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Financial market reaction to monetary policy surprises.

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Key findings

- This note builds on previous Reserve Bank of New Zealand work analysing the relationship between monetary policy surprises and the New Zealand (NZ) dollar exchange rate. We also analyse the impact of monetary policy surprises on domestic interest rate swap rates and their spread to swap rates offshore.
- We find similar effects of a monetary policy surprise on the NZ dollar to previous research. Our results show a positive 10 basis point OCR surprise is associated with a 0.5 percent appreciation in the NZ dollar one hour after an OCR announcement. This compares to a 0.4 percent appreciation identified in earlier research (Wong and Cook 2012). We also find that there is a stronger relationship between monetary policy surprises and interest rate swaps than with the NZ dollar.
- In our extensions we find some evidence that OCR surprises to Monetary Policy Statement announcements have a slightly stronger and more persistent effect on financial instruments than with Monetary Policy Review announcements. This could be related to the larger information set provided with these decisions.
- We also find evidence that OCR surprises have a continued effect on the exchange rate after a week, but the precision of our estimates falls quickly as the event window expands. This reflects a wide range of influences on exchange rates over this time-frame.

Introduction

As argued by Bernanke and Kuttner (2005), the most direct and immediate effect of monetary policy actions are on financial markets. Consequently, understanding the effect of monetary policy surprises on financial markets is important given the role financial markets play in the transmission of monetary policy.

There is a broad literature assessing the effect of monetary policy surprises (the part of monetary policy decisions unanticipated by market participants) on asset prices. Event studies have become a popular approach for assessing monetary policy surprise effects on asset prices given central banks have fixed and known future policy announcement dates (see Kuttner 2001, Bernanke and Kuttner 2005). To date, the literature has largely focused on the effect of policy surprises on exchange rates and long-term interest rates (Kuttner 2001, Jiang and Wang 2017). There is also existing research that has assessed the difference between different types of policy surprises (such as the level of the policy rate compared to changes in its expected future path) on asset prices, given that central banks can provide new information to financial markets along several dimensions. These different types of surprises can have different effects on market prices (Gurkaynak 2005, Karagedikli and Siklos 2008). Fawley and Neely (2014) summarise the US literature on policy surprise effects and asset prices.

Past Reserve Bank of New Zealand (Reserve Bank) work has also assessed monetary policy effects on asset prices. The work largely consists of event studies that focus on the effect of monetary policy surprises on the NZ dollar exchange rate (Karagedikli and Siklos 2008, Wong and Cook 2012). Karagedikli and Siklos (2008) find that monetary policy surprises have a significant and large effect on exchange rate movements. They also find that monetary policy announcements have a permanent effect on the exchange rate. Wong and Cook (2012) find that a positive 10 basis point

policy surprise is associated with a 0.4 percent appreciation in the NZ dollar trade weighted index (NZD TWI).

Some Reserve Bank studies also include the effect of monetary policy surprises on medium-term interest rates (Coleman and Karagedikli 2008, Drew and Karagedikli 2008). Drew and Karagedikli (2008) show that domestic swap rates with horizons longer than five years behave in almost the same manner as five-year swap rates. Coleman and Karagedikli (2008) find that spot exchange rates and swap rate differentials respond by a similar amount to monetary policy surprises.

Our analysis both updates and expands on the more recent work of Wong and Cook (2012). We expand on their work by analysing the effect of monetary policy surprises on short-term interest rate swaps, specific currency pairs, and cross-market interest rate swap differentials. We look at cross-market interest rate differentials to better measure the relative moves in NZ interest rate swaps, as directional moves on a given day can be dampened or exacerbated by co-movement with foreign swap rates.

We also contribute to the broader literature through our extensions by assessing whether the effect of monetary policy surprises is larger for Monetary Policy Statement (MPS) announcements, compared to announcements that are not accompanied by an MPS. We also analyse the effect of changes in monetary policy expectations on MPS dates on other financial instruments. Additionally, we assess whether the effect of a monetary policy surprise has changed since 2012, and we include analysis of material versus non-material monetary policy surprises.

We are interested in both the immediate effects of a monetary policy surprise in the first hour following the decision, and also - for MPS meetings - the effect of a press conference in sustaining, increasing or decreasing this effect, which is captured in the two-hour window. Additionally, while the exchange rate tends to respond almost instantaneously to monetary policy surprises, interest rates can be slower to respond. Interest rate derivatives are less liquid than the currency market, so the price adjustment to new information may take longer to observe in available price data. We also investigate whether financial market reactions dissipate, are sustained, or strengthen over time.

Monetary policy announcements

Monetary policy announcements are scheduled well in advance (except for in emergencies, for example, during the acute phase of the COVID-19 pandemic), which allows financial markets to form observable expectations or 'pricing' for each announcement. This pricing can be used to quantify market expectations of the likelihood of a given interest rate decision, which indicates both whether the decision is a surprise and the size of a surprise. A positive monetary policy surprise – a larger than expected monetary policy tightening or a smaller than expected monetary policy loosening – tends to see the exchange rate appreciate and interest rates increase. The opposite would be true for a negative policy surprise.

The Reserve Bank publishes its Official Cash Rate (OCR) decision seven times per year (eight times per year until 2016).[1] Four times a year, the Reserve Bank also publishes a MPS, which is accompanied by a press conference one hour after the release of the OCR decision. The MPS also contains a full range of economic projections, including a forward path for the OCR (OCR track)

1 Past monetary policy decisions - Reserve Bank of New Zealand - Te Pūtea Matua (rbnz.govt.nz).

conditional on these projections. Other OCR decision meetings are Monetary Policy Reviews (MPR), with the release of the OCR decision and a summary record of meeting (minutes). MPRs are not accompanied by a press conference or an updated set of economic projections.

Data and methodology

We analyse the relationship between unexpected OCR changes and the NZ dollar, domestic interest rate swaps, and cross-market interest rate swap differentials. We use a simple regression to determine the relationship:

$$\Delta y_t = \alpha + \beta s_t + \varepsilon_t \quad (1)$$

where Δy_t is the change in either the NZ dollar (natural log difference of the exchange rate over the measurement window), front-end swap rates (basis point change), or cross-market interest rate differential (basis point change), and s_t represents the vector of monetary policy surprises.

We exclude from our data the NZ-US 1-year interest rate differential due to data availability issues.

Data sample and measurement windows

Our sample period from September 2006 to December 2023 includes a change to the time of the OCR announcement. Prior to 2019, the OCR was released at 9:00 am; during 2019 this was changed to being released at 2:00 pm. We therefore use hourly financial market pricing data to ensure the data observation windows (one hour, two hours, daily, and weekly) can be kept consistent for both announcement times.

Our data set consists of hourly data at ten minutes past every hour from September 2006 to November 2023. We exclude from our data the OCR decision at the start of the COVID-19 pandemic (16 March 2020) as this was an unscheduled announcement. We also exclude the OCR meeting on 30 July 2009 from our weekly data set due to data availability issues.

For the one-hour window, we use data between 8:10 am to 10:10 am for 9:00 am announcements and from 1:10 pm to 3:10 pm for 2:00 pm announcements. The two-hour window is measured from 8:10 am to 11:10 am for 9:00 am announcements and from 1:10 pm to 4:10 pm for 2:00 pm announcements. The daily window is measured from 8:10 am the day of the announcement to 8:10 am the following day for 9:00 am announcements and from 1:10 pm the day of the announcement to 1:10 pm the following day for 2:00 pm announcements. The weekly window is measured from 8:10 am the day of the announcement to 8:10 am seven days after for the 9:00 am announcements and from 1:10 pm the day of the announcement to 1:10 pm seven days after for the 2:00 pm announcements.

Monetary policy surprises

There are different ways to calculate monetary policy surprises, with many developed markets using futures contracts (e.g. federal funds futures in the United States) to measure policy expectations and therefore monetary policy surprises. In New Zealand, 90-day bank bill futures have been widely used to calculate monetary policy surprises, in part because the data has the longest time series availability.[2] However, these futures contracts are not directly comparable to

2 These can also be used to estimate surprises at different time horizons (using the first, second, third and fourth contracts).

futures contracts used to measure policy expectations in some other developed markets. The bank bill rate is not a pure measure of OCR expectations, as it contains a credit risk component that varies over time.

Another way to measure monetary policy surprises is using overnight index swaps (OIS). OIS are interest rate swaps in which the periodic floating rate payment is based on the realised OCR;[3] that is, the observed OIS rate should equal the currently expected OCR over the life of the contract, allowing for market expectations to be deduced.[4] The cleanest measure of monetary policy expectations in New Zealand markets are meeting date OIS contracts. These are OIS contracts that cover the period from one Reserve Bank meeting date to another and can therefore be used to measure the expected policy rate between each meeting. However, the data availability of these meeting date OIS does not span the full period for which we have other financial market data. We instead use a monthly OIS contract to measure our surprises.

