# On Surveys of Asset Returns*

Ralph S.J. Koijen ** Maik Schmeling ‖ Evert B. Vrugt †

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**Abstract**

We study the link between surveys of asset returns and subsequent realized returns for a large cross section of global equities, fixed income, and currencies. On average, surveys forecast future returns with a negative sign, both in the cross section and in the time series. The returns to strategies based on survey information are not explained by the market, carry, momentum, and value factors. Although survey expectations of returns are related to lagged returns, surveys of fundamentals, the global business cycle, and VIX, most of its variation is left unexplained. Finally, we show that the excess volatility and correlation puzzles across countries are strongly related to how surveys predict future realized returns.

JEL-Classification: G12

Keywords: Survey expectations, asset prices, equities, fixed income, currencies, return predictability, correlation puzzle, excess volatility

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**London Business School. rkoijen@london.edu. http://www.koijen.net/.

‖Faculty of Finance, Cass Business School, City University London. Maik.Schmeling.1@city.ac.uk. Cass web page.

†VU University Amsterdam, PGO-IM, The Netherlands. evert.vrugt@gmail.com. http://www.EvertVrugt.com.

Expectations of fundamentals and asset returns play a key role for decisions made by firms, investors, and policy makers. However, measuring expectations of agents directly is non-trivial and inference is often indirect. One potential solution would be to use survey data and relate these expectations to decisions made by different agents and to asset prices. Even though survey data have been explored quite extensively in the literature, most papers focus on a single asset class or on a single country. Our main contribution is to study survey data of asset returns and macro-economic fundamentals across 13 equity markets, 19 currencies, and 10 fixed income markets and to relate it to the dynamics of asset prices and fundamentals.

Using this comprehensive data set, we document three sets of results. We start by analyzing the main drivers of survey expectations. We find that survey expectations are significantly related to lagged returns, surveys of fundamentals, the global business cycle, and the VIX. However, most of the variation in survey expectations is left unexplained by these variables. This implies that the way in which analysts form beliefs is not solely based on extrapolation of either returns or fundamentals.

Second, we relate survey expectations of returns to future realized returns. Survey expectations are, on average, negatively related to future returns, both in the cross section and in the time series. This is true in all three major asset classes that we study. A cross-sectional strategy that combines the three asset classes yields a Sharpe ratio of -0.72 on a per annum (p.a.) basis, while an equivalent time-series strategy earns a Sharpe ratio of -0.67 p.a. These results extend the recent evidence for the time-series of U.S. equity returns in Greenwood and Shleifer (2013) to a global setting and the three major asset classes.

For the same cross section of asset returns, we also construct asset pricing factors based on carry, momentum, and value signals that have been shown to capture important variation in expected returns within and across global asset classes (Asness, Moskowitz, and Pedersen, 2013; Koijen, Pedersen, Moskowitz, and Vrugt, 2013). We find that these standard factors do not explain much of the variation of our survey-based investment strategies, which implies that the Sharpe ratios translate more or less directly into information ratios. Over our sample-period and across assets, the survey-based strategy performs almost at par with carry

strategies and better than momentum and value strategies. By studying the long and short positions of our strategies, we find that short positions contribute most in terms of raw returns whereas both sides contribute equally to the strategy's risk-adjusted performance.[2]

Third, we relate our findings to two important asset pricing puzzles, namely the excess volatility (LeRoy and Porter, 1981; Shiller, 1981) and the correlation puzzle (Cochrane and Hansen, 1992; Campbell and Cochrane, 1999; Albuquerque, Eichenbaum, and Rebelo, 2013). The excess volatility puzzle points to the fact that asset prices are too volatile relative to fundamentals. The correlation puzzle is about the low correlation between asset prices and fundamentals. Recent macro-finance models attempt to match the volatility of prices and fundamentals and the low correlation between them. In many of these papers, the same theoretical mechanism drives a wedge in volatilities and the correlation Albuquerque, Eichenbaum, and Rebelo (2013) and time-varying risk premia play a key role to break the link between fundamentals and returns (Cochrane, 2011). We add another dimension to these puzzles. Instead of studying a single market, which is the typical approach thus far, we study these puzzles across countries thereby focusing on *the cross section of excess volatility and correlation puzzles*.

We find substantial heterogeneity in terms of excess volatility and correlations across markets. More surprisingly, we find that, if anything, the correlation puzzle is less pronounced for markets in which asset prices are more excessively volatile. In most macro-finance models, the same mechanism that produces excess volatility, also lowers the correlation between prices and fundamentals, which suggests the opposite pattern relative to what we find. Hence, regardless of our results on surveys and asset returns, this finding is of broader interest and suggests a relevant set of moments to target for international macro-finance models.

We then relate these puzzles to the link between survey expectations and future returns. We find that for markets in which the predictive coefficient of a regression of future returns on lagged survey expectations is lower, the excess volatility puzzle is more pronounced. Due

[2] All investment strategies are implemented using futures, implying that short-sales constraints are much less of an issue than with cash investments.

to the positive correlation, across countries, between excess volatility and the correlation between prices and fundamentals, we find that for markets where the slope coefficient is lower, the correlation between prices and fundamentals is higher.

The results that we document in this paper are consistent with at least two interpretations. One view contends that a non-trivial group of agents holds the beliefs reported in surveys, which will then be reflected in asset prices if other, more rational, agents have limited risk bearing capacity. An interesting question that we do not yet answer is what drives survey expectations as lagged returns, the VIX, and expected fundamentals leave a large fraction of variation unexplained.

According to the alternative view, survey participants misinterpret or misunderstand the survey questions and instead report demand functions for risky assets, which entangles return expectations, risk, and risk preferences.

For policy and welfare questions that one would like to ultimately answer with macro-finance models, it matters which interpretation is the right one. However, it is generally hard, if not impossible, to separate risk preferences from beliefs. This challenge becomes even harder if we cannot rely on survey data to measure beliefs correctly.[3]

Despite the ambiguity about the precise interpretation of survey expectations, we show at the very least that survey expectations are useful state variables that capture an important component of expected returns in a large cross section of assets. This suggests that survey expectations reflect useful information about preferences or beliefs not captured by carry, momentum, and value signals.

*Related Literature*

Survey expectations have been used in several strands of the finance and macro literature, e.g. in equities (Vissing-Jørgensen, 2004; Brown and Cliff, 2005; Lemmon and Portniaguina,

[3]Fund flows appear to be of limited use to disentangle both interpretations. If we observe that equity funds, for instance, experience outflows when survey expectations are low, proponents of the second view can argue that risk aversion has increased and one group of investors reduces their allocations accordingly.

2006; Campbell and Diebold, 2009; Amronin and Sharpe, 2013), fixed income (Piazzesi and Schneider, 2009), inflation and the term structure (Pennacchi, 1991; Ang, Bekaert, and Wei, 2007; Cieslak and Povala, 2013; Chernov and Mueller, 2012), or currencies (Frankel and Froot, 1987; Bacchetta, Mertens, and van Wincoop, 2009). Most recently, Greenwood and Shleifer (2013) provide empirical evidence on how survey expectations of equity returns relate to actual future stock returns whereas Barberis, Greenwood, Jin, and Shleifer (2013) provide a theoretical model of how extrapolative investors matter for equity returns.

Our paper also relates to a recent literature that studies a large cross section of expected returns both within and across asset classes. Asness, Moskowitz, and Pedersen (2013) and Mosowitz, Ooi, and Pedersen (2012) study momentum and value type strategies, while Koijen, Pedersen, Moskowitz, and Vrugt (2013) focus on carry strategies. All of the strategies produce positive returns relative to (versions of) the CAPM. Our survey-based signal adds yet another dimension that appears unspanned by these other factors but is economically as large, if not larger, than these more well-known strategies.

# 1. Data

We describe the main data sources that we use, and provide summary statistics.

## 1.1. Asset Returns

Our international return data for equities, currencies, and fixed income are the same as in Koijen, Pedersen, Moskowitz, and Vrugt (2013) who provide further details on the data construction. We use futures returns for equities and fixed income, and forward returns for currencies.

We use equity returns from 13 countries: United States (S&P 500), Canada (S&P TSE 60), the United Kingdom (FTSE 100), France (CAC), Germany (DAX), Spain (IBEX), Italy

(FTSE MIB), The Netherlands (AEX), Norway (OMX), Switzerland (SMI), Japan (Nikkei), Hong Kong (Hang Seng), and Australia (S&P ASX 200).

We consider 19 currencies, which are all measured against the US dollar: Australia, Austria, Belgium, Canada, Denmark, Euro, France, Germany, Ireland, Italy, Japan, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. Countries that joined the EMU are eliminated after the introduction of the Euro.

Fixed income returns (10-year bonds) are based on synthetic futures for 10 countries: Australia, Canada, Germany, Japan, New Zealand, Norway, Sweden, Switzerland, the U.K., and the U.S. Appendix A describes other data sources we use for fundamentals such as dividend growth, GDP growth, and global business cycle indicators.

All returns are excess returns and expressed in US dollars. The equity and fixed-income returns are currency-hedged by using foreign exchange forwards. Table 1 reports the mean and standard deviation (in parentheses) of returns. The first column describes the start of the sample for each contract, which is when both survey and returns data are available. Sample periods for a given country and asset are largely dictated by data availability of the surveys whereas the cross-sectional coverage of countries within each asset class is largely dictated by the availability of returns. Most equity and fixed-income surveys start in the second quarter of 1998, whereas currency surveys typically start in the first quarter of 1989. Throughout the paper, we either use a quarterly frequency to match the frequency of the survey or convert surveys to a monthly frequency by using the quarterly survey score for all three months of a quarter.

### 1.2. Survey Data

Our data on return expectations come from the "World Economic Survey" (WES), run by the IFO Institute, Paris Chamber of Commerce, and EU Commission. The survey is conducted in the same way in all countries, providing comparable survey expectations across countries.

Survey expectations are available for a number of different series, among them return expectations and macro-economic fundamentals. We collect survey data for all countries with available return data (listed above) from Datastream.[4]

The survey is run once per quarter (in the first month of the quarter) and asks experts in various countries for their near-term expectations (the next six months). The respondents in the survey are domiciled in the country for which they complete the survey. This is different from some other surveys where respondents from one country are asked for their expectation about different countries.

The number of survey respondents varies from country to country but is largely driven by a country's size in terms of GDP. For larger countries, such as the U.S., Germany, Japan, there are about 30 respondents per country but this number can be as low as 3 for very small countries such as Cyprus (which is not included in our data, though).

The survey is qualitative in nature and respondents can answer either "higher," "about the same" or "lower." These answers are then coded as 1 (lower), 5 (about the same) or 9 (higher), respectively. The published score for each quarter is the average of all respondents' individual answers and hence ranges between 1 and 9.

In our empirical analysis below, we make use of survey scores for equities, currencies, interest rates, and the economic situation to which we will refer in the empirical sections as "growth." The survey asks respondents:

1. "The level of domestic share prices (in domestic currency) by the end of the next 6 months will be" — "higher", "about the same", "lower"
2. "The value of the US$ in relation to this country's currency by the end of the next 6 months will be" — "higher", "about the same", "lower"
3. "Expected interest rates by the end of the next 6 months – long-term rates (government bonds with 10 and more years of maturity)" — "higher", "about the same", "lower"

[4]Datastream mnemonics for these survey time series are detailed in the appendix.

4. "The country's general situation regarding overall economy – from now on: expected situation by the end of the next 6 months" — "better", "about the same", "worse"

We use the first question to measure expectations about equity returns, the second question to measures exchange rate returns, the third item for fixed-income returns, and the last item to measure growth expectations.

For currencies, respondents issue expectations for the price of USD in foreign currency (FC), so we invert the survey scores to make them correspond to a USD/FC forecast, i.e. higher survey scores imply a positive return on holding foreign currency. For interest rate forecasts, we also invert the survey score so that a higher value indicates declining interest rates and, thus, higher bond returns.

Table 1 provides descriptive statistics for survey scores across countries. The third column reports the average survey scores and standard deviations (in parentheses) for all three asset classes and countries. As can be seen, all equity scores exceed five on average, whereas fixed-income scores are below five on average. This means that survey participants expected positive equity returns and rising interest rates, on average. For equities, this patterns seems reasonable as forecasters expect a positive equity premium. For currencies, there is no similarly uniform pattern, pointing to the fact that respondents expect some currencies to appreciate and some to depreciate relative to the US dollar.

### 1.3. The Time-series of Survey Expectations and Asset Returns

Figure 1 shows plots of average survey scores and cumulative average returns for equities (top panel), currencies (middle panel), and fixed income (bottom panel). To construct each figure, we average returns and survey expectations across countries.

For equities, the behavior of survey expectations and equity returns appears to differ across the two recessions in our sample. During the 2001-2002 recession, survey expectations increase somewhat, to then further rise during the subsequent expansion. During the recent financial

crisis, survey expectations fall sharply, consistent with the evidence in Greenwood and Shleifer (2013). In case of currencies, surveys align more closely with returns, at least for the average return. As all currencies are measured relative to the US dollar, these returns correspond to betting on the dollar trade (Lustig, Roussanov, and Verdelhan, 2014).

For fixed income, the returns are strongly positive over our sample, consistent with the decline in global interest rates. The times series correlation of cumulative returns and survey expectations equals 4.3% for equities, 48.5% for currencies, and -24.6% for fixed income.

### 1.4. Carry, Momentum, and Value Signals

In our analysis below, we compare the returns to survey-based strategies to other strategies that produce positive returns for the same cross-section of countries such as carry, momentum, and value strategies. We briefly explain the the computation of carry, momentum, and value signals below.

We follow Koijen, Pedersen, Moskowitz, and Vrugt (2013) and compute the carry of each asset's carry from futures ($F$) and spot ($S$) prices. They define the carry as the return an investor would earn if market conditions stay constant. In case of future, this definition implies as a measure of carry ($C_t$)

$$C_t \equiv \frac{S_t - F_t}{F_t}, \tag{1}$$

where $S_t$ denotes the spot price and $F_t$ the one-month spot price. Koijen, Pedersen, Moskowitz, and Vrugt (2013) provide further details how to interpolate the futures curve to obtain a consistent carry measure over time and across countries.

They also show that this definition of carry implies that the equity carry equals the expected dividend yield minus the risk-free rate, currency carry equals the interest rate differential between the foreign country and the US interest rate, and the fixed income carry is close the term spread between a 10-year bond and the short-term rate.

For momentum and value signals, we follow Asness, Moskowitz, and Pedersen (2013) and compute equity, currency, and fixed income momentum as the sum of lagged 12-month returns. The value signal for equities is given by the book-to-market ratio of each index. For currencies, we compute the currency signal as the negative of the 5-year change in the real exchange rate (5-year change in the spot return minus 5-year U.S. inflation plus 5-year inflation of the foreign country). The value signal for fixed income is given by the 5-year change in bond yields. Details on the data used for computing these signals can be found in Appendix A.

