What can we learn about monetary policy transparency from financial market data?

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Abstract

In this paper we investigate the impact of UK macroeconomic news announcements on selected futures contracts and exchange rates. We include a wide set of scheduled public news announcements in our study, including official interest rate decisions. We investigate whether the reaction to these announcements has changed since the Bank of England was granted operational independence in May 1997. Our results indicate that there may well have been changes in the way that financial markets incorporate key economic data into securities prices. In particular, we document an increase in the speed of the reaction to interest rate announcements, but also some evidence of a fall in the size of the full reaction.

Zusammenfassung

In diesem Papier wird untersucht, wie in Großbritannien makroökonomische Neuigkeiten auf ausgewählte Terminkontrakte und Wechselkurse wirken. In der Studie wird eine breite Palette regelmäßig veröffentlichter Daten betrachtet, einschließlich der Entscheidungen über die Notenbankzinsen. Wir untersuchen, ob die Reaktionen auf diese Ankündigungen sich geändert haben, seit der Bank von England im Mai 1997 operationelle Unabhängigkeit gewährt worden ist. Die Ergebnisse zeigen, dass durchaus Veränderungen zu verzeichnen sind in der Art und Weise, wie auf den Finanzmärkten ökonomische Daten die Wertpapierpreise ändern. Insbesondere dokumentieren wir, dass die Reaktionen auf Zinsänderungen schneller erfolgen aber auch, dass die Stärke der Reaktionen geringer ist.

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1 Introduction

A number of researchers have focused on the role of macroeconomic and public news announcements as a source of financial market volatility. A large number of such studies investigate the impact of macroeconomic news announcements on foreign exchange rates (see Almeida, Goodhart and Payne (1998), Andersen and Bollerslev (1998) or Kim (1998)), while others look at the impact of macroeconomic announcements on stock prices (see Mitchell and Mulherin (1994)), bond prices (see Fleming and Remolona (1997), Jones *et al* (1994) or Clare *et al* (1999)), interest rates (Becker *et al* (1995)) and derivative prices (see Ederington and Lee (1993, 1995) or ap Gwilym *et al* (1998)). In this paper we study the impact of scheduled UK macroeconomic news announcements on three of the most popular futures contracts traded on LIFFE - the short sterling, long gilt and FTSE 100 contracts - and on the dollar/sterling and Deutsche Mark/sterling foreign exchange rates, using a methodology due to Ederington and Lee (1995).

The purpose of this paper relates to the granting of operational independence to the Bank of England on 6 May 1997 by the UK Government. This decision by the new Labour Government changed the monetary policy environment in the United Kingdom. Prior to this date, interest rate decisions were taken by the Chancellor of the Exchequer after a monthly meeting with the Governor of the Bank of England, where the Governor offered advice to the Chancellor. The minutes of these meetings were subsequently published. Following the announcement of operational independence, interest rate decisions are now made by the Bank of England's Monetary Policy Committee (MPC), which consists of nine members: five from the Bank itself (the Governor, two Deputy Governors, the Chief Economist and the Executive Director responsible for financial market operations) and four external members, chosen from industry and academia. The Committee's decisions are taken with the aim of keeping inflation close to a target rate of 2½% a year, set by the Chancellor. Another stated aim of this change in regime was that monetary policy should be more transparent than under previous regimes. An increasing number of academic papers have focussed on the theoretical aspects of monetary policy transparency. This

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* The views expressed in this paper are those of the authors and do not necessarily reflect those of the Bank of England or the Bundesbank. An earlier version of this paper appeared as a Bank of England Working Paper (for more details please go to www.bankofengland.co.uk). We would like to thank our colleagues at the Bank of England and the participants of the Bundesbank\CFS Conference on "Transparency in Monetary Policy" in October 2000 for comments on earlier versions of this paper. We would also like to thank Mark Johnson and Steven Seddon for providing excellent research assistance.

change in the monetary policy framework gives us a rare opportunity to study how such a change can influence the way that key economic data are impounded into financial prices, and perhaps the extent to which the Bank of England has been successful in making UK monetary policy more transparent.[1] It also gives us an opportunity to interpret some the results in the light of these relatively new theoretical models.

We use two sets of intra-day data on UK financial prices. The first set comprises intra-day data from LIFFE on FTSE 100, short sterling and long gilt futures contracts spanning the period from January 1994 to June 1999. The second data set comprises intraday quotes on the dollar/sterling and Deutsche Mark/sterling exchange rates, over the same period. Using these two data sets we investigate whether there has been a change in the way that key UK scheduled macroeconomic news announcements impact on these markets. Crucially, the announcements that we consider include the key monetary policy announcements – official interest rate decisions, the publication of the Bank of England's *Inflation Report* and the minutes of the Monetary Policy Committee's monthly meeting – which have not been considered previously.

