



Index Insights | Macroeconomic Environment

Market reaction to GDP release events

February 2025



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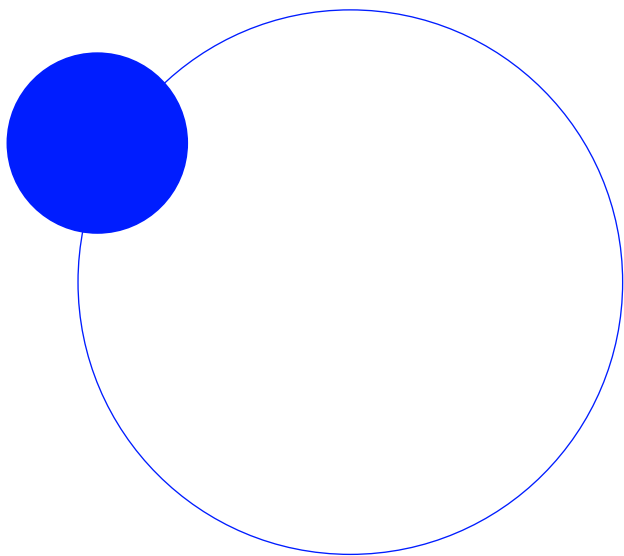


Overview

We investigated the performance of the US stock market and factors on, and around, gross domestic product (GDP) release events. Categorising events into groups allowed us to examine any differences in investor reaction to the nature of the releases and surprises.

Perhaps counterintuitively, we found that on days when GDP figures were released, the [Russell 1000® Index](#) performed better than on all trading days for both negative and positive release and surprise events.

We considered several possible explanations for this increase in performance including: markets in general, have a good sense of the GDP release figures prior to the event or investors may breathe a sigh of relief when uncertainty is removed when the GDP figures are finally known. We have observed that the excess performance on the release day was different prior to the period of the US Federal Reserve's quantitative easing programme.



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1. Introduction

US gross domestic product (GDP) growth is an important macroeconomic indicator for investors because economic growth trends in the world's largest economy set the tone for corporate profits and risk appetites. GDP releases, both actual and preliminary, influence monetary policies and economic decisions in the US and around the globe. Although GDP is a lagging indicator, it is widely followed. Analysts issue estimates and investors closely watch the estimates and releases. In this research, we assessed if GDP estimates and final releases, contain information and affect investors' decisions by analysing how the US market and factors such as value, low volatility, quality, momentum, and size reacted to GDP releases.

Dividing events into categories allowed us to examine investor reaction to the magnitude of GDP growth and surprises relative to growth estimates. We found that over the last 24 years, the Russell 1000[®] Index performed better than average on all GDP release dates, including advance, second and final.

The impact of GDP release events on the daily excess returns of low volatility, quality and momentum factors was not significant. Size performed better than average on release event days, while value underperformed.

There are several possible explanations. Markets may already have a good idea of what to expect from the GDP growth release figures. Advance GDP growth, despite the name, is typically released 30 days after the end of the quarter. Investors may be using leading indicators to get early indications on the GDP growth estimate. We used GDPNow, the nowcasting index, as a proxy for the leading indicators. Moreover, investors could have reacted positively even to seemingly negative releases if they help reduce investors uncertainty by clarifying economic conditions. Remarkably, the excess performance of investing only on the release date before, and after 2008, shows that the effect has only existed since quantitative easing was introduced.

2. Data

For this analysis, we used the Russell 1000 as a proxy for the US stock market. The Russell 1000 tracks the performance of the large-cap segment of the US equity universe.

We also used pure factor indices from the FTSE Target Exposure Index Series to track the behaviour of factors on or around the release dates. Our standard factor definition and index construction are given in the ground rules¹. Further below, we mention factor returns as active returns of the pure factor indices versus the Russell 1000 benchmark. Table 1 shows the index names and active exposure targets of the indices with other factor exposures targets set at zero. We used total returns in US dollars.

Table 1: Factor indices

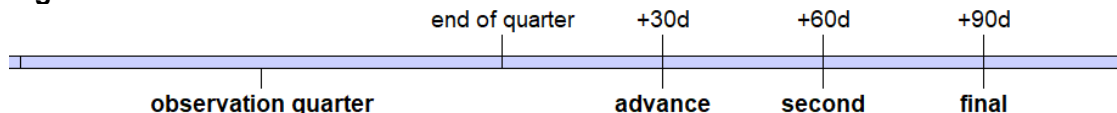
Index Name	Factor	Target
Russell 1000 Pure Low Volatility Target Exposure Factor Index	Low Volatility	0.6 σ
Russell 1000 Pure Momentum Target Exposure Factor Index	Momentum	1 σ
Russell 1000 Pure Quality Target Exposure Factor Index	Quality	1 σ
Russell 1000 Pure Size Target Exposure Factor Index	Size	1 σ
Russell 1000 Pure Value Target Exposure Factor Index	Value	1 σ

Source: FTSE Russell. Please see the end for important legal disclosures.

¹ FTSE Global Factor Index Series Ground Rules, FTSE Russell, August 2024.

Regarding the GDP data, the US Bureau of Economic Analysis (BEA) produces quarterly and annual estimates of year-over-year GDP growth², or GDP releases. The GDP growth estimates are published quarterly in a series of releases: advance, second and final approximately 30, 60 and 90 days, respectively, after the end of the reference quarter. This results in 12 releases each year as highlighted in the schedule in Figure 1.

Figure 1: US GDP release schedule



Source: BEA. Please see the end for important legal disclosures.