## 2. Determinants of Survey Expectations

We start by studying the determinants of survey expectations. To this end, we pooled panel regressions regressions per asset class of survey scores ($S_{it}$) on lagged 12-month returns ($R_{it}$), the VIX index ($VIX_t$), changes in the VIX index ("$\Delta VIX_t$"), a global business cycle indicator ("$GBC_t$"), and survey growth expectations ("$Growth_{it}$"). The full model is

$$S_{it} = \alpha_0 + \alpha_1 R_{i,t-1} + \alpha_2 VIX_{t-1} + \alpha_3 GBC_t + \alpha_4 Growth_{it} + u_{it}, \tag{2}$$

and we use quarterly data to estimate the model. We also consider a specification in which $VIX_t$ is replaced by the change in the VIX, $\Delta VIX_t$. The measure of the global business cycle (GBC) we use it based on averaging across recession dummies for the countries in our sample. This is the same business cycle measure as in Koijen, Pedersen, Moskowitz, and Vrugt (2013) and is and described in more detail in the Data Appendix.[5]

In terms of timing, we regress survey scores in quarter $t$ on lagged returns over the previous 4 quarters (that is, from quarter $t-4$ to quarter $t-1$), the VIX at the end of the previous quarter $t-1$ (or the change in VIX over the previous four quarters), the business cycle

[5]We also ran regressions with country-specific regression dummies instead of, or on top of, the global business cycle dummies. The results suggest that using the global business cycle measure captures all the relevant information and that adding country-specific business cycle information does not yield significant additional insights.

indicator in the first month of the same quarter $t$, and the contemporaneous growth survey score in quarter $t$.

Lagged returns aim to capture the notion of extrapolative expectations based on past returns as emphasized recently by Greenwood and Shleifer (2013) and Barberis, Greenwood, Jin, and Shleifer (2013). We use contemporaneous growth expectations and global business cycle indicators to capture the idea that respondents may confuse fundamentals and returns, i.e. respondents may erroneously report cash-flow expectations instead of return expectations. We employ the VIX to measure economic uncertainty, which we lag for a quarter (we use the last trading day of the previous quarter) as we do not know the exact day in a given month at which the respondents complete the survey. The same logic applies to VIX changes.

For currencies, we make one further adjustment and we use differences in growth survey scores and the GBC (foreign country relative to the U.S.) as exchange rates depend on relative growth rates.

We report results in Table 2. The results in Panel A for equities indicate that if we study one determinant at the time, lagged returns are positively related to survey expectations, consistent with models of extrapolative return expectations. If we study the full model, the two variables that stand out in terms of significance are the VIX and growth expectations. However, we find that growth expectations are positively related to return expectations, while the VIX is negatively related to expected returns. The latter observation appears to be at odds with most basic risk-based asset pricing models.

In Panel B for currencies and Panel C for fixed income, we find an important role for past returns, even in the full model. High past returns are associated with high expected returns going forward. The VIX also enters significantly for both asset classes, but with the opposite sign. For currencies, foreign currencies are expected to depreciate relative to the dollar in periods of high macro-economic uncertainty, while interest rates are expected to decline, which is intuitive.

Growth expectations do not significantly explain return expectations for currencies, but they do for fixed income. The sign is the opposite for equities: when growth is expected to pick up, respondents expect interest rates to rise and bond prices to decline.

Lastly, despite this relatively rich model, we explain only 41% of the variation of equity return expectations, 20% of currency return expectations, and 42% of the fixed income return expectations. This implies that a non-trivial amount of variation is left unexplained by standard measures of risk, business cycle movements, growth expectations, as well as a measure of extrapolative expectations.

## 3. Surveys and Asset Returns

In this section we study the link between survey-based measures of expected returns and actual realized returns.

### 3.1. Time-series Regressions

As a starting point to analyze the link between survey-based expected returns and realized returns, we consider a time-series regression of the form:

$$R_{i,t+1} = \alpha_i + \beta_i S_{it} + u_{i,t+1}, \tag{3}$$

which we estimate at a quarterly frequency. Table 3 reports the slope coefficients of in the first column alongside the R-squared value. As a point of reference, the second, third, and fourth column consider a similar predictive regression, but using carry, momentum, and value signals instead. We scale returns to an annual volatility of 10% and standardize the signals (surveys, carry, momentum, and value) to have unit volatility to make results comparable across signals, assets, and countries.

Even though the coefficients are imprecisely measured, as one would expect given the rather

short sample, the carry, momentum, and value signals virtually all predict equity returns with a positive sign, while the results are more mixed for surveys, as can be seen from Panel A for equities. If we turn to Panel B for currencies or Panel C for fixed income, a clearer picture emerges. Where carry, momentum, and value by and large predict returns with a positive sign, virtually all slope coefficients using survey-based expectations are negative. Moreover, there is considerable heterogeneity across countries/markets for all three asset classes.

### 3.2. Survey Portfolios

Next, we form investment strategies based on survey-based expected returns. We consider both cross-sectional and time-series strategies. For the former, we build portfolios based on the relative ranking of all countries at each point in time.

More specifically, we follow Asness, Moskowitz, and Pedersen (2013) and form rank portfolios with weights $w$ for month $t+k-1$ determined by

$$w_{i,t+k-1} = c_t \left( \text{rank}(S_{it}) - N_t^{-1} \sum_i \text{rank}(S_{it}) \right), \tag{4}$$

where $i$ indexes countries/markets, $N_t$ is the total number of countries with available data in month $t$, and $c_t$ is a scalar that we use to scale positions so that the portfolio invests both one dollar short and one dollar long.

This investment strategy exploits relative differences in survey scores *across* countries at a given point in time and are, importantly, always long and short the same dollar amount, even if, for example, surveys are optimistic about all countries at a particular point in time. For currency portfolios, this also means that the rank portfolio is neutral relative to the US dollar.

We considers a second investment strategy that exploits the time-series, instead of cross-sectional, information in survey expectations (Mosowitz, Ooi, and Pedersen, 2012; Koijen,

Pedersen, Moskowitz, and Vrugt, 2013). In this case, we go a dollar long or short in country $i$ in month $t+k$ when $S_t > 5$ or $S_t \leq 5$, respectively. We then average over the positions in all countries to form a portfolio based on a timing strategy. In contrast to the cross-sectional strategy, a time-series strategy exploits variation in survey scores *within* countries. Moreover, the time-series portfolio does not mechanically take long and short positions that net out but can be long (or short) in all assets at the same time.

In forming portfolios, we lag the signal for $k = 1, 2, ..., 12$ months, implying that we use portfolio weights in period $t$ based on survey scores in month $t+1-k$. Implementation lags are worth exploring for various reasons. First, survey scores are not published immediately in the first month of the quarter in which respondents express their views, but typically with a one month lag and occasionally even with a lag of two months, so that an investable strategy would correspond to $k = 3$. The results for $k = 1$ are of independent interest, even if investors cannot build trading strategies based on this information, as these are the most recent survey expectations. Second, as the survey is run at a quarterly frequency, $k = 3$ corresponds to a quarterly strategy where portfolios in one quarter are based on survey scores from the previous quarter and thus represents a natural benchmark. Third, we also report results for lags of $k > 3$ because findings from the earlier literature suggest that it might take time for surveys to forecast returns (Brown and Cliff, 2005; Greenwood and Shleifer, 2013).

Table 4 reports average annualized excess returns ("mean"), volatilities ("std"), and Sharpe Ratios ("SR") of portfolios formed on surveys in international equity markets, currencies, and fixed income. Numbers in squared brackets are $t$-statistics of the mean returns using Newey and West (1987) standard errors. Panel A reports the results for cross-sectional strategies and Panel B for time-series strategies.

In each panel, we also report results for a strategy that combines the equities, currencies, and fixed income portfolios, to which we refer as the "Global Survey Factor" (GSF). To form this factor, we weigh the returns of the three asset classes with the inverse of their volatility. We then scale the portfolio have an annual volatility of 10%.

If we first focus on Panel A, then we find that the Sharpe ratios are all negative for up to $k = 8$ lags. At a 3-month lag, i.e. the quarterly benchmark strategy, the Sharpe ratios are lowest. For equities, the Sharpe ratio equals -0.67, for currencies it -0.52, and -0.48 for fixed income. All the mean returns are significantly different from zero.

If we combine the three strategies into the Global Survey Factor, then this strategy has a Sharpe ratio of -0.72 p.a. The mean return equals -7.2% p.a. with a $t$-statistic of -3.54. Over the same sample period, the Sharpe ratio of the US stock market equals on 0.12 (Table 1), which illustrates the sizable Sharpe ratio of the Global Survey Factor.

Turning to Panel B, we find that most Sharpe ratio are again negative at a 3-month lag. However, the Sharpe ratio for equities equals only -0.04, it equals -0.53 for currencies, and -1.10 for fixed income. We show below that the Sharpe ratio of equities can be explained by a large market exposure, which implies that the information ratio (in particular for equities) is much lower than the Sharpe ratio.

If we again combine the three strategies into the Global Survey Factor, the Sharpe ratio at a 3-month lag equals -0.67, which is close to the cross-sectional Global Survey Factor that has a Sharpe ratio of -0.72.

In sum, we find strong evidence that survey expectations negatively forecast future returns in all asset classes, both in the time series and in the cross section, and across various implementation lags.[6]

### 3.3. Correlations Across Asset Classes and Strategies

Table 5 reports correlations between returns to survey portfolios for cross-sectional and time-series strategies in all three asset classes, which summarizes the benefits to diversify across the different strategies.

[6]We also show in the Internet Appendix, Table IA.3, that these findings are not purely driven by a negative link between an asset's survey score and carry.

We find in Panel A that correlations across asset classes are typically low and often slightly negative, whereas correlations between cross-sectional and time-series strategies within asset classes are all positive and range from 35% for fixed income to 53% for currencies. In Panel B, we report how much of the return variation can explained by each of the six principal components we can construct. A single principal component only explains 30% of the variation, and the first two explain a little over half of the variation.

Taken together, these results suggest substantial diversification benefits by combining various strategies, in particular across asset classes.

### 3.4. Surveys, Carry, Momentum, and Value

A natural explanation of our results in Table 4 is that survey-based return strategies correlate with other well-known asset pricing factors and thus do not offer independent information about future asset returns. For example, Greenwood and Shleifer (2013) show that U.S. equity surveys are driven by lagged returns, so our survey-based strategies may be exposed to momentum and do not offer any alpha relative to this benchmark strategy.

To examine how surveys are linked to standard benchmarks in the literature, we form portfolios based on carry, momentum, and value, as well as passive long benchmarks (equally weighted return of all countries within one asset class) using the same portfolio construction techniques as for our survey-based strategies. We report average returns, standard deviations, and Sharpe ratios for carry, momentum, and value portfolios in Tables IA.5 – IA.6 in the Internet Appendix.

Figure 2 plots cumulative returns to a Global Survey Factor (GSF), Global Carry Factor (GCF), Global Momentum Factor (GMF), and Global Value Factor (GVF), which are based on combining cross-sectional and time-series portfolios for each signal (surveys, carry, momentum, and value) for each of the three asset classes into a single factor. We form these combined portfolios by weighting returns of cross-sectional and time-series strategies by the

inverse of their standard deviation, and then scale positions to ensure that the strategy has a volatility of 10% to ensure comparability across assets.

We use the benchmark lag of $k = 3$ months for survey strategies to ensure that the strategy is investable and a lag of $k = 1$ month (we form portfolios at the end of each month and hold them during the following month) for carry, momentum, and value. The choice of lags is driven by the quarterly data frequency of survey signals and the monthly data frequency of carry, momentum, and value, respectively. The red dashed line in all four panels corresponds to the cumulative return of the passive long benchmark (we multiply the passive benchmark return by minus one for the GSF in the upper left panel for obvious reasons).

For a visual comparison of the Sharpe Ratios and the impact of lagging signals, Figure 3 plots annualized Sharpe ratios of the GSF, GCF, GMF, and GVF for different lags as in Table 4. For carry and momentum, the Sharpe ratios decay from 0.6 and 0.3 at $k = 1$ to 0.4 and 0.1 at $k = 12$. The survey-based strategy starts at -0.4, then declines to -0.6 at $k = 3$, before gradually increasing to -0.2 at $k = 12$. The value strategy is rather stable at a Sharpe ratio between 0.1 and 0.2. Hence, survey-based strategies perform on par with carry strategies and perform better than value or momentum strategies over our sample period.

To compare the strategies more formally, we consider factor regressions of the form

$$xr^S_{t+1} = \alpha + \beta^P xr^P_{t+1} + \beta^C xr^C_{t+1} + \beta^M xr^M_{t+1} + \beta^V xr^V_{t+1} + e_{t+1},$$

where $xr$ denote excess returns and $S, P, C, M$, and $V$ denote surveys, passive long benchmarks, carry, momentum, and value, respectively. We use returns to cross-sectional carry, momentum, and value strategies for the cross-sectional survey portfolios and we follow the same approach for the time-series strategies. We also report results for regressions of the global survey factor on the global passive long benchmark, the global carry factor, the global momentum factor, and the global value factor.

Table 6 reports the exposures of survey strategies to these four factors as well as the alphas

and the information ratios ("IR"), which is the ratio of the alpha to the residual standard deviation.

We find that all survey portfolios have negative alphas. Consequently, the information ratios are all negative and fairly low, ranging from -0.22 (cross-sectional fixed income) to -0.78 (time-series FX). The alpha is statistically significant for the cross-sectional equity portfolio, all three time-series portfolios, and for the $GSF$.

We find that the time-series equity portfolio also has a significantly negative alpha even though the raw return to the strategy is basically zero. This is driven by the fact that the equity time-series strategy is long most of the time (as can also be seen by the large and highly significant market beta in Table 6), but delivers low returns when it deviates from the market portfolio.

In terms of exposures, there is no clear pattern for the passive long and value betas across survey portfolios but all except the time-series fixed income survey portfolio have negative exposures to carry whereas all but the cross-sectional equity portfolio have positive exposures to momentum.

In sum, although there are exposures to the other factors, this is mostly for the time-series strategies that result in an exposure to the passive long strategy. After correcting for standard factors, all information ratios are consistently negative.

### 3.5. The Long and Short of Survey-based Strategies

Table 7 decomposes the portfolio return (top panel) of all six survey strategies into the return coming from long (indexed by a "+" superscript, second panel) and short (indexed by a "−" superscript, third panel) positions. We do so by computing the portfolio return for positive and negative portfolio weights, respectively. Hence, adding up the "+" and "−" returns yields the overall portfolio return. In the bottom panel, we report the fraction of the overall average portfolio return coming from long and short positions, implying that both shares aggregate

to 100%.