To calculate our monetary policy surprise, we take the difference between market pricing for one-month OIS from the day prior to the meeting, and the actual change to the OCR.[5] For example, if the OCR is increased by 25 basis points and the one-month OIS was implying an increase of 18 basis points, the monetary policy surprise is +7 basis points. We then compare this surprise with the subsequent change in the NZ dollar, interest rate swaps and the cross-market differential between interest rate swaps in New Zealand and Australia or the United States.

Results

Table 1 shows the results of the estimation of equation (1) for OCR surprises using one-month OIS rates.

The relationship between OCR surprises and our financial market instruments

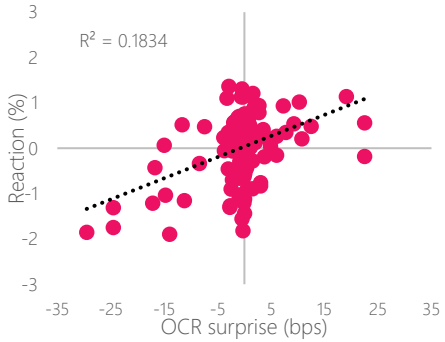
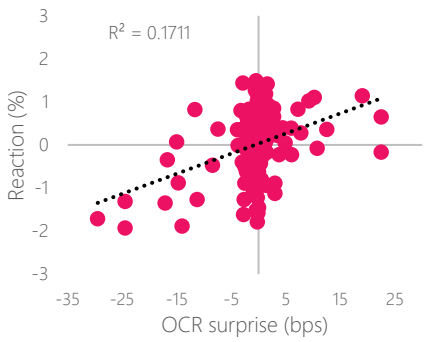
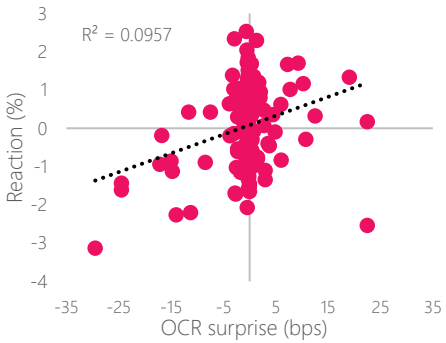
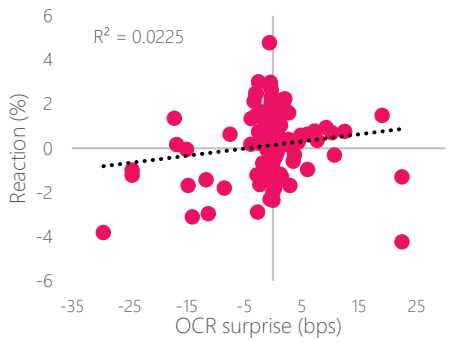
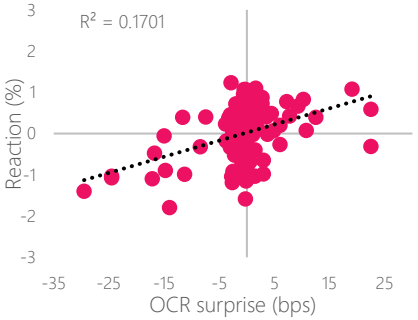
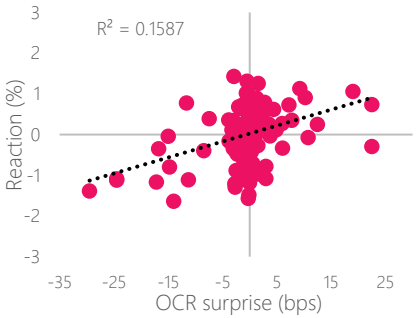
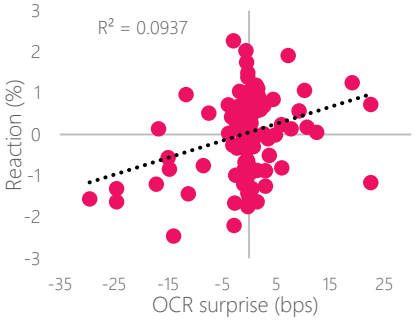
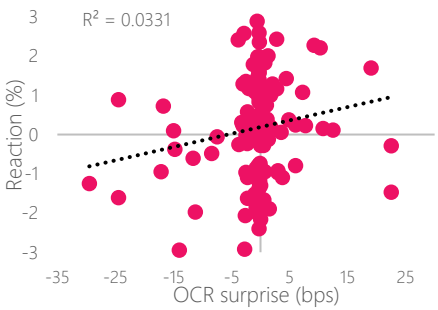
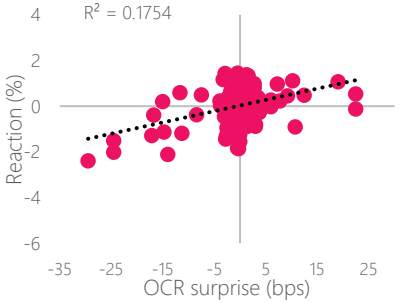
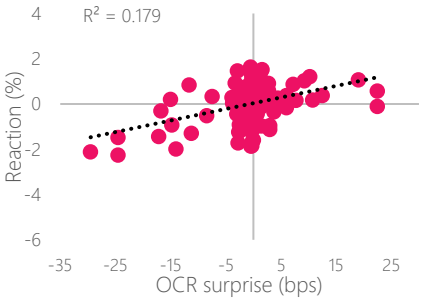
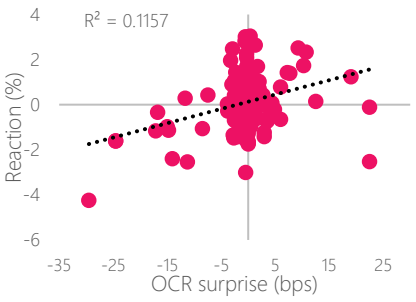
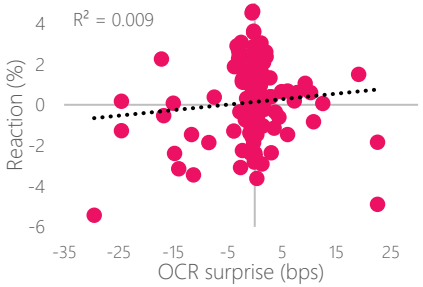
The results show an intuitive positive relationship between OCR surprises and the financial market instruments we look at. This implies that a positive monetary policy supply surprise results in an appreciation of the NZ dollar, an increase in domestic swap rates, and a widening in the swap rate differential between NZ and Australia or the US. For example, a positive 10 basis point OCR surprise corresponds with a 0.5 percent appreciation in the NZD TWI one hour after an announcement, an 8 basis point increase in the 1-year swap rate, and about an 8 basis point widening of the 1-year NZ-AU swap rate differential. This finding is consistent with Drew and Karagedikli (2008), Karagedikli and Siklos (2008), and Wong and Cook (2012).

