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Institutional Design, Macroeconomic Policy Coordination and Implications for the Financial Sector in the UK

Abstract: This study has analysed the implications of institutional design of macroeconomic policy making institutions for the macroeconomic policy interaction and financial sector in the United Kingdom. Employing a Vector Error Correction (VEC) model and using monthly data from January 1985 to August 2008 we found that the changes in institutional arrangement and design of policy making authorities appeared to be a major contributing factor in dynamics of association between policy coordination/combination and financial sector. It was also found that the independence of the Bank of England (BoE) and withdrawal from the Exchange Rate Mechanism led to the increase in macroeconomic policy maker's ability to coordinate and restore financial stability. The results imply that although institutional autonomy in the form of instrument independence (monetary policy decisions) could bring financial stability, there is a strong necessity for coordination, even in Post-MPC (Monetary Policy Committee) and the BoE independence.

Keywords: Macroeconomic Policy Interaction, Institutional Design, Financial Markets, Policy Coordination, Central Bank Independence.

JEL Classification: E02, E44, E52, E58, E61, E63.

1. INTRODUCTION

Macroeconomic policies have significant effects which are not limited to the real economy and a number of studies, for instance, Bredin et al. (2005), Ardagna (2009) and Arnold et al. (2010) reported their significant influence contributing to dynamics of financial sector. In comparison with monetary policy, although less attention has been paid to investigate the association between fiscal policy and the financial sector (Ardagna, 2009; Blanchard et al., 2010) there is sufficiently enough evidence to support the notion of financial stability being also influenced by fiscal stance (see Blanchard et al. 2010; Zigman and Cota, 2011; Benigno et al; 2013). Nevertheless, beside the individual analysis of macroeconomic policies, there is an emerging consensus in recent literature which suggests considering interaction of macroeconomic policies rather than implication of a single policy stance for financial sector (see Jansen et al., 2008; Nasir and Soliman, 2014) which is also the theme of this study.

An important aspect of macroeconomic policies is the structure and design of their parental institutions. The organization structure involves the formal division of organization in subunits, location of decision making responsibilities within that structure and establishment of integrating mechanism to coordinate the activities of subunit of origination (Hill, 2014). Institutional design is an important aspect to be kept under consideration while studying the subject of macroeconomic policies as any change in the framework of policy making institutions could affect the effectiveness of policies they formulate (see Lu and In, 2006; Osborn and Sensier, 2009). Specific to the policy framework in the UK, we can acknowledge some major changes in the past few decades, for instance the membership and departure from Exchange Rate Mechanism (ERM), which was a fixed exchange rate system (with margin of fluctuations) in 1992 or independence of the Bank of England (BoE) in 1997 that resulted in a major shift in institutional design and major changes in the Bank's traditional responsibilities. Certain responsibilities related to financial stability e.g. banking sector supervision and management of sovereign debt, were all transferred to the Financial Service Authority (FSA) and the Debt Management Office (DMO). In this regard, studies like on New Zealand by Lu and In (2006) and on Britain Osborn and Sensier (2009) indicated variability in the effectiveness of monetary policy after any institutional framework changes. Although there are also some voices declaring these institutional changes for instance the Bank of England's independence in 1997 as overrated institutional changes for price stability (see Mariscal and Howells, 2007). Concomitantly refereeing back to the debate on the influence of macroeconomic policy interaction on financial sector, in the context of the UK, it is imperative to analyse the dynamics of macroeconomic policy interactions and coordination in the light of said institutional changes.

This study analyses the implications of structural changes in the design of policy making institutions on the association between policy interaction and the financial sector. Specifically, we focused on *stock and bond market, the choice of these two markets as proxy for financial sector* because of their *Wealth Effects* on the real economy (see Malikane and Semmler, 2008; Funke et al., 2011; Airaudo, 2015). Nevertheless, the context in which we are analysing the interaction of macroeconomic policies is the financial stability. In this regard, we also refer to Kontonikas et al. (2006) who argue that optimal[1] monetary policy should positively affect stock market and house prices due to Wealth Effects of these assets. Hence *it is not either the stock or bond market we need to positively influence per se, these are their Wealth Effects which justify a macroeconomic policy role*. The difference this study is making is by taking it further by taking fiscal policy, bond market and institutional design changes on board. Putting it rather simple, the main aim of this research is to evaluate how the institutional designs influence the association between policy interaction and financial stability. This could be achieved by investigating implications of changes in the institutional design in Britain for policy interaction and financial sector. There are several reasons for the choice of UK financial sector (a) size and significance of subject financial sector for British economy as well as international financial system (b) availability of reliable data from credible sources (c) well established policy making intuitions which have been leaders in reforms[2].

A particular feature of the subject study makes it very pragmatic, as we will be able to see how institutional design defines the ability of policies and the context in which they are formulated. In the context of recent developments to restore financial stability, it is important to mention here that the BoE has recently formulated Financial Policy Committee (FPC)[3]. As cited earlier, it is the major change in functioning of the BoE since May 1997. Since then the official mandate of the

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[1] Our definition of optimal policy combination for financial stability is to some degree unique as mostly optimal policy has been seen as a single policy in context of real economy. To provide some support from existing evidence, we refer to Kontonikas et al. (2006) and Khorasgani (2010) which declared a monetary policy as optimal which positively affects Stock and Forex markets.

[2] The Britain is leading the world and The Bank of England has been the main source of fresh thinking, see an interesting account by John Kay (2003). Available at *http://www.ft.com/cms/s/0/40231e4a-dcdc-11e2-b52b-00144feab7de.html#axzz3EDkmBJGK*, (accessed 6.6.14).

[3] Headed by Governor of the Bank of England this committee would monitor UK financial sector and its effects on economy. Available at http://www.bankofengland.co.uk/publications/news/2011/041.htm, (accessed 2.5.14). Moreover, there has been a formulation of the FCA (Financial Conduct Authority), and the PRA (Prudential Regulation Authority). The focus of all of them is on financial stability, both micro-prudential and macro-prudential.

BoE was price stability by targeting inflation at 2% Consumer Price Index (CPI)[4]. However in the context of these changes it could be well anticipated that in the future, influence on financial sector would also be considered in macroeconomic policy formulation; yet, existing literature does not provide any evidence of it. Neither has it provided great details on the aspect of previous changes nor their implications for under analysis factors of policy interaction and financial sector.

Recent studies also consider it preferable to use both macroeconomics policies simultaneously while analysing their impact on real economy (Porqueras and Alva, 2010; Sims, 2011). Therefore in this study we would take both fiscal and monetary policies on board. Despite the acknowledged importance of joint policy analysis, most of the studies in the existing literature have been only focused on single policy. Even the limited number of studies which investigated the effects of policy interaction or combination have only considered real economy; financial sector could not gain adequate attention (Jansen et al., 2008; Nasir and Soliman, 2014).

As we have acknowledged in previous paragraphs that the impact of monetary policy is contingent on institutional design. It implies that there is a prospect that the aspect of policy coordination and combination of macroeconomic policies may also be influenced by changes in the institutional design and hence their implications for the financial sector. However, in existing body of literature on the subject, we could not evident a study which has analysed impact of these factors on macroeconomic policy interaction, neither for financial sector. It would help to understand the implication for optimal policy mix in the light of institutional changes.

2. DEBATE ON INSTITUTIONAL DESIGN

The importance of institutional design and arrangement in the light of various studies has also been briefly acknowledged in the previous section, however we would revisit and debate a few more evidences to establish its relevance with subject study. The addition of institutional arrangement aspects is motivated by the arguments by Srinivasan et al. (2009) that the institutions must be designed so that the central bank's commitment to its objectives is not in doubt. In this context, the financial stability has not been a prime objective of any central bank, at least not explicitly, to best of our knowledge, however if institutional design

[4] Since October 2003, CPI (Consumer Price Index) also named as HICP (Harmonised Index of Consumer Prices) is targeted at 2% with 1% tolerance range.

affects the outcome of macroeconomic policy, it raises question about its implications for financial sector.

One of the major institutional arrangements made during the time of study was independence of the BoE. This may sound a simple case of giving autonomy to monetary authority to achieve its prime objective for price stability; perhaps it was the explicit good intention. Nevertheless, it was rather more complex and vital change in functioning of the BoE. Specifically, subject decision resulted in a big shift in institutional design and certain responsibilities related with financial stability e.g. banking sector supervision and management of sovereign debt were transferred to FSA and DMO (i.e. the supervision of banking sector was transferred to FSA and the responsibility of Sovereign debt stabilization was transferred to DMO). These are the major shifts in responsibilities and authorities with an intention to increase the efficiency of policy formulation; however these changes may have important implication for financial sector. Perhaps the recent or post financial crises development and revival of the BoE role in financial stability is something that requires plentiful attention. The Financial Services Act (2012) lead to major reform in the form of formulation of FPC. The prime objective of the Committee is to identify, monitor and take action to reduce systemic risk for the protection and resilience of the British financial sector, in addition, the Prudential Regulation Authority (PRA), as a part of the BoE, also started functioning from April 2013 with the objection of banking sector supervision. Specific to effectiveness of macroeconomic policies and financial stability these institutional changes raised a question whether the withdrawal of earlier cited responsibilities of financial supervision from the BoE influenced macroeconomic policy role.

