

**To my mom, dad, sister and
friends who were always there for me**

MONETARY POLICY EFFECTIVENESS
AND
INFLATION TARGETING

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I hereby certify that this thesis meets all the requirements of the Graduate School of Social Sciences for a Master's degree.



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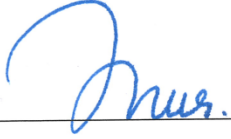
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ABSTRACT

MONETARY POLICY EFFECTIVENESS AND INFLATION TARGETING

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The purpose of this thesis is to check the effectiveness of monetary policy on macroeconomic indicators after the adoption of inflation targeting for randomly chosen 10 economies to fill the gap in the literature. For this purpose, the effectiveness of interest rates on output gap and inflation rates have been measured to compare the differences for pre and post targeting periods by evaluating VAR model analysis. The duration and magnitude of a shock is investigated by implementing

impulse response functions. Effectiveness on output gap is found out significant for Iceland, South Korea, Mexico, Norway, Poland, Romania and Turkey and insignificant for Czech Republic, Republic of Serbia and the U.K. for pre-targeting period but significant for all economies for post-targeting period. Effectiveness on inflation has been found out significant for South Korea, Mexico, Romania and Turkey but insignificant for Czech Republic, Iceland, Norway, Poland, Republic of Serbia and the U.K. for pre-targeting. For post-targeting period, the findings have revealed effectiveness on inflation is significant for Czech Republic, Iceland, South Korea, Mexico, Norway, Poland, Republic of Serbia and the U.K..

Findings reveal that effectiveness of monetary policy on output gap has been relevant for all countries after the adoption of inflation targeting by making effectiveness on output gap more obvious. The similar conclusion holds for effectiveness on inflation rates for post-targeting (except Turkey and Romania) implying the evidence for effectiveness on macroeconomic indicators after the adoption of inflation targeting.

Keywords: Inflation Targeting Regime, VAR Model, Impulse Response Function, Effectiveness of Monetary Policy, Output Gap.

ÖZET

PARA POLİTİKASI ETKİNLİĞİ VE ENFLASYON HEDEFLEMESİ

HUYUGÜZEL, Nurbanu

Yüksek Lisans, Ekonomi Bölümü

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Bu çalışma, farklı zamanlarda enflasyon hedefleme rejimini benimsemiş olup rasgele seçilmiş 10 ekonominin, bu rejimin benimsenmesinden sonraki dönemlerde para politikasının makroekonomik göstergeler üzerindeki etkinliğini kontrol ederek ilgili literatürdeki boşluğu doldurmayı amaçlamaktadır. Bu amaçla, faiz oranlarının ekonomik çıktıdaki açık ve enflasyon oranları üzerindeki etkinliği, enflasyon hedeflemesi öncesi ve sonrası dönem arasındaki farkları kıyaslamak amacıyla VAR

Model analizi aracılığıyla incelenmiştir. Bu kapsamda, etki-tepki fonksiyonları uygulanarak faiz üzerindeki olası bir şokun ekonomik çıktı açığı ve enflasyon oranları üzerindeki etkisinin süresi ve büyüklüğü incelenmiştir. Ampirik bulgulara göre, enflasyon hedeflemesi öncesi dönemde, Çek Cumhuriyeti, Sırbistan ve Birleşik Krallık hariç analize dahil edilen ekonomilerde para politikasının ekonomik çıktı açığı üzerindeki etkinliği %5 önem düzeyinde istatistiki olarak anlamlı bulunurken; hedeflemesi sonrası dönemde tüm ekonomilerde istatistiki olarak anlamlı sonuçlara ulaşılmıştır. Enflasyon oranları üzerinde para politikasının etkinliğine dair ise hedefleme öncesi dönemde yalnızca Güney Kore, Meksika, Romanya ve Türkiye için istatistiki olarak anlamlı sonuçlara ulaşılırken; hedefleme sonrası dönemde, Romanya ve Türkiye hariç analize katılan tüm ekonomilerde istatistiki olarak anlamlı sonuçlara ulaşılmıştır.

Bu sonuçlara göre hedefleme sonrası dönem için para politikasının ekonomik çıktı açığı üzerindeki etkinliği tüm ülkeler için anlamlı olup enflasyon hedefleme yaklaşımının para politikasının ekonomik çıktı açığı üzerindeki etkinliğini daha da görünür hale getirmektedir. Analizde yer alan 10 ekonominin 8'i için hedefleme öncesi dönemle kıyaslandığında, hedefleme sonrası dönemde benzer sonuçların para politikasının enflasyon oranları üzerindeki etkinliği için de geçerli olduğu sonucuna varılmıştır. Tüm bu bulgular, enflasyon hedefleme rejimi sonrasında para politikasının ekonomik çıktı açığı ve enflasyon oranları üzerinde belirgin bir etkinliğinin olduğuna dair ampirik bir bulgu olarak değerlendirilmiştir.