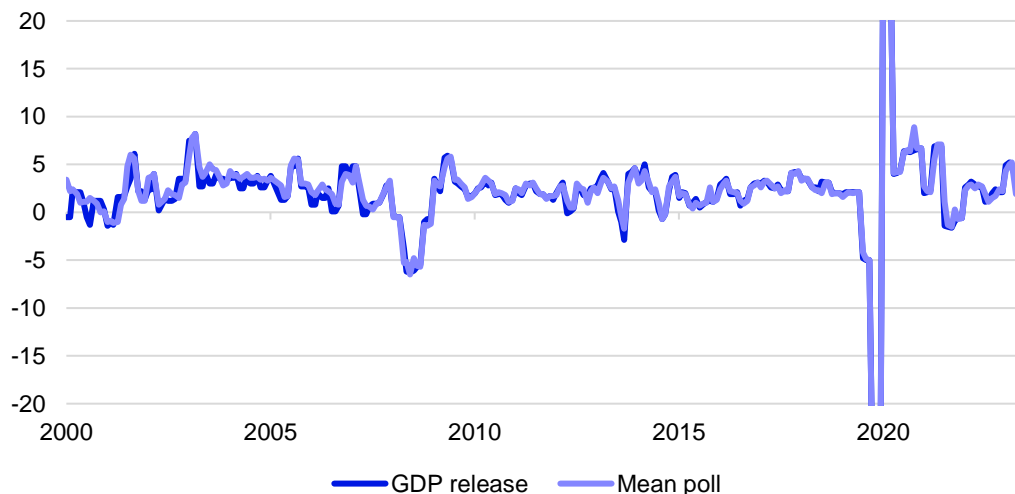
For each GDP release, LSEG provides poll data via Reuters Polls³. In these, subject matter experts forecast over 1700 data items, including all three US GDP growth forecasts. Contributors to the polls include economists, buy/sell-side research and strategists. In this research, we used the GDP release polls as a proxy for investor expectations because they are informed by the same publicly available information about the current state of the economy.

GDPNow is a nowcast of the official GDP estimate prior to its release⁴. The Federal Reserve Bank of Atlanta publishes GDPNow on a running basis based on all available economic data for the current measured quarter. It mimics the methods used by the BEA to estimate real GDP growth. We use GDPNow as a daily representation of all GDP related information available to investors.

We analysed stock market uncertainty by using the CBOE VIX and VVIX indices^{5,6}. The VIX reflects demand for options on the US stock market and is used as a volatility or “fear” gauge. The VVIX measures the volatility in VIX options. It can be interpreted as uncertainty surrounding the VIX.

The release and poll data we used for this study covers the period from October 2000 to March 2024. Figure 2 displays the history of releases and poll. During this timeframe, there were 276 GDP growth releases, of which only 14% were negative. They ranged from -32.9% to 33.4%, reaching both extremes during the onset of the COVID pandemic. The two periods during which there were prolonged periods of negative GDP releases were the global financial crisis (GFC) and COVID in 2008 and 2020 respectively. Reuters Polls estimates are generally close to the actual release figures.

Figure 2: GDP advance, second and final releases and mean Reuters Poll

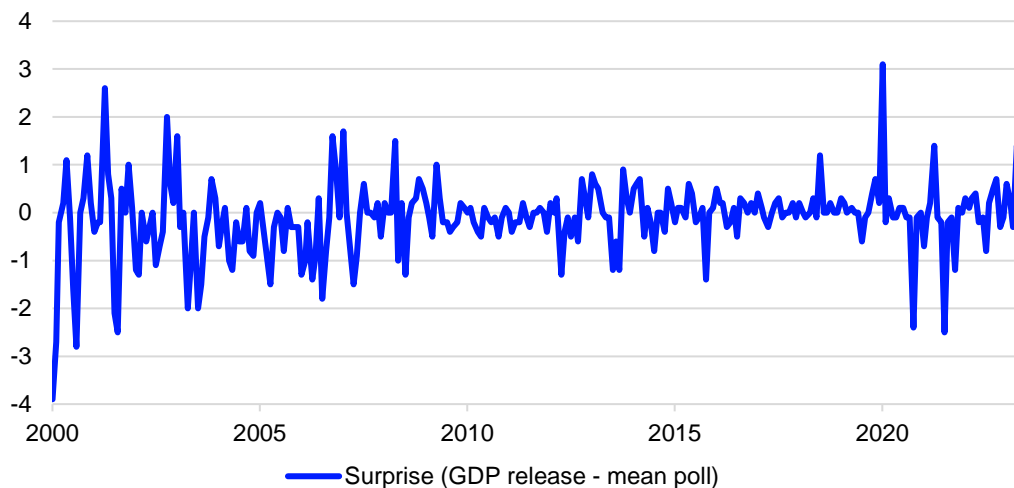


² Gross Domestic Product, U.S. Bureau of Economic Analysis, August 2024.
³ Reuters Polls, LSEG, August 2024.
⁴ GDPNow, Federal Reserve Bank of Atlanta, August 2024.
⁵ VIX, CBOE Chicago Board Options Exchange, August 2024.
⁶ VVIX, CBOE Chicago Board Options Exchange, August 2024.

Source: LSEG Datastream. Please see the end for important legal disclosures.

Figure 3 shows the difference between the poll average and the actual GDP release – the GDP surprise. Surprises varied more when the economy was experiencing a downturn. In addition, in the years after GFC, the uncertainty surrounding the releases trended lower until the COVID crisis.

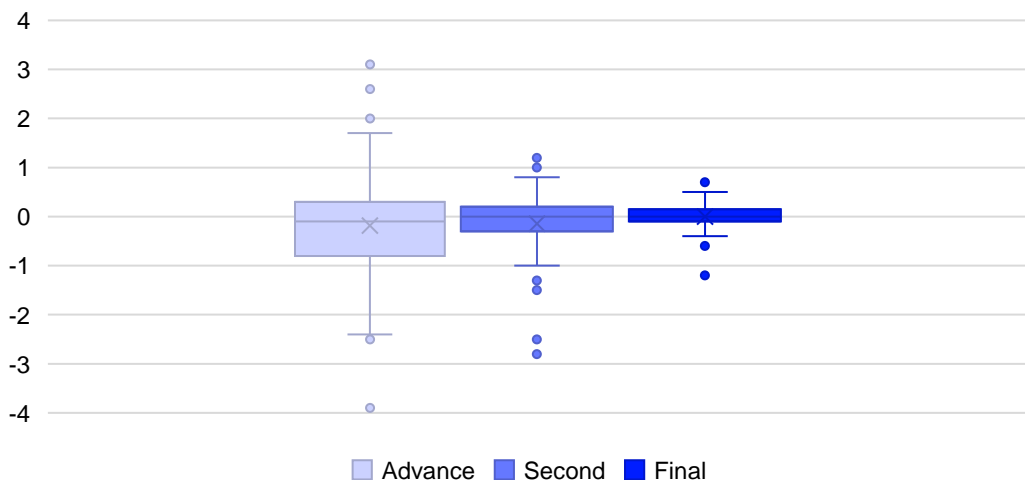
Figure 3: GDP advance, second and final release surprises



Source: LSEG Datastream, FTSE Russell calculation. Please see the end for important legal disclosures.

