UK Financial Market Reaction to Interest Rate Adjustments: Does Transparency Matter?

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Abstract

The purpose of this paper is to examine the impact of interest rate changes on the performance of UK financial markets, following major changes in monetary policy regimes from the beginning 1986 to the end 2004. The underlying argument that monetary policy affects asset returns is supported by a body of previous evidence that demonstrates that returns are influenced by factors, such as interest and inflation rates, which affect business conditions. Monetary policy changes and realised factor risk premia are able to convey information regarding future macroeconomic conditions to the extent that increases (decreases) in interest rates signal less (more) favourable anticipated economic outcomes, with an expected negative (positive) effect upon corporate values in general. Our results show that despite the increase in transparency over our sample period financial markets find it difficult to assimilate the added information quality as would be expected in an efficient market. Our findings also indicate that changes in interest rates impact asymmetrically on returns within financial markets, with rises in interest rates better anticipated than rate falls. Volatility of returns is regime varying with stock indices indicating substantially higher volatilities than the bond indices.

Key words: interest rate changes, TARCH, market reaction.

1. Introduction

It is widely accepted that financial markets in the global economy are responsive to monetary policy changes and that financial markets focus on discount rate changes because these are perceived as indicative of future policies. This study considers whether the increased openness of the decision making process surrounding UK interest rate adjustments is reflected in the behaviour of stock and bond returns.

From the 1970s until 1997, successive UK governments have utilised their ability to set interest rates and therefore to reliably predict the economic consequences of their monetary policy changes in order to manage the economy. Following Britain's departure from the Exchange Rate Mechanism (ERM) in September 1992, when UK monetary policy was defined in terms of narrow bands against other European currencies, there has been a drive towards more openness and transparency outlined within a new monetary policy framework (King, 1997). At the heart of this new framework was an increase in the responsibility and transparency of the Bank of England from an advisory body in the early 1990s to full independence in 1997.

The general consensus is that the new UK framework has delivered on the Governments promise of improvements in transparency and openness surrounding monetary policy decisions. Recent international comparisons that consider the level of transparency based on inflation reports released by central banks indicate that UK transparency is rated first in a group of 19 inflation-targeting central banks (Fracasso et al 2003). Further work by Eijffinger and Geraats (2004) also confirms that the Bank of England is considered to be one of the leading banks in terms of transparency.

However, a survey of professional economists by DeHaan and Amtenbrink (2002), which is cited in Lasaosa (2005), finds that the respondents are less convinced of the increased transparency.

There is a strong body of evidence that supports the hypothesis that monetary policy, particularly decisions on interest rates, are useful in explaining asset returns see Waud, (1970), Pearce and Roley (1985), Cook and Hahn (1988) and Jensen and Johnson (1995). The underlying argument that monetary policy affects asset returns is further supported by the evidence that returns are influenced by factors which affect business conditions, such as interest and inflation rates.[1] Monetary policy changes and realised factor risk premia are able to convey information regarding future macroeconomic conditions to the extent that increases (decreases) in interest rates signal less (more) favourable anticipated economic outcomes, with an expected negative (positive) effect upon corporate values in general (Jensen, Mercer and Johnson, 1996). More recent work by Clare and Courtenay (2001) using intraday data, concludes the news content of UK monetary policy announcements may have fallen, suggesting that the process has become more transparent over time.

There can be no doubt, with the independence of the Bank of England; monetary policy decisions have become more transparent. The purpose of this paper therefore, is not to test transparency per se but rather to re-examine the efficiency of financial markets with an increase in information quality. By comparing pre- and post-Bank of England independence periods we can directly test whether increased transparency has reduced the news content of the UK monetary policy announcement.

[1] See Fama and French (1989) and Smirlock and Yawitz (1985).

The paper is organised as follows. Section 2 outlines the relevant changes in UK monetary policy framework over the period of the study while Section 3 discusses the data and methodology. The empirical results are analysed in Section 4 with conclusions and suggestions for future research provided in Section 5.