Anahtar kelimeler: Enflasyon Hedefleme Rejimi, VAR Model Analizi, Etki Tepki Fonksiyonu, Para Politikası Etkinliği, Ekonomik Çıktı Açığı.

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ABBREVIATIONS

CPI: The consumer price index

EU: European Union

GEM: Global Economic Monitor

GDP: Gross Domestic Product

IFS: International Financial Statistics

IMF: International Monetary Fund

IT: Inflation Targeting

OECD: Organization for Economic Co-operation and Development

OSCR: Optimal State Contingent Rule

U.K.: United Kingdom

U.S.: United States of America

VAR: Vector-Auto-Regressive

CHAPTER ONE

INTRODUCTION

In our contemporary world, the main obligation of every Central Bank has been turned out to be the provision of stability in economics and assisting indirectly the other economic actors to ensure the stability in every aspect of economics. Although the stability is the main issue of every economy ranging from developed to developing economies, there is no single solution for sustaining the stability in every economy. Some economies have higher inflation and some others might have to deal with liquidity trap as in the case of Japan (Krugman et al., 1998). Therein Central Bank of any country should take the country-specific economic outlook into consideration when to evaluate monetary policies.

Up until 21st century, the main responsibility of Central Banks has been the accomplishment and sustainment of low and stable inflation both in the short and long run. For this purpose, starting from Gold Standard to inflation targeting, many

different approaches and frameworks have been evaluated in retrospect (David and Doh, 2014). To begin with, the Gold Standard has been about fixing the value of national currency to the gold and it has been accepted that the national currency could be converted into gold (Eichengreen and Flandreau, 1997). In practice, once the national currencies have been fixed in terms of Gold for every economy that has accepted the Gold Standard, this has also meant that exchange rates would be fixed. Thus the responsiveness of monetary authorities to the shocks has been dissolved. The most important effect of this on economy has been the high level of unemployment rates during the application of Gold Standard (Bordo, 1993).

Once Gold Standard has been abandoned, the economies have been more focused on money supply after the World War I (Fischer, 1977). The monetary authorities have started targeting the growth rate of money supply. As the stable and low level of inflation has been the main purpose of monetary authorities ever since, it is assumed that the inflation could be stabilized and lowered by arranging and changing the money supply (Sargent and Wallace, 1975). Unfortunately, the direct effect assumed to be between money supply and inflation has not been that much clear unlike it had been assumed by the economic theory.

The fixation of exchange rate has been another strategy of monetary authorities in order to handle the high inflation. In the fix exchange rate regimes, many different methods have been applied but their common property has been fixing the value of national currency to a more internationally accepted currency such as US dollars (Eichenbaum and Evans, 1993). But economies that have applied fixed

exchange rate regimes have to apply policy approaches that might cause devaluation of national currency which in turn results in higher money supply and higher inflation (Alogoskoufis and Smith, 1991). Because of this negative effect on inflation, today's economies have changed their exchange rate regime to floating regime.

All of these different approaches and applications have been proved to generate negative effects on stability of inflation rates and they have been replaced by the new ones. Moreover, it was not possible to create a monetary policy tool applicable by Central Bank without damaging their credibility during the implementation of the previous monetary policy frameworks. Thus the monetary authorities started looking for a more flexible and more supportive inflation-stabilizing policy approach. And this strategy has been assumed to be "inflation targeting". Inflation targeting has been basically about announcement of inflation targets of Central Bank into the public (Bernanke and Mishkin, 1997).

The main feature of inflation targeting has been the focus on the future inflation rather than the past and current ones. More importantly, once the target is about the future inflation, this has also meant the presence of a credible Central Bank since setting targets for future requires commitment and reliability (Fuhrer, 1997). Therefore, an accountable and transparent Central Bank in its operations is a sine qua non of inflation targeting framework (Friedman, 2002). Another important feature of inflation targeting has been the direct specification about the inflation of the future but the other monetary tools and strategies have indirect effects on inflation and

therein it is not always possible to foresee their effects on future inflation. Through inflation targeting, the countries have tried to control the inflation rates at some extent.

In practice, the inflation targeting has been carried out by trying to keep the inflation within a wider range rather than point target or a narrow range for inflation in order to give some space to Central Bank to respond to the shocks (Roger, 2009). In this way, it is also aimed to preserve the accountability and credibility of Central Bank at the same time. On the other hand, the price stability has been the main objective of inflation targeting as it is for all other monetary policy regimes. Based on all these properties of inflation targeting, this framework has been regarded as a policy approach that captures all the best properties of all different regimes (Bernanke et al., 1999).