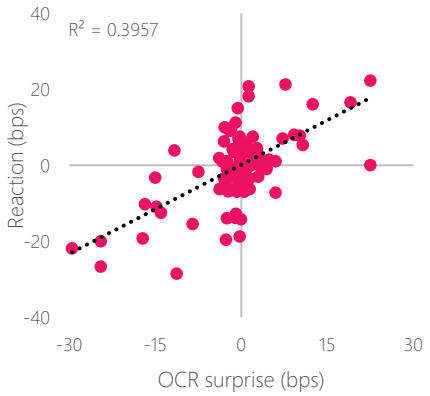
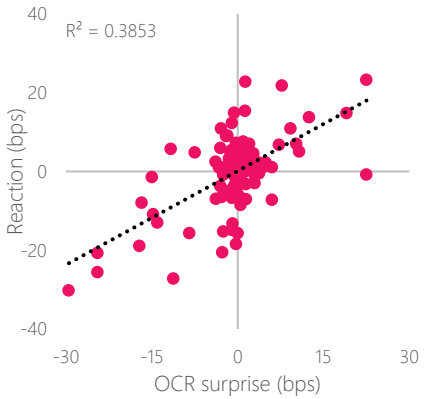
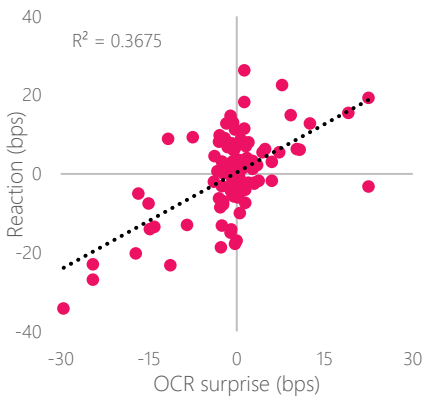
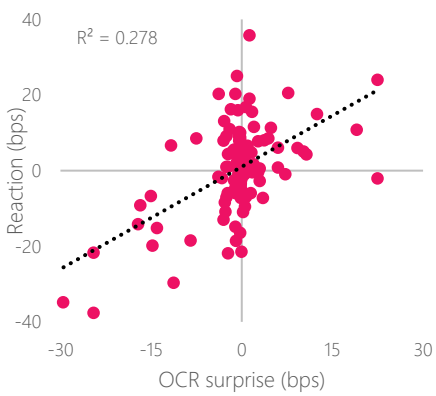
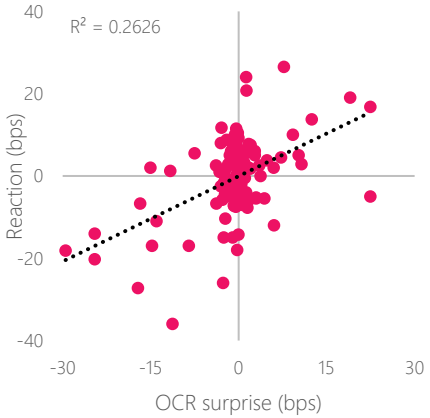
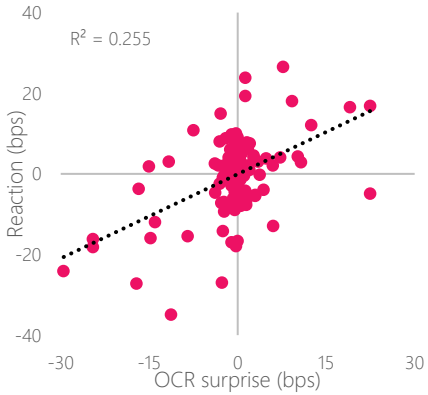
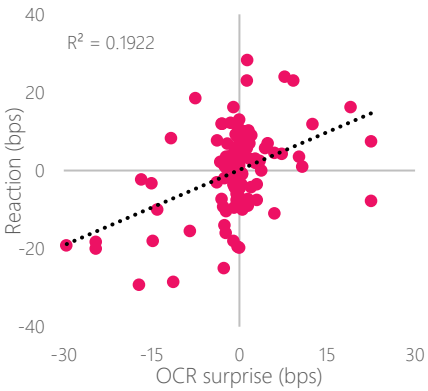
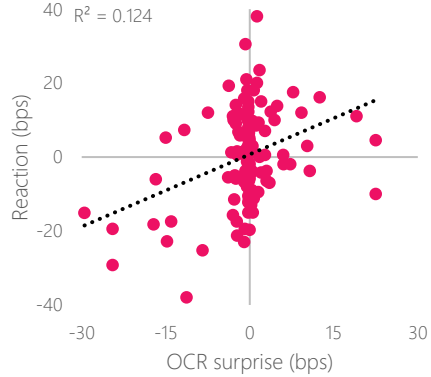
Our results suggest there is a stronger relationship between OCR surprises and short-term interest rate swaps than between OCR surprises and the NZ exchange rate. For example, only 18 percent of the variation is explained when regressing OCR surprises on the NZD TWI within a one hour window compared to 40 percent of the variation being explained in relation to the 1-year swap rate. The relationship between OCR surprises and cross-market interest rate differentials for NZ and Australia or the US is also stronger than the relationship with the exchange rate, and similarly stronger for the 1-year interest rate differential than for the 2-year interest rate differential. This result is intuitive – short tenor swap rates should be strongly influenced by monetary policy

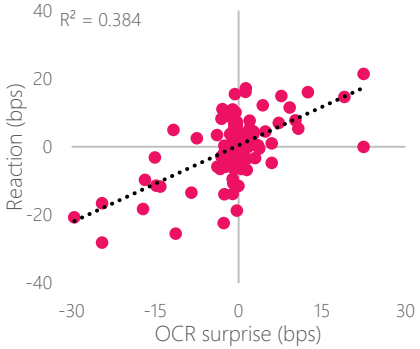
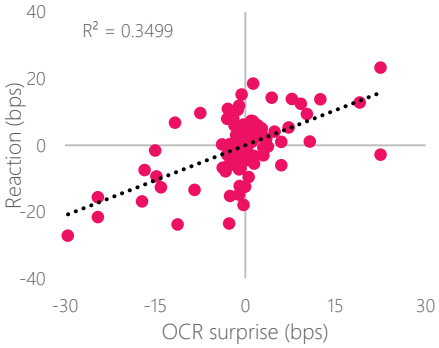
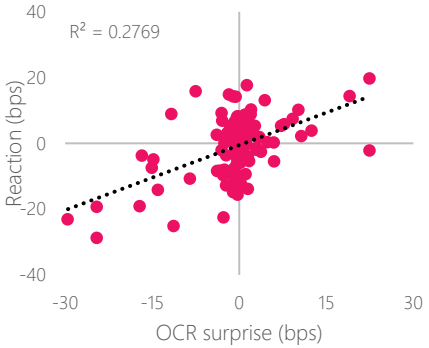
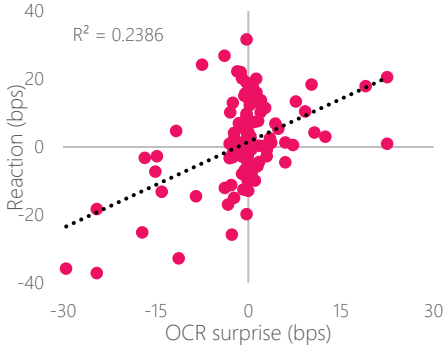
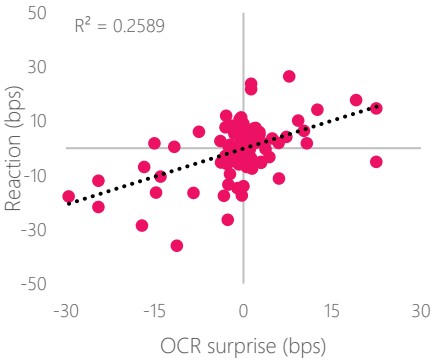
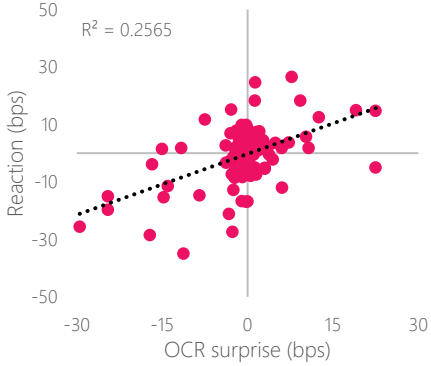
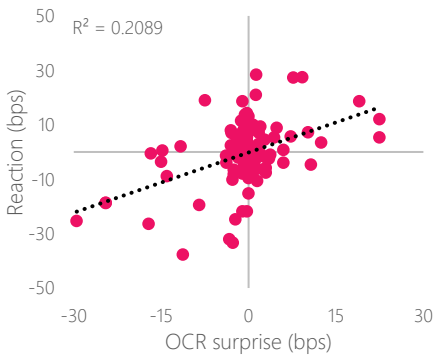
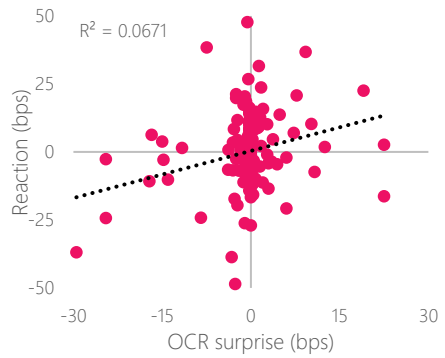
3 NZ Overnight Indexed Swap Closing Rate Pricing Service (NZOS) (nzfbf.co.nz).
4 See Choy, W-K (2003), "Introducing Overnight Indexed Swaps", Reserve Bank of New Zealand Bulletin, Vol. 66. No.1, pp 34-39.
5 Given that there is always more than a one-month gap between scheduled policy meetings, and we are only analysing market moves on decision days, this method should given equivalent surprises to using meeting date contracts.

expectations, while exchange rates are influenced by a wide range of factors (such as investor risk sentiment and commodity prices) and are more volatile. Jiang and Wang (2017) found a similar relationship when analysing monetary policy surprises on US Treasury bills and exchange rates.