2. Changes in UK monetary policy since 1985

Mervyn King (1997, the then governor of the Bank of England) provides a useful outline of the history of monetary policy in the UK over our sample period. In summary, from the 1970s to the mid 1980s, the UK government used monetary aggregate targets for policy decision making. These were abandoned (due to their unpredictable and volatile nature), and were replaced by exchange rate targets informally held against the Deutsche mark (DM). In October 1990, the UK became a full member of the ERM with its explicit exchange rate target expressed in terms of narrow bands against other European currencies. That same year the German unification caused growing pressure on fellow members of the ERM to increase interest rates but this led to higher rates than was appropriate for the UK economy. George Soros guessed that the natural equilibrium rate was far below the lower band and consequently he decided to buy deutschemarks and sell his sterling holdings. The actions of Soros led other speculators to sell sterling. This precipitated the September 1992 ‘Black Wednesday’ crisis that cumulated in the withdrawal of Britain from the ERM.

By October 1992, a new framework for monetary policy was devised which had two key elements. Firstly, interest rates would be set to achieve an explicit target for inflation. Secondly, a major change in policy towards increased transparency and

openness with the biggest sign of this being the changing role of the Bank of England. Initially this new role for the Bank of England consisted of monthly meetings between the Chancellor of the Exchequer and the Governor of the Bank of England, with the publication of minutes of the monthly meeting and a quarterly inflation report. This move towards more transparency and accountability was seen as part of a conscious attempt to give incentives to the Bank such that its public advice would enhance the credibility of monetary policy (King 1997).

These institutional changes of regular monetary policy meetings between the Chancellor and the Governor, the publication of minutes from these meetings, and the provision of quarterly inflation reports were enhanced by giving the Bank sole discretion as to the timing of any interest rate changes (which until then had been decided by the Chancellor). By allowing the Bank to choose the timing of any interest rate changes the government thought to allay suspicions that interest rate movements might be determined by short run political objectives.

On the 6th May 1997, the Bank of England was granted operational independence by the UK government and formally allowed to set interest rates, whilst remaining within certain criteria such as a single target inflation level of 2.5% for the Retail Price Index (RPI).[2] Since December 2003 the inflation target has been set at 2% as measured by the Consumer Price Index (CPI). This change of inflation measure from RPI to CPI is

[2] As noted in Chadha and Nolan (2001), increased information flows following operational independence can be viewed as further increasing transparency.

seen as purely 'mechanical' and unimportant by the Monetary Policy Committee (MPC) therefore should not affect the issue of transparency[3].

3. Data and Methodology.

Our sample period encompasses the nineteen years from 1st January 1986 until the 31st December 2004, with daily returns collected from Datastream, a financial data service. We test the reactions of two stock market indices, the FTSE all share Financial sector and the FTSE all share Small Companies sector, along with two bond indices, UK Government Fixed Income Bonds of less than 5 years and of greater than 15 years, to interest rate changes within two distinct sample periods[4].

These sample periods are defined as:

a) Regime 1, from the 1st January 1986 until 31st August 1992. During this period interest rates were determined by the Chancellor of the Exchequer with the decision potentially affected by both economic and political considerations. The period ends when the UK exited the ERM.

b) Regime 2, from 6th May 1997 until the 31st December 2004. With operational independence the Bank of England MPC can set interest rates within what is seen as one of the most transparent central banks in the world.[5]

[3] At the annual CBI business lunch in January 2004 Mervyn King defended the switch from RPI to CPI by saying 'Hence the switch to a new PI target has in itself no implications for monetary policy.' (King 2004)

[4] In a similar manner to Jensen and Johnson (1995), our data consists of an index of financial firms, an index of small stocks and an index representing a basket of short term bonds and one representing long term bonds, all are value-weighted. A finance index allows us to determine whether interest rate sensitive shares behave differently from other stocks while an index of small stocks will allow us to isolate the effect of size.

[5] See Fracasso et al 2003

The event dates for interest rate (previously the repo rate) changes are taken from the Bank of England website at www.bankofengland.co.uk/statistics/index.htm

The period between these two regimes, 1st September 1992 until 5th May 1997, was one of transition with an increase in published information surrounding the setting of interest rates and a growing responsibility for the Bank of England, albeit as an advisory body. During this period the ultimate timing and direction of any interest rate adjustments were controlled by the Chancellor.

Table 1 Number of Interest rate changes in sample

	Rise	Fall	Total
Full Period	33	44	77
Period 1	14	18	32
Period 2	15	16	31

For the pre-Bank of England Independence (BEI) period, Regime 1, there were 32 interest rate adjustments, 18 downward movements and 14 upward movements. For comparative purposes this equates nicely with the 31 adjustments recorded for the post-BEI period where there were 16 downward movements and 15 upward movements in interest rate. For the duration of the 5 year transition period there were 10 downward movements and 4 upward movements in interest rate.