There is a consistent pattern across all six portfolios: The short leg of all survey portfolios yields negative returns and contributes between 84% to 251% to the overall portfolio mean return.[7] However, if we focus on the information ratios on the long and the short side, which removes the market exposures as well as the exposure to the carry, momentum, and value factors, we find that the information ratios of the long and the short side are very similar (identical for the time-series strategies by construction).

## 4. Asset pricing puzzles and surveys

We next take a look at the relation between survey expectations and excess volatility and the correlation puzzle. We do so since surveys seem to be an important driver of expected returns which are not captured by other well-known benchmark factors such as carry, momentum, and value. Moreover, most macro-finance models use the same mechanism to drives a wedge in volatilities of, and break the correlation betwen, returns and fundamentals by allowing for time-varying expected returns. Hence, if surveys relate to expected returns and these asset pricing puzzles are driven by time-variation in expected returns, we would expect to see a link between these puzzles and surveys.

Figure 4 shows a scatter plot of excess volatility and return-survey betas for equity markets. Excess volatility is measured as the ratio of return volatility to dividend growth volatility and we employ an annual frequency here to avoid seasonality issues with dividend growth. Dividend growth itself is computed by first calculating the level of dividends from total return and price indices and then summing monthly dividends up to an annual frequency to compute annual dividend growth (Koijen and van Binsbergen, 2009). The return-survey beta is the predictive coefficient from a regression of equity returns in quarter $t+1$ on the survey score in quarter $t$. We employ the maximum possible sample lengths to compute excess volatility

[7] A share of more than 100% means that the positive leg of a survey portfolio actually yields a positive return.

and the return-survey beta, that is, excess volatility estimates are typically based on a longer sample than the return-survey betas.

We find a strong connection between the predictive coefficient and our measure of excess volatility with a cross-country correlation of -0.52. This implies that for those countries in which high survey-based forecasts of returns correspond to lower realized returns, stock markets are more excessively volatile. This finding seems well in line with a story in which excess volatility is driven by time-variation in expected returns.

We then turn to the correlation puzzle. We compute return-survey betas as before as well as the contemporaneous correlation between fundamentals and returns. We use GDP growth as the fundamental variable for all three asset classes and, for equities, we also use dividend growth as this seems to be the most natural fundamental for equities and relates to the notion of excess volatility in equities above. As for our excess volatility computations, return-survey betas are computed on a quarterly frequency whereas correlations of returns and fundamentals are based on annual data to avoid seasonality issues.

Figure 5 shows scatter plots of predictive coefficients and correlations of fundamentals and asset returns. The two top panel display the results for equities (top-left for GDP and top-right for dividends), the bottom-left panel for currencies, and the bottom-right panel for fixed income.

We find a negative relation between predictive coefficients and the correlation between fundamentals and asset returns for all assets and fundamentals. This implies that for those countries for which surveys predict future returns with a more negative sign, the correlation between returns and fundamentals is *higher*. This may come as surprise relative to our result for the excess volatility puzzle. However, for equities, we find that our measure of the correlation puzzle and the excess volatility puzzle are positively correlated across markets, with a correlation coefficient of 35%, which seems interesting in itself, as it suggests an important set of moments for macro-finance models to match.

As both the correlation puzzle and the excess volatility puzzle are related to the dynamics of discount rates, these results underscore the broader theme of this paper that survey-based measures of expected returns contain important information about variation in expected returns, both in the cross section and in the time series.

# 5. Robustness Checks

## 5.1. Distribution of survey scores

We provide a more detailed description of survey scores in Tables IA.1 and IA.2. Table IA.1 reports unconditional frequencies with which survey scores $s$ fall in the interval $1 \leq s < 2$, $2 \leq s < 3$, ..., $8 \leq s \leq 9$. Table IA.2 shows transition probabilities for these intervals.

## 5.2. Components of survey portfolio returns

In order to learn more about the properties of the survey portfolios in Table 4, we next decompose the total excess return ($xr_{t+1}$) into a carry ($C_t$) component and the actual price appreciation of an asset. Based on Koijen, Pedersen, Moskowitz, and Vrugt (2013), the total excess return can be written as

$$xr_{t+1} = \frac{S_{t+1} - F_t}{F_t}, \tag{5}$$

which can be split up into a carry and a price appreciation components ($r$):

$$xr_{t+1} = \underbrace{\frac{S_t - F_t}{F_t}}_{\text{Carry}} + \underbrace{\frac{\Delta S_{t+1}}{F_t}}_{r_{t+1}}. \tag{6}$$

For example, for currencies, this corresponds to splitting up the total excess return into the interest rate differential (carry) and the simple spot exchange rate return.

Table IA.3 reports the average excess returns for cross-sectional and time-series survey portfolios in equities, currencies, and fixed income from Table 4 with a lag of $k = 3$ and also breaks the average excess return up into the average price return and the average carry.

We find that all portfolios have negative expected price returns except for the equity time-series strategy which is also the only survey strategy that does not deliver a significantly negative excess return. For all other survey portfolios, the price return accounts for a significant fraction of the overall excess return. Hence, it is not the case that survey portfolios are just "anti-carry" portfolios and a large part of the negative return seems to come from survey forecast errors. However, this is not to say that carry doesn't matter at all. On the contrary, we find that the average carry of all portfolios is negative and significantly so for the fixed income strategies. Looking at the GSF as a summary measure of all portfolios, the total excess return of -7.81% p.a. can be split up into -5.38% coming from price returns and an additional -2.43% coming from the carry of the portfolio positions.

### 5.3. Carry, momentum, and value strategies

We provide more details on carry, momentum, and value stratgies in Tables IA.4, IA.5, and IA.6 in the Internet Appendix. The setup of the tables follows Table 4 in the main text and shows annualized average excess returns, standard deviations, and Sharpe Ratios for cross-sectional and time-series strategies for the three signals. As in Table 4, we allow for additional lags between observing the signal and forming the portfolio. As above, a lag of $k = 1$ means that we observe the signal in month $t$, form the portfolio at the end of month $t$ and then hold the portfolio in month $t + k$. A lag of $k = 2$ means that we observe the signal in month $k$, form the portfolio at the end of month $t + k - 1$ and hold the portfolio in month $t + k$.

### 5.4. Survey portfolios: Netting out other factors

Table IA.7 reports results for a robustness exercise where we first regress survey scores for each country on the lagged VIX, carry, momentum, value signals, as well as contemporaneous growth survey scores and the global business cycle measure and then use the full-sample residuals to form survey portfolios as documented in Table 4. As above for Table 2, we employ country differentials for growth survey scores and the GBC (foreign country relative to the U.S.).

## 6. Conclusions

We study the link between surveys of asset returns and subsequent realized returns for a large cross section of global equities, fixed income, and currencies. On average, surveys forecast future returns with a negative sign, both in the cross section and in the time series. The returns to strategies based on survey information are not explained by the market, carry, momentum, and value factors. Although survey expectations of returns are related to lagged returns, surveys of fundamentals, and the VIX, most of its variation is left unexplained. Finally, we show that the excess volatility and correlation puzzles across countries are strongly related to how surveys predict future realized returns.

# Data Appendix

**Dividends** We emply Datastream country index returns to compute dividends for the 13 countries in our sample which are used for the excess volatility computations. Table A.1 lists the corresponding mnemonics. More specifically, we first compute monthly dividends from the total return (item "RI" in Datastream) and price indices (item "PI"), sum the monthly dividends within each year, and then compute annual dividend growth rates. Dividends for full calendar years are available for all countries since 1983, except for New Zealand and Spain, which start in 1989 and 1988, respectively.

**GDP growth** We employ annual GDP growth for the correlation puzzle computations which are downloaded from Datastream and Table A.1 lists the corresponding mnemonics. GDP growth data start in 1984 for Australia, Canada, France, Hong Kong, Norway, Switzerland, the U.K., and the U.S.; in 1989 for Austria, the Netherlands, and New Zealand; in 1992 for Denmark, Germany, and Italy; in 1994 for Sweden; in 1995 Japan; and in 1996 for Belgium, the EMU, Portugal, and Spain.

**CPI inflation** Value signals for currencies are based on 5-year changes in real exchange rates, i.e. changes in 5-year spot exchange rates plus the 5-year U.S. inflation rate minus the 5-year inflation rates of the foreign countries (spot exchange rates in our paper are quoted as FC/USD). The CPI inflation rates are downloaded from Datastream and Table A.1 lists the corresponding mnemonics. Inflation data are available for the full sample period for all countries except France (Feb 1990), Japan (Feb 1985), and the U.K. (Feb 1988)

**Surveys** As mentioned in the data section, we employ survey scores from the World Economic Survey (WES) which can be downloaded from Datastream at a quarterly frequency. Table A.1 lists the corresponding mnemonics for equities, foreign exchange, interest rates, and growth surveys.

**Global business cycle indicator** We employ a global business cycle indicator in Table 2 which is based on data from the Economic Cycle Research Institute (ECRI), available at `www.businesscycle.com`. For each country with available data, we construct a time series of recession dummies (which equals one during a recession and zero otherwise). We then average the recession indicators across all countries to obtain the global business cycle indicator (denoted GBC in the table). Note that the GBC is asset-specific, e.g. for equities we average the individual recession indicators across the 13 countries for which we have equity futures returns. ERCI recession dummies are available for the full sample period since 1983 for all countries except Belgium, Denmark, Hong Kong, Ireland, the Netherlands, Norway, and Portugal.

Table A.1 lists the Datastream mnemonics for time series relating to dividend growth, GDP growth, CPI inflation, as well as equity, currency, fixed income and economic growth surveys used in this paper.

**Table A.1.** Datastream mnemonics

This table lists the Datastream mnemonic for for each country in our data.

| | | | | WES survey data | | | |
|---|---|---|---|---|---|---|---|
| Country | Dividends | GDP | CPI | Equities | FX | Int. rates | Growth |
| Australia | TOTMKAU | AUGDP...D | AUCONPRCF | AUIFDSPLR | AUIFCUUSR | AUIFIRLTR | AUIFGSOFR |
| Austria | | OEGDP...D | OECONPRCF | | OEIFCUUSR | | OEIFGSOFR |
| Belgium | | BGGDP...D | BGCONPRCF | | BGIFCUUSR | | BGIFGSOFR |
| Canada | TOTMKCN | CNGDP...D | CNCONPRCF | CNIFDSPLR | CNIFCUUSR | CNIFIRLTR | CNIFGSOFR |
| Denmark | | DKGDP...D | DKCONPRCF | | DKIFCUUSR | | DKIFGSOFR |
| EMU | | EMGDP...D | BDCONPRCF | | EMIFCUUSR | | EMIFGSOFR |
| France | TOTMKFR | FRGDP...D | FRCONPRCE | FRIFDSPLR | FRIFCUUSR | | FRIFGSOFR |
| Germany | TOTMKBD | BDGDP...D | BDCONPRCF | BDIFDSPLR | BDIFCUUSR | BDIFIRLTR | BDIFGSOFR |
| Hong Kong | TOTMKHK | HKGDP...C | HKCONPRCF | HKIFDSPLR | | | HKIFGSOFR |
| Ireland | | IRGDP...D | IRCONPRCF | | IRIFCUUSR | | IRIFGSOFR |
| Italy | TOTMKIT | ITGDP...D | ITCONPRCF | ITIFDSPLR | ITIFCUUSR | | ITIFGSOFR |
| Japan | TOTMKJP | JPGDP...D | JPCONPRCE | JPIFDSPLR | JPIFCUUSR | JPIFIRLTR | JPIFGSOFR |
| Netherlands | TOTMKNL | NLGDP...D | NLCONPRCF | NLIFDSPLR | NLIFCUUSR | | NLIFGSOFR |
| New Zealand | | NZGDP...D | NZCONPRCF | | NZIFCUUSR | NZIFIRLTR | NZIFGSOFR |
| Norway | | NWGDP...D | NWCONPRCF | | NWIFCUUSR | NWIFIRLTR | NWIFGSOFR |
| Portugal | | PTGDP...D | PTCONPRCF | | PTIFCUUSR | | PTIFGSOFR |
| Spain | TOTMKES | ESGDP..VE | ESCONPRCF | ESIFDSPLR | ESIFCUUSR | | ESIFGSOFR |
| Sweden | TOTMKSD | SDGDP...D | SDCONPRCF | SDIFDSPLR | SDIFCUUSR | SDIFIRLTR | SDIFGSOFR |
| Switzerland | TOTMKSW | SWGDP...D | SWCONPRCF | SWIFDSPLR | SWIFCUUSR | SWIFIRLTR | SWIFGSOFR |
| U.K. | TOTMKUK | UKGDP...D | UKCONPRCF | UKIFDSPLR | UKIFCUUSR | UKIFIRLTR | UKIFGSOFR |
| U.S. | TOTMKUS | USGDP...D | USCONPRCE | USIFDSPLR | | USIFIRLTR | USIFGSOFR |

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**Table 1.** Summary statistics

This table reports means and standard deviations of asset returns and survey scores. The latter are on a scale from 1 to 9, where 5 means "no change" and values below 5 mean "declining" and values above 5 mean "increasing". Column "Sample" shows the first month in the sample for which both returns and survey expectations are available. Numbers in parentheses are standard deviations. Mean returns and return volatilities are annualized.