In anticipation of our conclusions, a comparison of the reactions pre and post operational independence does not reveal simple, definitive conclusions about whether monetary policy is now better understood by financial market participants as a result of this regime change. The total (cumulative) reaction of the LIFFE contracts and exchange rates to interest rate changes appears to be either unchanged or lower in the post Bank independence period, depending on the market observed, although these differences are rarely significant in a statistical sense. However, the immediate reaction in the first five minutes is larger in all of the markets studied here. With respect to other key macroeconomic data, the short sterling, long gilt and FTSE 100 contracts exhibit a smaller reaction to these data releases in the post Bank independence period, while conversely the exchange rates studied here exhibit a larger reaction.

The remainder of this paper is organised as follows. In Section 2 we consider briefly the way in which the impact that economic data has on financial prices might be expected to change following a change in monetary policy; in Section 3 we undertake a review of some of the related academic literature; in Section 4 we introduce the data; in Section 5 we present simple results designed to highlight some key stylised facts; in Section 6 we employ a variant of the Ederington and Lee (1995) methodology to determine whether the announcements in our study have a significant impact on asset prices using the whole

[1] In a similar vein, McQueen and Roley (1993) and Fleming and Remolona (1997) investigate whether the reaction to US scheduled macroeconomic announcements varies systematically with the state of the US economy

sample period, while in Section 7 we use the same methodology to determine the degree to which the change in the United Kingdom's monetary policy regime has led to a systematic change in the way that economic data now impacts on financial markets; and finally, we conclude in Section 8.

2 Theoretical considerations[2]

2.1 The recent literature

One aim of the empirical part of this paper is to establish whether monetary policy in the UK is more transparent following the granting of operational independence to the Bank of England in May 1997. Partly inspired by the adoption of more transparent monetary policy regimes amongst a number of western central banks and partly by the debate about the ECB's transparency, a growing number of recent papers have focused on the role of transparency in the monetary policy process.

Cuikerman (2000) draws attention to two particular difficulties which monetary authorities face in trying to become truly transparent. Firstly, in trying to signal to the public the economic model which they use in their decision making process, they are hindered by the fact that there is no consensus in the economics profession about the 'correct' model. This lack of consensus clearly becomes more critical when decisions are made collectively rather than by a single individual. Secondly, Cuikerman argues that when central banks are self-confessed flexible inflation targeters it is difficult in this case for the general public to work out just how flexible the monetary authorities will be when faced, for example, with a large supply shock. According to Cuikerman this uncertainty can only be removed if the monetary authorities have responsibility only for maintaining price stability and no responsibility for smoothing fluctuations in output, i.e. that they become strict inflation targeters.

Theoretical papers on the desirability of monetary policy transparency can be found to support the view that it is desirable in terms of social welfare or to refute this claim. Geraats (2000a) shows how transparency can help to reduce equilibrium inflation rates and give the central bank greater flexibility to respond to economic shocks. She argues that full transparency involves the publication of the central bank's conditional forecasts of inflation and output. In contrast to this result, Jensen (2000) shows that full transparency may not always be desirable. Modelling the economy using a New Keynesian "Phillips curve"

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2 This literature review owes much to the participants of the Bundesbank/CFS Conference on "Transparency in Monetary Policy", October 2000 and the papers presented at this conference.

framework he shows that the benefits of transparency depend crucially upon the credibility of the central bank. When the central bank initially has little credibility more transparency forces the central bank to focus on its inflation target and less upon any output target which it might have.[3] However, when the central bank is seen to be credible Jensen shows that transparency involves a loss in terms of stabilising output fluctuations. Perhaps the main difference between the results of Jensen (2000) and Geraats (2000a) is the underlying model of the economy used - Geraats (2000a) uses a Lucas-style supply function rather than the New Keynesian model used by Jensen (2000).

The stylised message from the time-inconsistency literature which has its origins in Kydland and Prescott (1977), is that a central bank that commits to a policy rule can eliminate any inflationary bias which might otherwise exist. Geraats (2000b) revisits this idea to investigate the issue of monetary policy transparency. Essentially by changing the timing of the 'game', with the central bank moving first and the private sector then forming its expectations about future inflation second, rather than the other way around, Geraats (2000b) shows that it is necessary for the bank to be more transparent about the shocks to which it is responding to reduce any inflation bias which exists.[4] In the extreme case of perfect economic transparency an inflation bias may be eliminated completely. In showing that greater economic transparency is sufficient to eliminate an inflation bias, whereas pre-commitment to a monetary policy rule is not, Geraats (2000b) argues that this may explain why newly redesigned monetary policy procedures are not accompanied by commitment to rules, but rather by a commitment to publish "inflation reports".

