01/2008	16.6	17	10	22	2.8
United Kingdom	01/1990	28.0	27	19	34	3.9
United States	01/1990	26.7	27	19	33	2.7

Figure A1: Forecast Disagreement Index Based on Rolling Windows (1/2)



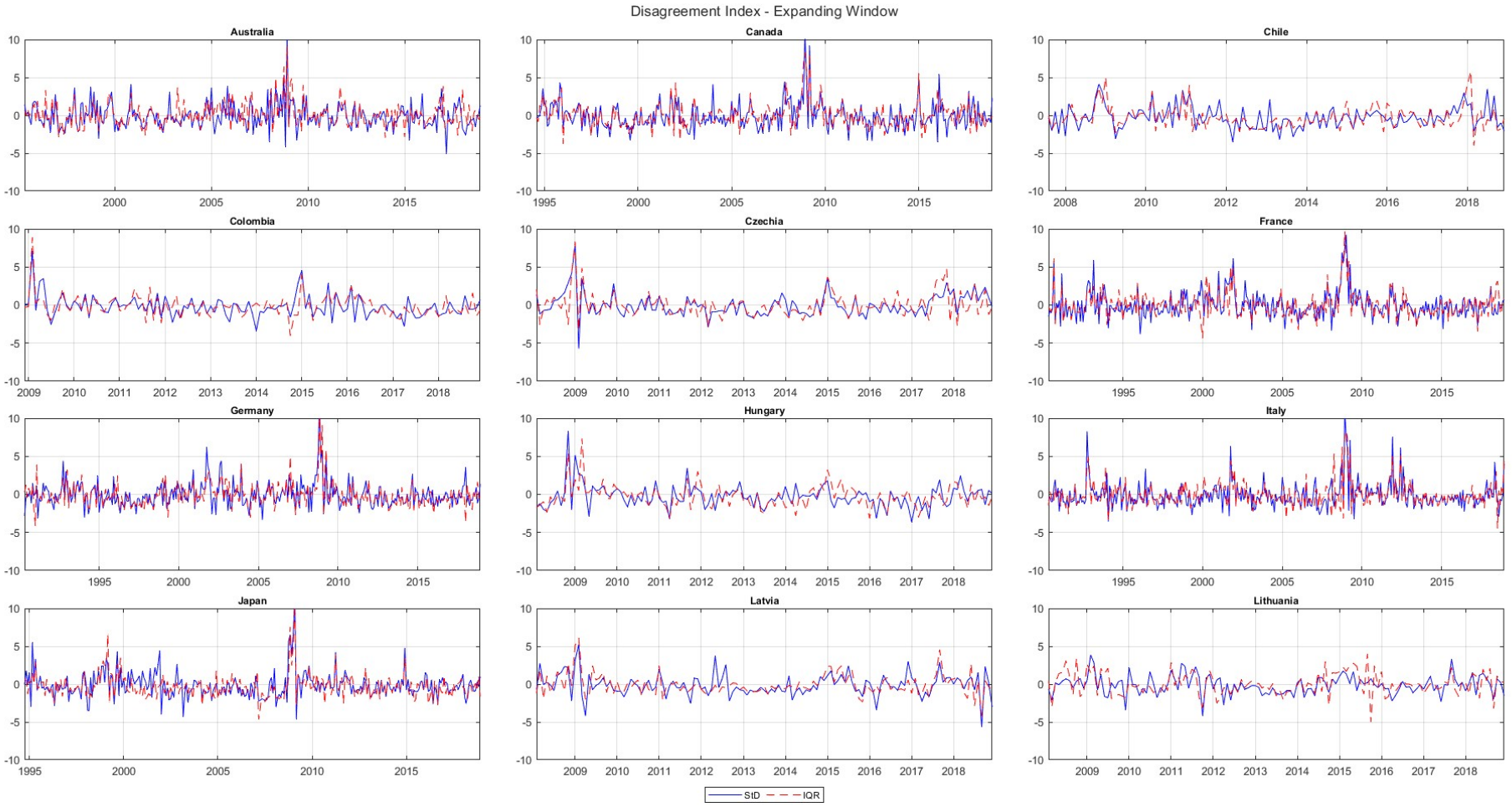
Notes: The figure shows the forecast disagreement index for each country, computed using a rolling window of 60 monthly observations. Blue lines represent the index based on the StD measure, while red lines represent the index based on the IQR.