Table 1: Full sample regression results (2006 – 2023)

	One hour	Two hours	One day	One week
TWI				
NZDAUD				
NZDUSD				

	One hour	Two hours	One day	One week
1-year swap				
2-year swap				

	One hour	Two hours	One day	One week
1-year NZ-AU spread				
2year NZ-US spread				

* Full regression results can be found in the Appendix.

Effects on the NZ dollar

An OCR surprise has a larger effect on the NZD TWI and the NZ/US exchange rate compared to the NZ/AU exchange rate. A positive 10 basis point OCR surprise corresponds with a 0.5 percent appreciation in the NZD TWI and the NZ/US exchange rate, but a slightly smaller (0.4 percent) appreciation in the NZ/AU exchange rate one hour after an announcement. The slightly smaller impact on the NZ/AU exchange rate is consistent across the longer time windows (two hour and one day).

Karagedikli and Siklos' (2008), and Coleman and Karagedikli (2008) found similar but smaller sized effects for these exchange rate pairs.[6] In previous work on the NZ/AU exchange rate, Coleman and Karagedikli (2010) note that this pair is much less volatile than each country's exchange rate is with other currencies as both currencies respond to macroeconomic surprises in the other country.[7] The difference between our estimated coefficients for the Australian and US dollar reactions is consistent with NZ OCR surprises resulting in a small spillover to the value of the Australian dollar compared to the US dollar (although the difference is not statistically significant).

In terms of persistence of exchange rate effects, our estimated coefficients are very similar for the one hour, two hour, and one day windows across all currency pairs. However, our point estimates of the exchange rate reaction decline when moving from the one day to one week window. This decline is marginal against the Australian dollar, but larger against the US dollar. Conversely, we cannot statistically reject the hypothesis that the coefficients are the same across windows. This reflects that our estimates in the one week window are imprecise – over this period of time, there are a wide range of influences on exchange rates outside of NZ monetary policy surprises, as indicated by the low proportion of variation explained in these regressions.

Overall, our estimates are limited in what they can tell us about the persistence of exchange rate reactions to policy surprises. However, the sustained reaction of the NZ dollar against the Australian dollar (which is less affected by other factors and therefore more precisely estimated) suggests exchange rate effects can persist beyond a week after the decision.

Effect on domestic interest rate swaps

We assessed the effect of monetary policy surprises on the interest rate swap curve (1- to 10-year swap rates)[8]. Our results suggest there is a stronger effect from an OCR surprise on shorter tenor swap rates. For example, a positive 10 basis point OCR surprise corresponds with an 8 basis point increase in the 1-year swap rate and a 3 basis point increase in the 10-year swap rate one hour after an announcement. Our results are consistent with Kuttner (2001) and Jiang and Wang (2017) who found that long-term interest rates were less sensitive to Federal Reserve monetary policy surprises. This finding is consistent with the theory that central banks can impact short-term interest rates and thereby change long-term interest rates but to a lesser extent.

Over our event windows, the effect of a policy surprise on 1- and 2-year swap rates remains relatively stable. For example, a 10 basis point OCR surprise is associated with about a 7-9 basis point effect on the 1-year swap rate, which is sustained from the first hour out to one week after an announcement.

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6 Explaining Movements in the NZ Dollar: Central Bank Communication and the Surprise Element in Monetary Policy? (rbnz.govt.nz).
7 The NZD responded more to Australian macroeconomic surprises than the AUD to New Zealand macroeconomic surprises.
8 We exclude from our presented findings the results for interest rate swaps beyond the 2-year tenor given these swap rates are impacted less by policy surprises. Results on these longer tenors can be found in the Appendix.

The amount of variation explained when regressing OCR surprises on the 1- and 2-year swap rates falls over our event windows. For example, the amount of variation explained when regressing OCR surprises on the 1-year swap rate falls from around 40 percent over the one hour window to around 30 percent over the one week window. This is similar for 2-year swap rate, however the amount of variation explained is lower at around 25 percent at the one hour window, falling to around 12 percent at the one week window. As the time window expands, the information set relevant for swap rate pricing expands, and so the proportion of variance explained by OCR surprises falls. Our results suggest that while other factors, such as economic data releases or major foreign central bank decisions, will cause swap rates to shift following the policy decision over time, on average the effect of the OCR surprise on swap rates is sustained.

Effect on cross-market interest rate swap differentials

We also estimate the effect of OCR surprises on interest rate swap differentials with the US and Australia. As NZ OCR surprises are unlikely to materially affect foreign swap rates, we would expect our point estimates to closely match our estimates for domestic swap rates. A large difference in the point estimates could suggest that our results for NZ swap rates were being affected by correlated movements in foreign interest rates during the event window.

Our results for the NZ-US 2-year swap rate differential closely matches our result for the NZ 2-year swap rate. This increases our confidence in our estimated results for domestic swap rates. However, when we compare our NZ 1- and 2-year swap results with the NZ-AU 1- and 2-year swap rate differential result, we find that while the estimates are similar, the estimates are slightly lower for the NZ-AU differential for all windows. The difference in estimated coefficients is small and so hard to estimate with precision. However, this is consistent with our exchange rate results and suggest that NZ OCR surprises may have a small effect on Australian swap rates, given the co-movement between these two markets.

Extensions

We extend our analysis in three ways. Firstly, we compare our results to Wong and Cook (2012). Our second and main extension focuses on differences in the effects of OCR surprises from MPS announcements compared with MPR announcements. Having established that OCR surprises affect financial markets above, we assess whether the effect is relatively larger on MPS dates given that more information is provided - a longer statement with economic projections and a forward interest rate track, media conference, and interviews with Monetary Policy Committee members. Lastly, we assess which interest rate movement best explains changes in the NZ exchange rate.

Comparison to Wong and Cook (2012)

We compare our results to Wong and Cook's (2012), who took a similar approach to assessing the effect of an OCR surprise on the exchange rate by using hourly NZD TWI data and OIS contracts.[9] Our main results are very similar – our point estimates suggest that a positive 10 basis point OCR surprise corresponds to a 0.5 percent increase in the NZD TWI one hour after an announcement, compared to their point estimate of a 0.4 percent increase.

9 The way we calculate OCR surprises in our main results is the same way Wong and Cook (2012) calculated OCR surprises.

However, there are important differences between our analysis and Wong and Cook's (2012). Firstly, we use a different and longer sample period to Wong and Cook (2012).[10] Furthermore, Wong and Cook (2012) only include OCR surprises for meetings where there was a change to the OCR. Our results include *all* OCR surprises for any scheduled meeting, even when there is no change to the OCR. This is because a 'no change' decision can still be a surprise, especially when a reasonable probability of a change had been priced.

To make our results more comparable, we restrict our data to only include meetings where there was a change to the OCR. Our point estimate that a positive 10 basis point OCR surprise corresponds to a 0.5 percent increase in the NZD TWI one hour after an announcement remains unchanged. However, the amount of variation explained increases compared to the full sample. For example, in our full sample only 18 percent of the variation is explained when regressing OCR surprises on the NZD TWI within a one-hour window compared to 35 percent of the variation being explained when using the restricted 'OCR change' sample. This is likely because OCR surprises are larger on average in meetings with OCR changes, and therefore account for a larger proportion of financial market moves on average compared to other factors.

Wong and Cook (2012) also find that OCR surprises can explain a lower share of variance in the NZD TWI as the time window expands. While their estimated coefficient for the move in the TWI is similar at one week compared to one hour, the additional noise from other factors at the one-week horizon meant that the one-week coefficient was not statistically distinguishable from zero. In our results, we still find a statistically significant effect of OCR surprises on the NZD TWI and NZD-AUD exchange rates with our larger sample size likely helping the precision of our estimates. However, the precision of our estimates falls over our time windows.

Lastly, we restrict our sample to 2012 onwards – but include all meeting dates, rather than just meetings where the OCR was changed – to assess whether and how the relationship between OCR surprises and financial market instruments has changed since Wong and Cook's (2012) note. Overall, our results for the exchange rate were very similar to the full sample. These results are presented in the Appendix.

MPS dates only

Given that MPSs contain more information than MPRs, we try restricting our sample to MPS dates to assess whether MPS OCR surprises have a larger effect on financial markets. We also extend our OCR surprise analysis to include three-month and twelve-month OIS contracts. This is because MPSs contain additional information, such as the OCR track, which can be influential on medium and longer-term rates and future monetary policy expectations. While three-month and twelve-month OIS contracts are not perfect measures for monetary policy expectations, they can be used as a good proxy for them. Our results are presented in Table 2.