Finally, we might note that the theoretical literature distinguishes between different types of transparency.[5] For example, Gerbasch and Hahn (2000) define three types of transparency: *goal*, *knowledge* and *operational* transparency. Goal transparency is defined as transparency about the objectives of monetary policy, for example the announcement of a specific inflation target would fall into this category. Knowledge transparency involves informing economic agents about the central bank's views about the shocks with which committee members are currently concerned. The inflation reports now widely published by central banks generally aim at improving knowledge transparency. Finally, operational transparency refers to the process of setting monetary policy and the micro level decisions, for example like whether the key interest rate decisions should be made by the central bank President/Governor, or by a committee etc.

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3. Eijffinger and Hoeberichts (2000) argue that increasing central bank accountability through increasing monetary policy transparency is most desirable when the credibility of the monetary authorities is relatively low.

4 In her paper Geraats thus distinguishes between different types of transparency, with economic transparency being only one type.

5 See also Geraats (1999) for an alternative take on types of transparency

2.2 The impact of greater transparency on financial prices

With this literature and the Gerbasch and Hahn (2000) definitions of monetary policy transparency in mind, can we say anything about the consequences of greater transparency in practice, rather than in theory ? For instance, how would the introduction of a more transparent monetary policy regime affect the way in which the information contained in scheduled macroeconomic news announcements is impounded into financial prices ?

The reaction of financial prices to news should be determined by the extent to which the news changes market perceptions about the future payoff of the relevant security. For example, an announcement that changes expectations about long-term economic growth and inflation should, other things being equal, have some effect on the values of long-term assets. The announcement of Bank independence caused UK 20-year bond yields to fall by around 40 basis points on the day.

If monetary policy is transparent in terms of its goal and in the way in which information about economic shocks are dealt with, then it may be possible for economic agents to predict interest rate decisions accurately using publicly available macroeconomic data. In this case any interest rate decision made by the authorities may subsequently contain less information than ones made under a less transparent regime, in turn causing a lower response from securities prices. News will, however, be conveyed in macroeconomic data releases. Over a period when the monetary policy process becomes more transparent, the reaction to these macroeconomic announcements could therefore increase while the reaction to interest rate decisions declines (Haldane and Read (1999) also propose this hypothesis).

In a world of perfectly transparent monetary policy then it is possible that monetary policy could be become devoid of any news content for financial markets. However, this is never likely to happen in reality as Vickers (1998) says:

"*While transparency – inflation reports, MPC minutes, Treasury Committee hearings and so on – increases what is in the public domain (desirably in my view), there is surely information relevant for policy-making that is simply incapable of being put in the public domain.*"

In this comment Vickers is referring to the complex process which each committee member goes through in assimilating all the information relevant to his or her decision, which is then turned into a decision with the help of his or her 'economic model' of the economy. For each member of any monetary policy committee this is indeed a complex task which is difficult enough to convey concisely to the public, but when the interest rate

decision is a collective one, we must bear in mind the added complexity involved with collating each members' views to form one collective judgement (see Cuikerman (2000)). If market agents' felt that they did not understand (or could not second guess) the dynamics of committee decisions adequately, in spite of the existence of both *goal* and *knowledge* transparency, then interest rate decisions would still convey useful information for market participants. The issue of monetary policy decision making by one, powerful individual (possibly a politician as in the UK prior to Bank of England independence), or via majority voting by a committee of individually accountable experts, is one aspect of *operational* transparency as defined by Gerbasch and Hahn (2000). In this case the underlying macroeconomic data might be less informative, and the key policy decisions might be more informative.

In summary, any improvement in the transparency of monetary policy might bring about a change in the way that both interest rate decisions and other macroeconomic announcements are incorporated into securities prices. It is possible that changes in the reactions to these two types of announcements may be in opposite directions.