Figure A2: Forecast Disagreement Index Based on Rolling Windows (2/2)



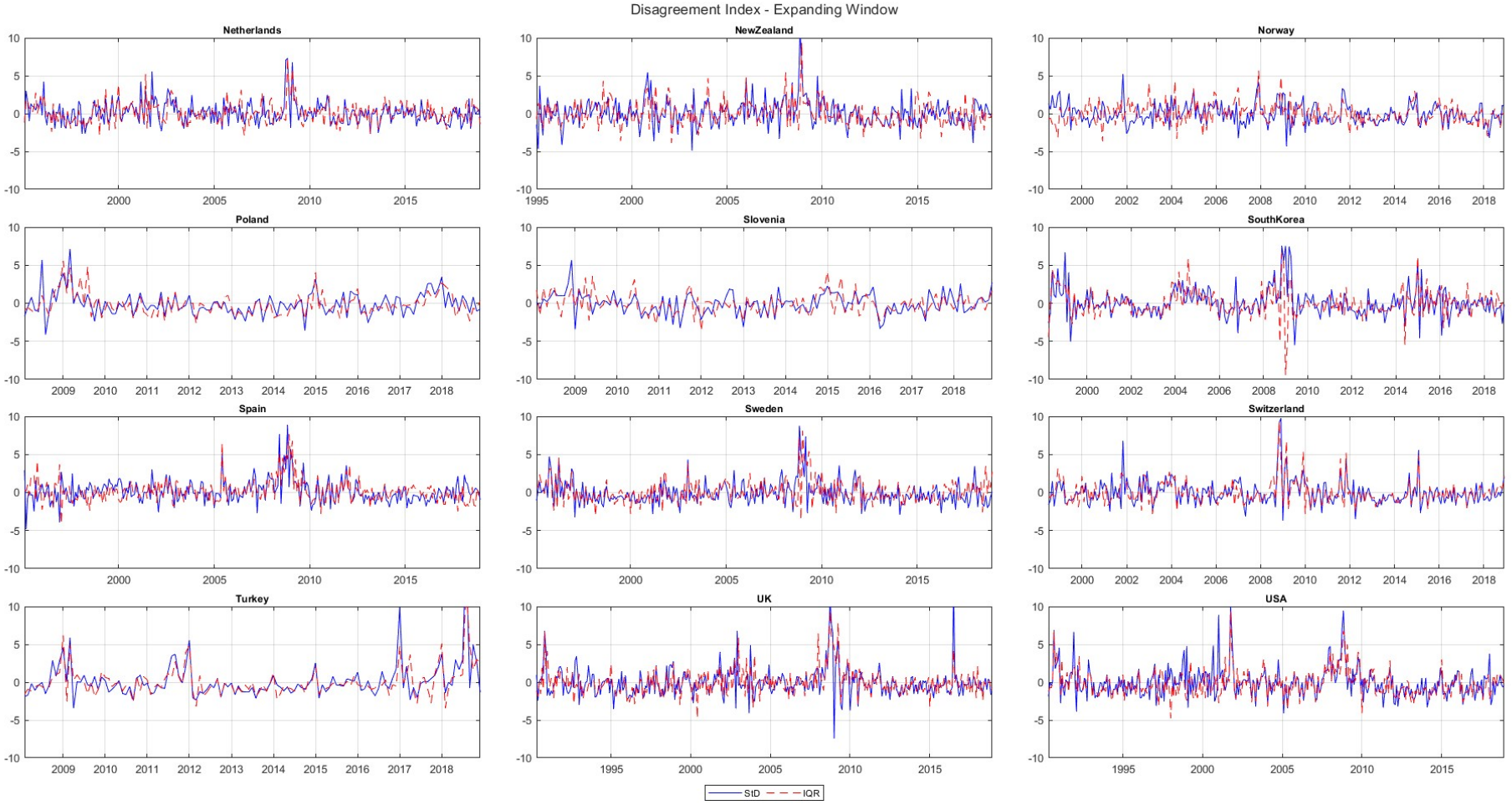
Notes: The figure shows the forecast disagreement index for each country, computed using a rolling window of 60 monthly observations. Blue lines represent the index based on the StD measure, while red lines represent the index based on the IQR.

Figure A3: Forecast Disagreement Index Based on Expanding Windows (1/2)



Notes: The figure shows the forecast disagreement index for each country, computed using an expanding window with at least 60 monthly observations. Blue lines represent the index based on the StD measure, while red lines represent the index based on the IQR.

Figure A4: Forecast Disagreement Index Based on Expanding Windows (2/2)



Notes: The figure shows the forecast disagreement index for each country, computed using an expanding window with at least 60 monthly observations. Blue lines represent the index based on the StD measure, while red lines represent the index based on the IQR.