One of the first economies applying the inflation targeting was New Zealand at the beginning of 1990s (Pétursson, 2004). Today the number of economies applying inflation targeting regime has reached up to 27 (Caldentey and Vernengo, 2013). As the current studies find out empirical evidence for the success of inflation targeting regime in sustaining low and stable inflation rates and also its positive effects on economic outcome such as real growth rate; the number of economies applying inflation targeting regime has been increasing (Truman, 2003). Moreover, as the number of economies applying inflation targeting regime has been increasing, the inflation targeting has been one of the most popular research subject of economic literature as well.

Since 1990s, these various and numerous studies carried out have made tremendous contribution into the literature that has been analyzing the relation between inflation targeting and macroeconomic indicators. Some of these studies have not found any significant relation between inflation targeting regime and the macroeconomic performance of economies applying inflation targeting. On the other hand, some others have found out empirical evidence supporting that inflation targeting results in higher credibility of monetary authorities, less volatility in inflation and growth indicators and lower inflation and interest rates and no negative effect on economic growth, unemployment and all other economic criteria. The detailed analysis between inflation targeting and macroeconomic outlook has been carried out in the following chapters of literature review part of this study as well.

Although there are many studies investigating the inflation targeting regime and its effect on economic parameters, there are just a few studies about the relation between inflation targeting and its effect on effectiveness of monetary policy. Therefore, this research investigates the effects of inflation targeting regime on monetary policy effectiveness in 10 different economies that have been adopting the inflation targeting by evaluating the Vector Auto-Regression model based methodology. In this study, it is expected that there would be no significant change on macroeconomic indicators if there is a shock on interest rates owing to the inflation targeting for the period after the effective date of inflation targeting regime. Moreover, it is expected that the duration of effects of shocks would be much limited to less number of periods under the inflation targeting regime.

This work consists of the following chapters : chapter two investigates and summarizes the findings of previous literature; chapter three provides brief but detailed information about inflation targeting applying economies that have been included in the empirical part of this study; chapter four provides information about the data and chapter five summarizes the methodology applied and chapter six displays results and findings and compares the results for each country and finally chapter seven concludes the whole study including the literature and the findings of the VAR models and impulse response functions.

CHAPTER TWO

LITERATURE REVIEW

Monetary policy and fiscal policy have been the main policy approaches of the economies since 1929 Great Depression period after which the Keynesian economic policy approaches have been widely accepted (Bibow, 2013). Since then, fiscal policy has been about managing the budget of the economy and the monetary policy has been about the money supply of the economies. Unfortunately, within economic retrospect both have been used for the political interests and populist aims. Especially monetary policy has been evaluated for populist goals (Lippi, 2002). But 1970s had been the turning point for the monetary policy evaluation for the economies after the Oil Crisis had burst (Kilian, 2008). Then the main focus of economies has been about how to decrease the inflation rates.

Once the economic outlook in 2000s is investigated, the inflation rate is still not the only important problem of any economy, there are still many economies

dealing with high inflation, devaluation of national currency, trade deficits, current account deficits and low growth rates (Milanovich, 2014). Especially 2008 Global Financial Crisis has turned out to be a real economy problem rather than a simple sub-prime crisis. The distortions in the financial and banking system due to moral hazard, information asymmetries and problems relevant in real estate market have heavily influenced the economic growth of many economies including the U.S. and E.U. member economies (Crotty, 2009). As a result of this crisis, the economic instability and high unemployment in world economies have taken much more attention. But the previous literature has put much more importance on inflation rate as inflation rate is the key player in directing the public to have rational expectations about future of the economy. Here high inflation rates distort the expectations about the economy (Buraschi and Jiltsov, 2005).

More importantly, since Great Depression the studies on monetary policy have revealed that the economy authorities cannot effectively use the monetary policy tools in a way that they always generate the desired outcomes. Furthermore, as the world economy has been more complicated and global through time, the effectiveness of national monetary policy has started to lose its importance. Liberalization of economies, openness to the global marketplace after World War II have all together made the world economies connected to each other (Rodrick, 2008). Thus the single monetary policy of any economy has been less effective on economic outlook of the economy. Eventually, all these radical changes taking place have made the Central Bank lose control over many indicators. Especially, the short run fluctuations have been more and more difficult to handle for any Central Bank. As a

result, Central Banks have started accepting the fact that there are not so many indicator they could control anymore (Woodford, 1995).