In this context a study by Weymark (2007) declared that a fully independent central bank is only concerned with the achievement of economic objectives, whereas fiscal authority may influence monetary framework. However, we need to validate these assertions and extend them to financial sector. We can report some evidence on this aspect in a US case, Lobo (2000) concluded that the Federal Reserve policy of immediate disclosure has resulted in change of volatility of stock market from before to after the announcement of monetary policy decisions. Later investigation by Lobo et al. (2006) also acknowledged that the Federal Reserve disclosure policy has influenced the impact of monetary policy on foreign exchange markets. However, we need to see it in the context of Optimal Policy Combination as well as both financial markets (stock and bond). In specific to our case the BoE has been independent since 1997 which may have important implications for macroeconomic policy interaction and financial sector. With regard to the macroeconomic policy interaction and real economy, we can

associate the study by Dixit and Lambertini (2001) as they argued that in the case of disagreement the outcome can be influenced by institution design.

Despite the fact that we could not evidence many studies on policy coordination in the light of institutional design, yet there is some remarkable work done by Arby and Hanif (2010) in context of Pakistani experience. They found that the monetary policy stance has shown a poor coordination with fiscal policy in Pakistan and the institutional arrangements to increase coordination i.e. establishment of Monetary and Fiscal Policies Coordination Board could not contribute towards coordination. This finding would be interesting in the context of UK as the Monetary Policy Committee (MPC) of the BoE which is responsible for the formulation of monetary policy has a representative of fiscal authority (HM Treasury) in its meetings, our empirical findings in this study would give us further insight if this arrangement has been successful for policy coordination.

In addition to the independence of the BoE a major change in institutional framework of the BoE was an explicit target of price stability by keeping inflation to 2% of CPI or Target 2.0. In this aspect, Haldane and Read (2000) investigated the role of monetary policy under the influence of inflation targeting and its effects on bond market (yield curve) and found that introduction of inflation targeting in the UK has significantly decreased the effects of monetary policy surprises on yield curve. They associated it with the increased transparency of monetary policy due to inflation targeting. Yet, we are seeing this shift in association with addition of interaction with fiscal policy stock market.

If we review the literature on the performance of policy framework, Institutional design of monetary policy in the UK was praised by Bhundia and O'Donnell (2002) who argued that the independence of the central bank and institutional arrangements are based on the principles of credibility, flexibility and democratic legitimacy, therefore the independence of the BoE has not only increased the effectiveness of monetary policy but also increased the fiscal coordination. Bhundia and O'Donnell arguments may be logical but there was no empirical evidence. In addition, this assertion also requires validity for financial sector and most importantly its combination with fiscal policy. Nevertheless, there is not a consensus on the success of institutional design of monetary policy in Britain as Mariscal and Howells (2007) rejected the argument of increased transparency of monetary policy in the post autonomous BoE era. They argued that although switching to inflation targeting itself significantly reduced monetary policy surprises, the subsequent reforms have contributed little. Capitalizing on this debate we are taking this battle to the financial sector to see if and how these institutional changes have influenced the aspect of policy coordination and concomitantly its application for the financial sector.

By analysing institutional changes Osborn and Sensier (2009) found that there was a strong evidence that structural break coincides with the introduction of inflation targeting. They declared that the inflation targeting is a more important change than the independence of BoE. Similarly, Lildholdt and Wetherilt (2004) concluded that the ability of market participants to predict monetary policy stance by the BoE has been improved. Later, analysing economic and structural changes in the UK economy (output, inflation, Forex) under different monetary regimes Baumeister and Mumtaz (2010) found that there had been a shift in response of monetary policy from economic growth and exchange rates fluctuation to inflation. They also acknowledged that economic fluctuation was less frequent after 1992 until recent past, though they did not associated it with any institutional aspect. The subject study would see their assertions in the light of comprehensive and alternative empirical frameworks and its implications in financial sector.

Considering the impact of institutional design on the association among underlying variable, we refer to Chow (1960) who argued that the association between variables in two different subperiods should be the same if the relationship has not been changed during an event. Putting it simple and being specific to our case, a shift in the relationship between monetary and fiscal policy and financial sector post structural changes in the institutional design would attribute to such a change.

3. EMPIRICAL FRAMEWORK

We would analyse the association between under consideration aspects of financial sector and macroeconomic policy interaction by using a Vector Autoregressive model to accomplish our research objectives. The statistical inference would lead to creation and testing of hypothesis and acquirement of empirical findings. It is worthwhile mentioning here that the VAR model would be estimated using Frequentist or traditional econometric approach i.e. Ordinary Least Square (OLS) method.

The time horizon of study is from January 1985 to August 2008 (N = 284) hence it includes the major institutional changes (withdrawal from ERM and independence of the BoE) in the macroeconomic policy formwork of the United Kingdom. All observations are in monthly frequency considering the fact that high frequency data would give better estimates (Hautsch, 2011). The BoE's Bank Rates are used as proxy for monetary policy while the fiscal policy is proxied by Public Sector Net Cash Requirements formally known as Public Sector Borrowing Re-

quirements (PSBR) as a percentage of GDP. It represents the fiscal deficit and is used as the monthly proxy for fiscal policy representing the fiscal stance. The monthly averages of real Yield on UK Government bonds (Gilts) are used as a proxy for bond market's response. The stock market is proxied by monthly average prices of FTSE-100 index. Stock market data is dividend adjusted so it incorporates the earning effects. All data are collected from the Office of National Statistics, FTSE Group and BoE database. A Vector Auto Regression framework is used for the analysis of structural breaks and their implication. The model is presented as below:

$$\ln Bond_t = \alpha + \beta_i \ln Bond_{t-i} + \beta_i Fiscal_{t-i} + \beta_i \ln Monetary_{t-i} + \beta_i \ln Stock_{t-i} + \varepsilon_t \quad (1)$$

$$\ln Stock_t = \alpha + \beta_i \ln Stock_{t-i} + \beta_i Fiscal_{t-i} + \beta_i \ln Monetary_{t-i} + \beta_i \ln Bond_{t-i} + \varepsilon_t \quad (2)$$

$$\varepsilon_t \sim N(0, \sigma 2)$$

[Note: Optimal lag selection is on the basis of lag selection criteria, preliminary lags (*t-i*) in above model are for presentation.]

Chow test is used to find out if there is a structural break coinciding with the breakdown of the ERM or the independence of BoE. According to Chow (1960), if we split the sample into before and after period of focus, according to the Null hypothesis the coefficient of regression analysis in both sub periods should be equal to coefficients of total period. For instance, if we split Equation (1) into

$$\ln Bond1_t = \alpha 1 + \beta_i \ln Bond1_{t-i} + \beta_i Fiscal1_{t-i} + \beta_i \ln Monetary1_{t-i} + \beta_i \ln Stock1_{t-i} + \varepsilon_t \;\&$$

$$\ln Bond2_t = \alpha 2 + \beta_i \ln Bond2_{t-i} + \beta_i Fiscal2_{t-i} + \beta_i \ln Monetary2_{t-i} + \beta_i \ln Stock2_{t-i} + \varepsilon_t$$

In the absence of a structural break, $\alpha 1 = \alpha 2$, $\beta_i \ln Bond1_{t-i} = \beta_i \ln Bond2_{t-i}$, $\beta_i Fiscal1_{t-i} = \beta_i Fiscal2_{t-i}$, $\beta_i \ln Monetary1_{t-i} = \beta_i \ln Monetary2_{t-i}$ and $\beta_i \ln Stock1_{t-i} = \beta_i \ln Stock2_{t-i}$.

Same holds for Equation (2). Thereafter we would perform the Unit Root test using Augmented Dickey and Fuller (ADF) method. In order to select appropriate number of lags, we performed an optimal lag selection test using various criteria (LR: sequential modified LR test statistic, FPE: Final prediction error, AIC: Akaike information criterion, SIC: Schwarz information criterion, HQ: Hannan-Quinn information criterion). After deciding on the number of lags to be included in the model as the next step we moved toward the co-integration analysis to find whether the variables are co-integrated, i.e. if they have long-run association with ether other. In case of a co-integration or long-run association among variables, we use a Vector Error Correction (VEC) model which is a restricted form

of Vector Auto-regression model. The basic feature of VEC model is that it includes an error correction term (U_{t-1}) which is a one-period lagged residual term and guides or restores the system to equilibrium. The Johansen Co-integration method then is used.