Table A2: Number of Stocks Remaining after Static Filters

Country	Initial Stocks	Non-Common	Cross-Listed	Foreign Currency	Foreign HQ
Australia	5622	4490	4484	4484	4443
Canada	12321	10012	10012	9939	9886
Chile	633	604	604	604	604
Colombia	258	251	251	251	251
Czechia	403	400	369	369	369
France	3536	2653	2558	2184	2182
Germany	3158	2566	2442	2082	2080
Hungary	228	207	203	201	201
Italy	1277	1213	1190	992	992
Japan	5384	5352	5351	5351	5351
Latvia	154	154	154	154	126
Lithuania	228	228	228	222	222
Netherlands	643	590	574	567	566
New Zealand	551	487	480	480	478
Norway	1018	1001	990	989	988
Poland	1752	1746	1725	1725	1724
Slovenia	422	417	417	417	415
South Korea	4205	3844	3844	3840	3840
Spain	556	510	504	504	504
Sweden	3037	2733	2712	2707	2703
Switzerland	802	743	738	731	731
Turkey	970	943	866	846	845
United Kingdom	8589	8354	7392	7392	7383
United States	23891	19109	18971	18971	18919

Notes: This table reports the number of remaining stocks after applying four static filters: non-common stock status, cross-listing, non-domestic currency, and non-domestic headquarters.

Table A3: Number of Stocks Remaining after Return Index Filters

Country	RI N/A	Impl. Ret.	Few Obs.	Few Non-Zeros	Low Vola
Australia	4412	3818	3542	3532	3515
Canada	9775	8309	7821	7798	7659
Chile	583	335	306	290	279
Colombia	240	136	110	101	96
Czechia	368	242	237	237	237
France	2170	1817	1736	1722	1705
Germany	2049	1502	1449	1448	1428
Hungary	200	131	103	103	101
Italy	986	799	747	747	746
Japan	5336	5047	4916	4912	4910
Latvia	124	35	33	33	29
Lithuania	222	64	62	61	59
Netherlands	555	432	345	343	342
New Zealand	471	375	345	341	340
Norway	985	869	792	790	788
Poland	1712	1359	1164	1164	1162
Slovenia	407	89	84	82	76
South Korea	3835	2454	2393	2393	2386
Spain	492	373	355	345	345
Sweden	2687	1887	1712	1710	1700
Switzerland	731	504	486	484	483
Turkey	843	528	494	494	491
United Kindgdom	7285	6109	4413	4386	4362
United States	18775	14238	12049	12030	11924

Notes: This table reports the number of remaining stocks after applying five return index filters: return index unavailable, implausible returns, few observations, few non-zero returns, and low volatility.