3 Previous empirical literature

Previous empirical research aimed at understanding the way in which the information embodied in scheduled macroeconomic announcements is impounded into securities prices has found that these announcements do have a significant impact upon securities prices. Most of the research has been conducted with respect to US securities. Using regression analysis, where announcements are represented by dummy variables in OLS regressions, Ederington and Lee (1993) used intraday data for T-bond, eurodollar and dollar/Deutsche Mark futures contracts to identify those US macroeconomic news announcements that had the greatest impact on these contracts. They found that the most important announcements for the interest rate contracts were scheduled news announcements relating to employment, PPI, CPI, durable goods orders, industrial production – capacity utilisation, construction activity, the NAPM survey and the Federal budget. For the Deutsche Mark contract the US merchandise trade deficit, GNP and retail sales were also important. Ederington and Lee also found that the majority of the price adjustment in their sample occurred within the first minute, with subsequent price movements seemingly independent of this first-minute change.[6] Price volatility remained much higher than usual for around 15 minutes after the

[6] This was in contrast to many studies prior to this date which had used lower-frequency data. For example, using US stock market data both Patell and Wolfson (1984) and Barclay and Lintzenberger (1988) identified significantly higher levels of volatility over a much longer post-announcement period.

announcements, statistically and significantly higher for around 40 to 45 minutes and slightly higher for several hours following the announcement. Using the same set of contracts but a different methodology, involving the comparison of securities prices around news announcements with the behaviour associated with equivalent periods that did not involve announcements, Ederington and Lee (1995) focused on price behaviour from the 2 minutes prior to the announcements to 10 minutes after. They found that the price reaction began within the first 10 seconds after the announcement and was over after another 40 to 50 seconds. [7]

Fleming and Remolona (1997), also employing a regression approach, used inter-dealer data for the US T-bond market, focusing on the possible implications that a particular market microstructure might have on the absorption of scheduled macroeconomic news announcements. To highlight some of the potential market microstructure issues they monitored the reactions of trade volume as well as price changes to the announcements. They found that 9 announcements had a statistically significant effect upon T-bond prices and 14 had an effect on trading activity. By decomposing the announcements into their expected and unexpected components using MMS forecast data they identified a further 6 announcements that had a significant impact upon the US T-bond market. As it is possible that the reaction of a market to a particular news announcement may vary depending upon the state of the world, Fleming and Remolona (1997) controlled for the economic cycle by using either a measure of implied volatility, or the expected change in the Fed funds rate as a proxy for market conditions. They found that durable goods orders, GDP, housing starts and employment announcements had a more significant impact upon T-bond prices and trading volumes once the economic cycle had been accounted for. In a similar vein, and using daily data, McQueen and Roley (1993) found that by classifying economic activity as being either 'high', 'medium' or 'low' relative to trend, it was easier to identify reactions of the US stock market to US macroeconomic announcements.

Far less work of this nature has been conducted using UK-specific securities market data. Using high-frequency derivatives data from LIFFE, ap Gwilym *et al* (1998) investigated the impact of UK scheduled macroeconomic news announcements on LIFFE's FTSE 100 and short sterling futures contracts. They considered the impact of nine different announcement types, finding that the RPI, PPI and PSBR announcements all had a significant impact on FTSE 100 contracts, and that RPI, PPI, labour market statistics and retail sales announcements had a significant impact on short sterling contracts. Using the Ederington and Lee approach with a 12-minute window around the announcements, they

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[7] The Ederington and Lee (1993, 1995) data set only contained price change data, preventing an analysis of trading activity around announcements.

found less price volatility than had been found in equivalent US studies in the 2 minutes prior to announcements, and a sharp reaction which peaked in the first 90 seconds, which subsequently remained significantly higher for another 5 to 6 minutes. The number of transactions remained high for around 10 minutes. The authors also found some evidence to suggest that price overreaction existed in the LIFFE pits in the first minute after the announcement. Clare *et al* (1999) extended the Ederington and Lee approach to examine the impact of scheduled UK macroeconomic news announcements on gilt market volatility and trading volumes. They found tentative evidence to suggest that the increase in volatility that follows these announcements is associated with an increase in both the size of price changes and the average size of trades, but not with an increase in the number of gilt market trades.

To date little empirical work has been conducted in using event study techniques to address issues of monetary policy transparency as seen by market participants. Some recent studies have made use of daily data to approach this issue. Haldane and Read (1999) looked at the response of the UK yield curve to official interest rate changes, using daily data from January 1984 to May 1997 (the start of the Bank independence period). They conclude that the response of the UK yield curve to a 1% change in official interest rates fell following the adoption of inflation targeting in October 1992, particularly at maturities up to two years. In a related study, Joyce and Read (1999) looked at the reaction of UK bond prices to RPI announcements from January 1982 to April 1997. They found that over the inflation targeting period beginning in October 1992 bond prices became less responsive to RPI announcements, and they interpret this as a sign of improved monetary policy credibility. Finally, using daily data Siklos (2000) investigates whether the Bank of Canada has been successful in making monetary policy more transparent following a number of measures such as the publication of a regular inflation report (the Monetary Policy Report) and the announcement of a formal inflation target. By calculating an unconditional measure of kurtosis as a proxy for uncertainty over various sub-periods, Siklos shows, for example, that uncertainty in Canadian financial markets was “especially high” when changes in the overnight rate of 50 basis points or more were made.