During the 19 year period of this study interest rates had a high of 14.875% following the increase of 1.125% in October 1989, and a low of 3.5% during the later part of 2003. Within the sub-periods of the study there has also been a contrast in rate changes with Regime 1 being more volatile with larger adjustments and higher base

rates, although, for the period as a whole there is only a 0.5% difference between the starting interest rate and the closing interest rate. Compare this to the lower base rates of the post-BEI period with a difference over this 7 year period being an overall reduction of 1.5%.

3.1 Time-varying Market Model

An unconditional beta for any asset *i* may be estimated by the standard Market Model regression, which is defined as:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (1)$$

where:

R_{it} is the return on asset *i* for period *t*,

R_{mt} is the return on the market index for period *t*,

$$\beta_i = Cov(R_{it}, R_{mt}) \big/ h_{mt} , \quad (2)$$

$$\alpha_i = \overline{R}_i - \beta_i \overline{R}_{mt} , \text{ and} \quad (3)$$

h_{mt} is the variance of the market and ε_{it} is the disturbance vector.

The error term, ε_{it} is assumed to have zero mean and a serially independent and homoscedastic variance-covariance matrix. Under this specification α_i and β_i are assumed constant over time with β representing the systematic risk of asset *i*.

In recent years, the assumption of a stationary risk factor, fundamental to security return models such as the market model has come under increasing scrutiny and there

now exists substantial evidence that systematic risk is unstable.[6] Moreover, the incorrect use of point estimate betas when the stability assumption is invalid may cause problems in the implementation of event studies. All measures indicate the presence of ARCH effects and the absence of a constant correlation within our dataset.[7] We therefore utilise a time varying model which explains more fully the differential news impact as noted by Engle and Ng (1993), namely the threshold ARCH (TARCH) model suggested by Zakoian (1994)

The TARCH process attempts to model the asymmetry in the stock price volatility reaction to information shocks. Formally, the conditional variance is modelled as:

$$h_{i,t} = c_1 + a_{11}\varepsilon^2_{i,t-1} + \gamma\varepsilon^2_{i,t-1}D_{t-1} + b_{11}h_{i,t-1} \quad (4)$$

$$h_{m,t} = c_3 + a_{33}\varepsilon^2_{m,t-1} + \gamma\varepsilon^2_{m,t-1}D_{t-1} + b_{33}h_{m,t-1} \quad (5)$$

$$\sqrt{h}_{im,t} = \rho_{im}\sqrt{h}_{i,t}\sqrt{h}_{m,t} \quad (6)$$

where D_{t-1} =1 if $\varepsilon_{t-1} < 0$, and D_{t-1} = 0 otherwise.

The conditional variances and covariance are then used to construct the time series of conditional betas, β_{it} for any asset *i* within a market *m*.

$$\beta_{it} = \frac{h_{imt}}{\sqrt{h}_{mt}} \quad (7)$$

[6] See Faff et al (2000), Pope and Warrington (1996), Bos and Fetherston (1995), Kim (1993), Faff, Lee and Fry (1992), Collins, Ledolter and Rayburn (1987), Bos and Newbold (1984), Sunder (1980) and Fabozzi and Francis (1978).

[7] Results of the Ljung-Box Q-statistic, the Lagrange Multiplier test and the test for constant correlation are available from the authors.

3.2 Event window methodology

We test for the reaction of the stock and bond markets to interest rate change announcements by examining in-sample prediction errors (IPE) for both upward and downward adjustments in interest rate. Stock and bond returns are examined for 5 days before and 5 days after an announcement of an interest rate change. Normally, interest rate changes are broadcast around mid-day therefore our event date (day 0) can be clearly stated as the announcement date.

$$IPE_t = \sum_{k=-5}^{t} (R_k - \overline{R}), (t = -5 to + 5) \qquad (8)$$

Where, R_t = index return on event day t. $\overline{R}$ = mean daily return calculated over an estimation period where the model parameters are averages of the individual daily parameters calculated using the TARCH(1,1)[8] model outlined above. Assuming the event date as day zero, the estimation period will be day -105 to day -6, giving 100 daily observations. We then test whether the average IPE for both stock indices and bond indices are significantly different to zero.