Table A4: Portfolio Breakpoints Based on Rolling Windows

Country	Standard Deviation						Interquartile Difference					
	Median		Min		Max		Median		Min		Max	
	1	2	1	2	1	2	1	2	1	2	1	2
Australia	–0.90	0.67	–2.07	–0.49	1.03	3.11	–0.78	0.82	–2.33	–0.97	0.20	2.51
Canada	–0.49	1.52	–3.78	–1.13	1.38	4.20	–0.48	1.31	–3.29	–1.38	1.14	3.68
Chile	–0.48	0.27	–1.67	–0.67	0.22	1.32	0.01	0.62	–0.75	0.03	0.77	1.92
Colombia	–0.91	–0.32	–1.41	–1.05	–0.34	0.58	–0.73	–0.30	–1.47	–0.63	0.08	0.60
Czechia	–0.24	0.19	–0.99	–0.48	0.58	1.17	–0.08	0.43	–0.99	–0.31	0.22	1.09
France	–1.10	–0.04	–2.98	–1.66	0.16	1.47	–0.85	0.16	–3.75	–2.04	0.61	1.77
Germany	–1.27	–0.08	–3.28	–1.94	–0.00	1.30	–0.98	0.15	–3.15	–1.77	0.15	1.46
Hungary	–0.73	0.11	–1.81	–0.48	–0.02	0.79	–0.86	0.04	–1.56	–0.40	–0.40	0.48
Italy	–1.11	–0.22	–2.24	–1.42	–0.00	1.15	–1.37	–0.24	–2.73	–1.63	0.39	1.88
Japan	–1.21	–0.14	–2.34	–1.14	0.54	1.55	–0.78	0.20	–2.39	–0.93	1.09	2.26
Latvia	–0.40	0.19	–3.02	–1.27	0.64	1.53	–1.57	–0.39	–3.76	–2.51	2.97	5.69
Lithuania	–0.29	0.15	–1.66	–0.79	0.13	0.89	–0.34	0.18	–3.26	–2.33	0.33	0.89
Netherlands	–2.08	–0.75	–4.26	–2.66	0.62	2.14	–0.84	0.24	–3.44	–1.45	0.88	2.45
New Zealand	–0.78	0.02	–2.30	–1.35	–0.12	0.66	–0.72	0.23	–2.11	–1.16	0.64	1.53
Norway	–0.63	0.71	–2.49	–1.23	0.75	2.73	–0.88	0.16	–2.26	–0.62	0.50	2.08
Poland	–1.34	–0.03	–1.90	–0.49	0.61	2.10	–0.76	0.39	–1.64	–0.39	0.65	2.27
Slovenia	–1.44	–0.19	–2.39	–0.86	–0.66	0.40	–0.76	–0.02	–1.68	–1.37	0.29	0.93
South Korea	–0.72	0.51	–4.17	–2.39	0.65	3.25	–0.88	0.55	–4.49	–2.76	1.21	4.40
Spain	–1.22	–0.31	–2.70	–1.31	1.36	2.64	–0.60	0.23	–2.72	–1.42	0.98	2.36
Sweden	–0.72	0.29	–5.09	–3.32	1.42	2.84	–0.33	0.69	–4.04	–2.75	1.38	2.94
Switzerland	–0.84	–0.16	–2.47	–1.35	0.40	1.53	–0.99	–0.22	–2.52	–1.41	0.40	1.60
Turkey	–1.15	0.01	–1.77	–0.74	–0.51	0.75	–0.93	0.11	–2.08	–0.83	–0.01	1.19
United Kingdom	–1.23	0.17	–3.52	–1.81	0.24	1.61	–0.96	0.35	–4.00	–1.73	0.53	2.12
United States	–0.82	0.21	–3.11	–1.19	0.08	1.10	–0.72	0.43	–2.82	–1.29	0.78	2.34

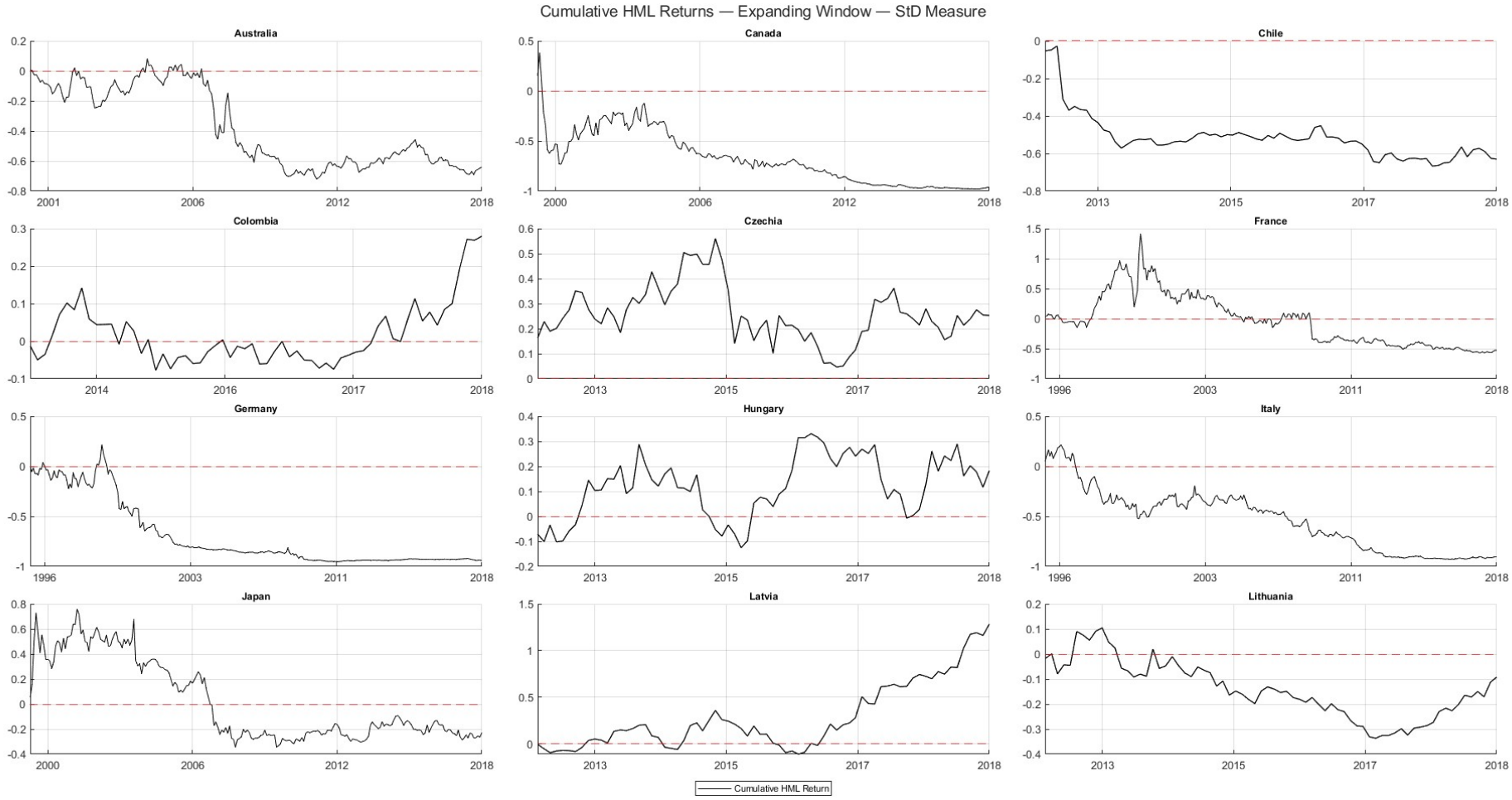
Notes: This table reports, for each country and for two portfolio breakpoints (1 and 2), the median, minimum, and maximum of the disagreement betas, computed using two measures of macroeconomic forecast disagreement: the standard deviation and the interquartile range.