4 Data

4.1 LIFFE data

The tick-by-tick futures contract data used in this study are provided by LIFFE for the FTSE 100, short sterling and long gilt futures contracts traded on this exchange between January 1994 and June 1999. The data contain details of all trades in the contracts, and

give the time to the nearest second, the price and the number of contracts traded. Most bids and asks are also recorded, but these are not matched, and at times of heavy trading the pit observers do not record all of these.[8]

The data used are generally for the most heavily traded contract. For the short sterling contract the nearest-to-maturity contract is used at all times. For the long gilt and FTSE 100 contracts we use the nearest-to-maturity contract until the trading volume on the next contract becomes greater. This generally occurs about three to four weeks prior to maturity for the former and at maturity for the latter. Since the futures price is linked by an arbitrage condition to the spot value of the index, the move to a new contract has virtually no implications for this study. We therefore pay no regard to contract changeovers in what follows. The close link between futures markets and the markets for the underlying asset also indicates that the results will be a good proxy for the reaction of the underlying asset.

4.2 Foreign exchange data

The foreign exchange data used here were provided by *Olsen & Associates* and consist of foreign exchange quote data gathered from Reuters, Knight-Ridder and Telerate. Foreign exchange quote data of this kind has been used extensively in the past to investigate: the behaviour of foreign exchange market volatility (see for example Andersen and Bollerslev (1997)); issues relating to foreign exchange market liquidity (see for example Hartmann (1996)); and issues relating to foreign exchange market volume (see for example Melvin and Yin (1996)).[9] We use the dollar/sterling and Deutsche Mark/sterling exchange rates between January 1994 and June 1999. The data are available on the tapes provided by Olsen on a 24-hour basis. We have deleted those days from the data set which correspond to a UK bank holiday. Even though the currency pairs are still traded elsewhere in the world, trading volume is substantially lower. Each line on the data file for each cross rate contains: a time stamp of the quote entry (GMT); bid and offer quotes; and codes denoting the country, city and institution of the dealer submitting the quote. In the analysis which follows we use the mid - prices of these cross rates.

4.3 Data transformation

We transform the irregularly spaced data in both data sets into calendar time intervals. For example, when we calculate returns over a five-minute interval, this return is defined as the

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8 Over our sample period, and for the times of the day that we consider here, only a small percentage of total trades were conducted off-floor.

9 Although see Danielsson and Payne (1999) for criticisms relating to the use of such data to test market micro-structural issues.

log of the ratio of the closing price of the previous five-minute interval to the opening price for the subsequent five-minute interval. For the first window in each day the opening price is taken to be the first transaction of that day. When we calculate the number of trades using the LIFFE contracts we simply count the number of trades that occur in each five-minute interval.

4.4 Macroeconomic announcement data

The macroeconomic announcement data consist of those announcements listed in the MMS database, supplemented by the inclusion of: MPC interest rate decisions (including 'no change' decisions) since the Bank of England was granted operational independence on 6 May 1997; and official interest rate changes up to (and including) 6 May. The full set of macroeconomic announcements that we use in our study is presented in Table 1, along with their release times and their frequency during our sample period.

The announcements reach the market at the official announcement time, which is generally 9.30 am for macroeconomic data releases and is currently 12.00 pm for interest rate decisions. The *Inflation Report* and the MPC minutes are made available to journalists in a secure location within the Bank an hour and half an hour respectively before the official announcement time. This allows Press reports to be made, and hence an informed reaction to take place, within a very short time of the official announcement.

5 Announcement versus non-announcement behaviour

In this section we present a formal analysis of the impact of these announcements on LIFFE contract prices and on the two exchange rates. To this end we employ the announcement versus non-announcement day methodology of Ederington and Lee (1995)[10] by splitting the sample period into days when the announcements were made (announcement days) and those days when they were not (non-announcement days) (see Table 1). We use the split between announcement and non-announcement days to investigate the pattern of price volatility (mean absolute returns)[11] and trading activity around the macroeconomic announcements. The differences in the mean absolute returns and mean number of trades between announcement and non-announcement days are tested

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10 ap Gwilym *et al* (1998) and Clare e*t al* (1999) also used this methodology.