Once this fact is accepted by most of the Central Banks in different economies, they have started focusing on the control of inflation rates especially in the long run as inflation rate is proved to be controlled in the long run. More importantly, since 1970s and especially in 1990s the moderate and high level of inflation rates are found out as being an influential distortion on the economic outlook (Zaleski, 1992). Literature on the effects of inflation rates has revealed inflation rate has an intermediate role in economy in order to reach to the macroeconomic targets. Through many empirical and theoretical works, high inflation rate is proved to be detrimental over the economic growth (Billi, 2011). Since high inflation rates distort the expectations of the public about the economy, as stated above.

All of these discussions have put the importance of price stability forward (Wray, 1998). It is assumed that price stability does not only support the expectations but also indirectly support the effectiveness of monetary policy. Since once price stability is ensured, this also gives signals to the public about the credibility of Central Bank. Once the credibility of Central Bank has been ensured through the stabilization of price levels, it is hypothesized that the confidence of public to the Central Bank policies could be ensured in the long run. In this respect, the guarantee of price stability through inflation targeting framework plays a supportive and

intermediary role for Central Bank (Bernanke and Mihov, 1997). Therein, the other policy announcements of Central Bank could be more easily accepted by the public.

Although it is assumed that inflation targeting is related to the price stability, the relation between inflation rates and macroeconomic indicators has gathered significance in the recent decades. The inflation targeting regime has put the main focus of Central Bank on the inflation rates as the inflation rates' effects on economic indicators become less clear because the economies are getting more and more integrated into the global marketplace and also the openness of economies has increased substantially since World War II. Besides, the recent studies have revealed that the Philips curve relation between inflation rates and unemployment is not valid all the time (Atkeson and Ohanian, 2001). Furthermore, there have been periods when both inflation rates and unemployment increase together. This would totally change the effectiveness of different monetary policy frameworks.

What is more, the inflation targeting approach is evaluated as a framework to keep the economy away from the deflationary periods. Studies have revealed that the deflationary situation results in instability in the economy and financial system since the deflation distorts the interest rate relations in the economy (Aoki, 2012). As the percentage change in price levels decreases, the resulting deflation would result in increase in the real interest rates and if this deflationary period continues in the long run, the real interest rates start to decline. This results in distortions in the investment dynamics in the economy because the cost of long run oriented investments increases, when the real cost of investment increases as well through time due to the

decrease in inflation rates. In this respect, it is assumed that the inflation targeting framework could also be a better policy tool in order to prevent the economy from the situation of deflation.

On the other hand, some other researchers could find any supporting evidence for this claim about the positive effectiveness of inflation targeting framework on the economic outlook (Johnson, 2002; Ball and Sheridan, 2004). Ardakani et al. (2015) specify that the main reason of difference among the findings of different studies is the selection of the countries for empirical analysis. Especially it is emphasized that the difference between targeting and non-targeting countries is not resulted from the ability to implement the inflation targeting but rather it is a problem of selection. Therefore, the comparison results between the performance of targeting and non-targeting countries are more heterogeneous and ambiguous. Especially it is hypothesized that the difference in the degree of independence of Central Bank could be the main reason of why different countries generate different results once they implement inflation targeting at the same period (Kara, 2012).

More importantly, the negative effects of evaluation of monetary policy for populist goals on future of the economy have revealed the importance of independency of Central Bank as the main monetary policy-setter (Cukierman, 1992). Thus, one of the main issues regarding the monetary policy – which is about the credibility and reliability of money policy setter, Central Bank – has started taking attention.

The credibility of Central Bank has been especially critical for the persuasiveness of inflation targeting policy of the economy since the inflation targeting is about generating a target for the Central Bank and economy to reach in the future. If economic authorities want to realize the inflation targeting goal, then they should be more focused on how to make the public believe that Central Bank really focuses on inflation target set in advance (Fuhrer, 1997; Keefer and Stasavage, 2003). The previous studies have revealed that inflation targeting policy approach cannot be succeeded as long as the credibility of Central Bank is not guaranteed (Bernanke and Mishkin, 1997). Regarding this from perspective of public, it is clearly seen that Central Bank credibility is highly linked to the Central Bank freed from the interests of political groups. Therein the independency of Central Bank has been one of the essential pre-condition for the countries applying inflation targeting based monetary policy approach.

As the independency of Central Bank has been one of the sine qua non of inflation targeting, the actual application of inflation targeting has differentiated among different economies (Burdekin et al., 2004; Gonçalves and Salles, 2008). The inflation targeting, as specified above, is about setting and announcing the future inflation target in advance but for how long and in what range the inflation has been targeted has been various in application. Although inflation targeting requires a medium or long range policy period, some economies such as the U.K. have chosen narrower ranges for the inflation target (Taylor and Davradakis, 2006). A much wider range setting has been recommended as the realized inflation might fall below or

above the targeted range as it has happened in the case of Turkey (Güney and Ceylan, 2014).