Table A5: Portfolio Breakpoints Based on Exapanding Windows

Country	Standard Deviation						Interquartile Difference					
	Median		Min		Max		Median		Min		Max	
	1	2	1	2	1	2	1	2	1	2	1	2
Australia	–0.90	0.59	–1.80	–0.52	0.64	2.56	–0.80	0.59	–2.25	–0.95	0.08	2.52
Canada	–0.59	1.12	–4.49	–1.73	1.62	4.51	–0.78	1.11	–3.04	–1.02	1.36	3.92
Chile	–0.39	0.28	–1.79	–0.67	0.21	1.26	–0.04	0.62	–0.73	0.08	0.70	1.86
Colombia	–0.88	–0.32	–1.52	–1.06	–0.34	0.58	–0.72	–0.30	–1.77	–0.62	0.12	0.64
Czechia	–0.21	0.33	–0.84	–0.63	0.58	1.17	–0.03	0.59	–0.81	–0.46	0.20	1.12
France	–1.02	–0.03	–3.04	–1.52	0.21	1.71	–0.75	0.27	–3.35	–1.78	0.68	1.94
Germany	–1.18	–0.05	–3.91	–2.26	–0.22	1.05	–0.87	0.14	–3.25	–1.85	0.24	1.41
Hungary	–0.88	0.11	–1.77	–0.46	–0.03	0.82	–0.86	0.02	–1.39	–0.36	–0.43	0.44
Italy	–1.07	–0.16	–1.96	–0.99	0.14	1.17	–1.11	–0.12	–2.42	–1.34	0.61	1.88
Japan	–0.93	0.06	–2.41	–1.13	1.01	2.16	–0.71	0.21	–2.40	–0.94	1.30	2.54
Latvia	–0.37	0.40	–2.97	–1.35	0.53	1.49	–1.51	–0.38	–4.41	–2.29	–0.15	0.72
Lithuania	–0.37	0.04	–1.65	–0.75	0.12	0.78	–0.43	0.08	–3.30	–2.39	0.28	0.92
Netherlands	–1.94	–0.66	–4.32	–2.77	0.49	1.69	–0.74	0.31	–3.42	–1.36	0.88	2.12
New Zealand	–0.72	0.09	–2.34	–1.43	0.31	1.30	–0.61	0.14	–2.20	–1.12	0.79	1.56
Norway	–0.71	0.55	–2.79	–1.29	0.77	2.52	–0.82	0.24	–2.12	–0.58	0.60	2.04
Poland	–1.26	0.01	–1.73	–0.31	–0.37	0.84	–0.75	0.43	–1.55	–0.38	0.77	2.42
Slovenia	–1.55	–0.31	–2.49	–0.82	–0.62	0.25	–0.90	–0.12	–2.06	–1.64	0.36	0.90
South Korea	–0.60	0.61	–3.82	–2.11	0.65	3.40	–0.57	0.86	–3.58	–1.93	2.02	5.79
Spain	–1.13	–0.23	–2.77	–1.63	1.24	2.74	–0.61	0.15	–2.95	–1.43	0.93	2.03
Sweden	–0.85	0.11	–5.16	–3.31	1.21	2.38	–0.31	0.73	–4.23	–2.91	1.39	2.81
Switzerland	–0.84	–0.18	–2.38	–1.28	0.50	1.55	–0.93	–0.22	–2.54	–1.40	0.36	1.46
Turkey	–1.18	–0.05	–1.76	–0.69	–0.53	0.73	–0.93	0.07	–2.13	–0.81	–0.13	0.96
United Kingdom	–1.32	0.04	–4.29	–2.13	–0.15	1.05	–1.01	0.30	–3.92	–1.83	0.67	1.70
United States	–0.83	0.18	–2.83	–1.02	–0.05	1.00	–0.79	0.31	–2.86	–1.26	0.26	1.56

