Economic surprises:

What really moves the markets

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LSEG DATA & ANALYTICS
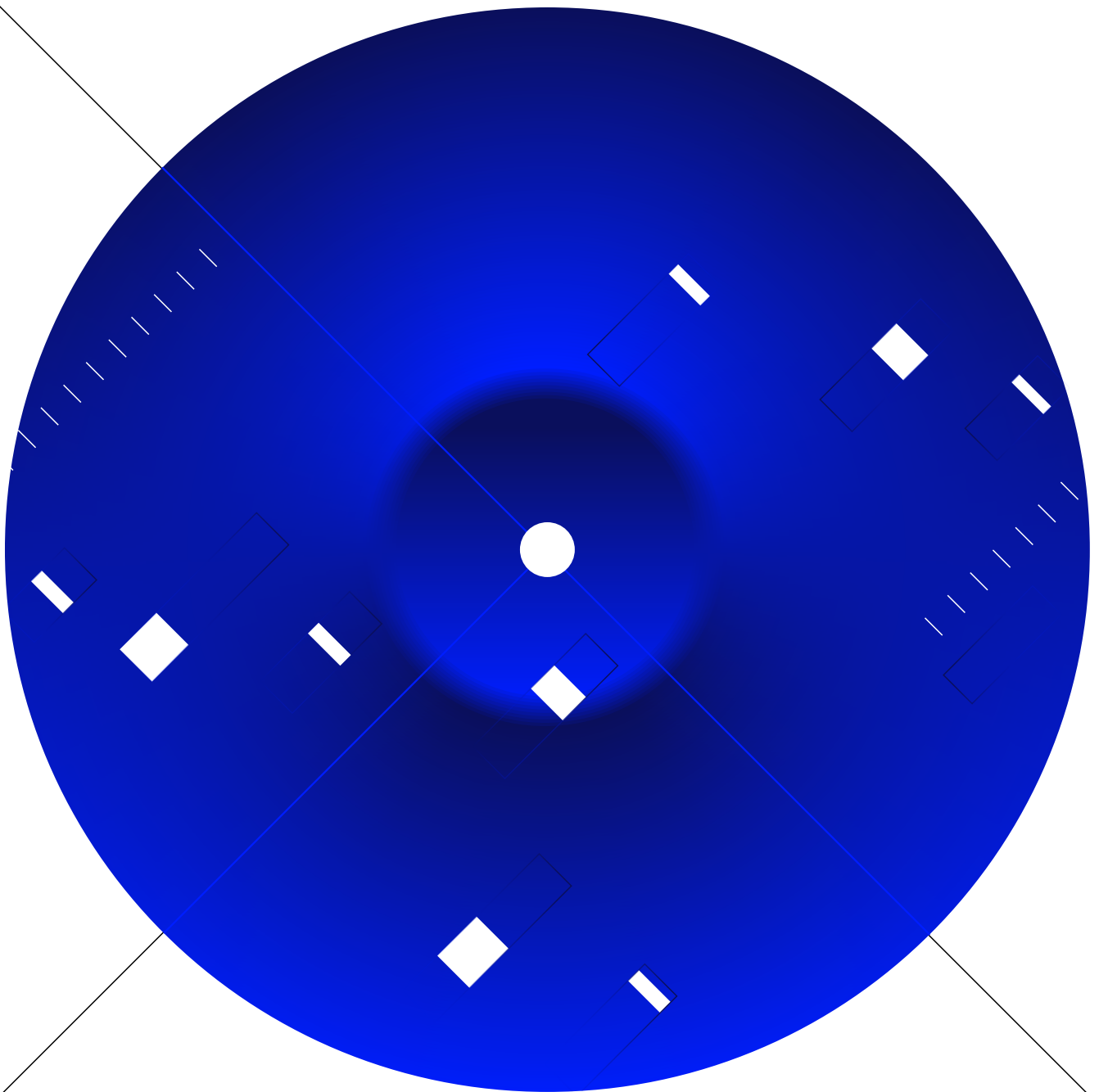
Abstract

We study the impact of economic surprises in the US in three different markets: namely foreign exchange, government bond prices and equity value, defining "surprise" as the actual minus the consensus. We find that different markets tend to be affected by the same indicators, with employment being the most impactful.