GDP surprises varied across release type. Figure 4 shows the distribution of the surprise across advance, second and final. Typically, the surprise was skewed to the downside. Advance estimates led to more extreme surprises with the distribution ranging from -2 to 2. The second release and final release surprises had a distribution between absolute values of 1 and 0.5 respectively. It is conceivable that it is most difficult to predict the advance estimate. As more information becomes available, the estimates get closer to the second and final releases.

Figure 4: Box plot of GDP surprise across advance, second and final release



Source: LSEG Datastream, FTSE Russell calculation. Data from October 2000 to March 2024. Please see the end for important legal disclosures.

The structure of this research is set out as follows: In Section 3, we outline how markets reacted to GDP releases and surprises. Section 4 contains a discussion regarding the results and Section 5 analyses potential drivers of the reaction. We make our conclusions in Section 6.

3. Analysis

3.1 Market reaction to sign of GDP release

We divided the GDP release timeseries into two categories – negative and positive year-over-year GDP change. Table 2 counts how often we had a positive and negative market return on positive and negative GDP release days. In general, there were many fewer negative releases than there were positive releases. We observed that markets reacted negatively less frequently on GDP release days compared to all trading days. When the release sign was negative, markets dropped only 36.8% of the time. When the release sign was positive, we observed that markets dropped more often (39.9%). We did not observe marked differences in market reaction to the sign of the GDP change. They were significantly different from zero, but we didn't test if they were different from each other.

Table 2: Returns of Russell 1000 on and off GDP release days.

	Negative return (#)	Positive return (#)	Total (#)	Negative return (%)
<i>All days</i>	2702	3222	5924	45.61
<i>Negative GDP change</i>	14	24	38	36.84
<i>Positive GDP change</i>	95	143	238	39.92

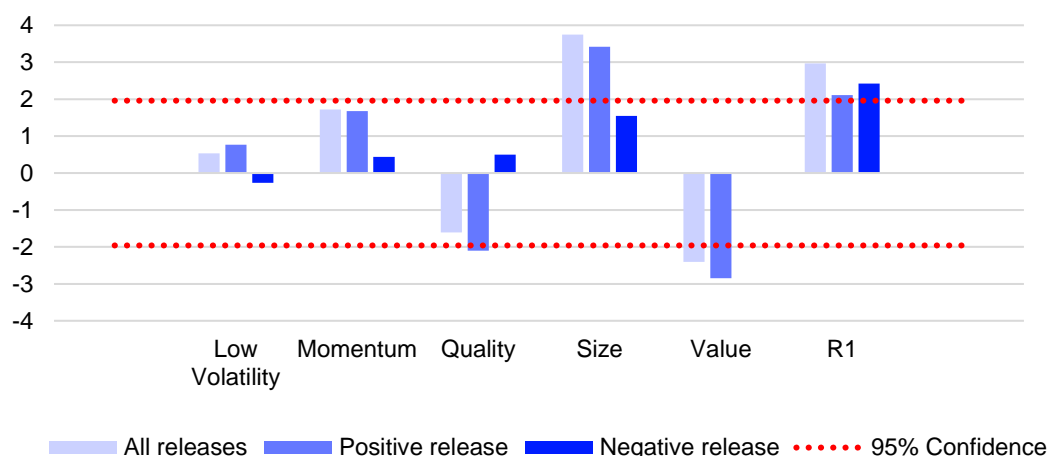
Source: FTSE Russell, LSEG Datastream. Total returns in USD. Data from October 2000 to March 2024. Please see the end for important legal disclosures.

We also looked at the market and factor returns on GDP release days relative to their long-term averages. To test if returns on release days were statistically significantly different from long term average return, we perform t-tests:

$$H_0: \overline{\tilde{r}_{release}} = \bar{r}$$

Figure 5 displays the t-statistics, and the red line shows critical values for the 5% confidence intervals. The market returns on release days were statistically significantly higher than long-term averages. We observed this for both negative and positive releases. Instead of reacting negatively to GDP decline, the market performed well on all release days. Factor returns were also remarkable. Low volatility and momentum factor returns on release days did not differ significantly from their long-term averages. Quality and value factors reacted negatively to positive releases, while size performed better on release days.

Figure 5: T-statistics – return on negative and positive release days vs. average daily returns



Source: FTSE Russell, LSEG Datastream. Data from October 2000 to March 2024. Please see the end for important legal disclosures.

As Table 2 shows, there were fewer negative releases. We looked at the performance of the market and factors grouping GDP releases by above and below 2% growth and above and below 2 year running average growth. Table 3 provides similar information as Table 2, for these events. Dividing the GDP release days in this way creates a more even distribution between “high” and “low” GDP. Negative market returns occurred less frequently than on non-release days for all but the below 2% GDP releases.