| | Sample | Returns | Surveys |
|---|---|---|---|
| **Equities** | | | |
| U.S. | 1998/04 | 1.90 | 6.43 |
| | | (16.45) | (1.02) |
| Canada | 1999/10 | 5.72 | 6.62 |
| | | (15.79) | (1.03) |
| U.K. | 1998/04 | 0.15 | 5.88 |
| | | (14.97) | (1.07) |
| France | 1998/04 | 1.02 | 6.47 |
| | | (19.73) | (0.88) |
| Germany | 1998/04 | 2.86 | 6.72 |
| | | (23.53) | (0.88) |
| Spain | 1998/04 | 1.93 | 6.03 |
| | | (22.28) | (0.80) |
| Italy | 2004/04 | -1.41 | 6.27 |
| | | (21.12) | (0.66) |
| Netherlands | 1998/04 | -0.24 | 6.72 |
| | | (21.46) | (1.02) |
| Sweden | 2005/03 | 8.53 | 6.43 |
| | | (19.04) | (0.83) |
| Switzerland | 1998/04 | 0.68 | 6.50 |
| | | (16.43) | (0.79) |
| Japan | 1998/04 | -1.88 | 6.32 |
| | | (20.70) | (0.97) |
| Hong Kong | 1998/04 | 8.62 | 6.29 |
| | | (25.83) | (1.53) |
| Australia | 2000/06 | 3.65 | 6.00 |
| | | (13.20) | (1.19) |
| **Currencies** | | | |
| Australia | 1989/01 | 4.10 | 4.72 |
| | | (11.70) | (1.45) |
| Austria | 1997/02 | -2.64 | 4.97 |
| | | (8.70) | (0.94) |
| Belgium | 1997/02 | -2.69 | 5.07 |
| | | (8.67) | (1.11) |
| Canada | 1989/01 | 1.73 | 4.39 |
| | | (7.52) | (2.18) |
| Denmark | 1989/01 | 2.13 | 5.04 |
| | | (10.72) | (1.61) |
| Euro | 1999/02 | 1.20 | 4.75 |
| | | (10.83) | (1.75) |
| France | 1989/01 | 2.89 | 6.79 |
| | | (10.62) | (1.36) |
| Germany | 1989/01 | 1.64 | 6.35 |
| | | (10.83) | (1.60) |
| **Currencies (continued)** | | | |
| Ireland | 1997/02 | -2.50 | 4.48 |
| | | (8.89) | (1.37) |
| Italy | 1989/01 | 2.50 | 4.88 |
| | | (10.83) | (1.28) |
| Japan | 1989/01 | -0.08 | 4.94 |
| | | (11.13) | (1.15) |
| Netherlands | 1989/01 | 1.55 | 5.94 |
| | | (10.74) | (1.65) |
| New Zealand | 1989/01 | 4.56 | 5.00 |
| | | (11.61) | (1.43) |
| Norway | 1989/01 | 2.84 | 4.38 |
| | | (11.04) | (1.43) |
| Portugal | 1997/02 | -2.26 | 3.14 |
| | | (8.42) | (1.78) |
| Spain | 1997/02 | -1.48 | 3.02 |
| | | (8.52) | (1.10) |
| Sweden | 1989/01 | 1.76 | 4.42 |
| | | (11.77) | (1.72) |
| Switzerland | 1989/01 | 1.28 | 5.49 |
| | | (11.64) | (1.93) |
| U.K. | 1989/01 | 1.83 | 5.20 |
| | | (9.66) | (1.13) |
| **Fixed Income** | | | |
| Australia | 1998/04 | 2.72 | 3.96 |
| | | (8.90) | (1.60) |
| Canada | 1998/04 | 4.74 | 3.86 |
| | | (6.79) | (1.44) |
| Germany | 1998/04 | 4.81 | 3.60 |
| | | (6.95) | (1.02) |
| U.K. | 1998/04 | 3.92 | 4.23 |
| | | (7.68) | (1.31) |
| Japan | 1998/04 | 3.22 | 3.77 |
| | | (5.26) | (1.12) |
| New Zealand | 2003/07 | 3.30 | 3.75 |
| | | (8.59) | (1.36) |
| Norway | 1998/04 | 3.84 | 3.66 |
| | | (9.08) | (2.05) |
| Sweden | 1998/04 | 4.30 | 3.79 |
| | | (7.48) | (1.53) |
| Switzerland | 1998/04 | 4.13 | 3.81 |
| | | (5.44) | (1.08) |
| U.S. | 1998/04 | 5.84 | 3.95 |
| | | (10.10) | (1.31) |

**Table 2.** What drives surveys?

This table reports results for pooled regressions of survey expectations on momentum lagged returns (12 months), volatility, and business cycles. $VIX$ denotes the S&P500 implied volatility index and $\Delta VIX$ denotes one-year changes. GBC is a global recession indicator which averages over individual countries' recession indicators in the cross-section for each month. "Growth" denotes survey expectations (from the same survey) for the future economic situation of a country (where a higher score means "better'). Numbers in brackets are $t$-statistics based on standard errors clustered by country and time.

| | (i) | (ii) | (iii) | (iv) | (v) | (vi) | (vii) |
|---|---|---|---|---|---|---|---|
| **Panel A. Equities** | | | | | | | |
| Lagged returns | 0.16 | | | | | -0.04 | -0.03 |
| | [3.13] | | | | | [-0.84] | [-0.66] |
| $VIX$ | | -4.20 | | | | -2.00 | |
| | | [-4.92] | | | | [-3.25] | |
| $\Delta VIX$ | | | -0.04 | | | | -0.01 |
| | | | [-5.43] | | | | [-1.45] |
| GBC | | | | -1.55 | | -0.30 | -0.57 |
| | | | | [-5.76] | | [-1.05] | [-2.18] |
| Growth | | | | | 0.40 | 0.36 | 0.35 |
| | | | | | [13.02] | [10.17] | [7.91] |
| $R^2$ | 0.09 | 0.11 | 0.17 | 0.11 | 0.38 | 0.41 | 0.40 |
| **Panel B. Currencies** | | | | | | | |
| Lagged returns | 0.69 | | | | | 0.63 | 0.68 |
| | [5.58] | | | | | [5.15] | [5.03] |
| $VIX$ | | -6.53 | | | | -4.13 | |
| | | [-3.90] | | | | [-2.79] | |
| $\Delta VIX$ | | | -0.02 | | | | 0.01 |
| | | | [-1.48] | | | | [1.10] |
| GBC | | | | 1.09 | | 0.56 | 1.39 |
| | | | | [1.88] | | [1.36] | [3.13] |
| Growth | | | | | -0.10 | -0.01 | 0.03 |
| | | | | | [-1.57] | [-0.11] | [0.66] |
| $R^2$ | 0.15 | 0.08 | 0.01 | 0.03 | 0.01 | 0.20 | 0.19 |

(continued on next page)

**Table 2.** continued

| | (i) | (ii) | (iii) | (iv) | (v) | (vi) | (vii) |
|---|---|---|---|---|---|---|---|
| **Panel C. Fixed income** | | | | | | | |
| Lagged returns | 0.63 | | | | | 0.41 | 0.45 |
| | [2.99] | | | | | [2.76] | [3.25] |
| $VIX$ | | 8.03 | | | | 3.58 | |
| | | [5.57] | | | | [2.32] | |
| $\Delta VIX$ | | | 0.07 | | | | 0.02 |
| | | | [7.39] | | | | [2.06] |
| GBC | | | | 2.98 | | 0.95 | 1.44 |
| | | | | [5.64] | | [1.49] | [2.48] |
| Growth | | | | | -0.43 | -0.33 | -0.30 |
| | | | | | [-7.18] | [-5.00] | [-4.35] |
| $R^2$ | 0.08 | 0.22 | 0.23 | 0.22 | 0.24 | 0.42 | 0.40 |

**Table 3.** Regressions of returns on surveys and other signals

This table reports results for regressions of returns on lagged survey scores as well as lagged carry, momentum, and value signals. We report the slope coefficient $\beta$, the corresponding $t$-stat based on Newey/West standard errors in brackets, and the $R^2$.

| | Surveys | | Carry | | Momentum | | Value | |
|---|---|---|---|---|---|---|---|---|
| | $\beta$ | $R^2$ | $\beta$ | $R^2$ | $\beta$ | $R^2$ | $\beta$ | $R^2$ |
| **Panel A. Equities** | | | | | | | | |
| U.S. | -0.12 | 0.04 | -0.02 | 0.00 | 0.22 | 0.55 | 0.19 | 0.41 |
| | [-0.17] | | [-0.09] | | [0.77] | | [0.97] | |
| Canada | 0.05 | 0.01 | -0.36 | 1.56 | 0.01 | 0.00 | 0.31 | 0.76 |
| | [0.07] | | [-1.38] | | [0.03] | | [0.91] | |
| U.K. | 0.51 | 0.90 | 0.12 | 0.16 | 0.03 | 0.01 | 0.14 | 0.23 |
| | [0.79] | | [0.70] | | [0.16] | | [0.79] | |
| France | -0.21 | 0.15 | 0.23 | 0.66 | 0.15 | 0.27 | 0.14 | 0.23 |
| | [-0.28] | | [1.53] | | [0.70] | | [0.72] | |
| Germany | 0.01 | 0.00 | 0.19 | 0.42 | 0.18 | 0.40 | 0.13 | 0.24 |
| | [0.01] | | [1.17] | | [0.73] | | [0.65] | |
| Spain | -0.30 | 0.35 | 0.03 | 0.01 | 0.11 | 0.15 | 0.22 | 0.51 |
| | [-0.31] | | [0.14] | | [0.50] | | [1.11] | |
| Italy | 0.26 | 0.27 | 0.31 | 1.16 | 0.08 | 0.07 | 0.02 | 0.01 |
| | [0.39] | | [0.75] | | [0.18] | | [0.08] | |
| Netherlands | 0.12 | 0.05 | 0.27 | 0.85 | 0.30 | 1.07 | 0.07 | 0.06 |
| | [0.16] | | [1.47] | | [1.18] | | [0.38] | |
| Sweden | 0.48 | 0.88 | 1.02 | 12.44 | 0.20 | 0.46 | 0.65 | 4.40 |
| | [0.37] | | [2.57] | | [0.49] | | [1.32] | |
| Switzerland | -0.42 | 0.65 | 0.59 | 4.23 | 0.34 | 1.33 | 0.23 | 0.38 |
| | [-0.62] | | [3.01] | | [1.28] | | [1.00] | |
| Japan | -0.73 | 2.50 | 0.33 | 1.34 | -0.03 | 0.01 | 0.24 | 0.65 |
| | [-1.44] | | [2.11] | | [-0.17] | | [1.44] | |
| Hong Kong | -0.76 | 2.81 | 0.56 | 3.76 | -0.15 | 0.28 | 0.30 | 1.10 |
| | [-1.24] | | [2.85] | | [-0.67] | | [1.34] | |
| Australia | 0.43 | 0.75 | 0.76 | 6.91 | 0.28 | 0.91 | 0.34 | 0.71 |
| | [0.66] | | [2.31] | | [0.67] | | [0.90] | |

(continued on next page)

**Table 3** (continued)

| | Surveys | | Carry | | Momentum | | Value | |
|---|---|---|---|---|---|---|---|---|
| | $\beta$ | $R^2$ | $\beta$ | $R^2$ | $\beta$ | $R^2$ | $\beta$ | $R^2$ |
| **Panel B. Currencies** | | | | | | | | |
| Australia | -0.69 | 1.95 | 0.33 | 1.31 | 0.05 | 0.03 | -0.07 | 0.05 |
| | [-0.97] | | [2.62] | | [0.25] | | [-0.43] | |
| Austria | -2.00 | 6.66 | -0.02 | 0.01 | 0.16 | 0.36 | | |
| | [-0.87] | | [-0.03] | | [0.36] | | | |
| Belgium | -3.07 | 16.53 | 0.60 | 4.34 | 0.18 | 0.45 | | |
| | [-2.26] | | [0.97] | | [0.40] | | | |
| Canada | 0.14 | 0.07 | 0.35 | 1.46 | 0.08 | 0.07 | -0.15 | 0.25 |
| | [0.30] | | [2.34] | | [0.36] | | [-0.87] | |
| Denmark | -0.57 | 1.42 | 0.31 | 1.14 | 0.17 | 0.35 | -0.05 | 0.04 |
| | [-0.99] | | [1.82] | | [1.09] | | [-0.35] | |
| Euro | -0.23 | 0.21 | 0.47 | 2.67 | -0.09 | 0.10 | 0.07 | 0.06 |
| | [-0.30] | | [2.48] | | [-0.37] | | [0.28] | |
| France | -1.14 | 2.80 | 0.31 | 1.14 | 0.22 | 0.61 | 0.07 | 0.09 |
| | [-1.30] | | [1.22] | | [1.08] | | [0.27] | |
| Germany | -1.00 | 3.14 | 0.28 | 0.92 | 0.25 | 0.78 | -0.10 | 0.15 |
| | [-1.55] | | [1.08] | | [1.23] | | [-0.50] | |
| Ireland | -1.85 | 10.32 | 0.31 | 1.15 | -0.31 | 1.51 | | |
| | [-1.92] | | [0.62] | | [-0.65] | | | |
| Italy | -1.63 | 8.23 | 0.01 | 0.00 | 0.21 | 0.51 | -0.04 | 0.02 |
| | [-1.92] | | [0.02] | | [1.02] | | [-0.15] | |
| Japan | -0.26 | 0.29 | 0.52 | 3.21 | 0.33 | 1.26 | 0.07 | 0.07 |
| | [-0.42] | | [3.30] | | [2.09] | | [0.31] | |
| Netherlands | -0.56 | 1.08 | 0.40 | 1.94 | 0.28 | 1.00 | -0.10 | 0.15 |
| | [-0.82] | | [1.60] | | [1.41] | | [-0.48] | |
| New Zealand | -0.29 | 0.40 | 0.58 | 4.09 | 0.17 | 0.36 | 0.03 | 0.01 |
| | [-0.52] | | [4.26] | | [0.77] | | [0.16] | |
| Norway | -0.39 | 0.60 | 0.16 | 0.31 | -0.05 | 0.03 | 0.14 | 0.22 |
| | [-0.91] | | [0.68] | | [-0.28] | | [0.78] | |
| Portugal | -0.57 | 1.04 | -1.08 | 13.93 | 0.11 | 0.17 | | |
| | [-0.39] | | [-2.85] | | [0.25] | | | |
| Spain | -3.75 | 15.49 | -0.71 | 5.99 | 0.13 | 0.24 | | |
| | [-1.68] | | [-2.11] | | [0.29] | | | |
| Sweden | -0.87 | 2.91 | 0.15 | 0.26 | 0.03 | 0.01 | 0.04 | 0.02 |
| | [-1.32] | | [0.49] | | [0.19] | | [0.24] | |
| Switzerland | -0.42 | 0.81 | 0.43 | 2.19 | 0.17 | 0.36 | 0.02 | 0.00 |
| | [-0.87] | | [2.48] | | [1.11] | | [0.09] | |
| U.K. | -0.13 | 0.07 | 0.46 | 2.54 | -0.04 | 0.02 | 0.18 | 0.62 |
| | [-0.29] | | [2.06] | | [-0.20] | | [1.31] | |

(continued on next page)