It is interesting to note that, on average, inflation impacts the markets differently to employment. For foreign exchange and fixed income, it has the same directional impact as employment, while it moves equity in the opposite direction. The period under study is 2009 to 2022. We also discuss the power of the LSEG StarMine® SmartEstimates® model for economics, foreign exchange, bond yield, money markets, commodities and stock indices.

Previous research has shown that economic data release that differs significantly from the consensus can move markets – see, for example, James et al., 2008, Bartolini et al., 2008, Goldberg et al., 2013. The goal of this short paper is to analyse the average impact of economic data surprise on foreign exchange (FX) rates, government bond prices and equity prices. Our study is limited to the US market for the period from 2009 to 2022.

As shown in Vieira et al., 2023, among the major currencies, the Japanese Yen is the one most affected by economic releases in the US. Therefore, for this impact study on FX, we chose USD/JPY exchange rate. For the impact on bond prices we selected the US 10-year government bond and for the impact on equity prices we choose the highly liquid S&P 500 E-Mini index.

We use one-minute frequency data and the impact is calculated on a five-minute window around the economic release. As an illustration of market impact, Figure 1 shows the response of USD/JPY to the November 2022 release of US nonfarm payroll. The consensus in the last poll before the actual was released was 200.0. On 2 December 2022 the actual was released at 8:30 am ET with a value of 263.0, which resulted in an actual surprise of 63.0. The response in the FX market was immediate. The USD/JPY rate jumped from about 134.1 to 135.7 within minutes.
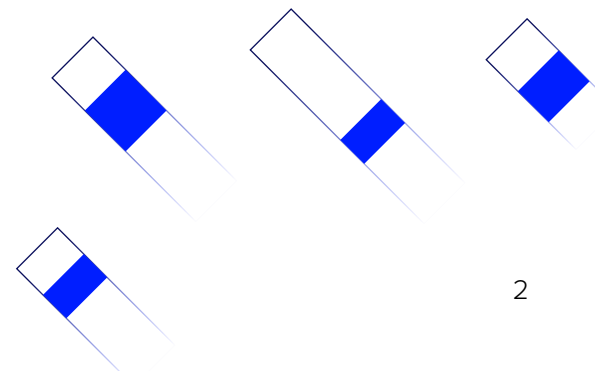
To study the impact of an economic surprise on a given indicator, we first calculated the FX rate change in a five-minute window around the indicator release. We then binned the actual surprises into five quintiles and measure the average percentage change in the USD/JPY rate in each quintile of actual surprise. In Figure 2 we plot the difference in the average FX rate change between quintile 5 (most positive surprises) and quintile 1 (largest negative surprises). We considered any quintile difference below 0.1% not to be significant. Consistent with others' findings, we found that on average US nonfarm payrolls is the most impactful indicator for the FX market, followed by private payroll and ISM manufacturing PMI. The larger the employment surprise numbers; the stronger USD becomes with respect to JPY. Note that there are indicators that move the currency markets in the opposite direction, such as initial jobless claims, since an increase therein typically indicates trouble for the US economy.