11 All returns given in this paper are log returns (ie $\ln[P_t/P_{t-1}]$), multiplied by 10,000 for notational convenience.

using a non-parametric statistic.[12] The non-parametric test which we use is the Kruskall-Wallis test which is given by:

$$H = \frac{12}{N(N+1)} \sum_{j=1}^{J} \frac{S_j^2}{m_j} - 3(N+1) \qquad (1)$$

where J=2, since there are only two series, i.e. the announcement and non-announcement series; N is the total number of observations from both series combined; m_j is the number of observations from series j; and S_j is the rank sum for series j. This test statistic is distributed $\chi^2(J\text{-}1)$ under the null hypothesis of equal medians.

We prefer to use this approach rather than the more commonly used dummy variable regression approach. High-frequency data such as these generally have highly persistent conditionally heteroskedastistic components and outliers, which make parametric inferences inappropriate (see Andersen, Bollerslev and Das (1999) for a critique of parametric inference with such data). The methodology we use should give a more statistically reliable framework for comparing the differences between announcement and non-announcement day behaviour.

In order to determine the size and speed of the impact of macroeconomic news announcements on the sterling exchange rates and LIFFE futures prices, we compared the behaviour in the period around announcements, with the behaviour on 'non-announcement' days, for a sequence of one- minute windows. Since announcements occur at different times of day we used event time rather than calendar time to construct the data set for the periods around the announcements, with all announcements said to occur at time zero.[13] Also, since market behaviour changes throughout the day, we constructed the non-announcement data set so that its time-of-day profile matched its announcement counterpart. In other words, we constructed the non-announcement data set so that it had the same proportion of observations around each announcement time (eg. 9:30 am, 12:00 pm etc) as the announcement data set.

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12 We also calculate a parametric test for the difference in these means, but given the highly non-normal nature of the data we prefer to use and report the non-parametric statistic in expression (1). The parametric results are available on request from the authors.

13 Working in 'event time' simply involves looking at the pattern of behaviour around incidences of a particular type of event. In this case the events are announcements, at whatever time of day these occur. Note that some researchers use the term 'event time' in the context of time series of high frequency data, to indicate that each trade (event) is treated as a sequential observation regardless of the elapsed time between each trade.

6 Reactions pre and post-Bank independence

In this section of the paper we investigate the hypothesis that there has been a systematic change in the way that scheduled macroeconomic news announcements are now absorbed into securities prices with the advent of the Bank of England's operational independence. As noted above, this independence was granted on 6 May 1997 by the UK Government with the remit that the Bank should aim to achieve an inflation target of 2½% a year; monetary policy decisions are now taken by the MPC.

6.1 Pre and post-BI reactions to macroeconomic announcements

In our empirical analysis we monitor the pattern of price reactions by calculating returns for each one minute window from 10 minutes before announcements to 60 minutes after, using these to calculate mean absolute returns (effectively a measure of volatility) and mean cumulative absolute returns over the same period.[14] The cumulated values are adjusted for similarly-calculated values for periods without announcements to produce cumulative absolute abnormal returns (CAARs), which can be used to measure the extent of the reaction to news announcements.

As an example of the kind of impact which macroeconomic data releases have on securities prices, in Chart 1 we plot the mean absolute return for one minute windows from 10 minutes before announcements to 60 minutes after, for the LIFFE short sterling contract. The chart shows the average reaction of this contract to all the macroeconomic announcements in our data set over the full sample period from 1994 to 1999. It is clear that these announcements have a pronounced impact upon contract volatility immediately following the announcement. This volatility remains higher than on non-announcement days for approximately fifty minutes, and is very much higher in the first five minutes or so. We apply a non parametric test (the Kruskal-Wallis test) to determine whether this higher volatility was significantly higher or not in a statistical sense. The results showed that volatility following macroeconomic announcements relative to volatility on non-announcement days was significantly higher at the 99% level of confidence for each of the twenty-two one minute windows following these announcements. The question however, is whether post-Bank independence volatility is significantly different from pre-Bank independence volatility.

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[14] The cumulative absolute returns are calculated from returns, not abnormal returns, and so measure the absolute return from the announcement to each subsequent minute.

We begin our analysis of this question by separating the interest rate announcements from the other macroeconomic announcements, where we apply the generic term - 'macroeconomic announcements' - to this second set. Chart 2 shows the difference between the mean CAARs on announcement days and non-announcement days, for the pre and post Bank independence periods, for the two sets of announcements, macroeconomic announcements and interest rate announcements. Table 2 gives the results of tests of the difference between the magnitude of the mean CAARs in the pre- and post-Bank independence periods after 5, 15 and 60 minutes.