Some others have argued that the inflation targeting in the short run might have negative outcomes on the real variables of macroeconomics such as unemployment rate and output, economic growth, based on Rational Expectations Theory (Svensson, 1999). Rational Expectations Theory implies money is only neutral in the medium and/or long run but may not be in the short run. Thus inflation targeting in the short run might disrupt the balance in the real economy. Therefore some has suggested inflation targeting in the long run range and in a more gradual way cannot result in imbalance on economy (Bernanke et al., 1999). Regarding setting inflation target, especially targeting high level of inflation change, the long run focus has been heavily recommended.

As inflation targeting is more of a general attitude with many different implementation methods (Seyfried and Bremmer, 2003), Central Bank is responsible for fulfillment of inflation target but there is no clear-cut methodology how they should reach to this target. Therefore Central Bank could have use more than one policy tool for inflation targeting because the goal now is more certain and clear-cut, they should take many other relevant variables into consideration as there are many factors affecting inflation in the short and also long run. Therefore, there is not any guideline for the effective usage of inflation targeting yet. The different outcomes obtained during the inflation targeting regime also support this hypothesis (Ball and Sheridan, 2004). As inflation target is an issue of future economy, the path to the

inflation targeting is based on uncertainty and expectations of the public and other relevant economic actors about the future. This also causes the lack of a guideline that works for every economy. Therein, it is suggested that inflation targeting in a more flexible and gradual attitude, when the targeting involves in high rates of decline in inflation, could be a better policy approach (Bernanke et al., 2001). The long run focus of inflation targeting also implies a more flexible regime that could provide some space for the Central Bank when controlling the inflation rates. Indeed, Walsh (2009) has concluded in his work that there is an issue of “flexible inflation targeting regime” in the recent periods. This more flexible attitude implies that Central Bank cares about the actualization of the inflation target but this does not mean Central Bank would not take the real economic indicators into consideration. Therefore, today’s Central Banks that apply inflation targeting are more focused on a more balanced and flexible inflation targeting framework, which try to off-balance the possible negative outcomes on macroeconomic indicators. In this way, also Central Bank could preserve their credibility and reliability in case the actual target cannot be achieved.

Furthermore, the inflation targeting in practice could require real commitment to the target set in advance and the Central Bank authorities make official announcement in public about this or they might just choose to make “cheap talk” about their targeting policy (Stein, 1989). Put this in other words, how Central Bank focuses on inflation targeting and how they signal their commitment to the public may differ. Based on these differences, Kuttner and Posen (1999) have specified

three inflation setting framework: untrusted discretionary, strictly conservative and trusted OSCR (Optimal State Contingent Rule).

First of all “untrusted discretionary” framework is more related to the “cheap talk” implying inflation targeting is more about setting the target in an informal way without putting real dedication to the target forward (Kuttner and Posen, 1999). On the other hand, “strictly conservative” framework is just the opposite of “untrusted discretionary” framework as it is more about official announcement of target and setting strict rules for the framework. The third framework – OSCR – is more of a framework between these two extremes. Within OSCR framework, the Central Bank sets the target in a range so that once the target is not actualized, the credibility of Central Bank would not be harmed seriously (Kotlán and Navrátil, 2003; Seyfried and Bremmer, 2003). In this way, it is assumed that the Central Bank could also preserve its credibility even in case of a shock since they could still continue to show their dedication to the target as they respond to the shock within the set range.

Although the outcomes and implementation methods of inflation targeting regimes for different countries have been various, the main goals of inflation targeting framework have been common for almost all of the targeting countries (Ardakani et al., 2015). First of all, the inflation targeting is future-oriented monetary policy framework and therefore the shaping and shifting the expectations of public about the future inflation rates is involved (Bofinger, 2000). By this way, the Central Bank could direct the market and the public towards the targeted inflation rate and this could assist the Central Bank to respond the shocks in a more proper and

efficient way. Therefore, the effects of shocks on the monetary policy would stay limited. Moreover, the inflation targeting is a future-oriented strategy, as specified before, therefore the public would see and evaluate the performance of Central Bank in case of lowering the inflation (Roger and Stone, 2005). Once Central Bank achieves to reach to the targeted inflation rate, this would signal positive outlook of Central Bank and by leveraging this, Central Bank could implement overall monetary policy more efficiently in a way that the market trusts on Central Bank and their commitment to future policies (Rogoff, 1985). More importantly, the public could have more reliable and correct information about the targets and goals of Central Bank (Blinder, 1999). Thus, the transparency in the monetary policy could be sustained. Transparency could also assist the Central Bank to receive the support of the public and to be a more credible authority of the economy.