**Table 3** (continued)

| | Surveys | | Carry | | Momentum | | Value | |
|---|---|---|---|---|---|---|---|---|
| | $\beta$ | $R^2$ | $\beta$ | $R^2$ | $\beta$ | $R^2$ | $\beta$ | $R^2$ |
| **Panel C. Fixed income** | | | | | | | | |
| Australia | -1.14 | 7.08 | 0.22 | 0.60 | 0.06 | 0.04 | 0.10 | 0.15 |
| | [-2.39] | | [1.15] | | [0.37] | | [0.45] | |
| Canada | -1.44 | 12.68 | 0.26 | 0.79 | -0.08 | 0.07 | 0.32 | 1.73 |
| | [-3.10] | | [1.38] | | [-0.47] | | [2.07] | |
| Germany | -1.09 | 4.74 | 0.32 | 1.20 | 0.13 | 0.19 | 0.03 | 0.01 |
| | [-1.87] | | [1.76] | | [0.80] | | [0.17] | |
| U.K. | -1.22 | 10.31 | 0.19 | 0.42 | -0.03 | 0.01 | 0.18 | 0.45 |
| | [-2.40] | | [1.01] | | [-0.15] | | [1.26] | |
| Japan | -0.52 | 2.19 | 0.39 | 1.81 | 0.06 | 0.05 | -0.06 | 0.05 |
| | [-1.53] | | [1.72] | | [0.29] | | [-0.38] | |
| New Zealand | -0.03 | 0.00 | 0.58 | 4.08 | 0.15 | 0.27 | 0.60 | 2.86 |
| | [-0.04] | | [2.74] | | [0.49] | | [1.73] | |
| Norway | -0.86 | 2.91 | 0.32 | 1.20 | -0.04 | 0.02 | 0.60 | 3.90 |
| | [-1.32] | | [1.81] | | [-0.19] | | [2.59] | |
| Sweden | -0.96 | 5.91 | 0.06 | 0.05 | 0.01 | 0.00 | 0.19 | 0.64 |
| | [-2.08] | | [0.30] | | [0.06] | | [0.97] | |
| Switzerland | -0.70 | 2.54 | 0.65 | 5.01 | 0.37 | 1.63 | 0.19 | 0.49 |
| | [-1.32] | | [3.12] | | [2.06] | | [0.94] | |
| U.S. | -1.38 | 8.72 | 0.25 | 0.73 | 0.00 | 0.00 | 0.29 | 1.28 |
| | [-2.13] | | [1.71] | | [-0.01] | | [1.72] | |

**Table 4.** Survey strategies

This table reports annualized returns, standard deviations (std), and Sharpe Ratios (SR) of survey portfolios. We report results for both cross-sectional strategies (portfolios are formed on cross-sectional ranks of survey expectations – Panel A) and time-series strategies (we go long or short in a country depending on whether survey indicate a rising or falling asset price – Panel B). We allow for a lag of $k = 1, 2, ..., 12$ months between the survey expectation and portfolio formation. Each panel also reports results for Global Survey Factors (GSF) which are combined portfolios of all three asset classes and where we weight individual portfolio returns by the inverse of their volatility, take the equally-weighted average, and then scale the portfolio return to have 10% volatility p.a.

| | Lag between survey and portfolio formation $k$ (months) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel A. Cross-sectional strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | -4.32 | -4.70 | -6.32 | -4.35 | -4.47 | -3.93 | -5.00 | -4.06 | -3.84 | -1.32 | -0.14 | -0.36 |
| std | 10.03 | 10.06 | 9.45 | 9.71 | 9.50 | 9.82 | 10.06 | 10.22 | 9.78 | 9.53 | 9.14 | 8.98 |
| $t$ | [-1.61] | [-1.94] | [-2.94] | [-1.83] | [-1.94] | [-1.49] | [-1.89] | [-1.54] | [-1.66] | [-0.57] | [-0.06] | [-0.15] |
| SR | -0.43 | -0.47 | -0.67 | -0.45 | -0.47 | -0.40 | -0.50 | -0.40 | -0.39 | -0.14 | -0.02 | -0.04 |
| **Currencies** | | | | | | | | | | | | |
| mean | -2.57 | -3.27 | -3.21 | -2.90 | -3.12 | -2.78 | -2.54 | -2.83 | -2.47 | -2.83 | -2.98 | -3.44 |
| std | 6.01 | 6.08 | 6.19 | 6.20 | 6.15 | 5.94 | 5.88 | 5.84 | 5.92 | 5.97 | 5.86 | 6.06 |
| $t$ | [-2.09] | [-2.75] | [-2.60] | [-2.50] | [-2.69] | [-2.13] | [-2.04] | [-2.14] | [-1.85] | [-2.28] | [-2.41] | [-2.65] |
| SR | -0.43 | -0.54 | -0.52 | -0.47 | -0.51 | -0.47 | -0.43 | -0.48 | -0.42 | -0.47 | -0.51 | -0.57 |
| **Fixed income** | | | | | | | | | | | | |
| mean | -0.76 | -0.85 | -2.35 | -1.46 | -1.35 | -0.60 | -1.47 | -0.71 | 0.23 | 0.35 | 0.82 | 0.76 |
| std | 4.26 | 4.54 | 4.90 | 4.94 | 5.00 | 4.67 | 5.03 | 4.89 | 4.91 | 4.70 | 4.77 | 4.70 |
| $t$ | [-0.81] | [-0.75] | [-2.04] | [-1.34] | [-1.30] | [-0.54] | [-1.16] | [-0.64] | [0.23] | [0.39] | [0.81] | [0.71] |
| SR | -0.18 | -0.19 | -0.48 | -0.30 | -0.27 | -0.13 | -0.29 | -0.15 | 0.05 | 0.07 | 0.17 | 0.16 |
| **Cross-sectional Global Survey Factor** | | | | | | | | | | | | |
| mean | -5.55 | -6.78 | -7.17 | -5.41 | -5.43 | -4.68 | -5.38 | -5.26 | -3.97 | -4.01 | -3.69 | -4.74 |
| std | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| $t$ | [-2.59] | [-3.37] | [-3.54] | [-2.79] | [-2.76] | [-2.01] | [-2.44] | [-2.28] | [-1.78] | [-2.05] | [-1.79] | [-2.17] |
| SR | -0.56 | -0.68 | -0.72 | -0.54 | -0.54 | -0.47 | -0.54 | -0.53 | -0.40 | -0.40 | -0.37 | -0.47 |

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**Table 4.** continued

| | Lag between survey and portfolio formation $k$ (months) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel B. Time-series strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | 1.21 | -0.36 | -0.53 | 0.65 | 2.34 | 1.97 | 1.81 | 0.59 | -0.13 | -0.29 | 0.67 | 0.14 |
| std | 12.40 | 12.68 | 12.81 | 13.25 | 13.00 | 12.99 | 12.81 | 12.73 | 12.79 | 13.31 | 13.29 | 13.52 |
| $t$ | [0.34] | [-0.10] | [-0.14] | [0.17] | [0.63] | [0.53] | [0.50] | [0.16] | [-0.04] | [-0.07] | [0.16] | [0.03] |
| SR | 0.10 | -0.03 | -0.04 | 0.05 | 0.18 | 0.15 | 0.14 | 0.05 | -0.01 | -0.02 | 0.05 | 0.01 |
| **Currencies** | | | | | | | | | | | | |
| mean | -2.16 | -2.33 | -2.86 | -2.56 | -2.32 | -1.54 | -1.57 | -1.81 | -1.98 | -2.49 | -2.77 | -2.38 |
| std | 5.46 | 5.24 | 5.40 | 5.24 | 5.22 | 5.16 | 5.29 | 5.51 | 5.57 | 5.67 | 5.57 | 5.53 |
| $t$ | [-1.80] | [-1.96] | [-2.42] | [-2.24] | [-1.95] | [-1.34] | [-1.32] | [-1.42] | [-1.52] | [-1.88] | [-2.13] | [-1.87] |
| SR | -0.39 | -0.44 | -0.53 | -0.49 | -0.44 | -0.30 | -0.30 | -0.33 | -0.35 | -0.44 | -0.50 | -0.43 |
| **Fixed income** | | | | | | | | | | | | |
| mean | -3.57 | -4.19 | -5.12 | -4.15 | -3.20 | -2.93 | -3.25 | -2.56 | -2.76 | -3.06 | -3.23 | -2.54 |
| std | 4.95 | 4.77 | 4.68 | 4.81 | 4.73 | 4.55 | 4.49 | 4.63 | 4.54 | 4.57 | 4.72 | 5.04 |
| $t$ | [-2.54] | [-3.19] | [-3.56] | [-2.98] | [-2.33] | [-2.09] | [-2.44] | [-1.77] | [-1.89] | [-2.14] | [-2.25] | [-1.67] |
| SR | -0.72 | -0.88 | -1.10 | -0.86 | -0.68 | -0.64 | -0.72 | -0.55 | -0.61 | -0.67 | -0.68 | -0.51 |
| **Time-series Global Survey Factor** | | | | | | | | | | | | |
| mean | -4.38 | -5.65 | -6.69 | -5.30 | -3.73 | -2.80 | -3.77 | -3.97 | -4.17 | -5.38 | -5.36 | -4.55 |
| std | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| $t$ | [-2.02] | [-2.55] | [-2.94] | [-2.43] | [-1.71] | [-1.26] | [-1.69] | [-1.82] | [-1.85] | [-2.30] | [-2.21] | [-1.89] |
| SR | -0.44 | -0.56 | -0.67 | -0.53 | -0.37 | -0.28 | -0.38 | -0.40 | -0.42 | -0.54 | -0.54 | -0.46 |

**Table 5.** Correlations of survey portfolios

This table reports correlation coefficients of returns to survey portfolios based on cross-sectional (CS) and time-series strategies in equities (EQ), currencies (FX), and fixed income (FI) in Panel A and the principal components of these portfolio returns in Panel B. The last row (cum $R^2$) shows the cumulative explained variance of the principal components. Survey portfolios are based on a lag of $k = 3$ months (which corresponds to quarterly updating at the end of each quarter).

| **Panel A. Correlations** | | | | | | |
|---|---|---|---|---|---|---|
| | $\text{EQ}_{CS}$ | $\text{EQ}_{TS}$ | $\text{FX}_{CS}$ | $\text{FX}_{TS}$ | $\text{FI}_{CS}$ | $\text{FI}_{TS}$ |
| $\text{EQ}_{CS}$ | | 0.43 | -0.11 | 0.15 | -0.03 | 0.08 |
| $\text{EQ}_{TS}$ | 0.43 | | -0.04 | 0.05 | 0.12 | 0.40 |
| $\text{FX}_{CS}$ | -0.11 | -0.04 | | 0.53 | 0.05 | 0.04 |
| $\text{FX}_{TS}$ | 0.15 | 0.05 | 0.53 | | 0.06 | 0.10 |
| $\text{FI}_{CS}$ | -0.03 | 0.12 | 0.05 | 0.06 | | 0.35 |
| $\text{FI}_{TS}$ | 0.08 | 0.40 | 0.04 | 0.10 | 0.35 | |
| **Panel B. Principal components** | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| $\text{EQ}_{CS}$ | 0.38 | 0.26 | -0.60 | 0.45 | -0.15 | -0.46 |
| $\text{EQ}_{TS}$ | 0.55 | 0.31 | -0.20 | -0.30 | 0.54 | 0.42 |
| $\text{FX}_{CS}$ | 0.20 | -0.69 | -0.04 | -0.17 | 0.47 | -0.49 |
| $\text{FX}_{TS}$ | 0.34 | -0.59 | -0.24 | 0.14 | -0.42 | 0.53 |
| $\text{FI}_{CS}$ | 0.35 | 0.01 | 0.63 | 0.66 | 0.21 | 0.06 |
| $\text{FI}_{TS}$ | 0.53 | 0.13 | 0.39 | -0.47 | -0.49 | -0.30 |
| cum $R^2$ | 0.30 | 0.55 | 0.74 | 0.86 | 0.94 | 1.00 |

**Table 6.** Exposure of survey portfolios

This table reports exposures of survey portfolios to benchmark factors. We regress survey portfolio returns on a passive long benchmark, carry, momentum, and value returns for all asset classes and both cross-sectional and time-series strategies. We report results for survey portfolios of each asset class individually and for a Global Survey Factor (GSF) which combine all survey portfolios by weighting with the inverse of return volatility and then scaling the returns up to have 10% annualized volatility. We annualize the alphas and Information Ratios (IR), where the IR is the alpha divided by the residual volatility from the regression. We regress returns to cross-sectional (time-series) survey portfolios on returns to cross-sectional (time-series) carry, momentum, and value portfolios and regress the GSF on global carry, momentum, and value factors (constructed in an analogous way). Numbers in squared brackets are $t$-statistics based on Newey and West (1987) standard errors.

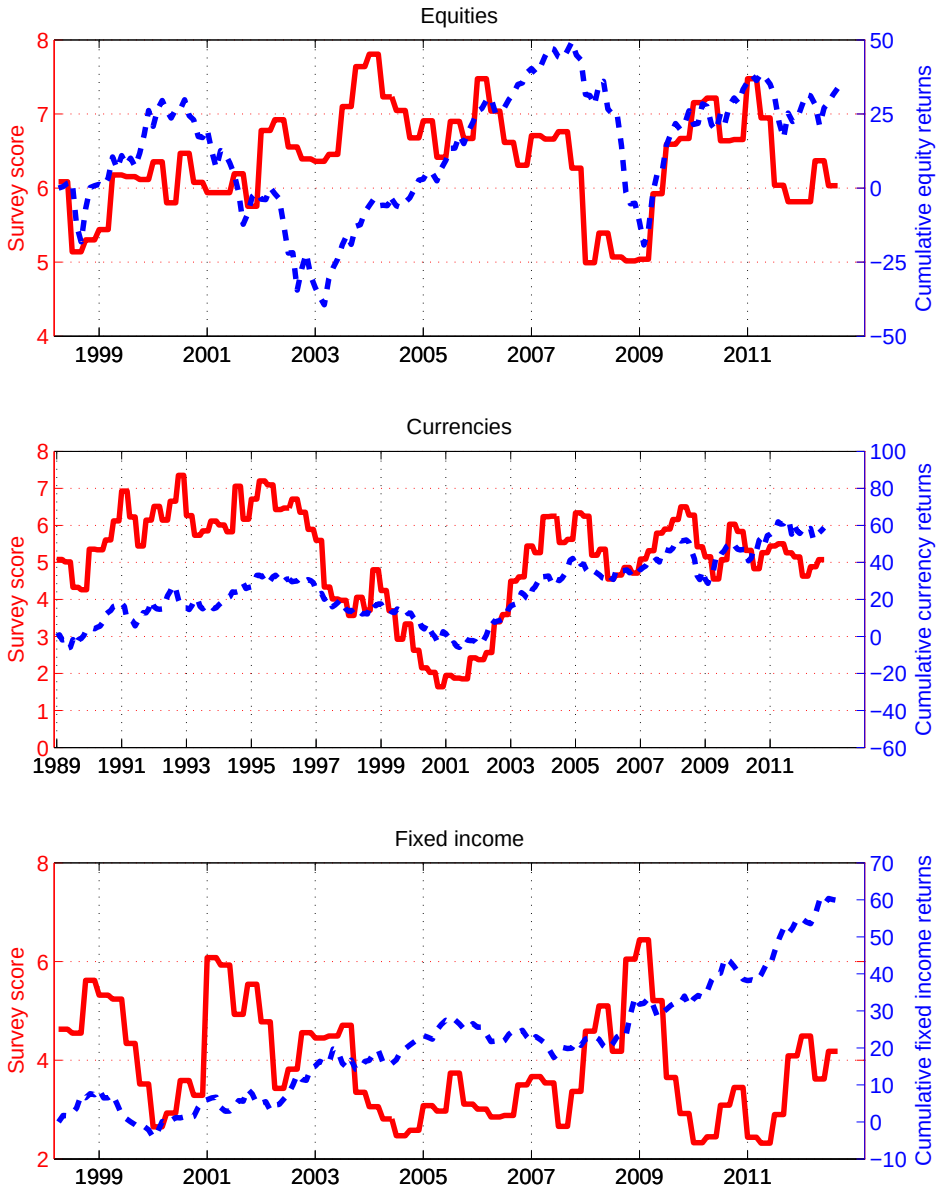
| | Cross-sectional strategies | | | Time-series strategies | | | |
|---|---|---|---|---|---|---|---|
| | EQ | FX | FI | EQ | FX | FI | GSF |
| $\alpha$ | -4.45 | -1.72 | -0.99 | -3.27 | -3.90 | -2.49 | -7.00 |
| | [-2.21] | [-1.50] | [-0.61] | [-2.24] | [-3.68] | [-2.42] | [-2.52] |
| Passive | 0.21 | 0.05 | 0.00 | 0.67 | -0.06 | -0.59 | 0.03 |
| | [4.10] | [0.77] | [0.01] | [9.50] | [-0.57] | [-4.82] | [0.39] |
| Carry | -0.13 | -0.11 | -0.27 | 0.13 | 0.20 | 0.04 | -0.06 |
| | [-1.31] | [-1.65] | [-1.67] | [0.79] | [1.74] | [0.27] | [-0.48] |
| Mom | -0.04 | 0.01 | 0.30 | 0.13 | 0.15 | 0.08 | 0.06 |
| | [-0.29] | [0.22] | [2.49] | [1.56] | [1.05] | [1.05] | [0.44] |
| Value | -0.29 | -0.42 | 0.21 | -0.19 | -0.11 | -0.18 | -0.17 |
| | [-1.91] | [-7.11] | [1.13] | [-1.50] | [-0.85] | [-1.50] | [-1.80] |
| $R^2$ | 0.17 | 0.27 | 0.12 | 0.72 | 0.13 | 0.50 | 0.03 |
| IR | -0.52 | -0.33 | -0.22 | -0.48 | -0.78 | -0.76 | -0.72 |