In order to use the event window methodology to test the hypothesis that increasing transparency leads to decreasing reaction to interest rate changes, we need to make the same assumption as Lasaosa (2005), namely that "increases in predictability of monetary policy decisions are brought about (only) by enhanced transparency in the decision making process". Other factors such as monetary policy decisions made by the European Central Bank or US Fed may influence the sensitivity and timing of our events but we don't believe that these exogenous factors are systematic and therefore by using an event study methodology should not affect the outcome of our results.

[8] TARCH(1,1) indicates the presence of first order TARCH and first order ARCH processes.

4 Results

The distributional properties of the 4 index groups are given in Table 2. The table is split to show the total sample period alongside regimes 1 and 2 for comparison purposes[9].

Table 2 Distributional properties for sample returns data

Distributional properties for daily returns on the 4 index groups and the 2 benchmark indices used in this study are given below. The table is split to give a comparison between the properties of the whole dataset and those of the two separate regimes used in this study. The data covers the period 1st January 1986 to 31st December 2004 with regime 1 from 1st January 1986 to 31st August 1992 and regime 2 from 6th May 1997 to 31st December 2004. Data is taken from Datastream.

Index	Mean $*10^{-4}$	St Dev $*10^{-3}$	Skewness	Kurtosis	Jarque-Bera
Total period (4957 observations)					
FT All Share	4.89	9.46	-0.6	11.8	$1.6*10^{4}$
FT All Gov bonds	0.40	3.39	-0.24	6.88	$3.2*10^{3}$
FT Financial Companies	6.31	11.5	-0.15	10.0	$1.0*10^{4}$
FT Small Companies	4.03	6.14	-2.49	35.9	$2.3*10^{5}$
FT Short Term Bonds	-0.16	1.9	-1.31	19.69	$5.9*10^{4}$
FT Long Term Bonds	1.28	5.7	-0.1	6.21	$2.1*10^{3}$
Regime 1 Pre-BEI period (1738 observations)					
FT All Share	5.39	9.4	-1.58	22.24	$2.8*10^{4}$
FT All Gov bonds	0.21	3.57	0.22	7.95	$1.8*10^{3}$
FT Financial Companies	4.42	9.9	-1.23	21.74	$2.6*10^{4}$
FT Small Companies	3.77	7.32	-3.26	42.9	$1.2*10^{5}$
FT Short Term Bonds	0.14	1.97	-0.16	7.27	$1.3*10^{3}$
FT Long Term Bonds	0.68	5.68	0.25	7.25	$1.3*10^{3}$
Regime 2 Post-BEI period (2002 observations)					
FT All Share	2.89	11.0	-0.08	5.17	$3.9*10^{3}$
FT All Gov bonds	0.33	3.2	-0.74	6.92	$1.5*10^{3}$
FT Financial Companies	4.81	14.2	0.13	5.5	$5.3*10^{2}$
FT Small Companies	2.31	6.26	-1.29	11.37	$6.4*10^{3}$
FT Short Term Bonds	-0.52	1.78	-4.33	38.11	$1.1*10^{5}$
FT Long Term Bonds	1.58	5.64	-0.31	6.32	$9.5*10^{2}$

The distributional properties of our benchmark indices, the FT All Share index and the FT All Government Bond index, are also reported in Table 2. The data is slightly negatively skewed with the exception of small positive values for the FT long term

[9] Results for the transition period between regime 1 and 2 are not utilised in this paper. As a transitory period between Government dominance and Bank of England independence the 5 year period is seen as a useful buffer zone which only helps to make the two regimes independent.

bond index over the first regime and the FT financial company's index during regime 2. All sets of data show a positive kurtosis and a highly significant Jarque-Bera value indicating non-normality during all periods of the study.

4.1 In-sample estimation error results

As outlined previously market model parameters have been calculated using a time varying methodology to allow for the non-stationary volatility observed over the sample period to be fully reflected in the model. Table 3 outlines the averaged TARCH(1,1) model parameters for each of the indices used in this study.