Additionally, the inflation targeting regime is assumed to stabilize the economic outlook in the long run (Clarida et al., 1998). In economic sense, the inflation targeting helps the Central Bank to make the economic growth as the fluctuations on the output could be less and the volatility on economic growth could be kept within desired limits. With regards to the economic fluctuations, the provision of trust and reliability in the market could also assist the economic authorities and Central Bank to respond to the output shocks in a more efficient way due to the framework of inflation targeting (Geraats, 2002; Mankiw and Reis, 2003). Indirectly, the inflation targeting regime is more likely to play an intermediate role on the overall economy by directing the market and the public towards the desired targets of economic authorities.

Although there are different approaches in application of inflation targeting for common goals, as discussed above, many studies have provided empirical evidence suggesting that the inflation targeting approach does not much matter as long as dedication to the target and making the public believe the dedication of Central Bank to the target guarantees the fulfillment of target (Creel and Hubert, 2015). More importantly, this has been implemented as there is actually no need for a very strict rule setting regarding the inflation targeting. Based on this it has been suggested the focus on variables that might affect the future inflation rather than the current one could be more favorable for inflation targeting of the Central Bank (Rudebusch and Svensson, 1999). Therein, a more future-oriented approach rather than only considering today's inflation has been recommended. As a result, the findings of previous studies have revealed that this kind of an approach actually works for both developed and also for developing economies (Öztürk, 2009).

Although there has been some debate about there is actually a new regime change for Central Bank or not, the studies have revealed that since 1990s Central Banks that have announced adopting inflation targeting regime have been much more successful in decreasing inflation in a meaningful way once compared to the previous regimes (Bernanke et al., 2001; Rose, 2007; Öztürk, 2009). More significantly, it is concluded the stability at low inflation rates could also limit the effects of shocks on output. But the studies regarding relation between inflation targeting and economic outlook is limited.

Since 1990s, the studies about success and/or failure of inflation targeting have provided empirical evidence supporting the success of inflation targeting in generating price stability (Johnson, 2002; Kim and Park, 2006). Especially, it is found out that the countries that have implemented inflation targeting regime properly and continuously have experienced lower inflation rates after the adoption of inflation targeting regime. Mishkin (2000) also has asserted the inflation targeting countries have experienced lower inflation rates beyond the expectations. For example, the U.K., as being one of the first countries adopting inflation targeting regime, has experienced both lower and also more stable inflation after starting to target the inflation rates in advance.

Indeed, it is found out that the inflation targeting countries have been much more prone to the shocks and the effects of shocks have been also more temporary. For example, Bernanke et al. (1999) have concluded that inflation targeting regime has assisted the shocks and policy changes into the economy by keeping the inflationary responses to those shocks. Svensson (1997) has also discussed that more stable and low levels of inflation could help economy authorities to move to the economy at a more stable growth level. Based on all those empirical findings, international and regional economy authorities have also started recommending the adoption of inflation targeting regime as the main monetary policy.

But there are also some contradictory or mixed findings regarding the direct effect of inflation targeting on lowering inflation and generating higher economic output. In one of those studies, Ball and Sheridan (2004) have investigated 20 OECD

countries. 7 of those 20 OECD countries were adopting the inflation targeting and the remaining were not adopting this regime in the period of their study. They have found out empirical evidence supporting the mixed performance among those inflation targeting and non-targeting OECD countries. More importantly, they have concluded that there is no statistically significant superior performance of targeting countries in terms of real economic indicators such as output and employment because there have been examples of superior economic performance among both targeting and non-targeting countries. These findings are interpreted as there might be some other additional reasons for superior economic performance of targeting countries.

Some other works have concluded that the inflation targeting regime has been more supportive and effective in lowering and stabilizing inflation rates for developing economies rather than it has been for developed economies (Savastano et al., 1997; Lin and Ye, 2009). In this regard, it is asserted that inflation targeting regime generates some kind of catching-up effect for developing economies (Neumann and von Hagen, 2002). In this respect, high inflation countries have seen positive change on the stability of inflation rates after adopting inflation targeting regime but still there is no empirical evidence stating that all those positive change on inflation rates of those countries is just the reason of inflation targeting regime. It is discussed that there might be some other reasons for the lower and more stable inflation rates.

In another work, Muscatelli et al. (2002) have investigated the forward-looking interest rate reaction functions for the countries that have recently adopted inflation targeting regime. As a result, they have found out that the initial effect of adopting inflation targeting regime on interest rate policy has been little and less than expected. More importantly, they have concluded that there is no significant change in the responsiveness of monetary policy onto the expectations about inflation after adopting inflation targeting regime. In this respect, it is argued that the effects of inflation targeting on macroeconomic outlook would be seen in the long run rather than short run.