6.2 Interest rate announcements

First consider the figures in Chart 2, column 1 which relate to interest rate announcements. For all three futures contracts the immediate reaction to interest rate announcements in the post-Bank independence period is higher than in the pre-Bank independence period. However, when we look beyond the initial period we can see that after approximately ten minutes the reaction is lower for the two interest rate contracts and approximately the same in the equity market. With respect to the exchange rate figures in Chart 2, column 1, the immediate reaction is also greater in the post-Bank independence period compared with the pre-Bank independence period. But after approximately thirty minutes the total impact of the interest rate announcements is very similar in both periods. These results could then be interpreted as broadly supporting the idea that monetary policy is less interesting, as the overall impact of Bank independence on the different markets has either been to reduce the reaction to interest rate changes, or to have little noticeable impact overall.

The test statistics in Panel A, of Table 2 indicate that for the five minutes following the interest rate announcements the increase in volatility in the interest rate contracts is statistically significant. However, this is not true for the FTSE-100 contract or for the exchange rates. Looking further ahead, we also provide test statistics for the difference in volatility between the two periods after both fifteen and sixty minutes. While the figures in Chart 2 are indicative of a systematic change, the non-parametric test indicates that none of the observed differences are significant after fifteen or sixty minutes after the announcement. With respect to the volatility of these markets further away from the initial event then, we must be careful in drawing too firm a conclusion from column 1 of Chart 2.

6.3 Macroeconomic announcements

Turning to the reactions to the set of macroeconomic announcements shown in Chart 2, column 2, we can see that for the LIFFE contracts the post Bank independence reactions are lower than the pre Bank independence reactions at all the horizons considered here.

This is in sharp contrast to the results for the exchange rates. In the FOREX market there appears to have been a clear post Bank independence increase in reactions following macroeconomic announcements at all horizons. The difference between the two sets of results are puzzling. They suggest that there has been an upward shift in the perceived importance of macroeconomic data to FOREX markets relative to other markets.

These results are supported strongly by the test statistics presented in Panel B of Table 2 for the five minute period following the announcements. It is also clear that for the long gilt and FTSE-100 contracts there is still significantly lower volatility sixty minutes after the announcements (and after fifteen minutes for the short sterling contract).

7 Conclusions

In this paper we have examined the extent to which the change in the United Kingdom's monetary policy arrangements, which occurred in 1997, has changed the way in which UK economic announcements are impounded into financial prices. The total (cumulative) reaction of the LIFFE contracts and exchange rates to interest rate changes appears to be either unchanged or lower in the post-Bank independence period, depending on the market observed. This supports the idea that the news content of monetary policy announcements may have fallen. However, while the total reaction supports this view, the differences in pre versus post-independence behaviour are rarely significantly different from one another in a statistical sense at these longer (30 to 60 minute) horizons. The immediate reaction to interest rate changes in the first 5 minutes is larger in all of the markets studied here and the difference between the pre and post-independence reactions at this horizon are frequently very significant. With respect to interest rate changes then it appears that the news contained in the decisions is incorporated into financial prices more quickly than in the pre-Bank independence era. One possible explanation for this is that pre-positioning in the financial markets ahead of the decision has become more sophisticated since Bank independence, with the publication of a clear, unambiguous timetable for the announcements of interest rate decisions. Another explanation is that financial market technology has been improved in a way that allows for a faster reaction. Although, we cannot rule this explanation out completely, we believe that the technology during this period did not change sufficiently (if at all in some cases) to account for these changes.

We also tested for a change in the way that the markets studied here absorbed macroeconomic data following Bank independence. Looking at exchange rate responses, there is very clear evidence to support the idea that FX market agents now pay more attention to macroeconomic data announcements than in the pre-independence period.

This evidence appears to suggest that the underlying economic data have become more important in these markets relative to the key monetary policy announcement. A different picture emerges when we consider the impact of the same set of announcements on all three LIFFE contracts, which is lower in the post-Bank independence period. If we consider this evidence along with the fact that the immediate impact of interest rate changes on these contracts was higher in the post-independence period, then we might conclude that, relatively speaking, the macro data were less important than the key monetary policy decision and therefore that the markets were still learning about the MPC's reaction function over this period. This seems to be a reasonable possibility given that prior to independence market agents were only having to 'second-guess' one person – the Chancellor – whereas after the change they had to play the game with the nine members of the committee, whose votes and therefore opinions all carried (and continue to carry) the same weight. However, if we consider this evidence along with the fact that the overall impact of interest rate changes on these financial prices was lower, or unchanged, in the post independence period, this could be taken to imply that both the key interest rate decision and the general UK macroeconomic data were both relatively less important, or at least no more important, in the post-independence period. If one is willing to accept this interpretation of our results, then this may suggest that the UK economic environment has become of less importance to the sterling-denominated financial prices considered here – a distinct possibility given the globalisation of financial markets. This might in turn imply that, relatively speaking, UK domestic economic news will be of less relevance than international economic news in the future.[15]