**Table 7.** Survey portfolios: Long and short positions

This table reports annualized mean returns and Sharpe Ratios for survey portfolios in equities (EQ), currencies (FX), and fixed income (FI) based on cross-sectional (CS) and time-series strategies where we set an implementation lag of 2 months after observing the survey signal (see Table 4 above). The upper part shows results for the overall portfolio (both long and short positions), the middle part (denoted by a + superscript) shows results for portfolios that are based only on the long signals, whereas the lower part (denoted by a − superscript) reports results for portfolios based only on the short signals at each point in time. The last two rows report the fraction of the overall portfolio returns that can be attributed to the long and short signals, respectively. Numbers in squared brackets are $t$-statistics based on Newwey/West standard errors.

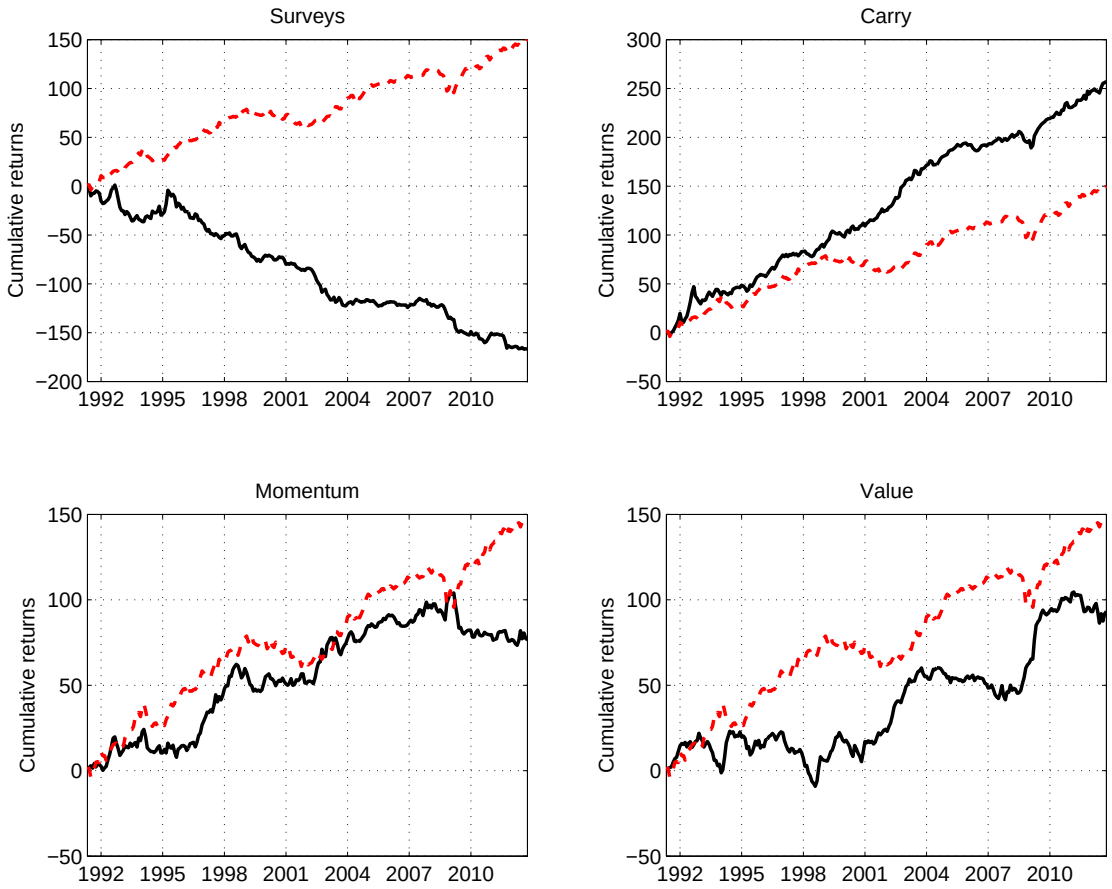
| | EQ | | FX | | FI | |
|---|---|---|---|---|---|---|
| | CS | TS | CS | TS | CS | TS |
| Mean | -6.32 | -0.53 | -3.21 | -2.86 | -2.35 | -5.12 |
| | [-2.99] | [-0.14] | [-2.60] | [-2.42] | [-2.09] | [-3.53] |
| SR | -0.67 | -0.04 | -0.52 | -0.53 | -0.48 | -1.10 |
| IR | -0.52 | -0.48 | -0.33 | -0.78 | -0.22 | -0.76 |
| $\text{Mean}^+$ | -0.97 | 0.86 | 1.04 | -0.14 | 3.02 | -0.52 |
| | [-0.17] | [0.20] | [0.50] | [-0.12] | [1.72] | [-0.97] |
| $\text{SR}^+$ | -0.05 | 0.06 | 0.11 | -0.03 | 0.49 | -0.25 |
| $\text{IR}^+$ | -0.57 | -0.48 | -0.24 | -0.78 | -0.09 | -0.76 |
| $\text{Mean}^-$ | -5.36 | -1.38 | -4.25 | -2.72 | -5.37 | -4.60 |
| | [-1.03] | [-0.84] | [-2.33] | [-2.41] | [-3.14] | [-3.09] |
| $\text{SR}^-$ | -0.33 | -0.28 | -0.50 | -0.54 | -0.83 | -0.95 |
| $\text{IR}^-$ | -0.38 | -0.48 | -0.35 | -0.78 | -0.29 | -0.76 |
| $\text{Share}^+$ | 0.15 | -1.62 | -0.33 | 0.05 | -1.28 | 0.10 |
| $\text{Share}^-$ | 0.85 | 2.62 | 1.33 | 0.95 | 2.28 | 0.90 |

**Figure 1.** Survey and return dynamics



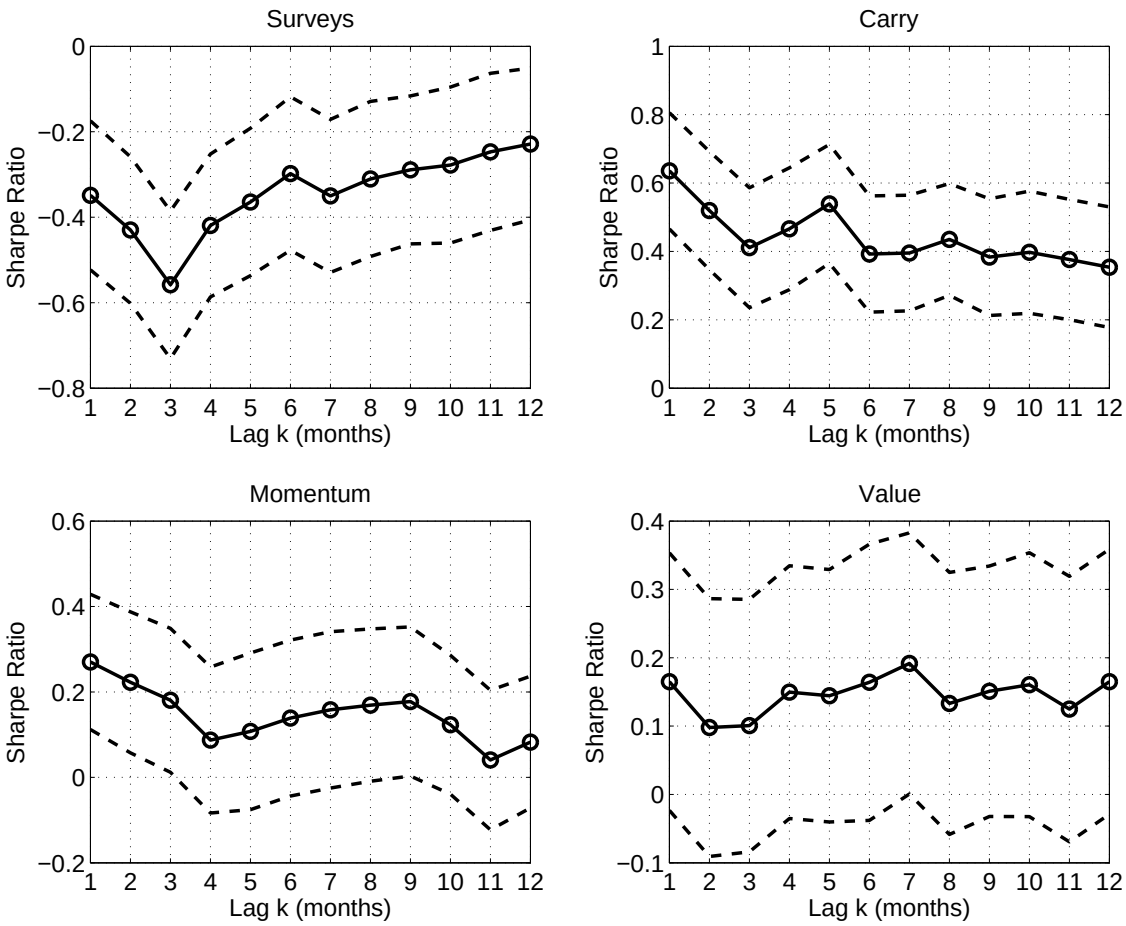

This figure shows time-series plots of survey scores (averaged across all countries in each month) and cumulative returns (also averaged across countries).

**Figure 2.** Cumulative returns of Survey, Carry, Momentum, and Value strategies



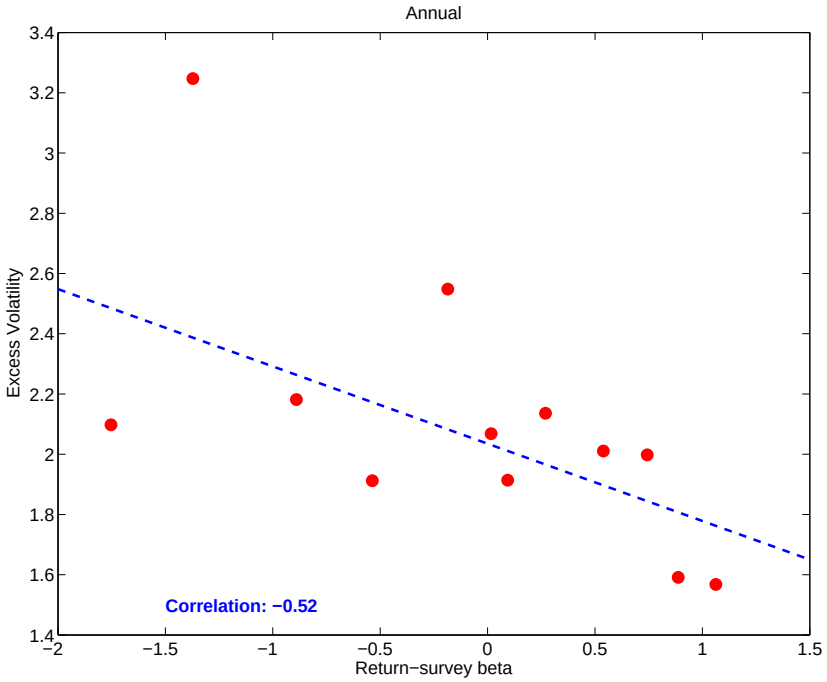

This figure shows cumulative excess returns of survey, carry, value, and momentum strategies (solid lines). We combine cross-sectional and time-series strategies and all asset classes for each strategy by weighting portfolio returns with the inverse of the standard deviation and then scale returns so that they have a target volatility of 10% p.a. The dashed lines show cumulative returns of the passive long benchmarks, also averaged and volatility-weighted across asset classes, and we multiply the passive long return with minus one in the upper left panel (survey portfolio) to make the two returns more easily comparable in the plot.