Figure 1 – USD/JPY as a function of the time on 12/2/2022, obtained from LSEG Tick History. US nonfarm payrolls were released at 8:30 am ET (13:30 GMT). The value came at 263.0, which was 63.0 higher than expected and caused the large spike in the spot rate at that time.
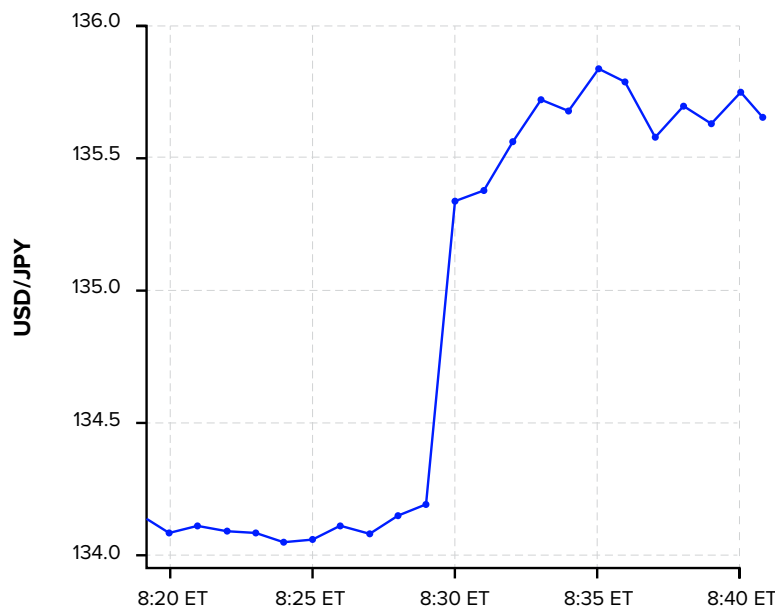
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> A larger employment surprise will likely increase inflation pressure, resulting in the Federal Open Market Committee raising interest rates, which has a negative impact on the price of bonds.
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Figure 2 – Difference in the average USD/JPY rate change for the top quintile of actual surprises minus bottom quintile of actual surprises for a given indicator. FX rates are measured in a five-minute window around the actual release time. Sample contains all last polls before a first release, 2009-2022.
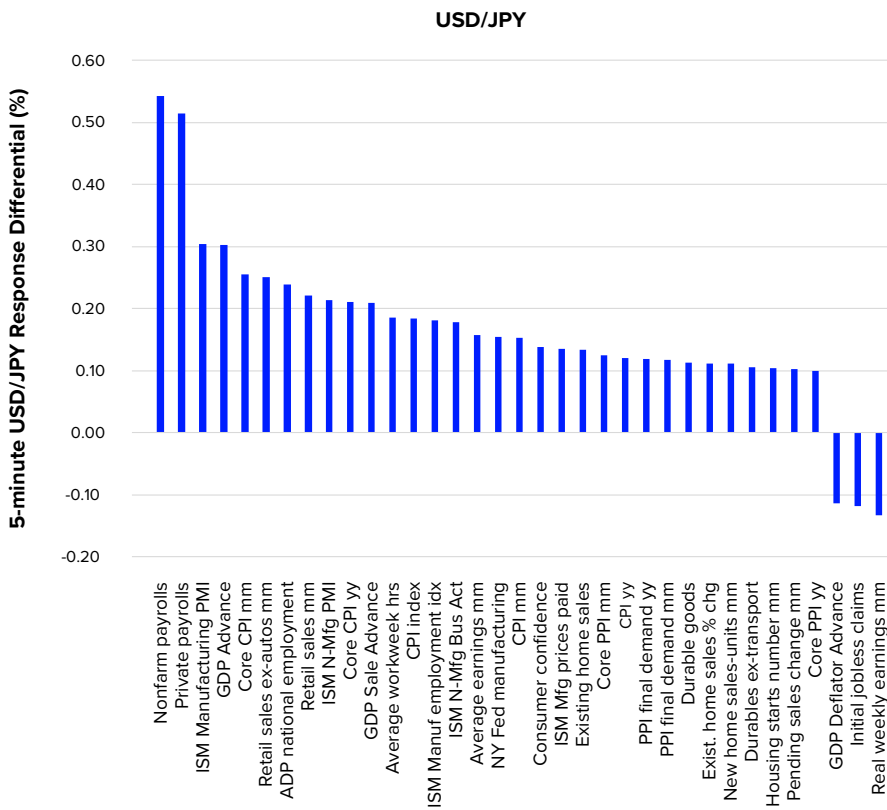