The estimation results often show that various values of lagged explanatory variables have different sign and size of impact on response variables. Therefore, we will perform the Wald test to see the joint impact of response variable in the coming section. We will also see it further in the Diagnostic test which includes Heteroskedasticity, Autocorrelation and Exogeneity tests. Nevertheless, to get some further insight and to view a big picture of association among variables we will perform an Impulse Response Function (IRF) Analysis.

4. FINDINGS AND ANALYSES

We started with the analysis of the implications of institutional design and arrangements for macroeconomic policy interaction in the financial sector in the UK. The first major episode was the membership and departure from ERM which was a fixed exchange rate system (with margin of fluctuations) of its European member countries.

4.1 Exchange Rate Mechanism (ERM) & Inflation Targeting

The first major episode was the membership and departure from ERM which was a fixed exchange rate system (with margin of fluctuations) of its European members. The decision to join was not very constructive for the UK economy and financial sector and led to enormous pressure on its currency and ended up in the departure after massive foreign exchange fluctuation in one day called "Black Wednesday". However, due to limited scope of this study we would neither go into the history of the ERM, nor its impact on the financial sector, rather we would see whether the dynamics of relationship among our under analysis variables i.e. macroeconomic policy interaction in the financial sector has been changed due to ERM experience.

Interestingly along with the breakup from ERM, a new framework of monetary policy was introduced where Retail Price Index (RPI) was used as measure of inflation targeting with in a rage of 1 – 4%. To achieve the objective of price stability, the interest rates (a tool of monetary policy) were used and used to be

set by HM Treasury. In the context of monetary policy framework it was a major change as an explicit target (inflation) and tool (interests) were set up.

At this stage we have limited the time horizon of study from January 1985 to April 1997 (N = 148) just before the occurrence of second episode of major institutional changes (independence of BoE) in macroeconomic policy framework of the UK. All the data series were transformed by taking natural log expect fiscal policy (deficit/GDP) as it is a ratio which does not require transformation. In addition, it has negative values which cannot be logged. The notion of transformation is supported by Nevill and Holder (1995) with the reason that it overcomes the issue of Non-normality and Heteroskedasticity and could lead to obtaining best estimates from the model. We moved straight to our most important *Chow test* to find out if there is a structural break coincides with the breakdown of the ERM. The results are presented as below:

Table 1: Chow Break Point Test-1992M09

Model Sample: 1986M01 1997M04			
Bond Markets			P – Values
F-statistic	1.665	Prob. F(49,38)	0.053
Log likelihood ratio	155.894	Prob. Chi-Square(49)	**0.000***
Wald Statistic	81.565	Prob. Chi-Square(49)	0.002
Stock Markets			
F-statistic	0.606	Prob. F(49,38)	0.950
Log likelihood ratio	78.564	Prob. Chi-Square(49)	**0.005***
Wald Statistic	29.712	Prob. Chi-Square(49)	0.987

*1% level of Significance.

As we can witness in Table 1, the null of No structural break was rejected at the highest level of significance (1%). It implied that the association between macroeconomic policy interaction and financial sector has been significantly changed after this structural break. To further investigate the impact of these institutional changes for macroeconomic policy interaction, we followed the method prescribed by Politis et al. (1999) and Wong et al. (2006) and divided the analysis into pre and post ERM periods. The rationale of doing so is that it will enable us to make a comparison between the pre and post ERM scenarios and its implications for macroeconomic policy interaction.

Before the estimation of the model it was necessary to test the stationary of the data series for the whole period of analysis, hence we performed the Unit Root test using a frequently used Augmented Dickey and Fuller (ADF) method which

gave us sufficient evidence of stationarity in the data[5], however, we also acknowledged a structural break in earlier mentioned Chow test which may pose a question on the robustness of our findings in the ADF test. On this aspect, Perron (1989) cautioned that ADF test could give biased results. On theoretical grounds, a very important point we must elaborate here is that financial assets for example stock or bond prices data series exhibit a structural change from their usual trend due to various reasons for instance macroeconomic policy decisions or financial and economic events. Making this point as a base, some studies like Ranganathan and Ananthakumar (2010) criticised that ADF test is biased towards null of random walk in presence of such a structural break in a series. The reason was given that in case of not accounting for structural break, the random shocks are assumed to have a permanent effect on the system. However, one special feature of this paper is that we are considering the structural breaks; hence it would help us test whether these shocks are just transitory around a stable trend path.

To overcome this potential flaw in ADF test and its theoretical and practical implications, we used Ng-Perron (2001) test of stationarity which propose the following tests: MZa and MZt that are the modified versions of Phillips' (1987) and Phillips and Perron's (1988) Za and Zt tests; the MSB that is related to Bhargava's (1986) R1 test; and finally, the MPT test that is a modified version of Elliot, Rothenberg and Stock's (1996) Point Optimal Test. We also used Modified Akaike Information Criteria (MAIC) and GLS de-trended data for lag length selection and construction of unit root test. The results are presented in Table 2:

[5] We also performed the Augmented Dickey and Fuller (ADF) test and the results indicated that in all cases, our test statistics taking the first difference were greater than the benchmark critical values at 5% as well as 1% level (p- value < 0.01), which implied that all the data series were non-stationary at level I (0) yet stationary at 1st difference I (1).The null hypothesis of unit root existence could not be rejected at level I(o) but rejected at first differences I(1). It is often the case with economic and financial data and quite satisfactory level of stationarity. Nevertheless, the residuals were stationary even at the level which is also an indication towards the reliability of data.

Table 2 : Ng – Perron Modified Unit Root Test

Variable	MZa	MZt	MSB	MPT
At level I(o)				
LnBond*	-11.899	- 2.198	0.184	8.933
LnStock*	- 4.544	-1..373	0.302	19.101
Fiscal*	- 0.975	- 0.650	0.666	82.971
LnMonetary	- 10.783	-2.252	0.208	8.802
Asymptotic Critical Values 5%**	- 17.300	- 2.910	0.168	5.480
Asymptotic critical Values 10%***	-14.200	- 2.620	0.185	6.670
1st Difference I(1)				
LnBond*	6.199	3.904	0.629	157.780
LnStock*	-4.004	-1.392	0.347	22.491
Fiscal*	1.644	8.585	5.220	6276.00
LN Monetary*	-60.520	-5.500	0.090	1.506
Asymptotic Critical Values 5%**	-17.300	-2.910	0.168	5.480
Asymptotic Critical Values 10% ***	-14.200	-2.620	0.185	6.670

* Ng-Perron test statistics of LnBond, LnStock, Fiscal and LnMonetary. ** Critical value at 5% level of significance. *** Critical value at 10% level of significance.

As shown above the results of Ng-Perron (NP) test indicates that in all cases, our test statistics taking the first difference were greater than the benchmark critical values at 5% or at least 10% level, which implied that all the data series were stationary. The null hypothesis of unit root existence was rejected at first differences I (1). It is often the case with economic and financial data and quite satisfactory level of stationarity.

Thereafter, we performed an optimal lag selection test using various criteria[6]. It indicated that SC, HQ, FPE criteria indicated one as optimal lag while the AIC and LR indicated 12 as optimal lag order. We followed the advice by AIC test. The rational for this choice is supported by Liew (2004) when they compared several lag selection criteria, they found it most appropriate. However, in particular to our study the alternative suggestion of one lag was not given best estimates, hence for robustness of our analysis we considered and incorporated 12 lags into our analysis. As the next step we move toward the co-integration analysis to find whether the variables are co-integrated i.e. if they have long-run association among them. In the case that a co-integration or long-run associa-

[6] Sequential modified LR test statistic. FPE: Final prediction error. AIC: Akaike information criterion. SIC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

tion among variables is found, we use a Vector Error Correction Model (VECM) which is a restricted form of Vector Auto-regression model. The basic feature of VECM model is that it includes an error correction term (U_{t-1}) which is a one-period lagged residual term and guides or restores the system to equilibrium. The Johansen Co-integration method was used and results of our co-integration test are presented below in Table 3. Our results of Johansen Co-integration test which included the assumption of linear deterministic trend suggested that there was a co-integrating relationship considering 12=lag periods.

Table 3: Johansen Co-integration Test

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.503	92.748	47.856	0.000
At most 1*	0.327	38.193	29.797	0.004
At most 2	0.087	7.291	15.495	0.544

Unrestricted Co-integration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.503	54.555	27.584	0.000
At most 1*	0.327	30.902	21.132	0.002
At most 2	0.087	7.096	14.265	0.478

* Hypothesis of no co-integration was rejected by Trace & Max Eigen value test.
** MacKinnon-Haug-Michelis (1999) p-values.