**Figure 3.** Sharpe Ratios of Survey, Carry, Momentum, and Value strategies



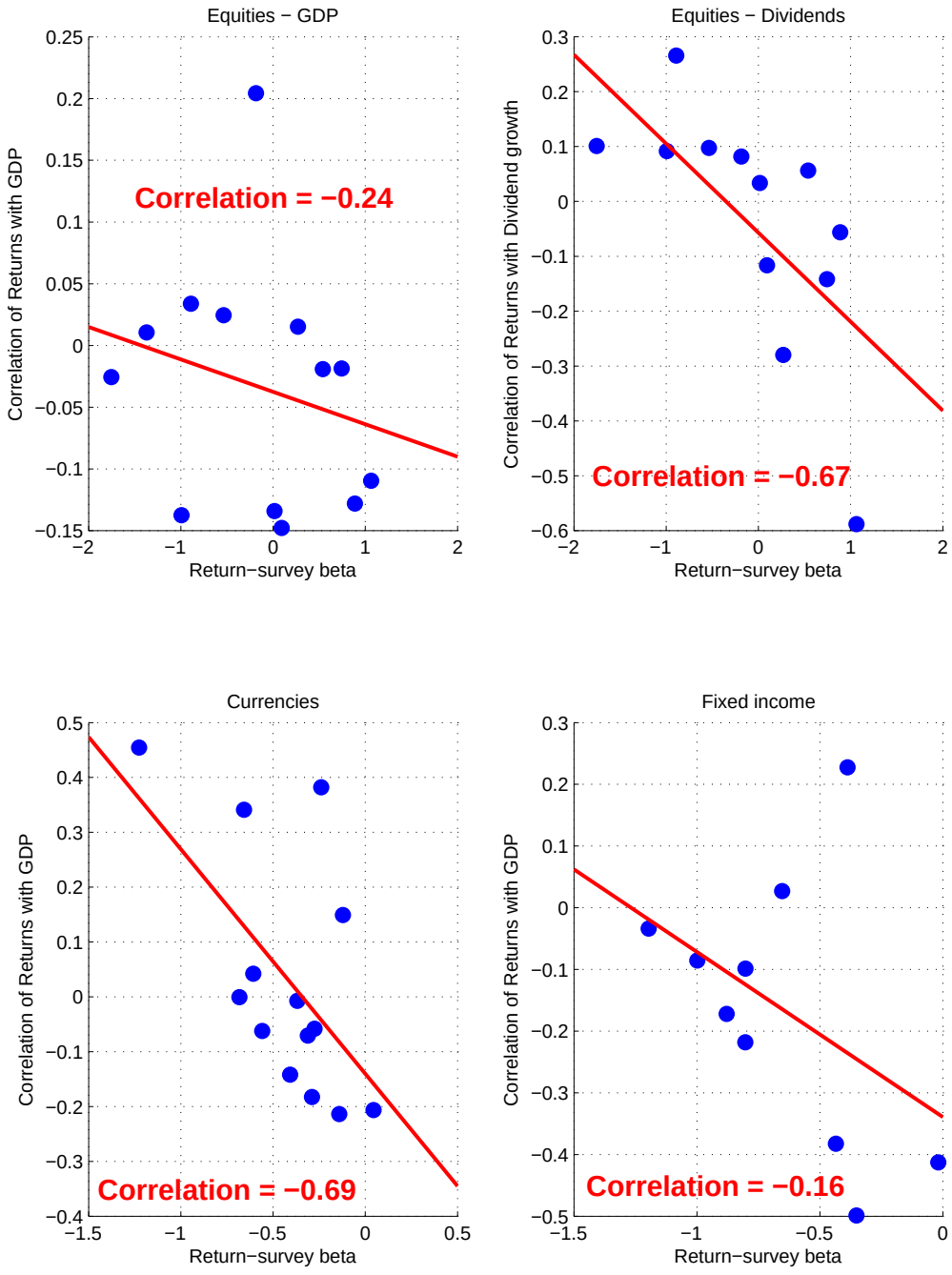

This figure shows average annualized Sharpe Ratios across all assets (equities, currencies, and fixed income) and across strategies (cross-sectional and time-series strategies) for portfolios based on survey expectations, carry, momentum, and value. We plot these Sharpe Ratios for different implementation lags of $k = 1, 2, ..., 12$ months. Dashed lines correspond to 99% confidence intervals.

**Figure 4.** Return-survey betas and excess volatility




This figure shows a scatter plot of "excess volatility," i.e., the volatility of equity returns divided by the volatility of dividend growth, and the survey-return relationship, i.e. the beta of a regression of future returns on return expectations. Dividend growth is computed at a yearly frequency by adding up monthly dividends.

**Figure 5.** Forecast errors and the correlation puzzle




This figure shows scatter plots of correlations between surveys and returns (horizontal axis) and correlations between returns and fundamentals (vertical axis). For equities, we show results for both GDP growth and earnings growth as fundamentals. For currencies and fixed income, the fundamental is GDP growth.

*Internet Appendix to accompany*

# On Surveys of Asset Returns

(not for publication)

**Table IA.1.** Unconditional frequencies for survey scores

This table reports unconditional frequencies for survey scores, i.e. the frequencies with which the survey score lies within the following boundaries: $1-2, 2-3, ..., 8-9$. We report these frequencies separately for equities, currencies, and fixed income, and average over all countries within each asset class.

| | Equities | Currencies | Fixed income |
|---|---|---|---|
| 1-2 | 0.00 | 0.07 | 0.07 |
| 2-3 | 0.00 | 0.05 | 0.21 |
| 3-4 | 0.02 | 0.11 | 0.27 |
| 4-5 | 0.06 | 0.17 | 0.22 |
| 5-6 | 0.25 | 0.27 | 0.14 |
| 6-7 | 0.36 | 0.17 | 0.07 |
| 7-8 | 0.27 | 0.11 | 0.02 |
| 8-9 | 0.04 | 0.03 | 0.00 |

**Table IA.2.** Transition probabilities

This table reports transition probabilities for equity, currency, and fixed income survey scores where we make use of the discretization of survey scores as in Table IA.1 above. The rows correspond to the bucket at time $t$ whereas columns correspond to the buckets at time $t+1$.

| | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 |
|---|---|---|---|---|---|---|---|---|
| **Panel A. Equities** | | | | | | | | |
| 1-2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2-3 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3-4 | 0.00 | 0.00 | 0.08 | 0.25 | 0.58 | 0.00 | 0.08 | 0.00 |
| 4-5 | 0.00 | 0.00 | 0.06 | 0.19 | 0.45 | 0.26 | 0.04 | 0.00 |
| 5-6 | 0.00 | 0.01 | 0.04 | 0.12 | 0.38 | 0.35 | 0.10 | 0.00 |
| 6-7 | 0.00 | 0.00 | 0.00 | 0.03 | 0.23 | 0.43 | 0.29 | 0.02 |
| 7-8 | 0.00 | 0.00 | 0.00 | 0.02 | 0.11 | 0.36 | 0.44 | 0.07 |
| 8-9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 0.52 | 0.22 |
| **Panel B. Currencies** | | | | | | | | |
| 1-2 | 0.59 | 0.30 | 0.09 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| 2-3 | 0.36 | 0.24 | 0.26 | 0.07 | 0.06 | 0.01 | 0.00 | 0.00 |
| 3-4 | 0.06 | 0.08 | 0.35 | 0.25 | 0.22 | 0.03 | 0.01 | 0.00 |
| 4-5 | 0.01 | 0.03 | 0.17 | 0.32 | 0.36 | 0.10 | 0.01 | 0.00 |
| 5-6 | 0.01 | 0.01 | 0.08 | 0.22 | 0.39 | 0.20 | 0.07 | 0.01 |
| 6-7 | 0.00 | 0.00 | 0.02 | 0.12 | 0.32 | 0.30 | 0.19 | 0.02 |
| 7-8 | 0.00 | 0.00 | 0.00 | 0.02 | 0.14 | 0.32 | 0.38 | 0.12 |
| 8-9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.18 | 0.40 | 0.28 |
| **Panel C. Fixed income** | | | | | | | | |
| 1-2 | 0.37 | 0.29 | 0.22 | 0.02 | 0.05 | 0.02 | 0.02 | 0.00 |
| 2-3 | 0.12 | 0.48 | 0.29 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3-4 | 0.04 | 0.25 | 0.33 | 0.21 | 0.15 | 0.01 | 0.00 | 0.00 |
| 4-5 | 0.02 | 0.08 | 0.35 | 0.32 | 0.15 | 0.05 | 0.01 | 0.02 |
| 5-6 | 0.01 | 0.02 | 0.17 | 0.28 | 0.25 | 0.22 | 0.04 | 0.00 |
| 6-7 | 0.00 | 0.02 | 0.05 | 0.34 | 0.34 | 0.17 | 0.05 | 0.00 |
| 7-8 | 0.00 | 0.00 | 0.27 | 0.09 | 0.09 | 0.45 | 0.09 | 0.00 |
| 8-9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |

**Table IA.3.** Components of survey portfolio returns

This table reports average annualized excess returns ($\overline{xr}$), price returns (simple percentage change in prices, $\overline{r}$), and carry ($\overline{C}$) for cross-sectional and time-series survey portfolios in equities, currencies, and fixed income. The last three columns refer to the combination of all cross-sectional portfolios ($\text{GSF}_{CS}$), the combination of all time-series portfolios ($\text{GSF}_{TS}$), and the combination of all six portfolios (GSF). We combine portfolios by weighting them with the inverse of their return volatility, take the equally-weighted average, and then scale the return to have 10% annualized volatility. For the GSF portfolios, we apply the same weighting to all three components (i.e. the weighting of portfolio excess returns) so that simple returns and carry add up to the excess return.

| | EQ CS | EQ TS | FX CS | FX TS | FI CS | FI TS | $\text{GSF}_{CS}$ | $\text{GSF}_{TS}$ | GSF |
|---|---|---|---|---|---|---|---|---|---|
| $\overline{xr}$ | -6.32 | -0.53 | -3.21 | -2.86 | -2.35 | -5.12 | -7.17 | -6.69 | -7.79 |
| $t$ | [-2.99] | [-0.14] | [-2.60] | [-2.42] | [-2.09] | [-3.53] | [-3.54] | [-2.94] | [-3.60] |
| $\overline{r}$ | -5.76 | 1.59 | -2.98 | -1.92 | -1.79 | -1.61 | -6.61 | -2.94 | -5.36 |
| $t$ | [-2.78] | [0.46] | [-2.37] | [-1.51] | [-1.65] | [-1.17] | [-3.15] | [-1.34] | [-2.47] |
| $\overline{C}$ | -0.57 | -2.38 | -0.23 | -0.79 | -0.56 | -3.64 | -0.57 | -3.75 | -2.43 |
| $t$ | [-1.94] | [-0.56] | [-0.89] | [-1.09] | [-2.77] | [-2.18] | [-1.16] | [-1.99] | [-2.14] |

**Table IA.4.** Carry strategies

This table reports annualized returns, standard deviations (std), and Sharpe Ratios (SR) of carry portfolios. We report results for both cross-sectional strategies (portfolios are formed on cross-sectional ranks of carry – Panel A) and time-series strategies (we go long or short in a country depending on whether carry is above or below zero – Panel B). We allow for a lag of $k = 1, 2, ..., 12$ months between the carry signal and portfolio formation.

| | Lag between survey and portfolio formation $k$ (months) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel A. Cross-sectional strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | 9.57 | 4.50 | 2.17 | 2.02 | 3.61 | -1.10 | 2.45 | 1.42 | -0.54 | 1.45 | 2.23 | 1.27 |
| std | 10.48 | 11.48 | 10.45 | 9.40 | 10.17 | 10.77 | 11.07 | 11.32 | 11.04 | 10.35 | 11.15 | 10.91 |
| SR | 0.91 | 0.39 | 0.21 | 0.21 | 0.36 | -0.10 | 0.22 | 0.13 | -0.05 | 0.14 | 0.20 | 0.12 |
| **Currencies** | | | | | | | | | | | | |
| mean | 4.73 | 4.08 | 3.68 | 3.95 | 3.78 | 3.97 | 3.60 | 3.90 | 3.19 | 3.59 | 2.99 | 3.01 |
| std | 8.01 | 7.97 | 7.90 | 7.83 | 7.79 | 7.76 | 7.89 | 7.87 | 7.78 | 7.81 | 7.82 | 7.71 |
| SR | 0.59 | 0.51 | 0.47 | 0.50 | 0.49 | 0.51 | 0.46 | 0.50 | 0.41 | 0.46 | 0.38 | 0.39 |
| **Fixed income** | | | | | | | | | | | | |
| mean | 3.85 | 4.69 | 3.78 | 3.23 | 3.30 | 3.19 | 2.20 | 2.90 | 2.01 | 2.65 | 1.96 | 2.42 |
| std | 7.45 | 7.00 | 7.45 | 7.16 | 7.52 | 7.52 | 7.29 | 7.20 | 6.91 | 6.70 | 6.79 | 6.68 |
| SR | 0.52 | 0.67 | 0.51 | 0.45 | 0.44 | 0.42 | 0.30 | 0.40 | 0.29 | 0.40 | 0.29 | 0.36 |
| **Panel B. Time-series strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | 3.85 | 1.35 | -1.48 | 1.52 | 3.71 | 0.17 | 0.96 | 1.46 | 2.42 | 0.72 | 2.29 | 1.33 |
| std | 9.33 | 9.62 | 9.06 | 9.19 | 8.73 | 9.39 | 9.63 | 9.85 | 9.72 | 9.50 | 9.73 | 9.60 |
| SR | 0.41 | 0.14 | -0.16 | 0.17 | 0.43 | 0.02 | 0.10 | 0.15 | 0.25 | 0.08 | 0.24 | 0.14 |
| **Currencies** | | | | | | | | | | | | |
| mean | 4.29 | 4.05 | 3.84 | 3.94 | 4.28 | 3.68 | 3.36 | 3.36 | 3.52 | 3.18 | 3.19 | 2.75 |
| std | 5.49 | 5.79 | 5.90 | 5.78 | 5.81 | 5.91 | 6.17 | 5.80 | 5.73 | 5.45 | 5.45 | 5.47 |
| SR | 0.78 | 0.70 | 0.65 | 0.68 | 0.74 | 0.62 | 0.55 | 0.58 | 0.62 | 0.58 | 0.59 | 0.50 |
| **Fixed income** | | | | | | | | | | | | |
| mean | 3.55 | 3.55 | 4.41 | 4.46 | 4.74 | 4.63 | 4.34 | 4.40 | 4.20 | 3.94 | 3.16 | 3.01 |
| std | 5.47 | 5.51 | 5.57 | 5.54 | 5.58 | 5.44 | 5.43 | 5.27 | 5.23 | 5.31 | 5.26 | 5.29 |
| SR | 0.65 | 0.64 | 0.79 | 0.81 | 0.85 | 0.85 | 0.80 | 0.83 | 0.80 | 0.74 | 0.60 | 0.57 |

**Table IA.5.** Momentum strategies

This table reports annualized returns, standard deviations (std), and Sharpe Ratios (SR) of momentum portfolios. We report results for both cross-sectional strategies (portfolios are formed on cross-sectional ranks of momentum – Panel A) and time-series strategies (we go long or short in a country depending on whether momentum is above or below zero – Panel B). Momentum is defined as the sum of lagged returns over the previous 12 months. We allow for a lag of $k = 1, 2, ..., 12$ months between the momentum signal and portfolio formation.