Regarding the effects of inflation targeting framework on real output, the immediate studies have not been able to find out significant and supporting evidence for the positive effect of inflation targeting regime (Cecchetti and Ehrmann, 1999; Aizenmann et al., 2011). As stated above, targets and goals of inflation targeting regime are long-term oriented and therefore it is assumed that this might be the reason of why the studies carried out right after the adoption of inflation targeting would not generate desired outcome on real economy indicators. Therefore, the studies carried out about the changes on output gaps could not find significant effect of inflation targeting on output stabilization (Huthison and Walsh, 1998).

In addition to the short versus long term effects, as a result of the differences on the application of inflation targeting framework, the researchers have concluded mixed results. Mishkin and Schmidt-Hebbel (2001), Mihov and Rose (2008), Ruge-Marcia (2003) and some others have asserted the presence of empirical evidence

supporting the fact that inflation targeting framework is significantly effective on the economic outlook in a positive way. In their work, Mishkin and Schmidt-Hebbel (2001) have regarded the inflation targeting framework as an amazing approach for the monetary policy and a big step in the development of the Central Bank. They have concluded that inflation targeting is an assisting approach for the Central Banks to take control of inflation rate fluctuations and to improve the economic outlook. But they have also put emphasis on the differences among the different application methods of inflation targeting regimes.

In another work, Rose (2007) takes the attention to the duration for implementation of inflation targeting regime. It is claimed that since 1990s, none of the inflation targeting country has abandoned the inflation targeting framework, although in the past many other monetary policy regimes had been abandoned by different countries and those other regimes would not last long. In the same respect, Mihov and Rose (2008) have regarded this long-lasting situation of inflation targeting regime as quite unbelievable. This is considered as the proof for the sustainability and effectiveness of inflation targeting. Since many countries ranging from developed to developing economies have tried many different approaches as the monetary policy since World War I. More interestingly, Mihov and Rose (2008) also puts attention on the fact that previous monetary frameworks that have lasted longer have also performed better than the new ones. Based on this assumption, the long-lasting implementation periods of inflation targeting is regarded as a remarkable result as the inflation targeting regime is considered as quite a new regime.

In a similar way, Thornton (2012) has emphasized that since 1990s the researchers have been skeptical about the effectiveness of inflation targeting regime since they have asserted that Central Bank indeed would not be able to control the inflation rates by themselves just by making announcement and arranging the monetary policy tools in order to keep inflation rates stable and at low levels. But from 1990s to the end of first decade of 21st century, the inflation targeting economies at least would not be worse off once compared to the non-targeting countries and there are at least six periods needed to get the positive influence of the inflation targeting (Batini and Haldane, 1999). More importantly, at the beginning it was claimed that the political interests would not allow the Central Bank to be more focused on targeting inflation rates in the long run. However, the results and continuation of implementation of inflation targeting all imply that targeting economies still continue to target the future inflation rates in advance as the main monetary policy framework and indeed the actual inflation has been conceptualized much below the target inflation rates (Ruge-Murcia, 2003).

Regarding the empirical evidences supporting the effectiveness of inflation targeting regime, different from similar studies, Walsh (2009) have asserted that inflation targeting may or may not reduce the volatility on the real economic outlook depending on the implementation of inflation targeting framework based on how the inflation targeting assists the Central Bank to achieve the credibility.

Although the success of inflation targeting depends on duration and some other factors, the empirical results generally imply the positive and meaningful

effectiveness of inflation targeting regime. In one of the more recent studies, Gonçalves and Salles (2008) have carried out the empirical analysis of inflation targeting effectiveness on volatility of GDP growth in real terms in order to compare the performance of targeting and non-targeting economies. It is found out that the targeting economies have experienced less volatility once compared to the non-targeting economies for the periods after the adoption of targeting regime.

To summarize the empirical studies that provide empirical evidence for the effectiveness of inflation targeting, it could be concluded that there are some obvious evidence for the effectiveness of inflation targeting regime. Fraga et al. (2004) especially emphasizes that getting empirical evidence for the effectiveness for developing economies is much easier than it has been for developed economies. But the findings have been heavily heterogeneous among different economies regarding the effectiveness of inflation targeting regime (Lin and Ye, 2009). On the other hand, it is seen that the increasing food and raw material prices makes the inflation targeting impossible to be achieved and indeed the inflation targeting might distort the macroeconomic outlook (Stiglitz, 2008). Since Stiglitz defines the inflation targeting as a rough policy rule that implies the interest rates should be risen as long as the inflation is above the targeted level.