15 We intend to pursue this question in future work of this kind.

Table 1: The macroeconomic announcement set

	No of observations	Release time(s)
Interest rate change (pre BI)	10	09:40, 09:45, 11:00, 12:00
Interest rate decision (post BI)	25	12:00
RPI M/M	66	09:30
RPIX Y/Y	65	09:30
PPI input M/M	66	09:30
PPI output M/M	66	09:30
Average Earnings	61	09:30
Unemployment	65	09:30
Prel. GDP Q/Q	22	09:30
Revised GDP Q/Q	22	09:30
Final GDP Q/Q	21	09:30
Ind Prod M/M	66	09:30
Retail sales M/M	66	09:30
PSBR	66	09:30
M0 M/M	66	09:30
M4 M/M	64	09:30
Consumer credit	67	09:30
Current Account	21	09:30
Global visible trade	67	09:30
Ex-EU visible trade	66	09:30
CIPM	38	09:30
CBI Dist trades	40	09:30, 10:00, 11:00, 11:30
CIPS services survey	26	09:30
CBI Ind Trends	40	11:00, 11:30

Table 2: Abnormal reactions to announcements post- vs. pre-BI

Announcement type	mins.	Short Sterling	Long Gilt	FTSE-100	GBP-EM	GBP-USD
			PANEL A			
Interest Rate changes	5	2.06**	5.58**	15.23	4.76	5.81
	15	-2.61	-18.45	-3.45	8.28	11.60
	60	-2.29	-10.24	6.30	-2.90	-9.10
			PANEL B			
Macroeconomic data announcements	5	-0.08***	-1.58***	-2.19***	2.74***	2.52***
	15	-0.31**	-3.90	-3.87***	1.99	1.43
	60	-0.60	-2.74***	-7.90***	0.80	1.10

Notes: The figures are given by the reactions in the pre-BI period minus the reactions in the post-BI period where the reaction is defined as the excess mean absolute return in the 5 minutes following the announcement on announcement days relative to non-announcement days. The significance of the test. The test uses the ratios of the absolute price changes following the reactions to the mean absolute price at that time of day on either pre-BI days or post-BI days. *** and ** denote significance at the 99% and 95% levels of confidence respectively.

Chart 1: Mean absolute returns for the LIFFE short sterling contract around announcements

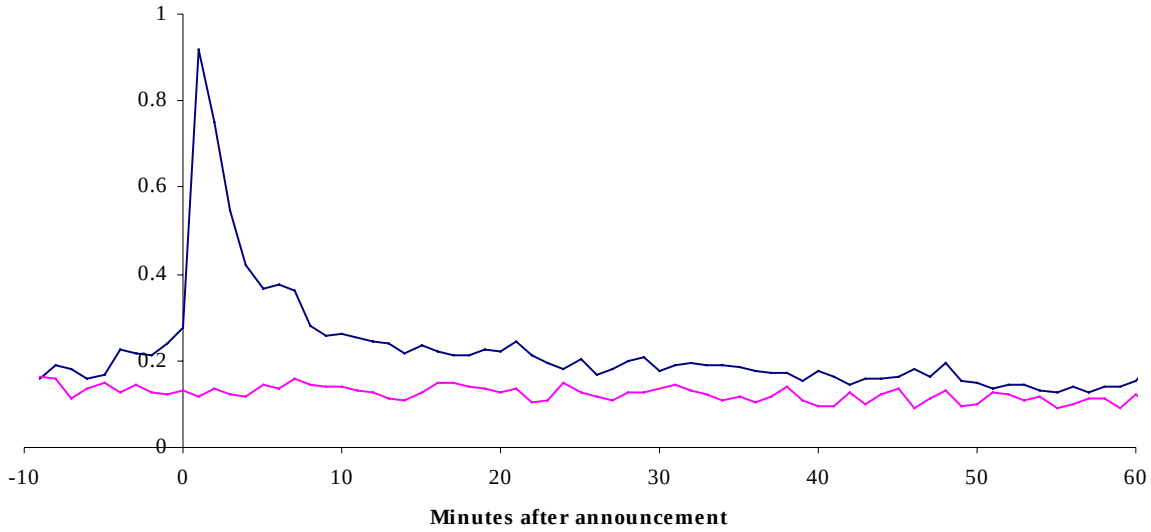

Chart 2: Cumulative Abnormal Returns

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