Table 3 Estimate of TARCH(1,1) model parameters for each index return series

This table presents TARCH(1,1) parameters for models fitted to each industry return series. The TARCH(1,1) model is defined as:

$$\sigma_{i,t}^2 = c_1 + a_{11}\varepsilon_{i,t-1}^2 + \gamma\varepsilon_{i,t-1}^2 D_{t-1} + b_{11}\sigma_{i,t-1}^2 .$$

The sample period is 1st January 1987 to 31st December 2004.

If the Leverage Effect Term (γ) is statistically greater than 0 the leverage effect exists. If γ is equal to 0, the news impact is asymmetric. * denotes statistical significance at the 1% level

FT Index	c_1 x 10^{-6}	a_{11}	γ	b_{11}	Average Conditional Beta
Financial	2.21*	0.04*	0.086*	0.902*	1.094
Small Company	0.82*	0.25*	0.091*	0.748*	0.410
Short term bond	1.25*	0.12*	-0.08*	0.585*	0.014
Long term bond	0.9*	0.05*	0.01*	0.927*	1.59
All Share	1.65*	0.04*	0.08*	0.908*	1
All Gov bond	0.34*	0.04*	0.011*	0.923*	1

* Statistically significant at 1% level.

An examination of Table 3 shows that the TARCH model adequately captures the characteristics of these index return variances. For every index, the ARCH and GARCH coefficients (a_{11} and b_{11}) are significantly different from zero at the 1% level. In addition all variances are stable with the conditional coefficients summing to less

than 1 (a_{11} + b_{11}). Moreover, the leverage effect as measured by the γ term is significant for every index series, suggesting that there are asymmetries in the reaction of these index returns to good and bad news shocks. This asymmetry can also be seen when we isolate specific events such as the announcement of interest rate adjustments as considered in this paper.

Table 4 Full Sample, rises and falls.
In-sample prediction errors on returns for stock and bond indices around interest rate announcements

Panel A Results for interest rate rises over the full sample period, from January 1986 to December 2004, a total of 41 upward adjustments in sample.

	In-sample prediction errors of stock indices		In-sample prediction errors of bond indices	
Event day	FT financial index	FT small companies index	FT short term bond index	FT long term bond index
-5	0.0001	-0.0002	-0.0006	0.0008*
-4	-0.0008	0.0005	-0.0003	0.0012*
-3	-0.0004	0.0005	0.0000	0.0014*
-2	-0.0013	0.0002	-0.0001	0.0017*
-1	-0.0015	0.0000	-0.0005	0.0014**
0	-0.0015	-0.0006	-0.0013	0.0024*
1	-0.0023	-0.0004	-0.0016**	0.0022*
2	-0.0018	-0.0004	-0.0015	0.0020**
3	-0.0015	-0.0005	-0.0019**	0.0021**
4	-0.0028	-0.0009	-0.0019**	0.0018
5	-0.0037	-0.0008	-0.0024*	0.0018

Panel B Results for interest rate decreases over the full sample period, a total of 38 downward adjustments in sample.

	In-sample prediction errors of stock indices		In-sample prediction errors of bond indices	
Event day	FT financial index	FT small companies index	FT short term bond index	FT long term bond index
-5	-0.0010	0.0001	0.0005	-0.0003
-4	-0.0021	-0.0027	0.0014*	-0.0011
-3	-0.0026	-0.0028	0.0021*	-0.0016
-2	-0.0024	-0.0028	0.0024*	-0.0019
-1	-0.0015	-0.0026	0.0038*	-0.0038*
0	-0.0015	-0.0009	0.0039*	-0.0045*
1	-0.0015	-0.0007	0.0038*	-0.0045*
2	-0.0023	-0.0005	0.0043*	-0.0046*
3	-0.0020	0.0002	0.0044*	-0.0046*
4	-0.0017	0.0006	0.0040*	-0.0041*
5	-0.0012	0.0018	0.0040*	-0.0041*

Significant at ** 5% and * 1% level.

Table 4 compares the in-sample prediction errors for both stock and bond indices between upward and downward adjustments in interest rates over the whole sample period. This table shows two important outcomes, firstly there does not seem to be any statistically significant findings to indicate either upward or downward announcements have impacted on stock values whereas for the bond indices there is an increase in uncertainty following downward adjustments indicating significant news impact from these announcements. Secondly not only is there statistically significant in-sample prediction errors for both bond indices but these are larger and more statistically significant, indicative of the strong relationship between interest rate movements and bond prices.