Our next step was to perform similar analysis for the bond market. For this, we used US 10-Year government bond prices. Figure 3 shows the average change in bond price of the top quintile minus the bottom quintile of actual surprises. As in the case of FX, by absolute value the most impactful indicator is also US nonfarm payroll. However, the sign of the impact is flipped – the higher the employment surprise the lower the bond prices. That is, a larger employment surprise will likely increase inflation pressure, resulting in the Federal Open Market Committee raising interest rates, which has a negative impact on the price of bonds.
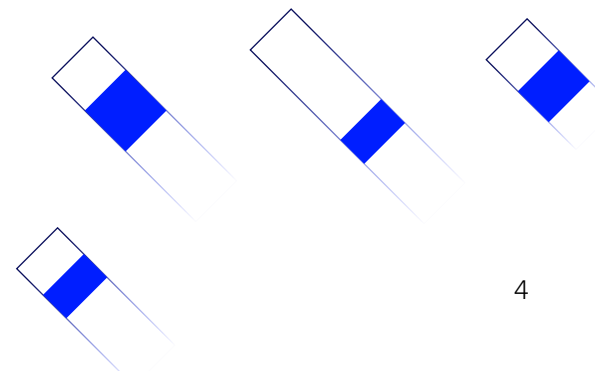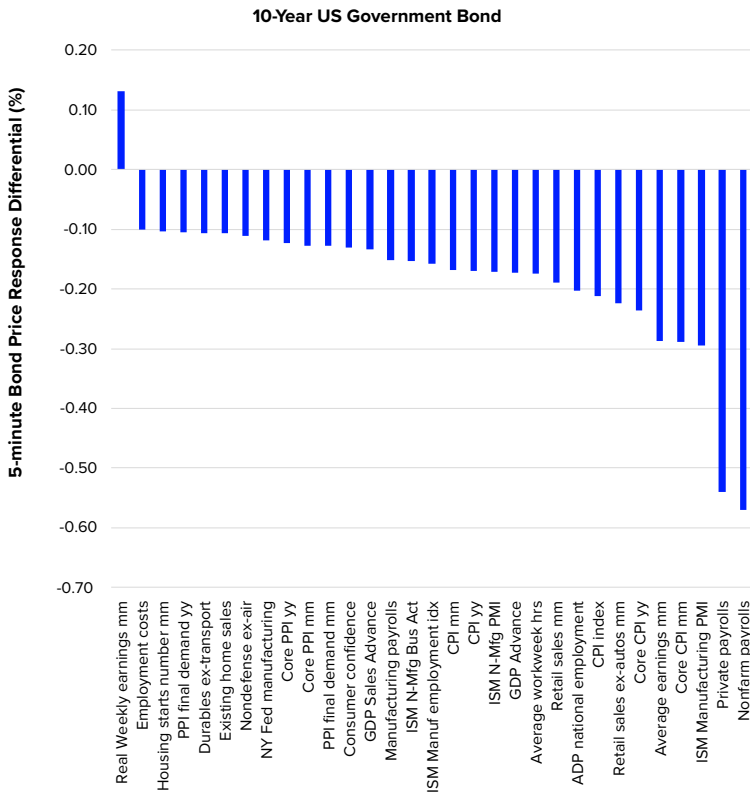
Figure 3 – Difference in the average 10-Year US Government bond price change for the top quintile of actual surprises minus bottom quintile of actual surprises for a given indicator. Bond prices are measured in a five-minute window around the actual release time. Sample contains all last polls before a first release, 2009-2022.