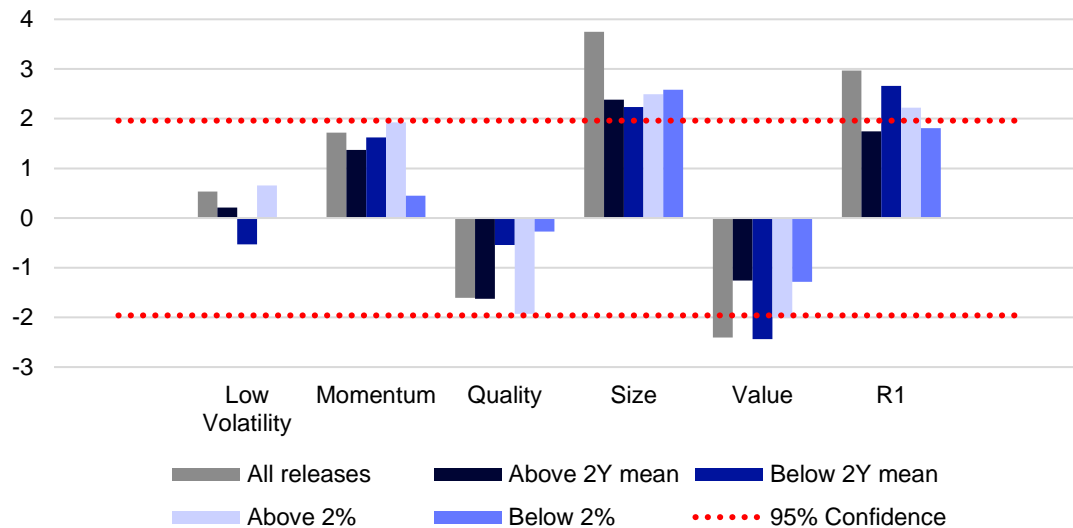
Figure 6 shows the t-statistics for the new release groups. The results are comparable to the variations we analysed previously. The Russell 1000 performed statistically significantly better on days where releases were above 2% or the releases were below running 2-year mean. The low volatility, momentum and quality factor did not have a statistically significant differences in performance from normal days. The size factor performed better than average on all variations of the GDP release event. The value factor performed worse than average on days where the GDP release came in below the rolling 2-year average, and on days where the release was above 2%.

Table 3: Returns of Russell 1000 on and off GDP release days compared to long- and short-term average.

	Negative return (#)	Positive return (#)	Total (#)	Negative return (%)
<i>All days</i>	2702	3222	5924	45.61
<i>Below 2Y average GDP change</i>	53	79	132	40.15
<i>Above 2Y average GDP change</i>	46	75	121	38.02
<i>Below 2% GDP change</i>	52	61	113	46.02
<i>Above 2% GDP change</i>	57	106	163	34.97

Source: FTSE Russell, LSEG Datastream. Total returns in USD. Data from October 2000 to March 2024. Please see the end for important legal disclosures

Figure 6: T-statistics – return on high and low release days vs. average daily returns.



Source: FTSE Russell, LSEG Datastream. Data from October 2000 to March 2024. Please see the end for important legal disclosures.

In our analysis broad market performance on GDP release days did not suggest that market reaction is based on the direction of the release. The value factor tended to underperform, and size tended to outperform on positive and negative release days. This effect remained stable when we analysed different variations of high and low GDP releases. Having examined the market’s reaction to the GDP release itself, we then turned our attention to how the market responded to GDP surprises.

3.2 Market reaction to GDP surprise events

To test how markets reacted to the poll surprise, we ran the same tests and split the release events into positive and negative surprises.

Analysing surprises provided insight into how investor expectations may have shaped the reaction to releases. Table 4 shows that there were substantially more days with negative surprises compared to positive surprises. Forecasters can be considered optimistic. However, markets dropped on approximately 40% of positive and negative surprise days. While there were more negative returns on days with a negative surprise, markets still rose more often than on non-release days.

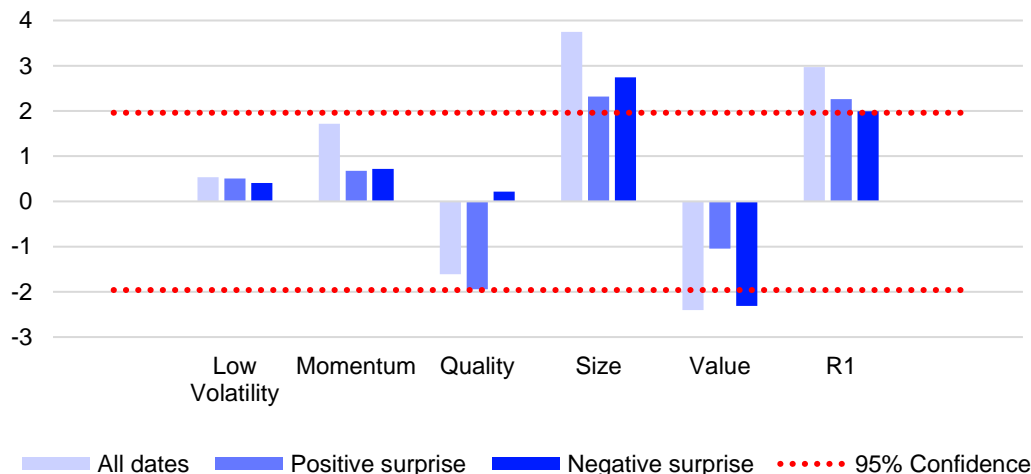
Table 4: Number of negative and positive trading days by GDP surprise direction

	Negative return (#)	Positive return (#)	Total (#)	Negative return (%)
All days	2702	3222	5924	45.61
Negative surprise	70	103	173	40.46
Positive surprise	39	64	103	37.86

Source: FTSE Russell, LSEG Datastream. Total returns in USD. Data from October 2000 until March 2024. Please see the end for important legal disclosures.

The data in the t-statistics chart in Figure 7 confirms our previous observation for market return and shows the factor breakdown. The sign of the surprise does not appear to have had a marked difference on market performance. Average returns on positive and negative surprise days were statistically significantly different than the average daily market return from the same period (2000 to 2024). The same applied to the size factor. Size performed better than average on positive and negative surprise events. Value, however, underperformed when the surprise was negative. Low volatility, momentum and quality did not show any significant deviation from the long-term averages.