Both of our Unrestricted Co-integration Rank tests (Trace & Max Eigen statistics) showed that the null of no co-integration was rejected at 5% level on the basis of MacKinnon-Haug-Michelis (1999) p-values, there were two co-integrating equations found. It implied that long-term association exists among variables and there are at least more than two time series which are co-integrated or share the common stochastic drift. Hence we employed a restricted or Vector Error Correction Model by incorporating error corrections terms. The estimation results of the model (Equations 1 & 2) for the Pre and Post-ERM periods by using Ordinary Least Square (OLS) method are obtained[7].It showed that for the model specified in Equations (1 & 2) there are several values of coefficients ranging from positive to negative and significant to insignificant. The P-values < 0.05 indicated significant impact of explanatory variables at 95% level of confidence and vice versa. Interestingly the Error Correction terms are significant and negative val-

[7] To conserve the space the results are not presented here and are available on request.

ues on the whole. It is an indication towards the stability of our model. However, we would perform the Wald test to see the joint impact of response variable in next section; it will also be further elaborated in the Diagnostic test. Hence, to test the validity of results and to check the robustness of our model against issues of Heteroskedasticity, Autocorrelation and Exogenity, a test diagnostic is performed, as presented in Table 4.

Table 4: Diagnostic Test (Heteroskedasticity, Autocorrelation & Exogeneity)

Exchange Rate Mechanism (ERM) Jan 1985 - July 1992

Bond Market			
Heteroskedasticity : White Test	Test Stat		P value
Obs. R-Squared	46.572	Prob. Chi-Square(50)	0.612
Breusch-Godfrey Serial Correlation LM test			
Obs. R-squared	21.656	Prob. Chi-Square(2)	0.000
Block Exogenity Wald test			
Fiscal	38.326	df-12	0.000*
Monetary	14.383	df-12	0.277
All	77.945	df-36	0.001*
Stock Market			
Heteroskedasticity : White Test	Test Stat		P value
Obs. R-Squared	53.330	Prob. Chi-Square(50)	0.347
Breusch-Godfrey Serial Correlation LM test			
Obs. R-squared	5.312	Prob. Chi-Square(2)	0.070
Block Exogenity Wald test			
Fiscal	6.621	df-12	0.881
Monetary	8.998	df-12	0.703
All	27.691	df-36	0.838

*Significant at 1% level, ** Significant at 5% level

In our Pre-ERM collapse period the results of diagnostic test showed that for stock market the null hypothesis of No Serial Co-relation (Breusch Godfrey test) and null hypothesis of Homoskedasticity (White test) could not be rejected at benchmarked level of statistical significance (5%). Although the bond market results could not lead to the acceptance of Null hypothesis of No Serial Co-relation (Breusch Godfrey test) at statistical level of significance (5%), null hypothesis of Homoskedasticity (White test) was accepted. It implied that we can trust our results of model estimation without the fear of Heteroskedasticity and Autocorrelation. The Block Exogeneity test also showed that fiscal policy has significant

exogenous impact on bond market while monetary policy could not reflect the same degree of association; however, for macroeconomic policy combination the results were significant. Interestingly, for stock market neither individual nor combination of macroeconomic policies showed much significant exogenous association. We would look into this factor in details in the Wald coefficient restriction test in the coming section. A diagnostic test for the Post-ERM estimation of the VAR model was also performed and results are presented in Table 5.

Table 5: Diagnostic Test (Heteroskedasticity, Autocorrelation & Exogeneity)

Post Exchange Rate Mechanism (ERM) October 1992 - April 1997

Bond Market			
Heteroskedasticity : White Test	Test Stat		P value
Obs. R-Squared	39.252	Prob. Chi-Square(35)	0.2850
Breusch-Godfrey Serial Correlation LM test			
Obs. R-squared	2.092	Prob. Chi-Square(2)	0.351
Block Exogenity Wald test			
Fiscal	6.616	df-8	0.578
Monetary	14.672	df-8	0.507
All	18.322	df-24	0.787
Stock Market			
Heteroskedasticity : White Test	Test Stat		P value
Obs. R-Squared	35.075	Prob. Chi-Square(35)	0.465
Breusch-Godfrey Serial Correlation LM test			
Obs. R-squared	9.521	Prob. Chi-Square(2)	0.009*
Block Exogenity Wald test			
Fiscal	32.158	df-8	0.000*
Monetary	19.425	df-8	0.012*
All	53.065	df-24	0.001*

*Significant at 1% level, ** Significant at 5% level

The results of diagnostic test for Post-ERM period showed that for bond market the null hypothesis of the No Serial Co-relation (Breusch Godfrey test) and null hypothesis of Homoskedasticity (White test) could not be rejected at benchmarked level of statistical significance (5%). Although the macroeconomic policies did not show significant exogenous impact on bond market neither their combination, we would shed further light on this aspect in the Wald test for this period. On the other hand, diagnostic test for the model analysing the association between macroeconomic policies and stock showed that although null of Homo-

skedasticity (White test) could not be rejected yet we could not accept the null of No serial correlation. It is quite initiative and could be expected where stock return market behaviour is influenced by previous period scenario and most importantly we can still obtain unbiased and consistent estimates though not much efficient. Interestingly each macroeconomic policy as well as their combination showed highly significant exogenous impact on stock market.

A Wald coefficient restriction test was performed to check the significance of various parameters of policy variables individually as well as jointly. The results of comparative analysis are presented in Table 6:

Table 6: Wald Test Vector Auto regression Model Jan 1985 – April 1997

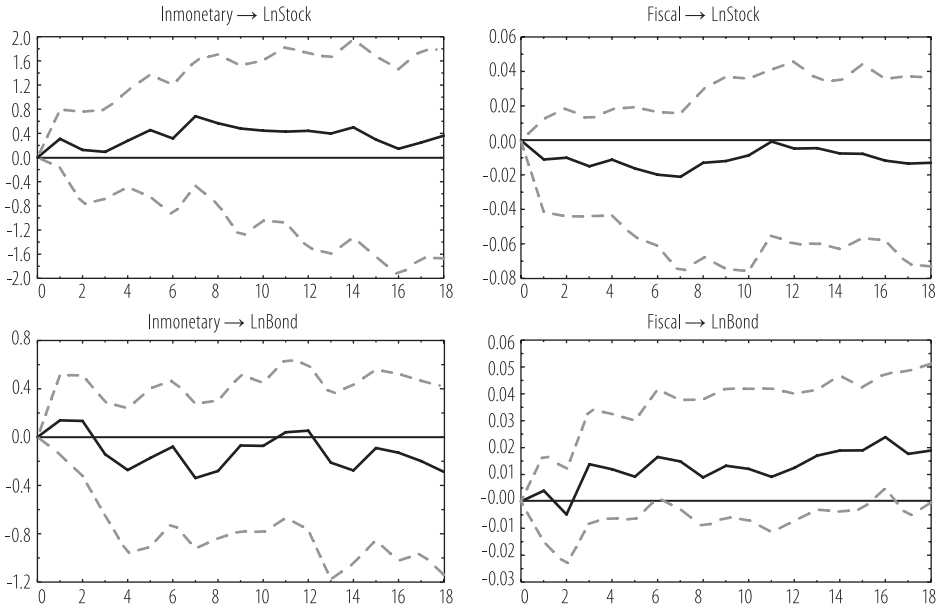
Exchange Rate Mechanism (ERM) Jan 1985 - July 1992

Test Statistic Bond Market	Chi Test Value	df	(P-value)
LnBond	38.442	12	0.034**
Fiscal Policy	38.326	12	0.001*
Monetary Policy	14.383	12	0.276
Fiscal + Monetary (coordination)	48.230	24	0.002*
Test Statistic Stock Market	Value	df	(P-value)
LnStock	4.445	12	0.974
Fiscal Policy	6.621	12	0.882
Monetary Policy	8.998	12	0.703
Fiscal + Monetary (coordination)	19.224	24	0.740
Post Exchange Rate Mechanism (ERM) October 1992 - April 1997			
Test Statistic Bond Market	Value	df	(P-value)
LnBond	6.173	8	0.627
Fiscal Policy	6.616	8	0.579
Monetary Policy	7.273	8	0.507
Fiscal + Monetary (coordination)	13.426	16	0.641
Test Statistic Stock Market	Value	df	(P-value)
LnStock	24.721	8	0.002*
Fiscal Policy	32.158	8	0.000*
Monetary Policy	19.425	8	0.012*
Fiscal + Monetary (coordination)	46.996	16	0.000*