10-Year US Government Bond

Finally, we come to the equity market using the S&P 500 E-Mini index. Figure 4 shows the average change in the equity index value of the top quintile minus the bottom quintile of actual surprises. Here we find that the most impactful indicator is private payroll; however, its impact is not much greater than nonfarm payroll's. it is interesting that core CPI mm has a very strong impact – as the fourth most important indicator – but that it impacts equity values in a different direction from employment, which is clearly distinct from what we see in the case of FX and bond prices.
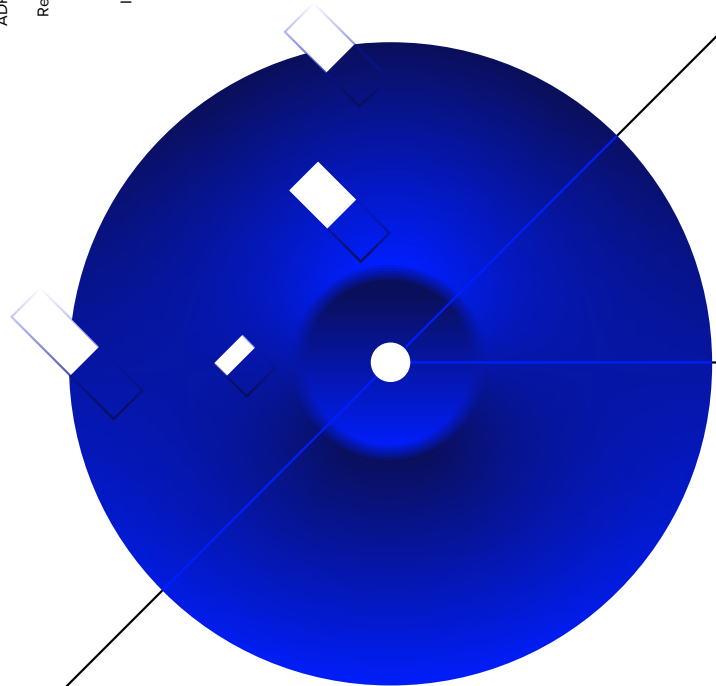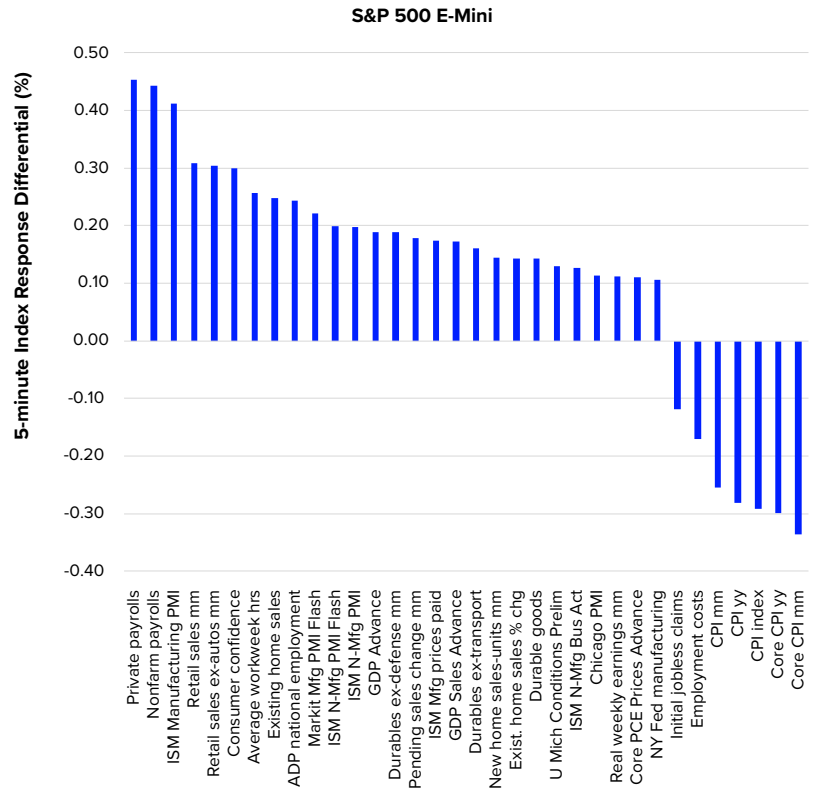
Figure 4 – Difference in the average S&P 500 E-Mini index change for the top quintile of actual surprises minus bottom quintile of actual surprises for a given indicator. Index values are measured in a five-minute window around the actual release time. Sample contains all last polls before a first release, 2009-2022.


S&P 500 E-Mini

In Table 1 we display the five most impactful indicators for each market. They all share four of the five most impactful indicators: nonfarm payrolls, private payrolls, ISM manufacturing PMI and core CPI mm. We find GDP advance is more important for FX, average earnings mm for fixed income and retail sales mm for equity. In parentheses we show the sign of the impact; a "+" sign means that the USD/JPY, the 10Y US Government Bond Price or the S&P 500 E-Mini will go up with a positive surprise and a "-" indicates the reverse.

Table 1 – The five most important indicators for each US market. The sign in parenthesis shows the direction of the market change in response to a positive surprise.