Figure 7: T-statistics – return on negative and positive surprise days vs. average daily returns



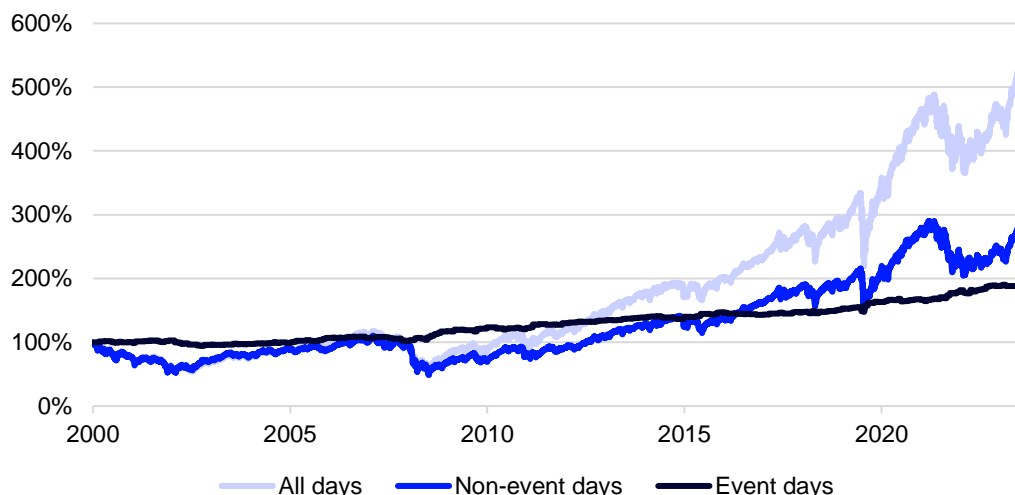
Source: FTSE Russell, LSEG Datastream. Data from October 2000 to March 2024. Please see the end for important legal disclosures.

3.3 Performance over release vs. non release days

The results in the previous sections indicate that the market produced excess return on release days regardless of a positive or negative surprise, and regardless of a positive or negative change in GDP growth announcement. All releases and surprises led to days with higher-than-average returns. Figure 8 illustrates how remarkable the effect was. The three time-series' compare performance of two strategies with the total return of the Russell 1000. One strategy invested in the Russell 1000 on release days only, from the previous days' close until the release days' close. The second strategy invested in the Russell 1000 in all days except release days. Table 5 contains simple performance statistics for the two

strategies and the Russell 1000 itself. Even though the “Event Days” strategy only participated 12 times per year, it achieved an annualised return of 2.7% and risk/reward ratio of 0.7.

Figure 8: Cumulative returns for event and non-event investment strategies



Source: FTSE Russell, LSEG Datastream. Please see the end for important legal disclosures.

Table 5: Performance statistics for event and non-event investment strategies

	All days	Non-event days	Event days
<i>Return (p.a.)</i>	9.07%	6.34%	2.74%
<i>Volatility (p.a.)</i>	19.54%	19.14%	3.97%
<i>Risk/Reward</i>	0.464	0.331	0.690

Source: FTSE Russell, LSEG Datastream. Total returns in USD. Data from October 2000 to March 2024. Please see the end for important legal disclosures.

4. Interpreting the data

This section discusses expectations for market reaction to release and surprise, and compares them with the results from Section 3.

We found it remarkable that regardless of the sign of the GDP change (in relative or absolute terms) and regardless of the direction of the surprise, the markets performed statistically significantly better on release days than on average trading days.

Positive GDP releases are generally seen as good news for the economy and corporate earnings. Therefore, we expected markets to react positively to such releases. Conversely, negative GDP releases signal economic challenges, which could lead to concerns about declining corporate profits. In such cases, we expected the data to show poor market performance.

Most of the factor performance on event days was not significantly different from average trading days. Intuition suggests that defensive factors like quality and low volatility should react positively to negative news, and size should perform better during risk-on environments, so it should react positively to favourable news. It is important to note that we looked at the size factor within large capitalisation stocks (Russell 1000). It has been shown that the value factor works best after a downturn, or after a period of

growth when stocks have been oversold or overbought⁷. It should react positively to a positive release. Momentum usually performs during prolonged periods of growth or contraction, so we don't expect its performance to fluctuate with the sign of the release.

It is counterintuitive that the market performed better on most release days regardless of either direction of GDP or sign of the GDP release surprise. Factor returns also didn't align with our expectations. Low volatility and momentum returns on release days did not differ significantly from their averages. While this might be expected for momentum, it was surprising for low volatility. Quality and value reacted negatively to positive releases. Because quality usually performs better when there is an economic downturn, it makes sense for quality to react negatively to positive news. A possible explanation for the negative value performance on positive releases is that most positive releases happen during later stages of the business cycle. Value may perform better during the turning point. The outperformance of the size factor on release days was in line with expectation.

Because investors act based on their expectations about the state of the economy, their reactions to positive/negative surprises were expected to align with their responses to positive or negative releases. When a release is worse than expected, the market overestimated growth and corporate profits. In such cases, investors are expected to react positively to positive surprises and negatively to negative ones. Similarly, factors such as size and value are expected to perform better on positive surprise days, while we expected quality and low volatility to perform well on negative surprise days. Momentum may perform worse on days with large absolute surprises because momentum investors rely on the continuation of the existing price trend. When unexpected data is released, it can lead to sudden shifts in market sentiment causing a reversal.

Positive and negative surprises both led to positive excess market return. This contradicts the idea that investors react according to how their expectations are met. For instance, the positive reaction of the size factor to negative surprises was unexpected. Low volatility and quality should react positively to negative surprises, but they performed similarly to normal days. In line with expectations, the value factor performed badly on days with negative surprises. In contrast to our expectations, momentum performance did not differ from its long run average on surprise events.

The market and factor reactions occasionally aligned with expectations, and we often saw counterintuitive factor performance on release days. The next section tests a few potential rationales for why we observed these patterns.