*Significance level (1%), **Significance level (5%) & ***Significance level (10%)

In addition to the structural break found in Chow test, the results presented in Table 6 also indicate a shift in effectiveness of macroeconomics policies in the post ERM period. It is prominent that the fiscal policy had significant impact on bond market before the breakdown of the ERM. The monetary policy did not show a sign of major influence on bond market, although the joint impact of both policies was highly significant, even at 1% level. On the other hand, none of single macroeconomic policy (or their combination) showed any significant impact on stock market in first periods. Very interestingly the second sub-periods showed major shift in the effectiveness of policies as their impact on bond market became insignificant which implied that the bond markets became rather efficient and stable in the post ERM period. The second major shift in policy dynamics was that the impact of both policies individually as well as jointly became highly significant on stock market. It is a vital finding implying that before withdrawal from the ERM, macroeconomic policies were not able to manoeuvre and influence stock market. The withdrawal of membership form the ERM seems a good decision in the context of macroeconomic policies and their role in financial markets. Furthermore, it brought stability in bond market. Nevertheless, to get some further insight and to view a big picture of the Pre and Post ERM periods, we performed an Impulse Response Function (IRF) Analysis for both sub-periods. It is worth mentioning here that the Impulses created based on VEC Model do not have (95%) confidence interval bands due to the presence of error correction terms in the model. However, to overcome this issue we performed bootstrapping by employing Efron Percentile Confidence Interval. One hundred bootstrap replications were carried out (B = 100) using JMulti-4 software package. The results are presented in Figure 1.

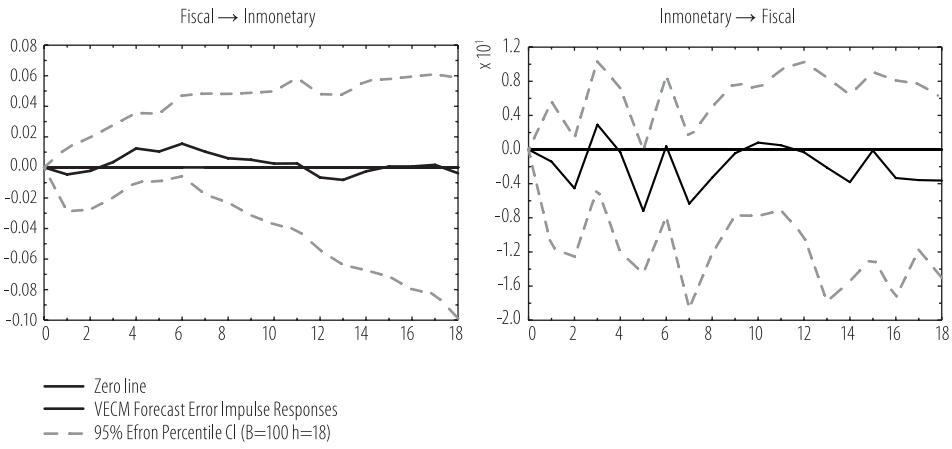
Figure 1: VECM Impulse Response Function (IRF): Period Jan 1985 - July 1992



Source: Author's Calculations using JMulti-4.

The results of the IRF analysis presented above showed that in the Pre-ERM collapse, contractionary monetary policy has positive impact on stock markets. Same policy stance by monetary authority led to a positive response from bond market. However in the long term it remained negative. On the other hand, contractionary fiscal policy negatively affected stock and bond markets. It terms that policy interaction contractionary fiscal policy led to a mild expansionary stance from monetary authority. Whereas the monetary contraction led to fiscal expansion, hence in this scenario an expansionary fiscal and monetary policy stance seems an optimal policy combination. Particularly for bond market as in the case of stock market the fiscal policy was rather more effective. It also supports the notion of using fiscal policy when monetary policy is not very effective.

Figure 2: VECM Impulse Response Function (IRF): Period Jan 1985 - July 1992

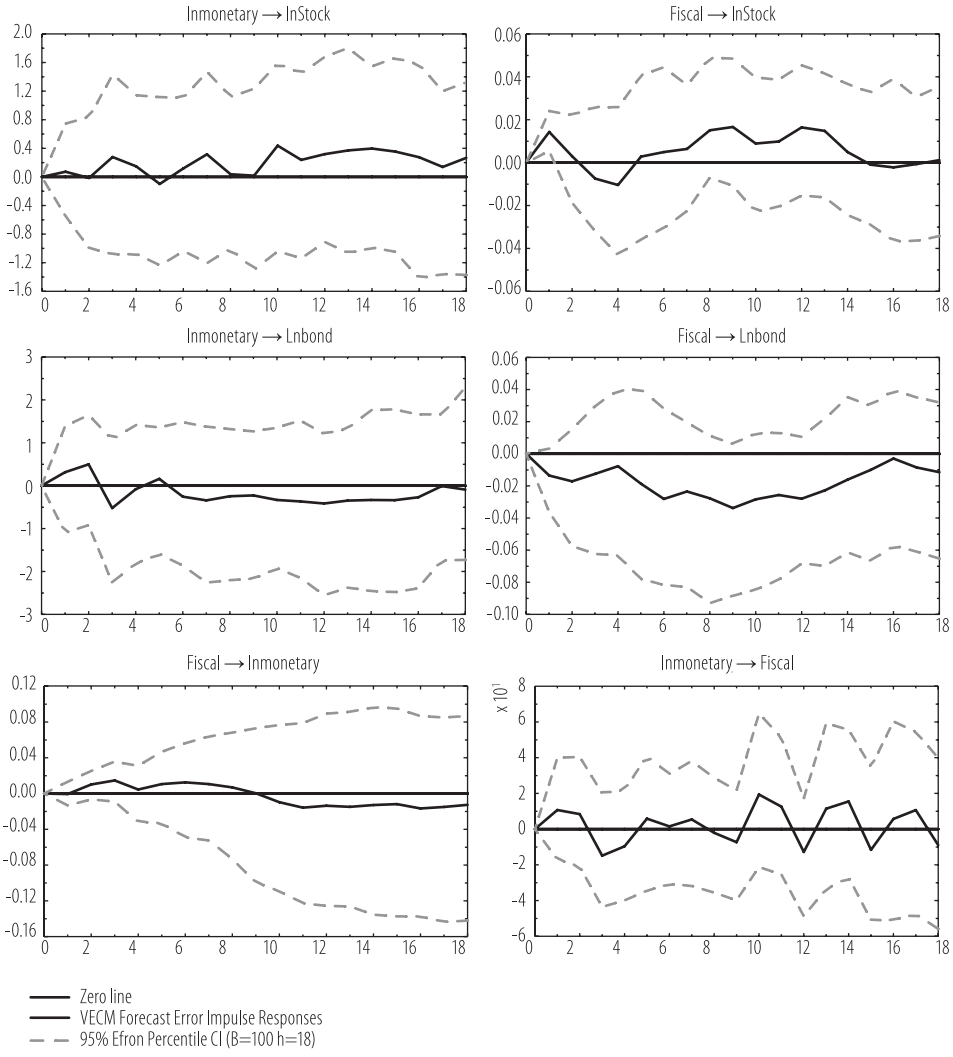


Source: Author's Calculations using JMulti-4.*Response to Cholesky One S.D. Innovations ± 2 S.E

In the Post-ERM scenario, the impact of macroeconomic policies on financial sector shifted. The contractionary monetary policy led to mild positive response from stock and bond markets whereas the similar policy stance from fiscal authority also resulted in positive response from bond market. The contractionary monetary stance led to fiscal consolidation and vice versa. The comparative analysis of two periods in above figure showed that the response of both stock and bond markets was milder in the second period (Post ERM). These finding are related to a study on state dependency (recession or boom) by Basistha and Kurov (2008) and Kurov (2010) and Chen (2012) as they argued that the monetary policy is more effective in recession and bearish stock markets than boom and bullish stock markets. Howeve,r we have taken their argument further by addition of fiscal policy and bond markets. Hence, in addition to the previous findings in Table 6 that bond and stock markets responses to policy shock variously with respect to financial turmoil. We may disagree with the arguments by Park (2008) made in study on macroeconomic policy and exchange rates that often the exchange rate policy was not affected by monetary and fiscal policies.

Period October 1992 - April 1997

Figure 3: VECM Impulse Response Function (IRF): Period October 1992 - April 1997



Source: Author's Calculations using JMulti-4.*Response to Cholesky One S.D. Innovations ± 2 S.E.

As we can witness that the withdrawal from the ERM significantly changes the association of macroeconomic policies and financial sector. Looking at the same argument from a different dimension, we can also argue that the effectiveness

and importance of macroeconomic policies coordination increases in the time of financial instability.