As we are looking at the OCR surprises across the OIS curve, we measure the OCR surprises differently to how the OCR surprise is calculated in the main results. For these calculations we take the difference in pricing for OIS at three-month, and twelve-month tenors between the closing price the day before an MPS and the closing price the day of an MPS. This means that for these measures, our estimated surprise is based on how market participants' expectations of the average OCR over a three- or twelve-month period change on the day the MPS is released. These

10 Wong and Cook's (2012) results consist of 14 OCR meetings over 2007 – 2012.

expectations will depend on both the OCR decision and how other information provided by the Reserve Bank is interpreted as affecting the outlook for the OCR.

Comparison of MPS only results and our main results

Our results provide some indicative evidence that there may be a stronger and more sustained effect of monetary policy surprises on financial markets for MPS dates than MPR dates when comparing a one-month OCR surprise. Furthermore, we find that policy surprises explain a larger share of the variation of financial market variables on MPS days compared to all decisions.

For the exchange rate, on MPS dates the point estimates for the one-month surprise effect increases over the event windows, whereas they decrease in our main results. This may suggest that the effect of an OCR surprise on the exchange rate is larger and more sustained on MPS dates than over the full sample. However, the declining precision of our estimates over longer event windows means we cannot rule out that the persistence is the same for MPSs and MPRs.

For interest rates (both domestic swaps and cross-market differentials) the point estimate for the one-month surprise effect is slightly stronger across the time windows for MPS dates compared to our main results. This effect also remains relatively stable across the time windows for both MPS dates and our main results. For example, a 10 basis point MPS surprise is associated with a 9-10 basis point change in the 1-year swap rate over the event windows.

There are several reasons why reactions to OCR surprises may be larger or more sustained following an MPS. For example, market participants may react more strongly to MPS surprises if they have more confidence (based on the larger information set) it will be sustained, or additional communication with an MPS may reinforce the surprise (on average), making the effect larger and more sustained.

Results with three- and twelve-month surprise measures

We find that the estimated effect of OCR surprises on the exchange rate is similar across our one-, three-, and twelve-month measures. Our point estimates for twelve-month surprises are slightly smaller but the differences are not statistically significant. In contrast, the share of variation explained increases for each event window. For example, the variation of changes in the NZD TWI explained increases from around 20 percent with one-month surprises to 30 percent for a twelve-month surprise one hour after an announcement. The increase in variation explained is likely because the twelve-month surprise includes the impact of both the OCR decision and expectations for future monetary policy. This reinforces that it is not just the OCR decision, but accompanying information regarding the future outlook for the OCR that are important for explaining financial market reactions to policy decisions.

Our results differ slightly from Karagedikli and Siklos (2008). While they also found that the relationship between OCR surprises and the exchange rate strengthened as the tenor of the OCR surprise increased, the size of the OCR surprise effect became statistically insignificant after 60 minutes. In contrast, our results remain statistically significant over all event windows for the NZ dollar. This is most likely due to our much larger sample size, however there are also some other

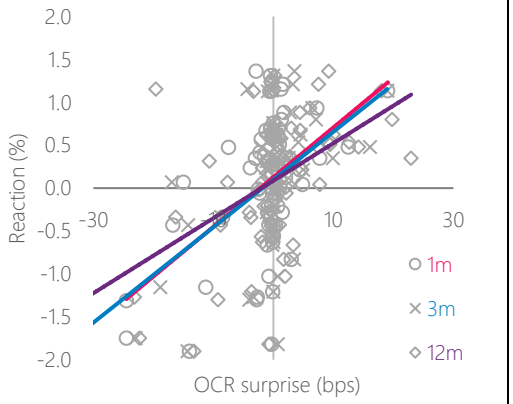
methodological differences between our studies such as in the construction of monetary policy surprises.[11]

11 Karagedikli and Siklos (2008) calculate the OCR surprise component in three ways. The first uses the 90-day bank bill rate at first, second, third and fourth contracts. The second way is similar to how we have calculated OCR surprises using OIS contracts, and the last method uses the weighted median market expectation of the OCR from a Reuters survey.

Table 2: Regression results (MPS dates only)