5. Possible Rationale

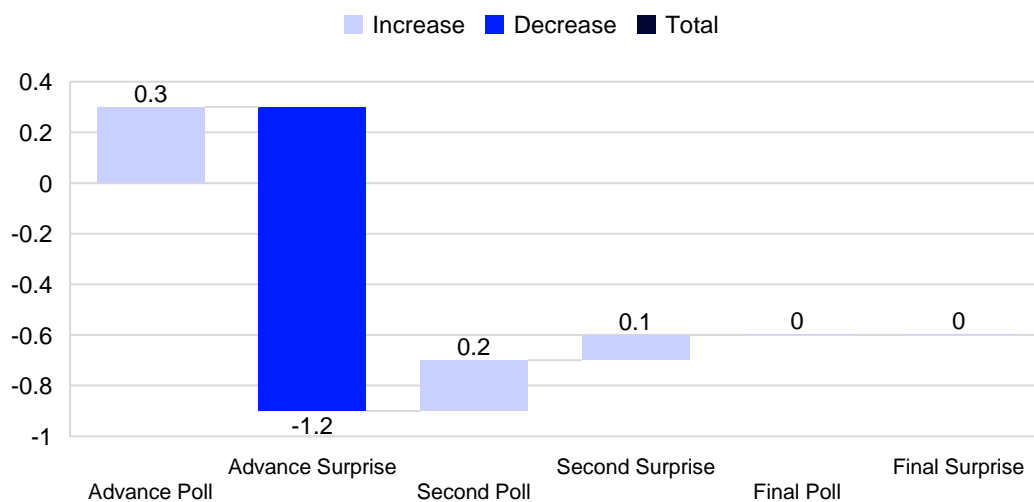
There are a few possible explanations for the counterintuitive reaction to GDP releases. 1. Markets do not always react negatively to negative news. This could be the result of the lagging nature of the GDP estimate. GDP is released one month after the end of the quarter and investors are using leading indicators to make investment decisions. 2. It could also be that investors dislike uncertainty. While markets may anticipate the content of the GDP release, they react positively to negative releases due to the reduction in uncertainty. Alternatively, the Federal Reserve's aggressive quantitative easing (QE) programme ran during most of the sample period. A negative release could have led to more QE, which was positive news for investors.

5.1 Does the market have a crystal ball?

The Q2 advance release in 2022 is an example of a release to which the market could have been expected to react negatively. The release provided a worst-case scenario for investors. The initial poll was positive, but the advance release came in negative. Not only was it a negative release, but it was a negative release on the back of positive expectations. Figure 9 shows how the polls and estimates progressed through the release cycle. Experts expected the advance release to come in at 0.3, but the advance came in at -0.9.

⁷ Do factors carry information about the economic cycle? Marlies van Boven, FTSE Russell, December 2020.

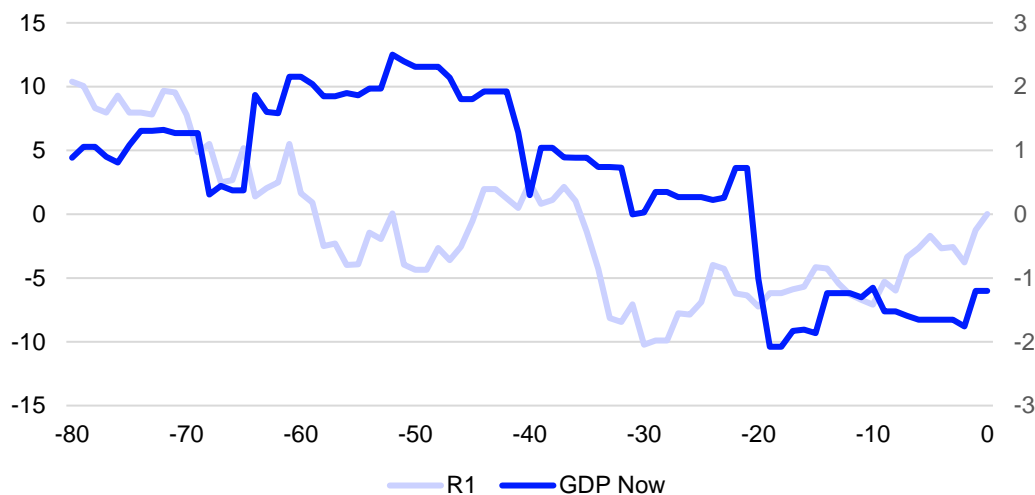
Figure 9: Q2 2022 release and poll updates



Source: FTSE Russell, LSEG Datastream. Please see the end for important legal disclosures.

Figure 10 shows Russell 1000 performance and the GDPNow index before the advance release. The x-axis shows the number of days before the release. The nowcasting index dropped during the quarter. Investors immediately began reacting to the negative information. The market and nowcasting index reached bottom a little under 30 days prior to the advance release.

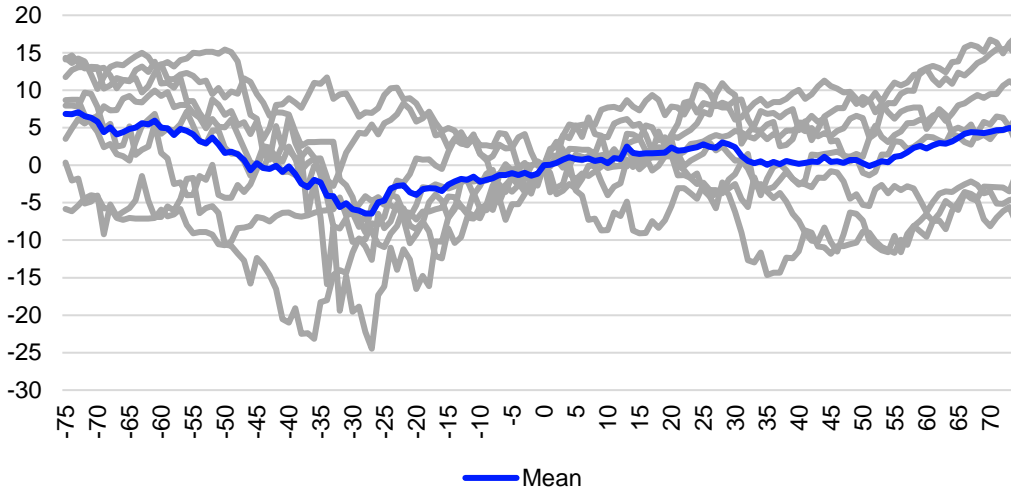
Figure 10: Russell 1000 and GDPNow up to 80 days before the Q2 2022 advance release



Source: FTSE Russell, Federal Reserve Bank of Atlanta. Total returns in USD. Please see the end for important legal disclosures.