On the aspect of initiation of inflation targeting (2.5% RPI) in October 1992, we have also provided the empirical support to assertion by Libich et al. (2011) which suggested that the monetary policy should be made more explicit (inflation targeting) and show commitment towards price stability. Their argument was that this mechanism would work as a partial substitute of monetary independence and coordination from the fiscal authority. Although their arguments were on price stability and requires empirical validations, yet our empirical analysis here shows that these are quite valid in the case of financial sector. It could be witnessed that in the Post ERM period when the explicit inflation target was started that resulted in an increase in the influence of monetary policy (Table 6), though the Bank of England was not independent till May 1997.

The inter-relationship between monetary and fiscal policies also increased in the period before withdrawal from ERM. It implies that the policies also affect each other more in the time of financial volatility; we must acknowledge the study by Franta et al. (2011) who argued that legislative and explicit inflation target could help monetary policy to control excessive fiscal spending and also lead to fiscal discipline. Contextualizing it in our findings, we could suggest that the inflation targeting may increase the association between policies hence their coordination becomes rather vital and more desirable for any positive role in financial markets.

4.2 Independence of the Bank of England & Formulation of MPC

After analysing the impact of the ERM and the start of inflation targeting we moved towards our second major institutional change i.e. independence of the Bank of England. On 6th May 1997 the BoE was delegated the authority to set up the interest rates, the Act was however approved and signed by the HM Queen in April 1998 to be enforced form the 1st of June 1998. As cited earlier with the independence of instrument (interest rates) setting, certain responsibilities for instance supervision of banking sector were also transferred to FSA. To find the impact of these institutional changes and whether they lead to structural break we performed Chow test by considering sample period from October 1993 to August 2008[8]. The null hypothesis of no structural break has been rejected against alternative of structural break at 95% confidence benchmark in the case of bond

[8] To conserve the space the results of structural break, lag selection and co-integration tests are not presented here and are available on request.

and at 99% benchmark, as in the case of stock markets. It implied that the association between our response and explanatory variables has been changed along with independence of the BoE, formulation of its Monetary Policy Committee and transfer of responsibilities to the FSA (Banking Sector Supervision) and the DMO (Sovereign Debt Management).

To precisely reflect and document the shift in the association among under analysis variables we estimated the aforementioned Vector Auto regression model for post MPC periods i.e. July 1998 to August 2008. However, as the first step we performed the optimal lag selection test where all the lag selection criterions unanimously suggested 23 as optimal numbers of lags, which is intuitive as the macroeconomic policies impact the financial markets through various channels some of which appear after a while. Therefore, following the unanimous advice by our lag selection criterions same numbers of lags were included. However, we also perform a Lag Exclusion test to cut off the number of lags by excluding the insignificant lags. Thereafter, the co-integration test using Johansen method is carried out to check the presence of co-integrating relationship and to decide whether to use restricted VECM or un-restricted VAR framework. In the Johansen Co-integration test, both of our Unrestricted Co-integration Rank tests (Trace & Max Eigen statistics) showed that the null of no co-integration was rejected at 5% level on the basis of MacKinnon-Haug-Michelis (1999) p-values, there are at least three co-integrating equations found. It implied that there are at least three time series that are co-integrated or have long term association as they share a common stochastic drift. Hence we employed a restricted or the VEC Model by incorporating error correction terms (rank 3). The estimation of the model (Equations 1 & 2) for the Post independence of the BoE and formulation of MPC period also included a Dummy variable i.e. CRASH to control the effects of Dot Com Bubble which coincided with the 9/11 Attacks. The Dummy variable is a binary variable (0, 1), the study by Cameron (2005) considered it tremendously useful extension in the model. In our case we assigned a value to 0 to this variable from September 2001 till December 2003 which indicates the period of Dot Com bubble burst and stock volatility in this period and in rest we assigned value of 1 (Cameron, 2005). For the observation with value of 0, the coefficients will have no role in influencing dependent variable whereas in the case of value of 1 the coefficients influence to alter the intercept. The results of estimation for Equation (1) and Post BoE independence various values of coefficient size, sign and significance; however, the Error Correction terms showed significant and negative values. We included 3 co-integration ranks as they gave maximum value of adjustment. It is an indication towards the stability of our model. The dummy variable CRASH showed a negative and significant coefficient value which implied that the period of Dot Com Bubble has negative effects on bond market. Thereafter we estimated the

second equation – Equation (2) for the same period. The model estimated showed some values below 5% significance level (p >0.05). However, considering the fact that we have a system of equation where variables are treated endogenously, it is vital to see the model on the whole. The dummy variable CRASH showed a positive, although not highly significant value of coefficient, which implied that the period of Dot Com bubble would have negative impact on the stock market as the period other than that for which we gave value of 1 to our binary dummy variable CRASH showed a positive sign. As mentioned earlier to decrease the number of insignificant lags we performed the Lag exclusion test. The results of the Wald Lag exclusion test showed that none of the lag was insignificant below the 5% level, hence we cannot drop and lag on the basis of its insignificance. Therefore, we accept the same numbers of lags suggested by lag selection test. Perhaps it is intuitive as it yields better estimates by following lag selection criteria. Hereafter, a diagnostic test is performed to check the robustness and validity of estimates and the results are presented in Table 7:

Table 7: Diagnostic Test (Heteroskedasticity, Autocorrelation & Exogeneity)

Post Formulation of MPC & Independence of BoE Sep 1998 – Aug 2008

Bond Market			
Heteroskedasticity : White Test	Test Stat		P value
Obs. R-Squared	94.108	Prob. Chi-Square(92)	0.425
Breusch-Godfrey Serial Correlation LM test			
Obs. R-squared	45.624	Prob. Chi-Square(2)	0.000*
Block Exogenity Wald test			
Fiscal	93.545	df-22	0.000*
Monetary	78.598	df-22	0.000*
All	165.928	df-66	0.000*
Stock Market			
Heteroskedasticity : White Test	Test Stat		P value
Obs. R-Squared	87.888	Prob. Chi-Square(92)	0.601
Breusch-Godfrey Serial Correlation LM test			
Obs. R-squared	35.636	Prob. Chi-Square(2)	0.000*
Block Exogenity Wald test			
Fiscal	258.871	df-22	0.000*
Monetary	248.353	df-22	0.000*
All	707.728	df-66	0.000*

* Significant at 1% level, ** Significant at 5% level

The results of diagnostic test for the Post MPC formulation and the independence of the BoE period showed that for bond market the null hypothesis of No Serial Co-relation (Breusch Godfrey test) could not be accepted at the benchmarked level of statistical significance (5%). However, the null hypothesis of Homoskedasticity (White test) could not be rejected at benchmarked level of significance. Therefore, we do not have the issue of Heteroskedasticity in our model so we can rely on our results to be unbiased and consistent. Nevertheless, the Exogeneity test showed very interesting findings. With comparison to the pre-independence of the BoE scenarios in Table 6 the significance of exogenous impact of fiscal policy for bond market and monetary policy for stock market increased enormously. It implied that the independence of the BoE which included the changes in its structure and responsibilities increased the effectiveness of monetary authority on sovereign debt market and equity market. We would further discuss this phenomenon in the Wald test in the next section. Nevertheless, in the context of macroeconomic policy combination, between monetary and fiscal policies the former showed a greater exogenous impact on stock while later showed a greater exogenous impact on bond market. However, both policies showed significant exogenous impact, whereas in the case of macroeconomic policy combination, it showed a rather greater exogenous impact than on both stock and bond markets. It implied that the solo effort of a single policy may influence one market more; however the combination of two could bring fruitful results for both markets.

Thereafter we performed a Wald coefficient restriction test to evaluate the individual and joint impact of macroeconomic policies on financial sector; the results are reported in Table 8.