USD/JPY	10Y US Government Bond Price	S&P 500 E-Mini
Nonfarm payrolls (+)	Nonfarm payrolls (-)	Private payrolls (+)
Private payrolls (+)	Private payrolls (-)	Nonfarm payrolls (+)
ISM manufacturing PMI (+)	ISM manufacturing PMI (-)	ISM manufacturing PMI (+)
GDP advance (+)	Core CPI mm (-)	Core CPI mm (-)
Core CPI mm (+)	Average earnings mm (-)	Retail sales mm (+)

Next, Figure 5 demonstrates how the change in FX, bond price or equity index occurs with a surprise in nonfarm payroll and core CPI mm. As a guide, we have added the regression line as a dashed line in black. We have eliminated from the plots for nonfarm payroll five values (out of 156 in the study), which we consider outliers – i.e., large surprises (in absolute value) that happened in 2020 and 2021 – leaving only those cases in which the surprise is in the interval [-400, 400]. The slopes of the regression lines qualitatively agree with the quintile spread results – that is, a positive quintile spread will result in a positive slope and vice versa.
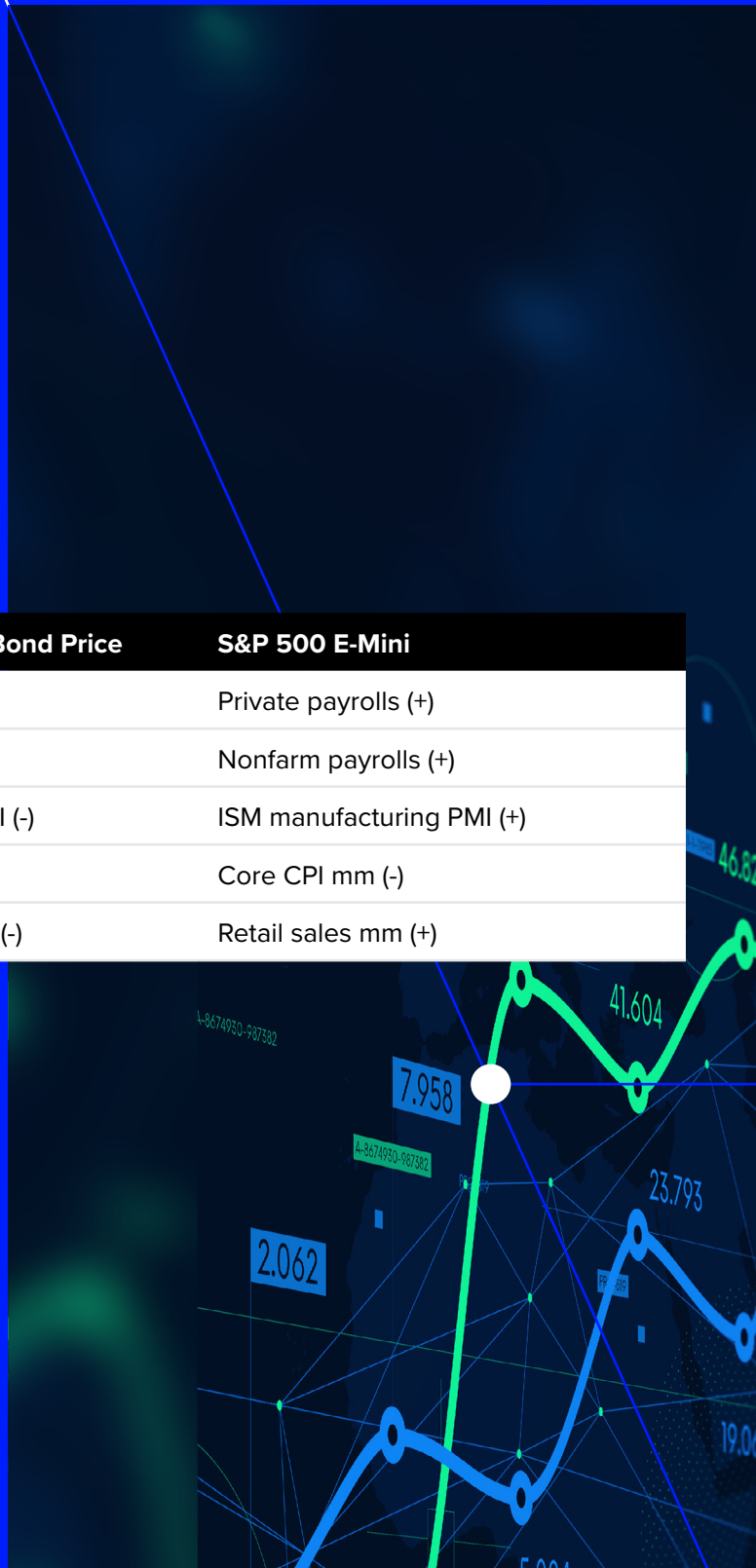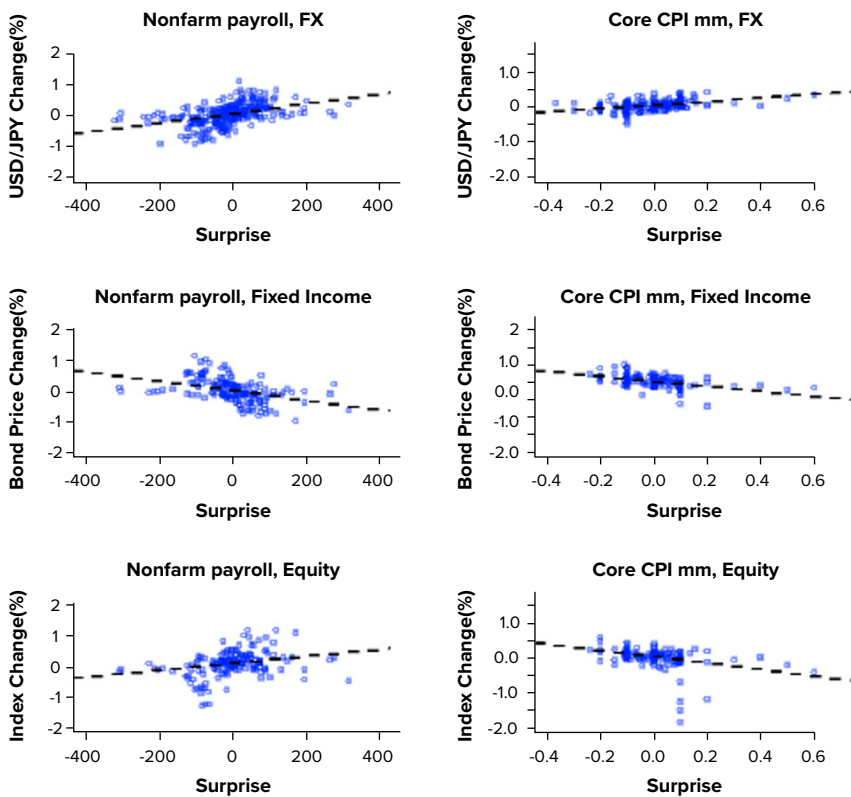
Since 2013 LSEG StarMine has been publishing SmartEstimates, a better measure than the consensus. Currently SmartEstimates covers economics, foreign exchange, money markets, bond yield, stock indices and commodities asset classes, encompassing over 1,160 indicators (Vieira et al., 2023).