Market performance surrounding other advance releases that surprised to the downside with a negative release confirmed this observation. Figure 11 shows the Russell 1000 performance indexed to the event of the release. On average, the Russell 1000 bottomed approximately 25 days before each release, which is at the end of the respective quarter. When investors are aware of worsening economic metric as it happens markets react accordingly. This suggests that the market was more in tune with expected GDP releases, based on the nowcasting index, than the polls.

Figure 11: Russell 1000 performance before negative release and surprise indexed to the release date

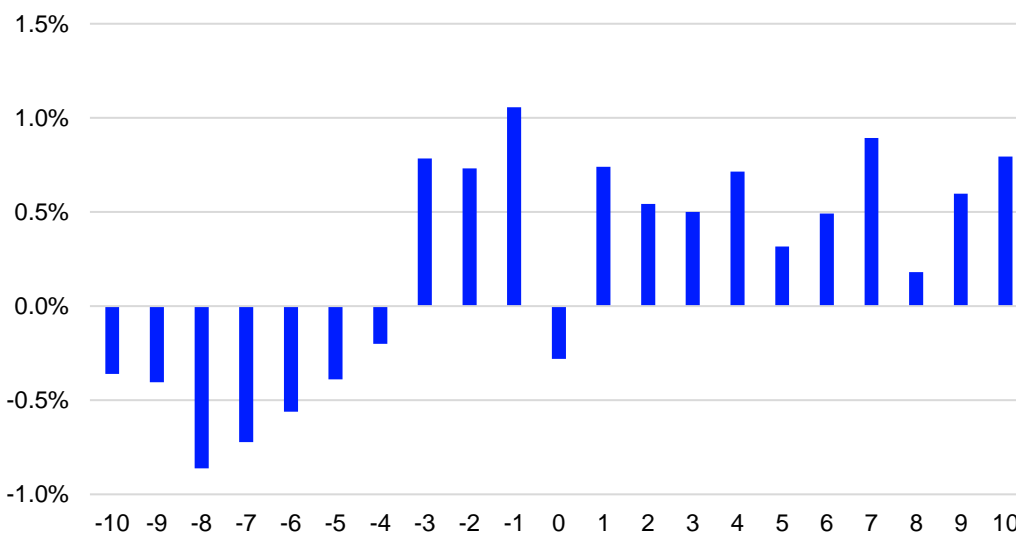


Source: FTSE Russell, LSEG Datastream. Total returns in USD. Data from October 2000 to March 2024. Please see the end for important legal disclosures.

5.2 Reduction in uncertainty

Another explanation for the unexpected positive reactions could be a reduction in uncertainty. To understand if this is the case, we used the VIX as the gauge of uncertainty and analysed how it behaved on the days surrounding the releases. Lower VIX means that there is less short-term uncertainty surrounding stock prices. Figure 10 shows VIX during the announcement period (t-10 -> t+10) relative to VIX of the non-announcement period (t-30 -> t-10 & t+10 -> t+30). On the announcement day of the GDP release, the VIX was over 0.2% lower compared to the non-announcement period and 1.3% lower than on the day before the release. This reduction was small and only lasted for one day.

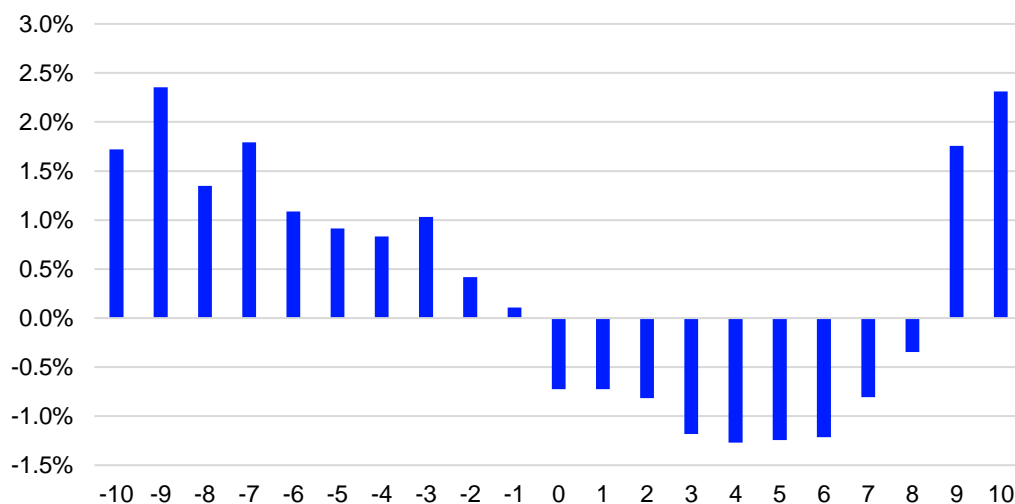
Figure 12: Average announcement period VIX vs non announcement period



Source: FTSE Russell, LSEG Datastream. Data from April 2004 to March 2024. Please see the end for important legal disclosures.

Figure 13 shows the same statistics for the VVIX. It demonstrates that while the reduction in uncertainty surrounding stocks was temporary, uncertainty on the VIX itself dropped by 0.7% and stayed lower for up to eight days. This implies that investors were expecting less movement in the VIX itself.