To test whether the results in Table 4 are representative of sub-periods within the 19 year sample we repeat the analysis within the two monetary policy regimes outlined above. To help analyse the data and compare difference between upward and downward adjustments Table 5 will consider only interest rate rises over the two periods while Table 6 reports the findings for interest rate falls.

For interest rate rises the financial index has had an increase in uncertainty since the Bank of England Independence with much higher in-sample prediction errors and for the first time showing statistically significant values albeit at the 10% level. In contrast the short term bond index reacts stronger for the pre-BEI period than for the post-BEI period with no statistically significant values recorded for the post-BEI period. The small companies index and the long term bond index appear to be unaffected by interest rate rise announcements with similar results observed for both the two sub-periods and the full sample period.

Table 5 In-sample prediction errors on stock and bond indices around upward movements in interest rate.

Panel A Results for interest rate rises over the Pre-BEI period, from January 1986 to August 1992, a total of 16 upward adjustments in sample.

	In sample prediction errors of stock indices		In sample prediction errors of bond indices	
Event day	FT financial index	FT small companies index	FT short term bond index	FT long term bond index
-5	0.0000	0.0001	-0.0002	0.0001
-4	-0.0013	0.0002	-0.0005	0.0003
-3	-0.0013	0.0011	-0.0006	0.0007
-2	-0.0012	0.0006	-0.0009	0.0010***
-1	-0.0003	0.0004	-0.0015***	0.0007
0	-0.0001	-0.0008	-0.0032*	0.0014***
1	-0.0002	-0.0016	-0.0039*	0.0017***
2	0.0012	-0.0016	-0.0040*	0.0021***
3	0.0012	-0.0015	-0.0045*	0.0023***
4	0.0004	-0.0018	-0.0047*	0.0017***
5	0.0003	-0.0018	-0.0047*	0.0008

Panel B Results for interest rate rises over the Post-BEI period, from May 1997 to December 2004, a total of 15 upward adjustments in sample.

	In sample prediction errors of stock indices		In sample prediction errors of bond indices	
Event day	FT financial index	FT small companies index	FT short term bond index	FT long term bond index
-5	-0.0004	-0.0003	-0.0012	0.0017*
-4	-0.0011	0.0013	-0.0006	0.0020*
-3	-0.0008	0.0006	-0.0001	0.0022*
-2	-0.0029	0.0008	0.0001	0.0026*
-1	-0.0042***	0.0007	0.0000	0.0021**
0	-0.0044***	0.0012	-0.0002	0.0035*
1	-0.0063***	0.0027	-0.0001	0.0030**
2	-0.0065	0.0029	-0.0001	0.0023***
3	-0.0057	0.0028	-0.0004	0.0023***
4	-0.0084***	0.0025	-0.0001	0.0019
5	-0.0105***	0.0032	-0.0009	0.0026***

Significant at *** 10%, ** 5% and * 1% level.

A closer look at Table 5 shows that for regime 1 the finance index and the long term bond index have increasing positive errors with the increasing negative values coming in regime 2, where we also find the increased significance levels. In contrast the opposite is seen for the short term bond index, with the increasing negative values appearing in regime 1, along with the increased significance. Our results appear to show that the short term bond market has been best at correctly incorporating the increased news content during regime 2 rises, while the financial index has been the

poorest at incorporating news from interest rate rises during regime 2. Due to the importance of interest rate levels to both these investment groups we would have expected them both to have been as equally knowledgeable about the added news content and for the market to be sophisticated enough to incorporate it into their pricing. The long term bond index and the small companies' index show no discernable difference between the two regimes indicating that it is possible that rate rise announcements do not carry as much importance here as it is a short term effect therefore the added news content of regime 2 is less immediate for these markets. So, for rises at least, there has been a distinct effect from increased transparency for two of our four indices, albeit, in different ways, Table 6 now looks at interest rate falls.

Remember from Table 4 there were almost no statistically significant error values for interest rate decreases; compare this with Table 6 where the strongest statistical values appear in regime 1, before BEI[10]. In fact both the bond indices show a reduction in sensitivity to increased transparency. As with a rate rise both the bond indices have incorporated the increased information content between regime 1 and 2 and have used this new information to reliably predict the strength of the announcement. The stock indices also show an improvement in reaction between the two regimes with the finance index statistically more uncertain during the pre-BEI period as to the nature and timing of rate change announcements. As interest rate falls are seen as primarily good news by both stock and bond markets it is interesting to note that for all four indices there is less of a shock effect to the announcement of rises in the more transparent regime 2 as would be expected.