We illustrate the power of SmartEstimates in Figure 6, which shows US nonfarm payroll release history for the period July 2021 to December 2022. We observe that

SmartEstimates' directionally correct hit rate on the US nonfarm payrolls release has been 61%, regardless of the magnitude of the predicted surprise. From the plot one can see that SmartEstimates and consensus are typically within +/-5 of each other, yet this difference has been important and powerfully predictive of subsequent surprises. One can also see that usually the actual value released falls within the range of individual forecasts – but occasionally the actual surprises everyone and ends up outside the range of all forecasts for the period.

Figure 5 – Difference in (a) USD/JPY, (b) US 10-Y government bond price, (c) S&P 500 E-Mini index for nonfarm payroll. Difference in (d) USD/JPY, (e) US 10-Y government bond price, (f) S&P 500 E-Mini index for core CPI mm. Changes are measured in a five-minute window around the actual release time. Sample contains all last polls before a first release, 2009-2022.


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Figure 6 – US nonfarm payrolls history for releases of the last 18 months. Individual forecasts, SmartEstimates, consensus and actual released value are plotted in the top panel. The predicted surprise is plotted in the bottom panel. Predicted surprises that were directionally correct "hits" are marked in green.
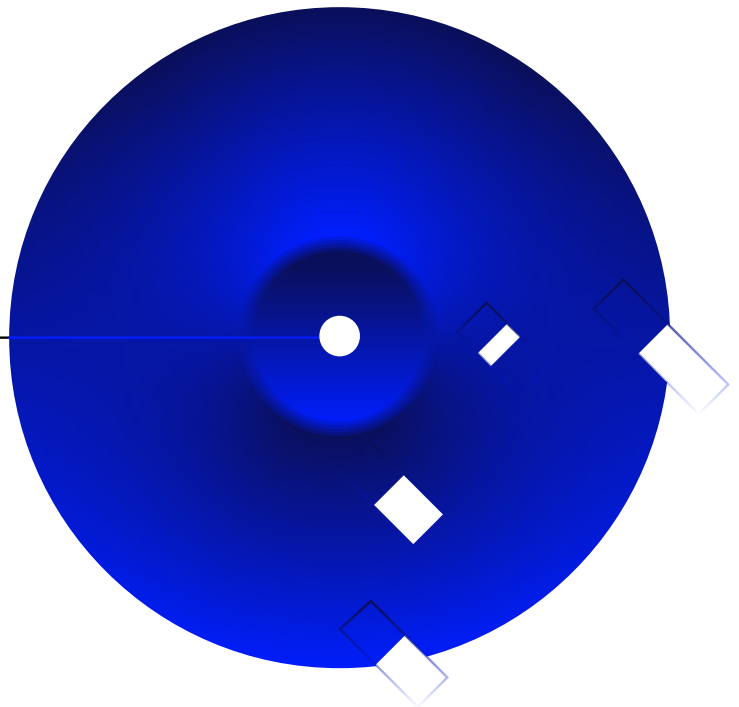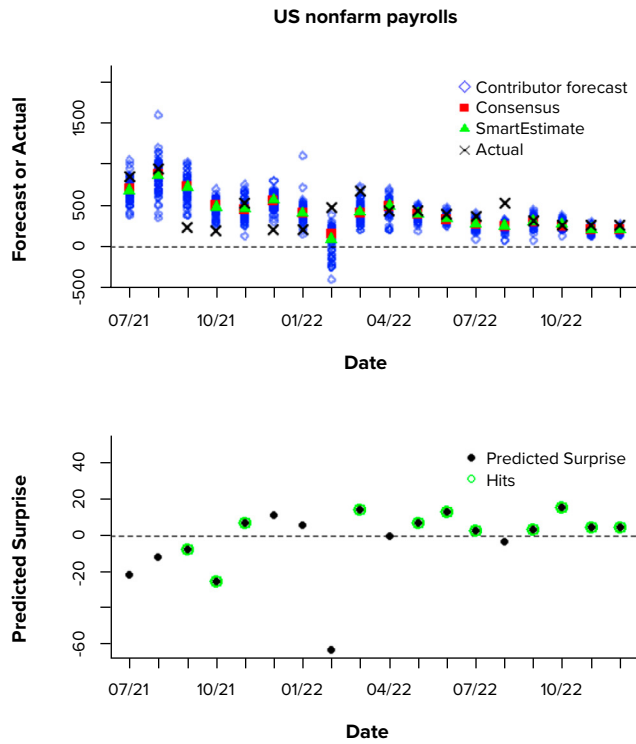
In conclusion, here we have studied the most impactful indicators for FX (represented by USD/JPY), US 10-year government bond prices and the S&P 500 E-Mini index. We found commonalities with respect to the most impactful indications for the different markets but also some differences – the most interesting being the way inflation affects equity compared with FX and fixed income. Among the five most impactful indicators, four are common to FX, bond price and equity value.

For more information, please contact the StarMine Quantitative Consulting team at starmine. quantconsulting@lseg.com to learn about how investors can gain an edge with LSEG StarMine SmartEstimates for Economics and the other asset classes.

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Maria Vieira is a Quantitative Research Analyst at LSEG, where she has worked for 20 years. After finishing her Ph.D. in theoretical physics at one of the most prestigious research institutes in Brazil she moved to the U.S. to do post-doctoral research. She has been a researcher at the University of Chicago, University of California at Berkeley, and University of California in San Francisco.

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