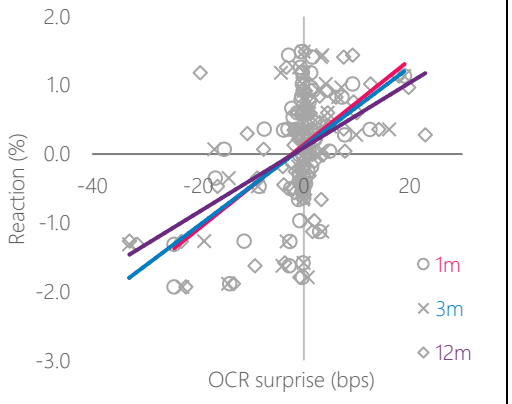
NZD TWI

60 minute window



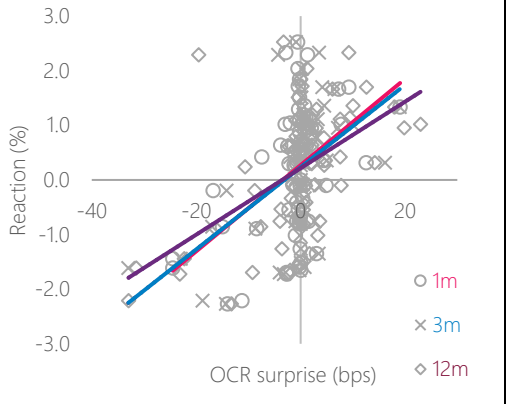
R^2 = 0.2353 R^2 = 0.2736 R^2 = 0.2988

120 minute window



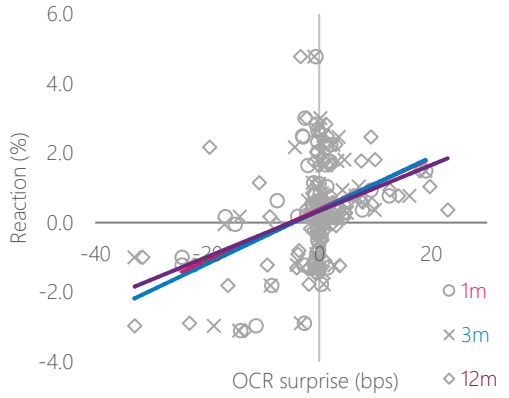
R^2 = 0.2299 R^2 = 0.2555 R^2 = 0.3012

One day



R^2 = 0.1998 R^2 = 0.2294 R^2 = 0.2651

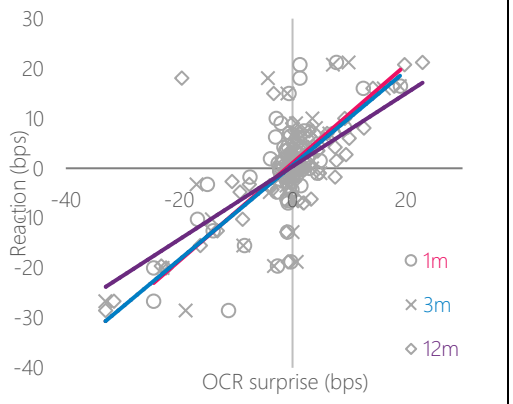
One week



R^2 = 0.1042 R^2 = 0.1435 R^2 = 0.1873

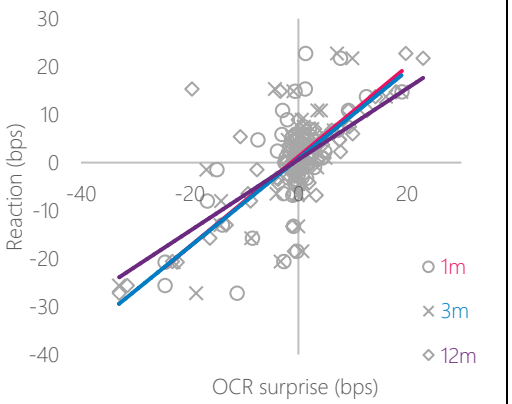
NZ 1-year swap rate

60 minute window



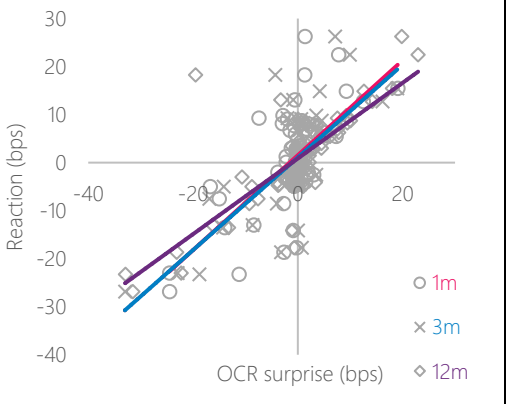
R^2 = 0.4609 R^2 = 0.5401 R^2 = 0.5704

120 minute window



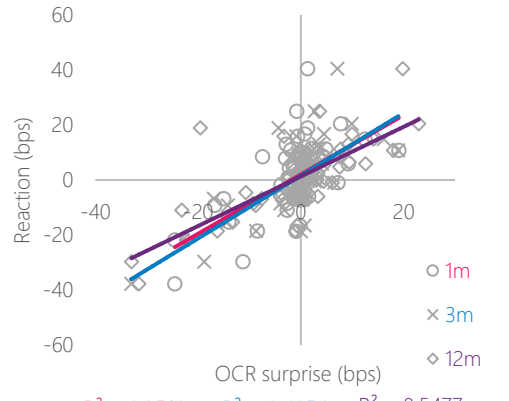
R^2 = 0.4249 R^2 = 0.5123 R^2 = 0.5955

One day



R^2 = 0.4374 R^2 = 0.5262 R^2 = 0.6201

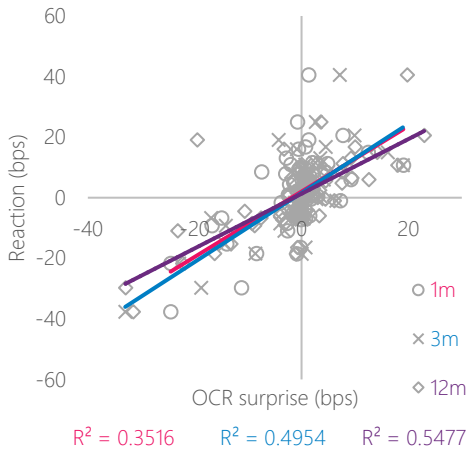
One week



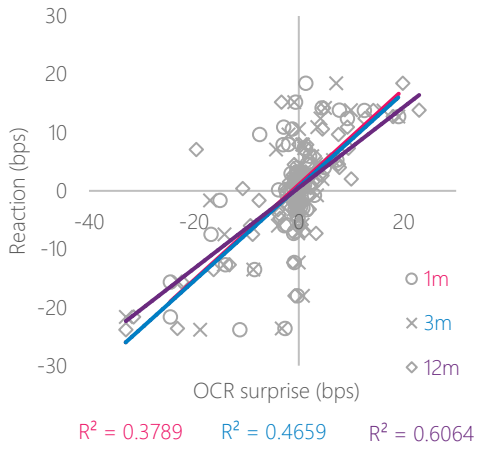
R^2 = 0.3516 R^2 = 0.4954 R^2 = 0.5477

NZ-AU 1-year swap differential

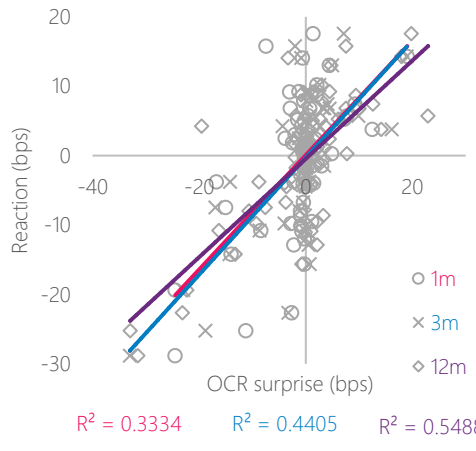
60 minute window



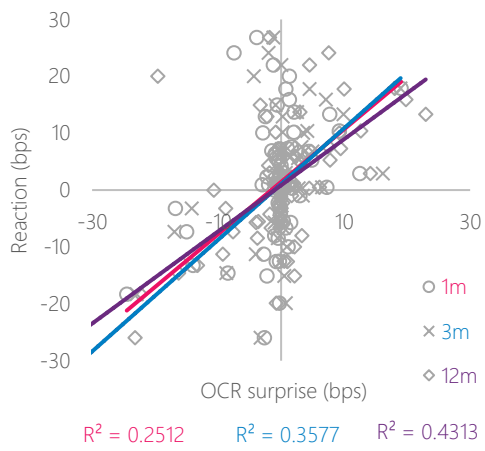
120 minute window



One day



One week



* 1-month OCR surprise (1m), 3-month OCR surprise (3m), and 12-month OCR surprise (12m). Full regression results are presented in the appendix.

Relationship between the exchange rate and domestic swap rates

Lastly, we assess the explanatory power of swap rates and OCR surprises on the NZD TWI to determine whether the NZD TWI moves more as a result of changes in swap rates compared to an OCR surprise. Our results are presented in the Appendix.

We calculate the change in the swap rate the same way we calculate OCR surprises in our extensions section; we take the difference between the last price of the swap rate the day before the announcement and the last price of the swap rate the day of the announcement. We use this calculation method due to the illiquidity of swap rates compared to foreign exchange – swap rates in New Zealand are often slower to change following new information, therefore we needed a large enough window to fully capture any changes.

We find that the estimated effect of domestic swap rates on the exchange rate is similar across 1-, 2- and 5-year swap rates. The point estimates are also slightly larger than our point estimates for OCR surprises on the exchange rate. Our point estimates for the 5-year swap rate are slightly larger, but the differences are not statistically significant.

Our results also suggest that changes in the NZD TWI are better explained by changes in domestic swap rates rather than OCR surprises. For example, the variation of changes in the NZD TWI explained increases from around 20 percent with an OCR surprise to around 55 percent with the 2-year swap rate one hour after an announcement. As with the three- and twelve-month OCR surprises, the increase in variation explained is likely because domestic swap rates include the impact of both the OCR decision and expectations for future monetary policy while the 1-month OCR surprise just includes the impact of the OCR decision.

Robustness checks

We carry out two robustness checks for our results. Firstly, we assess whether our results differ depending on whether the size of the policy surprise is 'material'. Lastly, we restrict our data set to exclude the COVID-19 period (2020 and 2021) to assess whether our results are sensitive to the conditions over this period (such as the OCR being close to zero).

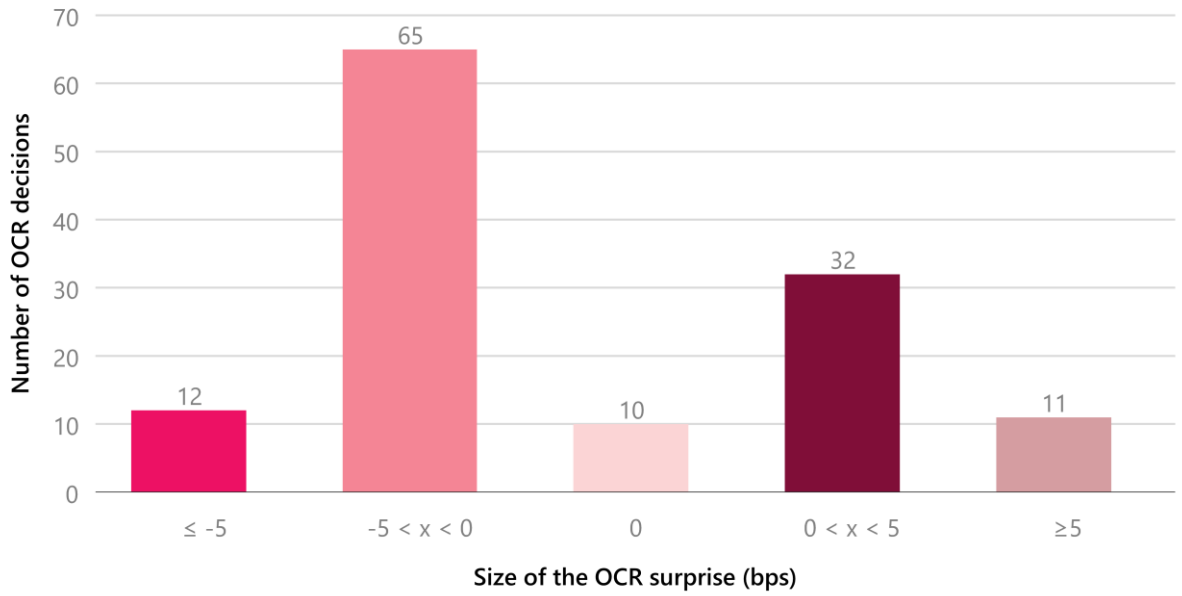
Material vs non-material surprises

Our sample contains a wide range of OCR surprises between -29.5 basis points to 22.5 basis points. It is possible that large OCR surprises could have different effects on average than small surprises, for instance via different effects on market participants' expectations of the persistence of the OCR, or via risk premia. To test if the size of the surprise is important, we deem a material OCR surprise as a one-month OCR surprise that is greater than or equal to 5 basis points (positive material surprise) and less than or equal to -5 basis points (negative material surprise).