Table 8: Wald Test Vector Auto regression Model Sep 1998 – Aug 2008

Test Statistic	Value	df	(P-value)
LnBond	70.384	22	0.000*
Fiscal Policy	93.545	22	0.000*
Monetary Policy	78.598	22	0.000*
Fiscal + Monetary (coordination)	139.436	44	0.000*
Test Statistic	Value	df	(P-value)
LnStock	234.606	22	0.000*
Fiscal Policy	258.871	22	0.000*
Monetary Policy	248.353	22	0.000*
Fiscal + Monetary (coordination)	476.296	44	0.000*

* Significance level (1%) ** Significance level (5%)

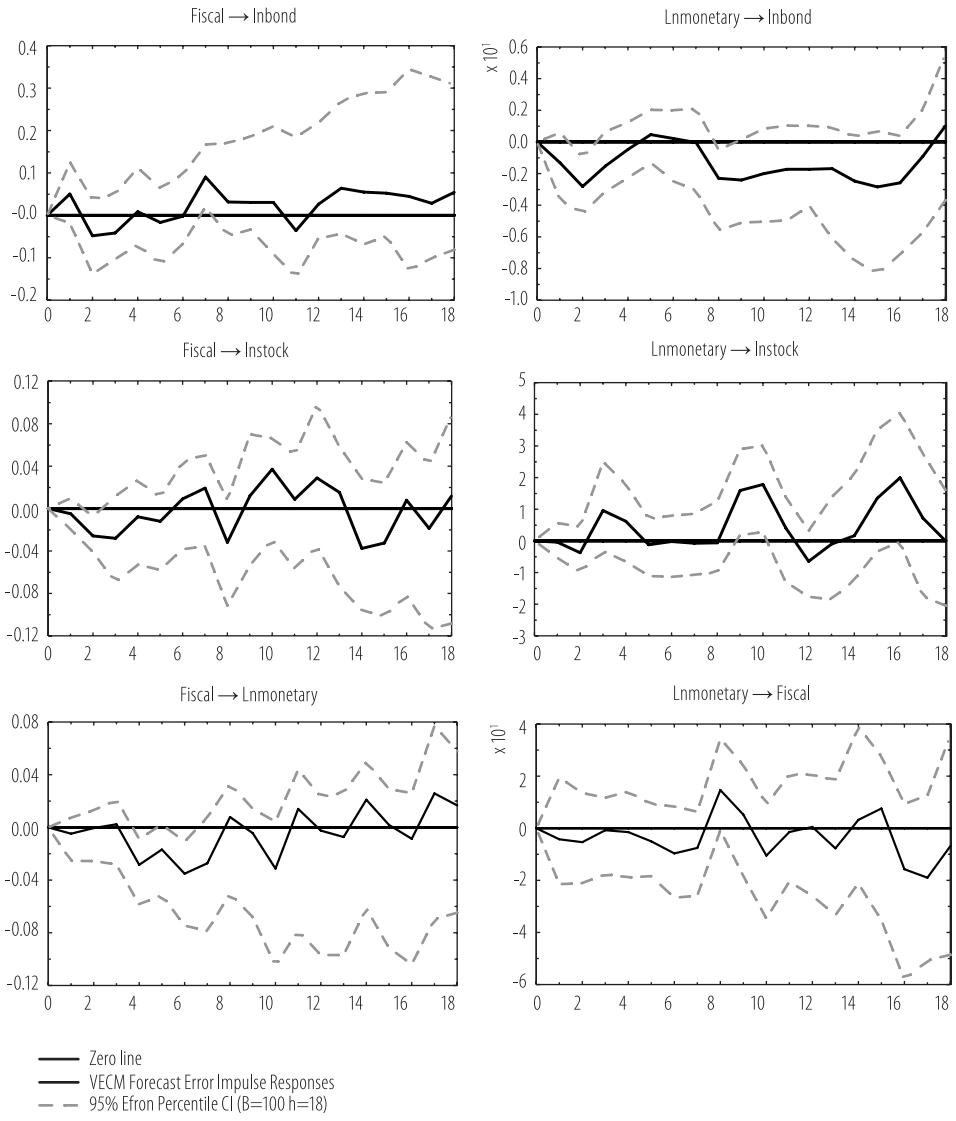
As we can see in the post Bank of England's independence there is a significant shift in association between macroeconomic policies and financial sector. While making a comparison between the Pre-MPC and the BoE independence period as presented in Table 7 with the Post BoE independence and formulation of the MPC period depicted in Table 8 it is evident that the individual impact of monetary policy as well as fiscal policy increased to a large degree in its significance. The reason could be the transfer of sovereign debt supervision to Debt Management Office for the bond market. Moreover the impact of fiscal policy and macroeconomic policy combination on the bond market has been rather more significant and greater during the latter period. It implies that the independence of the Bank of England and the formulation of MPC have increased the influence of policy interaction on the bond market although monetary policy at its own did have significant impact. This finding further validated the importance of macroeconomic policy coordination.

Furthermore, the stock market also showed a shift in its response to macroeconomic policy shocks. The impact of monetary policy remained highly significant. Moreover the fiscal policy also showed a significant long-run association with stock market. Concomitantly, this change towards rather more significant impact on stock market could be associated with the increase in effectiveness of macroeconomic policies after these institutional changes. It implies that although the market participants may anticipate fiscal and monetary authorities' actions in the light of rationale expectations and market efficiency arguments, macroeconomic policies still have impact on financial market. Being very specific to this scenario as with the independence of the Bank of England instrument (interest setting) setting from fiscal authority (HM Treasury) control, the fiscal policy remained significant for stock market. It is very much in line with intuition and institutional change. However, the joint impact of macroeconomic policy was also significant which authenticated the notion of policy coordination. In summary, on the basis of these findings we can argue that the independence of the BoE and the formulation of MPC have important and positive implications for influence of macroeconomic policies on financial sector. It also led to the increased necessity of macroeconomic policy combination, particularly for its capacity to influence bond market and stock markets, though the monetary and fiscal policies also affect bond and stock markets respectively.

Finally to view a snap shot of the post MPC formulation and independence of the BoE, we performed an Impulse Response Function (IRF) Analysis for subject sub-periods and a comparison with the period before this institutional change was also made. The bootstrapping was performed to construct the confidence interval by employing Efron Percentile Confidence Interval method. The one hun-

dred bootstrap replications were carried out (B = 100). The results are presented in Figure 4.

Figure 4: VECM Impulse Response Function (IRF): Period Sep 1998 – Aug 2008



Source: Authors calculations using JMulti-4.*Response to Cholesky One S.D. Innovations ± 2 S.E.

As we can see in Figure 4, the bond yield showed a positive response to expansionary fiscal shocks implying a plunge in bond prices after fiscal expansion, however monetary contraction leads to a fall in real bond yield and a surge in the real price of bond which is not counter intuitive. As we are using the real yield on bonds a contractionary monetary policy effects show an increase in bond prices in real terms rather than nominal. It could be associated with the decrease in inflation due to the contractionary monetary stance. However, we will not go into details as it is beyond the scope of this study. Interestingly the interaction between policies showed that alternative shocks to monetary and fiscal policy did cause some volatility to each other implying interdependence even after the BoE independence. It is indeed a vital finding considering the fact that the MPC has representation of HM treasure on its board, although in non-voting observer status. The stock market did show a persistent response to fiscal expansion whereas a positive (contractionary) monetary policy shock led to surge in stock prices after initial drop, implying that the monetary policy had short run impact on stock market in this period.

In the context of optimal policy combination, the contractionary monetary policy showed a negative impact on the stock market whereas the bond market showed positive response. The contractionary fiscal policy also led to negative response from stock as well as bond markets. The fiscal contractions led to monetary expansions and vice versa. Therefore, an appropriate policy combination in the light of these findings would be an expansionary fiscal stance while monetary policy could be passive considering the fact that it has heterogeneous response from the stock and bond markets, unless we are targeting a particular market in the short-run. It leads us to conclude.

5. CONCLUSIONS AND POLICY IMPLICATIONS

The changes in institutional arrangement and the design of policy making authorities appeared to be a major contribution factor in the dynamics of association between policy coordination/combination and financial sector. In the Post-ERM scenario, the impact of macroeconomic policies and their interaction on the financial sector shifted. Moreover, it was also found that the bond markets became rather stable in Post-ERM period while the effectiveness of macroeconomic policies had also been increased for the stock market. On the basis of these findings, we conclude that the withdrawal from the ERM was a vital factor for macroeconomic policy combination and its association with financial markets as post ERM effectiveness of macroeconomic policy combination has been increased for stock markets and the bond market has become more stable, hence the decision

to withdraw from ERM is appreciable in this context. The most important lesson to learn from it was that joining currency union in any form could reduce the capability of local policy makers to influence domestic financial sector. Moreover, the markets also showed instability in the form of massive fluctuations. With the benefit of hindsight we can see that this is the case in the European Monetary Union. However, the subject study has brought this aspect into the limelight in the context of British macroeconomic policy framework and the financial sector.

The major and perhaps the most important institutional design change was the BoE independence which involved the formulation of the MPC and the allocation of some of the BoE's responsibilities to the DMO. It is observed that the individual impact of macroeconomic policies as well as the impact of policy combination significantly increased after the formulation of the MPC. It could be declared as the success of the strategy of giving the BoE autonomy with regards to the increased effectiveness of policies for financial sector. In the light of this institutional change, another conclusion we could draw was that the interaction between policies showed that alternative shocks to monetary and fiscal policy did cause considerable volatility to each other implying that although the BoE gained independence along with the earlier cited transfers of responsibilities, yet the policy of coordination remained important for financial stability. Considering the fact that we found a heterogeneous response from the stock and bond markets to monetary and fiscal stance, unless we are targeting a particular market in the short-run, moreover, alternative shocks to monetary and fiscal policy did cause considerable volatility to each other. Concomitantly, we can recommend that the institutional autonomy in the form of instrument independence (monetary policy decisions) could bring financial stability; however, there is a strong necessity for coordination even in Post-MPC and the BoE independence.