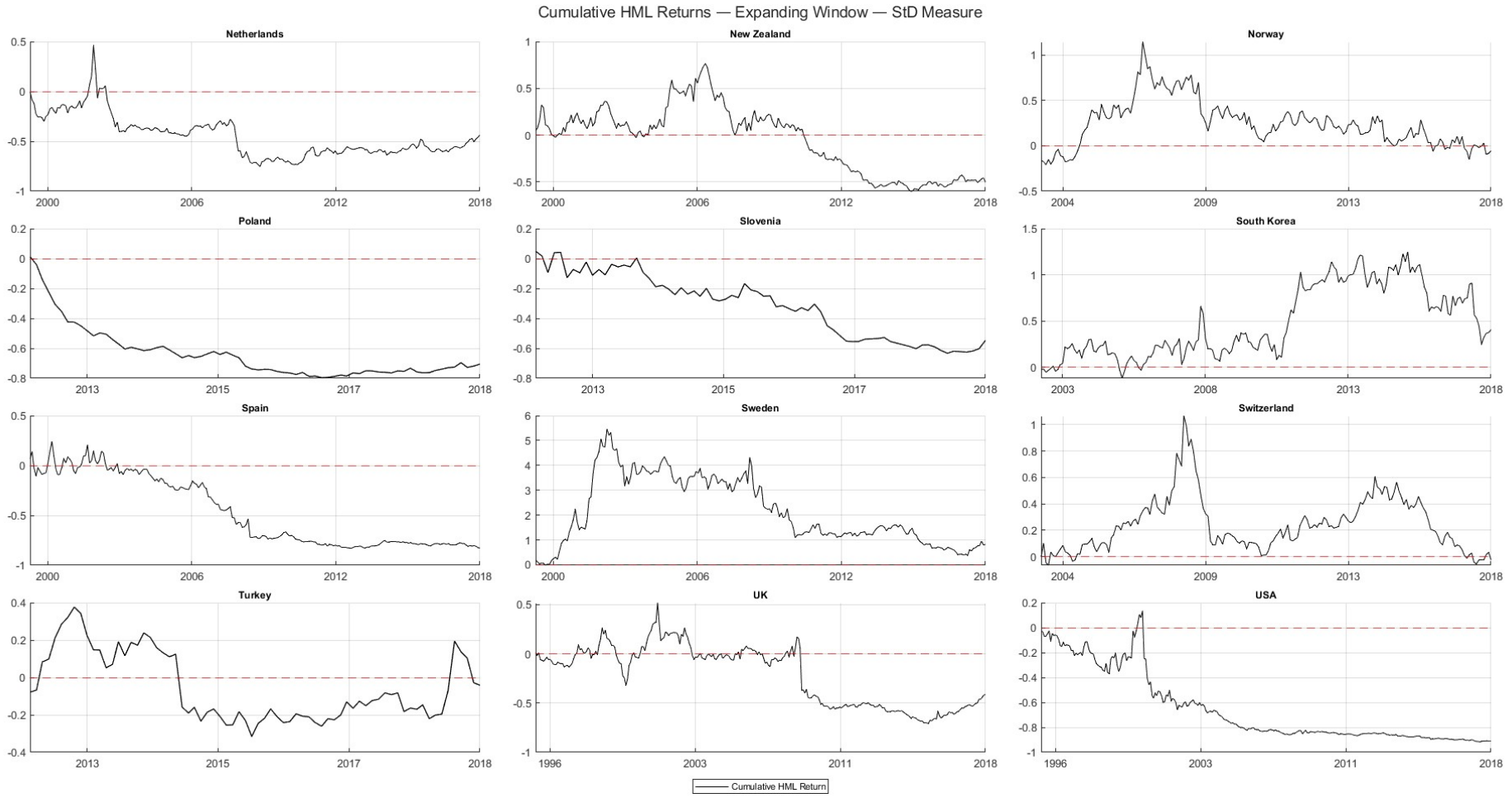
Notes: This table reports, for each country and for two portfolio breakpoints (1 and 2), the median, minimum, and maximum of the disagreement betas, computed using two measures of macroeconomic forecast disagreement: the standard deviation and the interquartile range.