This categorisation reveals that there are eleven instances of positive material OCR surprises and twelve instances of negative material OCR surprises within our sample.[12] This leaves 107 non-material OCR surprises, ten of which are where there was no OCR surprise (figure 1). In other words, less than one in five OCR announcements entail a material OCR surprise (greater than plus or minus 5 basis points). Our full results are presented in the Appendix.

12 In our sample, material surprises occurred in a similar share of decisions between MPS and MPR dates.

Figure 1: Histogram of OCR surprises for our sample



Results

Our results for material surprises are very similar to our main results for the NZD TWI and 1-year swap rate. For example, both samples show that a positive 10 basis point OCR surprise is associated with a 0.5 percent appreciation in the NZD TWI and an eight basis point increase in the 1-year swap rate one hour after an announcement. The size of the effect remains similar across the other event windows with similar levels of statistical significance.

In contrast, our coefficients for non-material surprises are estimated much less precisely, because when OCR surprises are small, their effects on financial market prices are dwarfed by the effects of other factors. While the point estimates of coefficients are smaller than for the full sample, or for material surprises, the standard error of these estimates is very wide, and therefore the differences from our other results are not statistically significant.

Exclusion of COVID-19 period

As a further robustness check, we check whether the market volatility and near-zero OCR during the COVID-19 pandemic period was having a material impact on our regression results. We restrict our sample to exclude data from 2020 and 2021 (COVID years) as these are the years when New Zealand lockdowns were implemented and removed. Our results are presented in the Appendix.

The results excluding the COVID-19 pandemic years were very similar to the results for the full sample, suggesting that these data points did not materially influence our results. It is worth re-noting that in the full sample the unscheduled meeting in March 2020 was already excluded.

Conclusion

This analytical note updates and extends previous Reserve Bank work that looked at the effect of OCR surprises on financial market instruments. Our main results suggest that a positive 10 basis point OCR surprise is associated with a 0.5 percent appreciation in the NZD TWI one hour after an announcement, similar to Wong and Cook's (2012) estimate. We find evidence that OCR surprises have a continued effect on the exchange rate after a week, but the precision of our estimates falls quickly as the event window expands.

We find that OCR surprises account for a material share of the variation in swap rates in the windows around policy decisions. These effects persist over the event windows we examine (up to a week) and are stronger for shorter-tenor swap rates. We find that OCR surprises have a similar effect on New Zealand's cross-country interest rate swap differentials compared to domestic swap rates alone.

Our findings are robust to a range of sample variations – we find similar results when excluding the COVID period, limiting the sample to be from 2012 onwards, and examining only material OCR surprises.

We find some indicative evidence that OCR surprises on MPS dates have a slightly stronger effect and more persistent effect on financial instruments, which could be related to the larger information set provided with these decisions.

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Appendix

Table 1A: Monetary policy surprise (1 month OIS) effect on foreign exchange and interest rates, 2006-2023

NZD TWI				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.047*** (0.009)	0.047*** (0.009)	0.049*** (0.013)	0.032* (0.019)
No. obs	130	130	130	129
R^2	0.183	0.171	0.096	0.023
NZD-AUD				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.039*** (0.008)	0.039*** (0.008)	0.041*** (0.011)	0.034** (0.016)
No. obs	130	130	130	129
R^2	0.170	0.159	0.094	0.033
NZD-USD				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.049*** (0.009)	0.051*** (0.010)	0.064*** (0.016)	0.027 (0.025)
No. obs	130	130	130	129
R^2	0.175	0.179	0.116	0.009
NZ 1-year swap rate				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.781*** (0.085)	0.794*** (0.089)	0.820*** (0.095)	0.901*** (0.129)
No. obs	130	130	130	129
R^2	0.396	0.385	0.367	0.278
NZ 2-year swap rate				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.691*** (0.102)	0.670*** (0.105)	0.644*** (0.117)	0.652*** (0.154)
No. obs	130	130	130	129
R^2	0.263	0.255	0.192	0.124
NZ-AU 1-year swap differential				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.753*** (0.084)	0.703*** (0.085)	0.658*** (0.095)	0.844*** (0.134)
No. obs	130	130	130	129
R^2	0.384	0.350	0.273	0.238
NZ-AU 2-year swap differential				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.679*** (0.102)	0.599*** (0.097)	0.479*** (0.115)	0.539*** (0.149)

No. obs	130	130	130	129
R^2	0.251	0.228	0.119	0.093
NZ-US 2-year swap differential				
	One hour window	Two hour window	One day	One week
	Surprise 1 (1m)	**Surprise 1 (1m)**	**Surprise 1 (1m)**	**Surprise 1 (1m)**
β	0.689*** (0.103)	0.707*** (0.106)	0.737*** (0.127)	0.578*** (0.191)
No. obs	130	130	130	129
R^2	0.259	0.256	0.209	0.067

Parentheses contain the standard error.
*** or ** or * indicates statistical significance at the 1% or 5% or 10% levels.

Table 2A: Regression results – longer tenor NZ swap rates

NZ 3-year swap rate				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.599*** (0.095)	0.612*** (0.096)	0.535*** (0.111)	0.512*** (0.156)
No. obs	130	130	130	129
R^2	0.237	0.240	0.153	0.078
NZ 5-year swap rate				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.451*** (0.084)	0.456*** (0.085)	0.383*** (0.100)	0.322** (0.157)
No. obs	130	130	130	129
R^2	0.184	0.185	0.102	0.032
NZ 10-year swap rate				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.293*** (0.073)	0.282*** (0.072)	0.232*** (0.087)	0.108 (0.163)
No. obs	130	130	130	129
R^2	0.112	0.106	0.053	0.003

Parentheses contain the standard error.
*** or ** or * indicates statistical significance at the 1% or 5% or 10% levels.

Table 3A: Regression results (MPS dates only)

NZD TWI												
	60 minute window			120 minute window			1 day			1 week		
	Surprise 1m	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**
β	0.058*** (0.013)	0.056*** (0.011)	0.044*** (0.008)	0.062*** (0.014)	0.058*** (0.012)	0.047*** (0.009)	0.079*** (0.019)	0.075*** (0.017)	0.061*** (0.012)	0.073*** (0.026)	0.077*** (0.023)	0.066*** (0.017)
No. obs	69	69	69	69	69	69	69	69	69	69	69	69
R^2	0.235	0.274	0.299	0.230	0.255	0.301	0.200	0.229	0.265	0.104	0.143	0.187
NZD/AUD												
	60 minute window			120 minute window			1 Day			1 week		
	Surprise 1m	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**
β	0.049*** (0.012)	0.048*** (0.010)	0.040*** (0.007)	0.050*** (0.012)	0.048*** (0.011)	0.043*** (0.008)	0.063*** (0.017)	0.065*** (0.015)	0.053*** (0.011)	0.052** (0.024)	0.049** (0.021)	0.045*** (0.016)
No. obs	69	69	69	69	69	69	69	69	69	69	69	69
R^2	0.207	0.250	0.307	0.198	0.230	0.316	0.163	0.218	0.257	0.065	0.072	0.112
NZD/USD												
	60 minute window			120 minute window			1 Day			1 week		
	Surprise 1m	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**	**Surprise 1m**	**Surprise 3m**	**Surprise 12m**
β	0.061*** (0.014)	0.058*** (0.012)	0.045*** (0.009)	0.065*** (0.015)	0.060*** (0.013)	0.048*** (0.009)	0.086*** (0.021)	0.078*** (0.018)	0.062*** (0.014)	0.067* (0.035)	0.068** (0.031)	0.063*** (0.023)
No. obs	69	69	69	69	69	69	69	69	69	69	69	69
R^2	0.235	0.266	0.276	0.230	0.250	0.281	0.201	0.212	0.235	0.052	0.067	0.101

NZ 1-year swap rate								
	60 minute window		120 minute window		1 Day		1 week	
	Surprise 1m	**Surprise 3m**	**Surprise 1m**	**Surprise 3m**	**Surprise 1m**	**Surprise 3m**	**Surprise 1m**	**Surprise 3m**
β	0.982*** (0.130)	0.947*** (0.107)	0.937*** (0.133)	0.916*** (0.109)	0.988*** (0.137)	0.965*** (0.111)	1.08*** (0.179)	1.140*** (0.140)
No. obs	69	69	69	69	69	69	69	69
R^2	0.460	0.540	0.425	0.512	0.437	0.526	0.352	0.495
NZ-AU 1-year swap differential								
	60 minute window		120 minute window		1 Day		1 week	
	Surprise 1m	**Surprise 3m**	**Surprise 1m**	**Surprise 3m**	**Surprise 1m**	**Surprise 3m**	**Surprise 1m**	**Surprise 3m**
β	0.946*** (0.128)	0.907*** (0.107)	0.819*** (0.128)	0.808*** (0.106)	0.824*** (0.142)	0.843*** (0.116)	0.924*** (0.195)	0.981*** (0.160)
No. obs	69	69	69	69	69	69	69	69
R^2	0.447	0.520	0.380	0.466	0.333	0.441	0.251	0.358

Parentheses contain the standard error.
*** or ** or * indicates statistical significance at the 1% or 5% or 10% level.