REFERENCES

1. Airaudo, M.Nistico, S. Zanna, L.F. (2015).Learning Monetary Policy and Asset Prices, Journal of Money, Credit and Banking, Volume 47 (7) Pages 1273–1307.
2. Altissimo, F., Georgiou, E. Sastre, M. Valderrama, M.T. Stocker, G.S.M. Weth, M. Whelan, K. William, A. (2005). Wealth and Assets Price Effects on Economic Activity, Occasional Paper Series No 29 / June 2005
3. Arby, M.F and Hanif, M.N. (2010). Monetary and Fiscal Policies Coordination: Pakistan's Experience, SBP Research Bulletin Volume 6, No. 1, May
4. Ardagna, S., (2009). Financial markets behaviour around episodes of large changes in the fiscal stance, European Economic Review 53, pp. 37–55.
5. Arnold, I.J.M., Vrugt, E.B. (2010). Treasury Bond Volatility and Uncertainty about Monetary Policy, the Financial Review, 45, 707–728
6. Basistha, A. Kurov, A. (2008). Macroeconomic cycles and the stock market's reaction to monetary policy, Journal of Banking & Finance 32 , 2606–2616
7. Baumeister, C. Liu, P., Mumtaz, H. (2010). Changes in the transmission of monetary policy: evidence from a time-varying factor-augmented VAR, Working Paper No. 401, Bank of England.
8. Benigno, G. Chen, H. Otrok, C. Rebucci, A. Young, E. R. (2013). Financial Crises and Macro-Prudential Policies, Journal of International Economics, Volume 89 (2), Pages 453-470.
9. Bhargava, A. (1986). "On the theory of testing for unit roots in observed time series", Review of Economics Studies, 53, 369-384.
10. Bhundia, A. & O, Donnell, G. (2002). UK Policy Coordination: The Importance of Institutional Design, Fiscal Studies, vol. 23, no. 1, pp. 135–164
11. Blanchard, O. Dell'Ariccia, G. Mauro, P. (2010). Rethinking Macroeconomic Policy, IMF staff Position Note, SPN/10/03
12. Bredin, D., Hyde, S., Reilly, G. O. (2005). UK Stock Returns & the Impact of Domestic Monetary Policy Shocks, Department of Banking & Finance, Graduate School of Business, University College Dublin
13. Cameron, S. (2005). Econometrics, Maidenhead, England: McGraw-Hill Education.
14. Chen, M.H. (2012). State dependence in the influence of monetary policy regime shifts on hospitality index returns, International Journal of Hospitality Management 31, 1203– 1212
15. Chow, G, C. (1960). Tests of Equality Between Sets of Coefficients in Two Linear Regressions, Econometrica, 28, 591–605.

16. Dixit, A., Lambertini, L. (2001).Monetary- fiscal policy interactions and commitment versus discretion in a monetary union, European Economic Review 45, pp. 977-987.
17. Elliot, G., Rothenberg, T. J. Stock, J. H. (1996)."Efficient tests for an autoregressive unit root", Econometrica, 64, 813-836.
18. Franta, M. Libich, J. Stehlik, P. (2011). The Big Picture of Monetary–Fiscal Interactions, Economic papers, Vol. 30, No. 1, March, 6–14
19. Funke, M. Paetz, M., Pytlarczyk, E. (2011). Stock market wealth effects in an estimated DSGE model for Hong Kong, Economic Modelling, Volume 28, (1–2), Pages 316-334.
20. Haldane, A. Read, V. (2000). Monetary policy surprises and the yield curve, Bank of England, ISSN 1368-5562
21. Hill, C. W. L. (2014). International Business: Competing in the Global Marketplace, 10th Edition, McGraw-Hill Education, Berkshire.
22. Jansen, D. W, Li, Q. Wang, Z., Yang, J., (2008). Fiscal policy and asset markets: A semi-parametric analysis, Journal of Econometrics 147, pp.141 -150
23. Khorasgani, H.S. (2010). Financial Instability and Optimal Monetary Policy Rule, FIW Working Paper No 42
24. Kontonikas, A. Montagnoli, A. (2006). Optimal monetary policy and asset price misalignments, Scottish Journal of Political Economy, Vol. 53, No. 5, November
25. Kurov, A. (2010). Investor sentiment and the stock market's reaction to monetary policy, Journal of Banking & Finance, 34, 139–149
26. Lildholdt, P. Wetherilt, A.V. (2004). Anticipation of monetary policy in UK financial markets, Bank of England
27. Liew, Venus Khim–Sen. (2004). "Which Lag Length Selection Criteria Should We Employ?." Economics Bulletin, 3, pp.1–9
28. Lobo, B.J . (2000). Asymmetric Effects of Interest Rate Changes on Stock Prices, the Financial Review 35, 125-144
29. Lobo, B. J, Darrat, A.F and Ramchander, S. (2006). The Asymmetric Impact of Monetary Policy on Currency Markets, the Financial Review 41, 289–303
30. Lu, X & In, F. (2006). Monetary Policy, Open Market Operations and New Zealand Interest-Rate and Exchange-Rate Markets, Journal of the Asia Pacific Economy ,Vol. 11, No. 4, 462–481
31. MacKinnon, James G., Alfred A. Haug, and Leo Michelis. (1999). "Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration." Journal of Applied Econometrics, 14, 563-577.
32. Malikane, C. Semmler, W. (2008). Asset Prices, Output and monetary policy in a small open economy, Metroeconomica 59:4

33. Mariscal, I.B. F. Howells, P. (2007). Monetary Policy Transparency in the UK: The Impact of Independence and Inflation Targeting, International Review of Applied Economics, Vol. 21, No. 5, 603–617.
34. Nasir, M.A. Soliman, A. M. (2014). Aspect of Policy Combination & Effects on Financial Markets" Economic Issues , 19, 92 – 118.
35. Nevill, A, M. Holder, R, L. (1995). Scaling, normalizing and per ratio standards: Scaling an Allometric modelling approach, The American Physiological Society. Available at: http://wlv.openrepository.com/wlv/bitstream/2436/66082/1/JAP%20Scaling,%20Normalizing.pdf [Accessed at: 23 September 2014]
36. Ng, S. and P. Perron. (2001). Lag length selection and the construction of unit root tests with good size and power. Econometrica, 69, 1519-1554.
37. Osborn, D.R. Sensier, M . (2009). UK Inflation: Persistence, Seasonality and Monetary Policy, Scottish Journal of Political Economy, Vol. 56, No. 1, February
38. Park, S, G. (2008). Monetary, Fiscal, and the Exchange rate Policy Interactions with Central Bank Debt, Department of Economics, University of Indiana.
39. Perron, P. (1989). The great crash, the oil price shock and the unit root hypothesis, Econometrica, 57, 1361-1401.
40. Phillips, P. C. B. (1987). "Time series regression with a unit root", Econometrica, 55, 311-340.
41. Phillips, P.C. B. Perron, P. (1988)."Testing for a unit root in time series regression", Biometrica, 75, 335-346.
42. Politis, D.N, Romano, J.P, Wolf, M. (1999). Sub-sampling, Springer Series in Statistics, Springer; edition
43. Porqueras, P.G and Alva, A.P. (2010). Optimal monetary and fiscal policies in a search theoretic model of monetary exchange, European Economic Review, 54, 331–344
44. Ranganathan, T., Ananthakumar, U. (2010). Unit Root Test: Give It A Break, The 30th International Symposium on Forecasting, International Institute of Forecasters
45. Sims, C.A. (2011). Stepping on a rake: The role of fiscal policy in the inflation of the 1970s, European Economic Review, 55, 48–56
46. Srinivasan, N. Jain, S. & Ramachandran, M . (2009). Monetary policy and the behaviour of inflation in India: Is there a need for institutional reform? Journal of Asian Economics 20, 13–24
47. Weymark, D. N. (2007). Inflation, government transfers, and optimal central bank independence, European Economic Review 51, 297–315

48. Wong , W. K. , Khan, H. K. Du , J . (2006). Do the interest rates matter for stock prices? And economic study of Singapore & U.S.A, The Singapore Economic Review, 51, pp. 31-51
49. Zigman, A. , Cota, B. (2011). The impact of fiscal Policy on Government Bond Spreads in Emerging Markets, Financial Theory and Practise, 35, pp. 385 - 412.