Figure A5: Cumulative HML Returns Based on Expanding Windows and StD Measure (1/2)



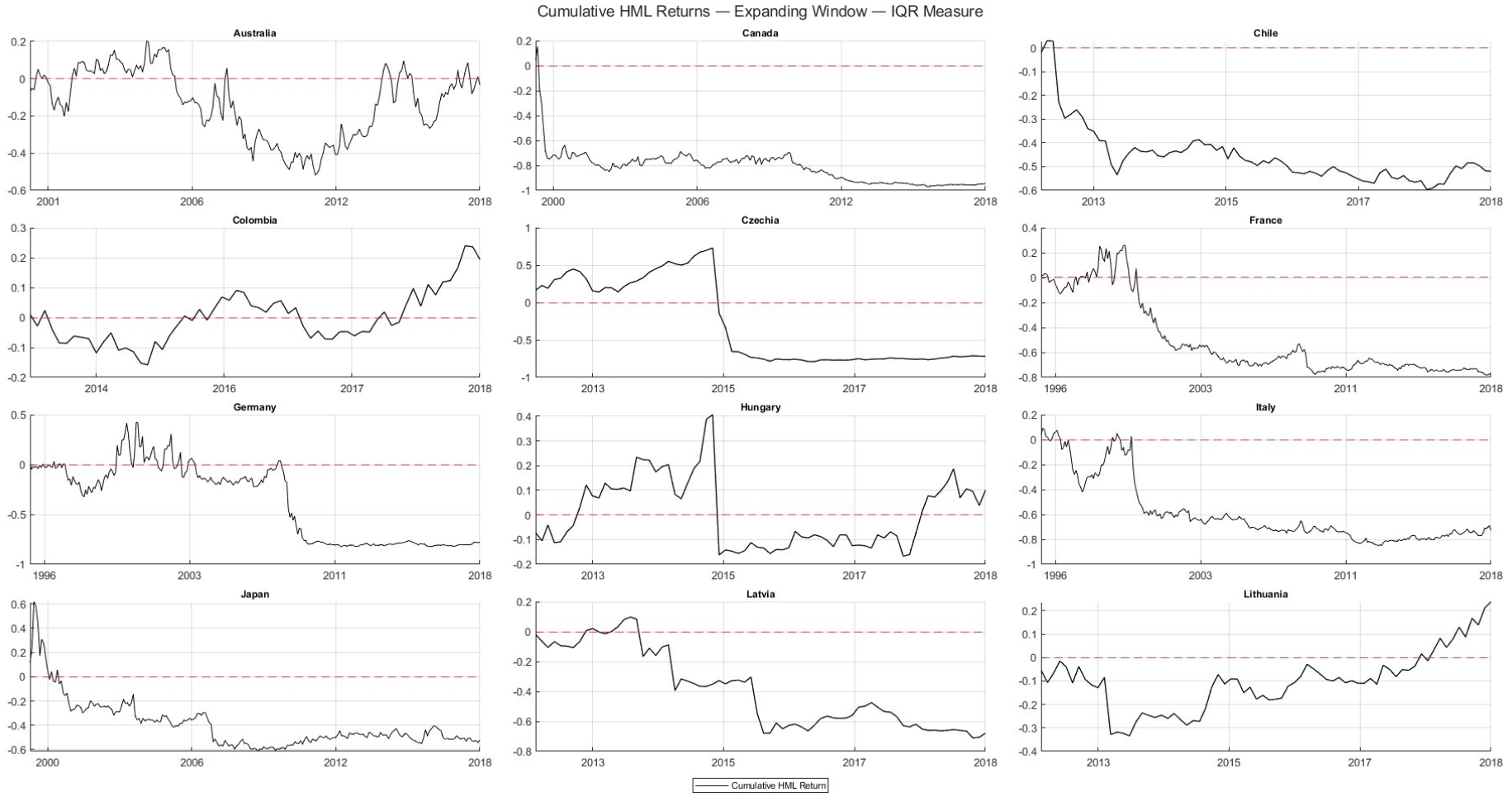
Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from expanding window regressions with the StD measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.