Table 4A: Regression results (2012 – 2023)

NZD TWI				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.053*** (0.012)	0.056*** (0.013)	0.062*** (0.017)	0.046** (0.022)
No. obs	87	87	87	87
R^2	0.183	0.187	0.134	0.048
1-year swap				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.879*** (0.102)	0.852*** (0.109)	0.842*** (0.118)	0.916*** (0.183)
No. obs	87	87	87	87
R^2	0.464	0.417	0.373	0.228
NZAU 1-year swap differential				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.799*** (0.095)	0.755*** (0.102)	0.734*** (0.115)	0.818*** (0.168)
No. obs	87	87	87	87
R^2	0.452	0.390	0.323	0.219

Parentheses contain the standard error.
*** or ** or * indicates statistical significance at the 1% or 5% or 10% levels.

Table 5A: Regression results: NZ exchange rate and NZ swap rates

NZD TWI												
	60 minute window			120 minute window			1 Day			1 week		
	1-yr swap	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**
β	0.063*** (0.005)	0.058*** (0.005)	0.065*** (0.006)	0.066*** (0.005)	0.061*** (0.005)	0.069*** (0.006)	0.081*** (0.008)	0.078*** (0.007)	0.087*** (0.010)	0.083*** (0.013)	0.081*** (0.012)	0.085*** (0.015)
No. obs	130	130	130	130	130	130	130	130	130	129	129	129
R^2	0.555	0.562	0.450	0.570	0.586	0.477	0.440	0.487	0.388	0.245	0.278	0.195
NZD – AUD												
	60 minute window			120 minute window			1 Day			1 week		
	1-yr swap	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**
β	0.054*** (0.004)	0.051*** (0.004)	0.057*** (0.005)	0.057*** (0.004)	0.054*** (0.004)	0.061*** (0.005)	0.067*** (0.007)	0.064*** (0.006)	0.071*** (0.008)	0.068*** (0.011)	0.070*** (0.010)	0.080*** (0.013)
No. obs	130	130	130	130	130	130	130	130	130	129	129	129
R^2	0.548	0.571	0.467	0.563	0.593	0.493	0.416	0.456	0.363	0.219	0.282	0.236
NZD - USD												
	60 minute window			120 minute window			1 Day			1 week		
	1-yr swap	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**	**1-yr swap**	**2-yr swap**	**5-yr swap**
β	0.066*** (0.006)	0.061*** (0.005)	0.067*** (0.007)	0.070*** (0.005)	0.064*** (0.005)	0.072*** (0.007)	0.090*** (0.010)	0.085*** (0.009)	0.093*** (0.012)	0.082*** (0.018)	0.080*** (0.017)	0.082*** (0.021)
No. obs	130	130	130	130	130	130	130	130	130	129	129	129
R^2	0.532	0.530	0.420	0.560	0.562	0.453	0.386	0.408	0.316	0.139	0.155	0.106

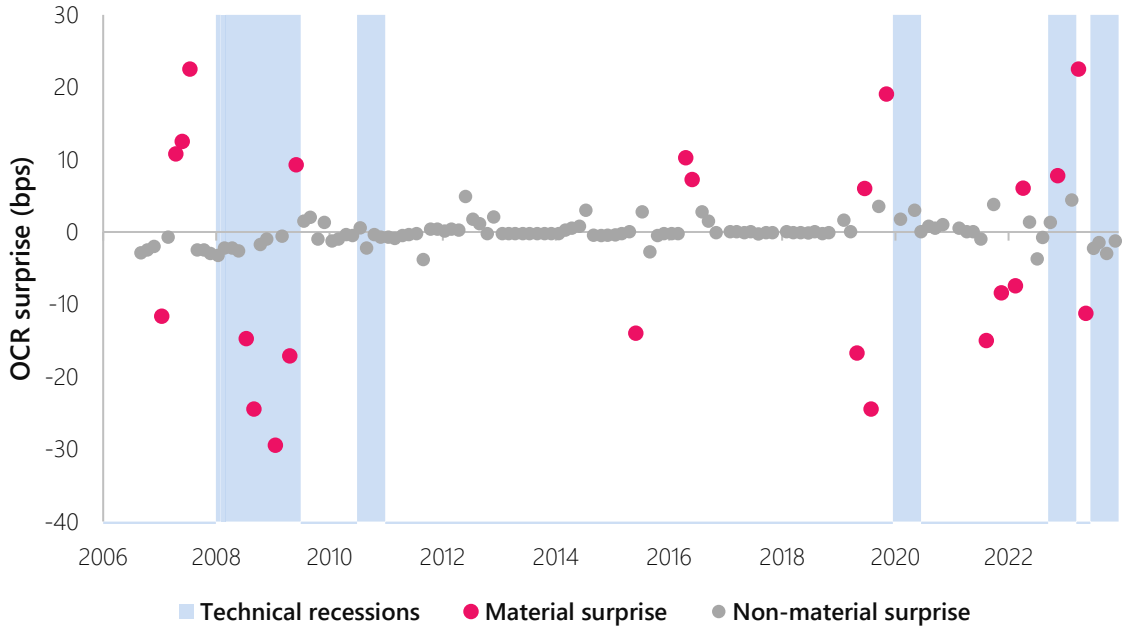
Parentheses contain the standard error.
*** or ** or * indicates statistical significance at the 1% or 5% or 10% levels.

Table 6A: Regression results: material and non-material surprises

NZD TWI					
		60 minute window	**120 minute window**	**1 day**	**1 week**
Full sample	***β***	0.047*** (0.009)	0.047*** (0.009)	0.049*** (0.013)	0.032* (0.019)
	No. obs	130	130	130	129
	R^2	0.183	0.171	0.096	0.023
Material	***β***	0.046*** (0.008)	0.046*** (0.009)	0.048*** (0.016)	0.029 (0.022)
	No. obs	23	23	23	23
	R^2	0.597	0.555	0.303	0.077
Non-material	***β***	0.029 (0.041)	0.029 (0.043)	-0.008 (0.059)	-0.057 (0.083)
	No. obs	107	107	107	106
	R^2	0.005	0.004	0.0001	0.005
NZ 1-year swap					
		60 minute window	**120 minute window**	**1 day**	**1 week**
Full sample	***β***	0.781*** (0.085)	0.794*** (0.089)	0.820*** (0.095)	0.901*** (0.129)
	No. obs	130	130	130	129
	R^2	0.396	0.385	0.367	0.278
Material	***β***	0.780*** (0.117)	0.792*** (0.125)	0.815*** (0.130)	0.866*** (0.139)
	No. obs	23	23	23	23
	R^2	0.680	0.656	0.653	0.649
Non-material	***β***	0.580 (0.367)	0.665* (0.378)	0.738* (0.412)	0.962 (0.594)
	No. obs	107	107	107	106
	R^2	0.023	0.029	0.030	0.025

Parentheses contain the standard error.
*** or ** or * indicates statistical significance at the 1% or 5% or 10% levels.

Figure 1A: New Zealand monetary policy surprises – 2006 to 2023



Note: We define a material monetary surprise as a surprise that is less than or equal to -5 basis points and greater than or equal to +5 basis points.

Table 7A: Regression results, full sample excluding COVID years 2020-2021

NZD TWI				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.049*** (0.009)	0.049*** (0.009)	0.049*** (0.014)	0.031 (0.020)
No. obs	117	117	117	116
R^2	0.202	0.191	0.096	0.020
1-year swap				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.794*** (0.090)	0.812*** (0.092)	0.829*** (0.100)	0.903*** (0.136)
No. obs	117	117	117	116
R^2	0.405	0.402	0.375	0.280
NZAU 1-year swap differential				
	60 minute window	120 minute window	1 Day	1 week
	Surprise (1m)	**Surprise (1m)**	**Surprise (1m)**	**Surprise (1m)**
β	0.768*** (0.089)	0.719*** (0.089)	0.663*** (0.100)	0.852*** (0.142)
No. obs	117	117	117	116
R^2	0.393	0.364	0.277	0.241

Parentheses contain the standard error.
*** or ** or * indicates statistical significance at the 1% or 5% or 10% levels.