[10] The small companies index does not react in a similar way to any other indices studied here this is perhaps due to the importance of factors other than interest rate changes to smaller companies.

Table 6 In-sample prediction errors on stock and bond indices around downward movements in interest rates.

Panel A Results for interest rate decreases over the Pre-BEI period, from January 1986 to August 1992, a total of 18 downward adjustments in sample.

	In sample prediction errors of stock indices		In sample prediction errors of bond indices	
Event day	FT financial index	FT small companies index	FT financial index	FT small companies index
-5	0.0000	0.0001	0.0000	0.0002
-4	-0.0014	-0.0017	0.0018**	-0.0013
-3	-0.0031**	-0.0024	0.0028**	-0.0023***
-2	-0.0047*	-0.0024	0.0040*	-0.0031***
-1	-0.0041**	-0.0011	0.0062*	-0.0059**
0	-0.0047**	-0.0003	0.0066*	-0.0070**
1	-0.0051**	-0.0007	0.0064*	-0.0071**
2	-0.0046**	0.0007	0.0073*	-0.0077*
3	-0.0053**	0.0016	0.0078*	-0.0084*
4	-0.0061**	0.0008	0.0077*	-0.0081*
5	-0.0062**	0.0005	0.0077*	-0.0081*

Panel B Results for interest rate decreases over the Post-BEI period, from May 1997 to December 2004, a total of 16 downward adjustments in sample.

	In sample prediction errors of stock indices		In sample prediction errors of bond indices	
Event day	FT financial index	FT small companies index	FT short term bond index	FT long term bond index
-5	-0.0026	-0.0009	0.0007*	-0.0007***
-4	-0.0034	-0.0048***	0.0007**	-0.0010***
-3	-0.0041***	-0.0039	0.0011**	-0.0014***
-2	-0.0013	-0.0040	0.0013**	-0.0014***
-1	0.0027	-0.0058	0.0016*	-0.0019**
0	0.0035***	-0.0026	0.0022*	-0.0027*
1	0.0045***	-0.0024	0.0023*	-0.0028*
2	0.0015	-0.0042	0.0019*	-0.0026*
3	0.0021	-0.0042	0.0015**	-0.0017***
4	0.0036	-0.0025	0.0005	-0.0010
5	0.0061***	0.0014	0.0005	-0.0010

Significant at *** 10%, ** 5% and * 1% level.

Although not significant the direction of in-sample errors is interesting, especially for the finance index where pre-BEI values are increasing negative while the post-BEI period shows increasing positive values. The other three indices in this study also show an increase towards the positive albeit to a lesser extent than that found with the finance index. This difference in in-sample prediction errors between the two regimes may be due to a combination of contradictory news and market over-reaction.

The increasing negative values of regime 1 in Table 6 indicate a market coming to terms with an over-reaction to a rate fall while the increasing positive values of regime 2 indicate a market readjusting to an under-reaction to a rate fall or possibly to a misinterpretation of the news causing the market to miss the rate fall altogether.

In summary, within the overall results, there are some asymmetric effects which our data has revealed, with statistically significant results showing rises in interest rates are being much better anticipated than falls by both the stock and bond markets. Thus, during the period that the Bank of England has become independent, transparency or the markets ability to anticipate and incorporate falls in interest rates seems to be more problematic. An increase in volatility would indicate the markets uncertainty as to the nature and content of information therefore the next section will examine the conditional volatility around interest rate adjustments.

4.2 Conditional volatility measures

This section will look at the conditional volatility as described by the TARCH(1,1) model, around interest rate adjustments during the two monetary policy regimes, in order to highlight differential periods of uncertainty within the market. We have already established heteroscedastic behaviour is present over our 19 year sample period; we now examine any differences in observed volatility between the two regimes as outlined in this study.