Figure A6: Cumulative HML Returns Based on Expanding Windows and StD Measure (2/2)



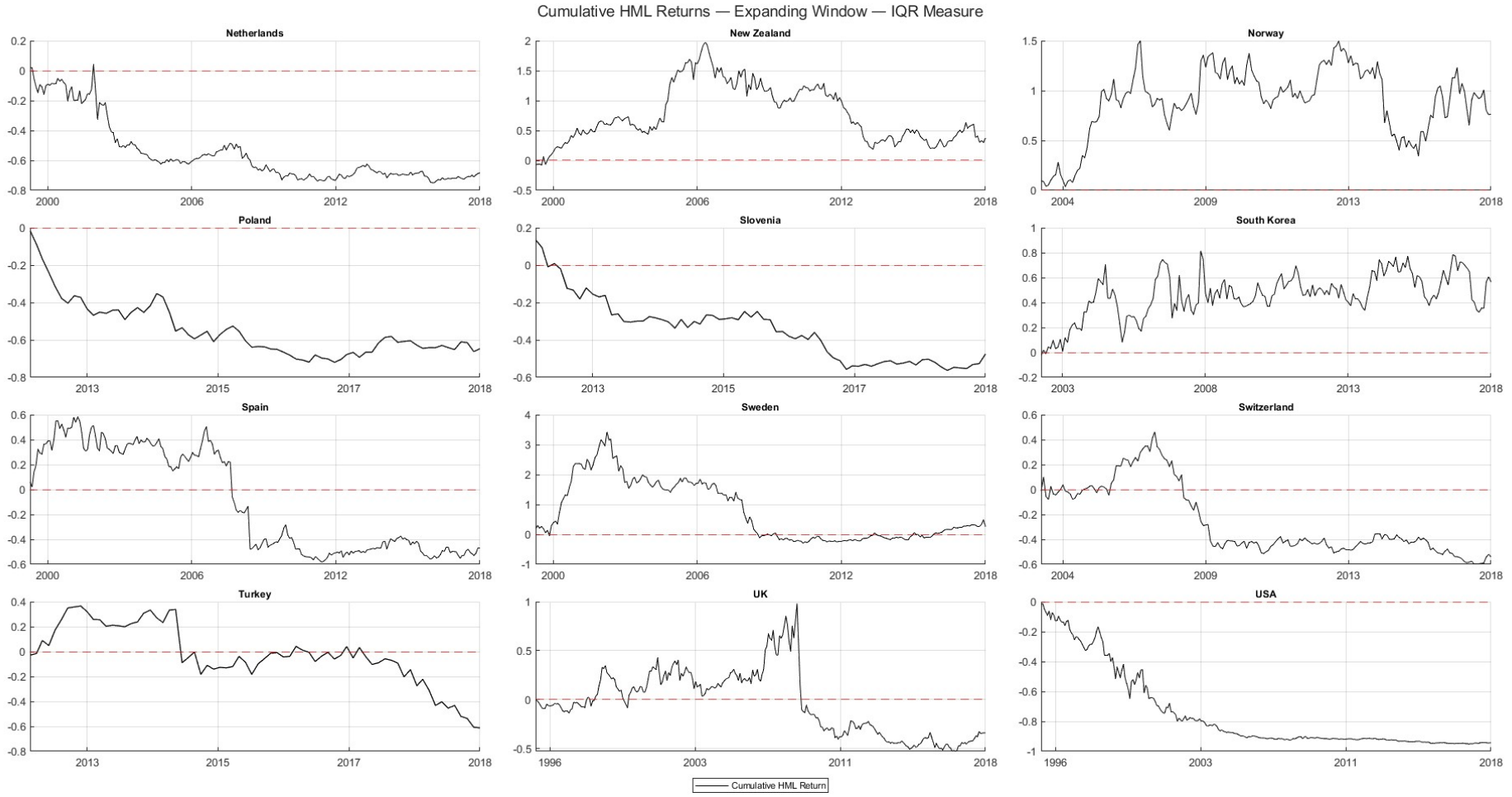
Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from expanding window regressions with the StD measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.

Figure A7: Cumulative HML Returns Based on Expanding Windows and IQR Measure (1/2)



Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from expanding window regressions with the IQR measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.

Figure A8: Cumulative HML Returns Based on Expanding Windows and IQR Measure (2/2)



Notes: This figure shows the cumulative returns of the high-minus-low (HML) portfolios formed based on disagreement betas estimated from expanding window regressions with the IQR measure. The cumulative return tracks the performance of a long-short strategy that buys stocks with high disagreement beta and sells stocks with low disagreement beta over time.