| | Lag between survey and portfolio formation $k$ (months) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel A. Cross-sectional strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | 1.71 | 1.43 | 3.28 | 1.45 | 0.83 | 2.73 | 3.26 | 3.28 | 5.32 | 2.68 | 0.13 | 4.42 |
| std | 13.49 | 13.40 | 12.52 | 12.81 | 12.53 | 11.76 | 12.17 | 12.04 | 12.12 | 12.31 | 12.64 | 12.15 |
| SR | 0.13 | 0.11 | 0.26 | 0.11 | 0.07 | 0.23 | 0.27 | 0.27 | 0.44 | 0.22 | 0.01 | 0.36 |
| **Currencies** | | | | | | | | | | | | |
| mean | 1.36 | 1.02 | -0.45 | -0.89 | -0.92 | -0.46 | 0.07 | -1.08 | -1.12 | -1.62 | -1.51 | -1.70 |
| std | 7.95 | 7.40 | 7.23 | 7.37 | 7.38 | 7.21 | 7.03 | 7.27 | 7.40 | 7.29 | 7.37 | 7.32 |
| SR | 0.17 | 0.14 | -0.06 | -0.12 | -0.13 | -0.06 | 0.01 | -0.15 | -0.15 | -0.22 | -0.20 | -0.23 |
| **Fixed income** | | | | | | | | | | | | |
| mean | -0.75 | -0.29 | -0.58 | -0.95 | 0.46 | 1.72 | 1.63 | 2.17 | 1.62 | 1.77 | 0.67 | 0.46 |
| std | 7.61 | 7.06 | 7.20 | 6.93 | 6.99 | 7.30 | 7.42 | 7.08 | 7.27 | 7.47 | 7.19 | 7.40 |
| SR | -0.10 | -0.04 | -0.08 | -0.14 | 0.07 | 0.23 | 0.22 | 0.31 | 0.22 | 0.24 | 0.09 | 0.06 |
| **Panel B. Time-series strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | 5.57 | 4.75 | 4.87 | 3.37 | 2.76 | 1.70 | 0.28 | 2.20 | 0.94 | -0.07 | -1.17 | 0.67 |
| std | 13.75 | 13.59 | 13.47 | 13.52 | 13.99 | 13.93 | 13.88 | 13.73 | 13.60 | 13.39 | 13.81 | 14.29 |
| SR | 0.41 | 0.35 | 0.36 | 0.25 | 0.20 | 0.12 | 0.02 | 0.16 | 0.07 | -0.01 | -0.08 | 0.05 |
| **Currencies** | | | | | | | | | | | | |
| mean | 2.91 | 1.86 | 1.36 | 0.35 | 0.19 | 0.54 | 0.59 | 0.12 | 0.56 | -0.10 | -0.09 | -0.10 |
| std | 7.82 | 7.75 | 7.72 | 7.90 | 8.02 | 7.93 | 7.91 | 7.72 | 7.70 | 7.59 | 7.75 | 7.91 |
| SR | 0.37 | 0.24 | 0.18 | 0.04 | 0.02 | 0.07 | 0.07 | 0.02 | 0.07 | -0.01 | -0.01 | -0.01 |
| **Fixed income** | | | | | | | | | | | | |
| mean | 4.04 | 3.37 | 2.91 | 2.51 | 2.58 | 1.62 | 2.26 | 2.89 | 2.67 | 3.26 | 2.57 | 1.46 |
| std | 6.20 | 6.22 | 6.35 | 6.31 | 6.19 | 6.15 | 6.05 | 6.02 | 6.08 | 6.16 | 5.97 | 5.87 |
| SR | 0.65 | 0.54 | 0.46 | 0.40 | 0.42 | 0.26 | 0.37 | 0.48 | 0.44 | 0.53 | 0.43 | 0.25 |

**Table IA.6.** Value strategies

This table reports annualized returns, standard deviations (std), and Sharpe Ratios (SR) of value portfolios. We report results for both cross-sectional strategies (portfolios are formed on cross-sectional ranks of value – Panel A) and time-series strategies (we go long or short in a country depending on whether value is above or below the historical mean – Panel B). We allow for a lag of $k = 1, 2, ..., 12$ months between the value signal and portfolio formation.

| | Lag between survey and portfolio formation $k$ (months) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel A. Cross-sectional strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | 3.22 | 2.03 | 1.88 | 2.54 | 1.64 | 1.66 | 1.91 | 1.78 | 2.21 | 3.67 | 3.38 | 3.51 |
| std | 11.07 | 11.01 | 11.04 | 11.26 | 11.35 | 11.41 | 11.05 | 11.19 | 11.14 | 11.14 | 11.07 | 11.15 |
| SR | 0.29 | 0.18 | 0.17 | 0.23 | 0.14 | 0.15 | 0.17 | 0.16 | 0.20 | 0.33 | 0.31 | 0.32 |
| **Currencies** | | | | | | | | | | | | |
| mean | 2.68 | 2.96 | 3.98 | 4.54 | 4.14 | 3.23 | 3.11 | 3.54 | 3.55 | 3.21 | 3.06 | 2.82 |
| std | 7.43 | 7.41 | 7.23 | 7.44 | 7.45 | 7.45 | 7.43 | 7.60 | 7.72 | 7.62 | 7.64 | 7.61 |
| SR | 0.36 | 0.40 | 0.55 | 0.61 | 0.56 | 0.43 | 0.42 | 0.47 | 0.46 | 0.42 | 0.40 | 0.37 |
| **Fixed income** | | | | | | | | | | | | |
| mean | 1.73 | 0.43 | -0.34 | -0.93 | -1.14 | -0.23 | -0.41 | -0.68 | 0.00 | -0.34 | -1.65 | -0.74 |
| std | 6.14 | 6.49 | 6.09 | 6.30 | 6.26 | 6.39 | 6.35 | 6.28 | 6.16 | 5.95 | 5.83 | 5.95 |
| SR | 0.28 | 0.07 | -0.06 | -0.15 | -0.18 | -0.04 | -0.06 | -0.11 | 0.00 | -0.06 | -0.28 | -0.12 |
| **Panel B. Time-series strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | -1.55 | -1.60 | -2.01 | -2.07 | -1.83 | -1.75 | -1.29 | -1.00 | -1.44 | -1.85 | -0.12 | -0.13 |
| std | 11.51 | 11.19 | 11.16 | 10.99 | 11.25 | 11.05 | 10.93 | 10.96 | 10.85 | 10.62 | 10.61 | 10.49 |
| SR | -0.13 | -0.14 | -0.18 | -0.19 | -0.16 | -0.16 | -0.12 | -0.09 | -0.13 | -0.17 | -0.01 | -0.01 |
| **Currencies** | | | | | | | | | | | | |
| mean | -0.94 | -1.09 | -0.92 | -0.04 | 0.91 | 0.75 | 0.80 | 0.21 | -0.37 | 0.51 | 0.15 | 0.37 |
| std | 6.86 | 7.21 | 7.20 | 6.97 | 6.92 | 7.02 | 6.79 | 6.98 | 7.11 | 6.92 | 6.91 | 6.89 |
| SR | -0.14 | -0.15 | -0.13 | -0.01 | 0.13 | 0.11 | 0.12 | 0.03 | -0.05 | 0.07 | 0.02 | 0.05 |
| **Fixed income** | | | | | | | | | | | | |
| mean | 1.31 | 0.89 | 0.95 | 1.84 | 1.65 | 2.23 | 2.81 | 1.40 | 1.80 | 1.50 | 1.21 | 1.44 |
| std | 4.97 | 5.01 | 4.74 | 4.95 | 4.91 | 4.99 | 4.88 | 4.67 | 4.75 | 4.68 | 4.68 | 4.55 |
| SR | 0.26 | 0.18 | 0.20 | 0.37 | 0.34 | 0.45 | 0.58 | 0.30 | 0.38 | 0.32 | 0.26 | 0.32 |

**Table IA.7.** Survey strategies: Controlling for other factors

This table is identical to Table 4 in the main text but here we form portfolios based on residuals of survey scores, where residuals are obtained from a (full sample) regression of survey scores on the lagged VIX, carry, momentum, and value signals as well as (contemporaneous) growth survey scores and the global business cycle (ECRI recession dummies averaged across countries).

| | Lag between survey and portfolio formation $k$ (months) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel A. Cross-sectional strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | -5.29 | -4.84 | -4.25 | -2.67 | -3.32 | -4.37 | -5.27 | -4.38 | -3.53 | 0.74 | 1.17 | 0.67 |
| std | 9.23 | 9.31 | 8.35 | 7.68 | 7.93 | 7.73 | 8.50 | 8.98 | 9.36 | 8.21 | 8.45 | 8.67 |
| $t$ | [-1.97] | [-2.01] | [-2.17] | [-1.57] | [-1.68] | [-2.48] | [-2.44] | [-1.99] | [-1.77] | [0.40] | [0.45] | [0.26] |
| SR | -0.57 | -0.52 | -0.51 | -0.35 | -0.42 | -0.56 | -0.62 | -0.49 | -0.38 | 0.09 | 0.14 | 0.08 |
| **Currencies** | | | | | | | | | | | | |
| mean | -2.03 | -2.08 | -2.18 | -1.04 | -1.75 | -1.94 | -1.97 | -1.49 | -0.11 | -0.93 | -1.71 | -1.67 |
| std | 5.96 | 5.90 | 5.94 | 5.84 | 5.68 | 5.48 | 4.95 | 5.24 | 5.76 | 6.11 | 5.80 | 5.46 |
| $t$ | [-1.64] | [-1.60] | [-1.71] | [-0.82] | [-1.69] | [-1.53] | [-1.82] | [-1.12] | [-0.07] | [-0.69] | [-1.29] | [-1.31] |
| SR | -0.34 | -0.35 | -0.37 | -0.18 | -0.31 | -0.35 | -0.40 | -0.28 | -0.02 | -0.15 | -0.29 | -0.31 |
| **Fixed income** | | | | | | | | | | | | |
| mean | 0.40 | 0.41 | -0.79 | 0.30 | -0.32 | 0.01 | -1.60 | -1.15 | 1.09 | 1.05 | 2.00 | 0.29 |
| std | 4.67 | 4.66 | 4.86 | 4.82 | 5.03 | 4.59 | 4.82 | 4.84 | 4.58 | 4.45 | 4.14 | 4.42 |
| $t$ | [0.30] | [0.39] | [-0.72] | [0.25] | [-0.29] | [0.01] | [-1.16] | [-1.05] | [1.19] | [1.14] | [1.93] | [0.26] |
| SR | 0.09 | 0.09 | -0.16 | 0.06 | -0.06 | 0.00 | -0.33 | -0.24 | 0.24 | 0.24 | 0.48 | 0.07 |
| **Cross-sectional Global Survey Factor** | | | | | | | | | | | | |
| mean | -3.90 | -4.39 | -4.42 | -1.72 | -2.93 | -4.69 | -6.93 | -5.03 | -0.59 | -0.77 | -2.01 | -3.31 |
| std | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| $t$ | [-1.76] | [-2.23] | [-2.26] | [-0.86] | [-1.62] | [-2.06] | [-2.97] | [-1.91] | [-0.21] | [-0.34] | [-0.81] | [-1.37] |
| SR | -0.39 | -0.44 | -0.44 | -0.17 | -0.29 | -0.47 | -0.69 | -0.50 | -0.06 | -0.08 | -0.20 | -0.33 |

(continued on next page)

**Table IA.7.** continued

| | Lag between survey and portfolio formation $k$ (months) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Panel B. Time-series strategies** | | | | | | | | | | | | |
| **Equities** | | | | | | | | | | | | |
| mean | 0.34 | -2.81 | -4.49 | -2.24 | -1.48 | -1.56 | -1.01 | 0.69 | 1.00 | 0.53 | 0.10 | 1.39 |
| std | 7.24 | 6.67 | 6.47 | 6.50 | 6.82 | 6.91 | 7.87 | 7.70 | 7.65 | 7.22 | 6.96 | 6.29 |
| $t$ | [0.20] | [-1.70] | [-2.49] | [-1.19] | [-0.76] | [-0.79] | [-0.53] | [0.34] | [0.55] | [0.31] | [0.06] | [0.77] |
| SR | 0.05 | -0.42 | -0.69 | -0.34 | -0.22 | -0.23 | -0.13 | 0.09 | 0.13 | 0.07 | 0.01 | 0.22 |
| **Currencies** | | | | | | | | | | | | |
| mean | -0.89 | -1.62 | -1.56 | -0.75 | -0.23 | 0.48 | -0.66 | -0.65 | -0.66 | -1.13 | -2.53 | -2.79 |
| std | 4.83 | 4.95 | 4.98 | 5.10 | 5.20 | 5.11 | 4.89 | 5.04 | 5.07 | 4.99 | 4.85 | 4.69 |
| $t$ | [-0.84] | [-1.63] | [-1.40] | [-0.66] | [-0.18] | [0.37] | [-0.55] | [-0.57] | [-0.55] | [-0.95] | [-2.14] | [-2.37] |
| SR | -0.18 | -0.33 | -0.31 | -0.15 | -0.04 | 0.09 | -0.14 | -0.13 | -0.13 | -0.23 | -0.52 | -0.59 |
| **Fixed income** | | | | | | | | | | | | |
| mean | -1.41 | -2.38 | -3.28 | -1.06 | -0.03 | -0.52 | -1.67 | -0.34 | 1.72 | 1.31 | 0.59 | 0.96 |
| std | 3.41 | 3.76 | 3.90 | 3.84 | 3.53 | 3.57 | 3.64 | 3.87 | 3.82 | 3.90 | 3.66 | 3.39 |
| $t$ | [-1.55] | [-2.42] | [-2.98] | [-0.88] | [-0.03] | [-0.51] | [-1.75] | [-0.35] | [1.94] | [1.22] | [0.56] | [1.04] |
| SR | -0.41 | -0.63 | -0.84 | -0.27 | -0.01 | -0.14 | -0.46 | -0.09 | 0.45 | 0.34 | 0.16 | 0.28 |
| **Time-series Global Survey Factor** | | | | | | | | | | | | |
| mean | -3.34 | -5.79 | -6.82 | -2.90 | 0.32 | -0.34 | -4.02 | -1.94 | -0.40 | -1.89 | -4.59 | -4.05 |
| std | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| $t$ | [-1.49] | [-2.89] | [-3.00] | [-1.33] | [0.13] | [-0.13] | [-1.60] | [-0.81] | [-0.16] | [-0.75] | [-1.82] | [-1.55] |
| SR | -0.33 | -0.58 | -0.68 | -0.29 | 0.03 | -0.03 | -0.40 | -0.19 | -0.04 | -0.19 | -0.46 | -0.41 |