Table 7 Conditional volatility around interest rate adjustments

This table reports the average conditional volatility values on days of interest rate adjustment for each index used in the study. For comparative purposes the mean volatility value of the total sample and for each of the sub-periods is given in columns 2, 3 and 4. The volatility of each sub-group is compared to the mean volatility of the total dataset with the computed f-test significance level indicated by * at 1% and ** at 5%. The table is split into two panels, interest rate rises are shown in panel A while interest rate falls are shown in panel B. All values are given to the power of $*10^{-5}$.

Panel A Interest rate rises	Total sample	Regime 1	Regime 2	All rises	Pre-BEI rises	Post-BEI rises
Stock Benchmark Index	9.11	9.27	11.6*	6.15*	5.25*	7.1**
Finance Index	13.5	11.1**	19.3*	9.61*	5.88*	13.5
Small Companies Index	4.89	6.87*	5.05	2.71*	2.84*	2.77*
Bond Benchmark Index	1.15	1.14	1.08	1.11	1.15	1.09
Short Term Bond Index	0.36	0.37	0.36	0.34	0.36	0.32
Long Term Bond Index	3.23	3.13	3.24	2.99	2.58**	3.36
Panel B Interest rate falls	**Total sample**	**Regime 1**	**Regime 2**	**All rises**	**Pre-BEI rises**	**Post-BEI rises**
Stock Benchmark Index	9.11	9.27	11.6*	19.37*	26.75*	15.53*
Finance Index	13.5	11.1**	19.3*	27.92*	32.3*	28.66*
Small Companies Index	4.89	6.87*	5.05	14.25*	22.24*	8.06*
Bond Benchmark Index	1.15	1.14	1.08	1.18	1.34	0.95
Short Term Bond Index	0.36	0.37	0.36	0.43	0.53*	0.33
Long Term Bond Index	3.23	3.13	3.24	3.38	3.67	2.78

* indicates significance at the 1% level, ** indicates significance at the 5% level

During the sample period of this study bond volatility levels remained fairly constant with both the bond benchmark index and the bond test indices having consistent volatility levels throughout. This was not the case for the stock market indices. In all cases, except for the post-BEI period for the finance index, the volatility of the smaller sub-samples are different showing statistical significance, at the 1% level. This was the case for both rises and falls which is indicative of market jitteriness around interest rate announcements in general. Higher volatility levels are indicated for the interest rate falls with 3 or 4 times the volatility values reported over the interest rate rises. This is what we would expect if speculators where trying to exploit the additional information flows around rate falls, especially as our results have already indicated that the market is more confident with predicting rate falls than rate rises.

5 Conclusions

This study considered the impact of two different interest rate regimes (further sub-divided into rises and falls), on the stock and bond markets within the UK. We based our analysis on the underlying assumption that increasing transparency, which was explicitly introduced as a policy aim in 1997, implies that markets should be able to more efficiently incorporate interest rates changes. However, our analysis suggests that increasing transparency appears to have *reduced* the markets' ability to correctly and efficiently anticipate rate changes in the case of rate falls for short term bonds and for both share indices.

The data patterns indicate that markets appear to have reacted as predicted for interest rate rises, to increasing transparency, in terms of reducing in-sample prediction errors for all four indices (see Table 5). However, contrary to our hypothesis, for interest rate falls (Table 6), the two stock market indices demonstrate increasing in-sample prediction errors around the event days for regime 1 (1997-2004). There are also statistically significant in-sample prediction errors for the short term bond index during regime 1 which become less significant during regime 2 supporting the idea that the increased transparency has made the short term bond market more efficient. Due to the strong relationship between interest rates and bond prices it is not surprising that the results from the short term bond market indicate a capacity to absorb the new information content.

One potential explanation for our result has been put forward by Lasaosa (2005, p10) who speculates that with the introduction of the Monetary Policy Committee, the added dimension of group dynamics has increased the uncertainty in the decision

making process. He writes ‘while there are no clear-cut arguments why committees should be less predictable than individuals, markets may find it harder to anticipate collective decisions’.

The counter-intuitive results shown in this study clearly merit further research. We have assumed the two regimes are distinguished by an increase in transparency alone, but have not tried to allow for the precise nature of this increased transparency. We have to recognise that as well as increased transparency during our sample period, the two regimes were distinguished by the introduction of inflation targets in setting interest rates and the removal of direct political lobbying. Therefore a useful extension of this paper would be to identify and then isolate specific policy developments that changed over this period such as the adoption of inflation targets, removal of the political element or implementation of a committee structure to decision making.

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