Figure 13: Average announcement period VVIX vs non announcement period



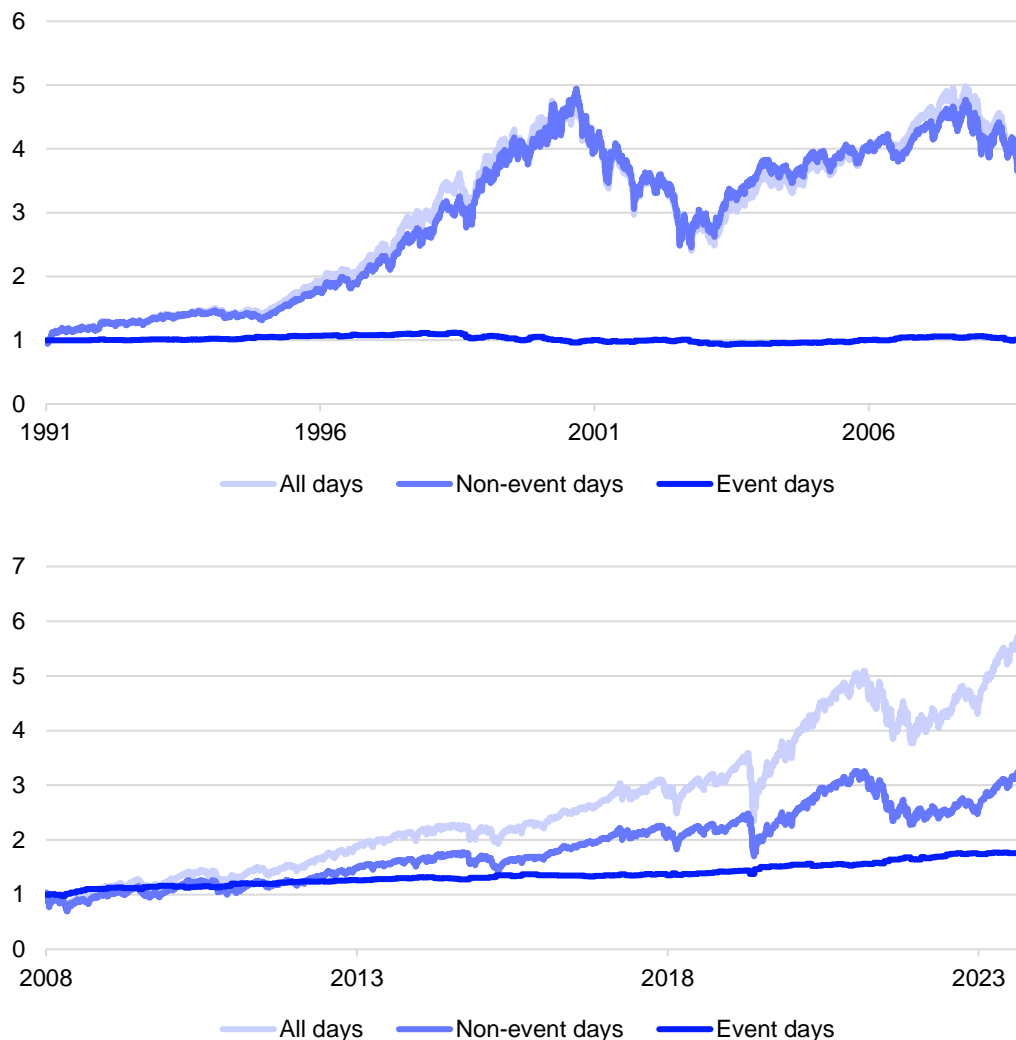
Source: FTSE Russell, LSEG Datastream. Data from June 2006 to March 2024. Please see the end for important legal disclosures.

The decline in demand for options on the US stock market lasted only for the release day. The reduction in demand for options on the VIX itself lasted longer. This means that the market expected the VIX to be more stable in the days following the release and might indicate that investors experienced a decrease in risk expectations when GDP was released.

5.3 Quantitative easing

Another possibility is that markets reacted positively to negative releases because of the quantitative easing (QE) programme the Fed introduced during the global financial crisis. It could be that markets reacted positively to negative news about the economy because the expectation was that when economic conditions worsened, the Federal Reserve would use monetary policy tools to improve them. If this was the case, we should only have observed the abnormal return on release days after QE was introduced. In Figure 14, we replicated the previous chart on the strategies that invested only on release days and on all days other than release days. We divided the timeseries into two parts – pre-QE and post-QE. The release date strategy achieved a risk reward ratio of 0.9 in the post-QE sample, but only a risk reward ratio of 0.1 during the pre-QE period. This suggests that investors may have been expecting negative news to lead to positive monetary policy.

Figure 14: Pre- and post-QE cumulative returns for event and non-event investment strategies



Source: FTSE Russell, LSEG Datastream. Total returns in USD. Please see the end for important legal disclosures.

Table 6: Performance statistics for GDP release event and non-event investment strategies before and after November 2008

	Before Nov 2008			After Nov 2008		
	All days	Non-event days	Event days	All days	Non-event days	Event days
<i>Return</i>	7.54%	7.27%	0.26%	12.43%	8.87%	3.56%
<i>Volatility</i>	16.93%	16.60%	3.37%	18.86%	18.41%	4.09%
<i>Risk/Reward</i>	0.445	0.438	0.078	0.659	0.482	0.869

Source: FTSE Russell, LSEG Datastream. Total returns in USD. Data from January 1991 until March 2024. Please see the end for important legal disclosures.

6. Conclusion

We investigated the performance of the Russell 1000® Index and factors on US GDP release days. We found that, perhaps contrary to intuition, on release days, the market performance was statistically significantly better than the long-term average daily return, regardless of whether the GDP change was negative or positive. Dividing the events into positive and negative surprise groups showed the same picture. The Russell 1000 performed better than average on any of the release days.

Factors also reacted somewhat counterintuitively. Momentum, low volatility and quality were not impacted significantly by the different types of release events. Size performed better than average on these days, while value underperformed. The size outperformance and value underperformance reactions were stronger on positive GDP release days than on the negative GDP releases.

The market appeared to be more in line with GDPNow, the nowcasting index from the Atlanta Fed, than the polls. It also appeared, that the market was already aware of most of the information in the GDP releases before the advance release. When release and surprise were negative, the Russell 1000 reached its low an average of 25 days prior to the release. It is unlikely that the observed performance was driven by a reduction in investor uncertainty. The VIX and VVIX dropped on the release days, but the drops were small and temporary. Dividing the market effect into pre-QE and post-QE samples indicates that this phenomenon can be explained by the Fed's aggressive QE policy. Positive news led to an increase in share price, and negative news led to expectations of additional QE, which was positive for markets.

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