All those studies reveal that inflation targeting has started being used heavily by many countries at an increasing rate in 21st century regardless of the targeting has been or will be successful or not. Although inflation targeting has been the main concern of Central Bank in many countries since 1990s, inflation rate as a nominal

variable would not be the main target of any economy before. The main concern of macroeconomic authorities has been mostly about the indicators of real economy such as economic growth, unemployment rates, export-import balance and trade deficit. But the previous literature has proven that although the real economy indicators require the highest level of attention, the inflation targeting assists the realization of the stability in the economy and also finance through generating price stability in the economy (Orphanides, A., & Wieland, 2000). Since, inflation targeting provides an economic environment where the price stability could also be sustained.

In conclusion, as inflation targeting has been applied at most for the last 25 years and, as specified above, the inflation targeting is more of a long run concern; the most of the studies focus on effectiveness of inflation targeting but limited number of studies focus on how the macroeconomic outlook has changed after inflation targeting. More importantly, the findings of different studies also contradict with each other due to the different implementation of regime among different economies and economic outlook differences between developed and developing economies. In order to fill this gap in the literature about the more specific effects of inflation targeting on macroeconomic outlook of economies, this study has focused on how the price and output parameters respond to the shocks to the interest rates before and after the inflation targeting regime period.

CHAPTER THREE

ECONOMIES ADOPTED THE INFLATION TARGETING

In this empirical study, 10 out of 27 inflation targeting countries have been examined from the perspective of effectiveness of inflation targeting regime on the macroeconomic outlook of each of those countries.

3.1. Czech Republic

Czech Republic has adopted the inflation targeting regime since the end of 1997. The main reason for the monetary policy shift in 1998 has been the exchange rate crisis of 1997. After the crisis, Central Bank of Czech Republic adopted the strict inflation targeting regime but through time they have adopted a more flexible

and internationally accepted guideline of inflation targeting framework. Since the adoption of inflation targeting regime, Czech Republic has seen tremendous change on the inflation rates such that the inflation rates fell from around 12% levels to 5% levels between 1997 and 2002. More importantly, the study of Kotlan and Navratil (2003) has provided empirical evidence supporting that adoption of inflation targeting has made significant contributions on the stabilization of the overall economic outlook.

3.2. Iceland

Iceland has started adopting the inflation targeting framework since 2001 but as a small-sized economy, Iceland has experienced serious problems during 2008 Global Financial Crisis. Indeed, the inflation targeting framework of Iceland has been blamed as the main reason of why Global crisis has influenced Iceland in such a serious way (Danielsson, 2008). It is claimed that Iceland would not adopt a flexible inflation targeting regime and as a small economy Iceland has always tried to keep increasing the interest rates in order to keep the inflation rates within targeted range. But firms and households have preferred borrowing in foreign currency in Iceland due to the high interest rates prevailing in the local economy. Eventually, this would influence the exchange rates and indeed the firms and households even have carried out higher level of investment that has supported the economic growth even more by resulting in higher inflation rates. Therefore, Central Bank of Iceland has never been

able to keep the inflation rates within the range and also interest rates were rising too. As a result of this, inflation targeting framework would not generate the desired outcome for the economy of Iceland and the main reason of this is regarded as the higher share of foreign currency in the monetary supply of Iceland.

3.3. South Korea

South Korea is one of the early-adopters of inflation targeting regime as they have adopted the targeting framework since 1998. The inflation targeting regime has been quite successful in South Korea in decreasing the inflation rate itself and the volatilities as well (Sanchez, 2010). Indeed, the inflation targeting regime of South Korea has been regarded as extraordinarily successful. Since 1999, the inflation rates have been less volatile and stayed at low levels in South Korea. But the application of regime has differed such that South Korea monetary policy has put the highest attendance onto the price stability by allowing the interest rates to move smoothly. More importantly, the main aim of inflation targeting regime of South Korea has not been the stabilization of the economic output but the stability of price levels. In this respect, this approach of South Korean Central Bank has been regarded as a more gradual application of inflation targeting. This implies that inflation stability is the initial and most important target and then output stability comes next.

3.4. Mexico

Mexico has started adopting the inflation targeting regime since 1999 and the transition to the inflation targeting framework has been slow and gradual in a form of step by step. More importantly, like other Latin countries Mexico has also applied the inflation targeting regime only when the inflation rates have been much higher than their stationary levels. Today Mexico has been applying a full inflation targeting framework in a way that the exchange rates are allowed to fully float and Central Bank credibility is ensured and the low and stable inflation rate is the main target of Central Bank. As a result, Mexico's inflation rates have fallen significantly but they have stayed at much higher levels in the medium run (Schmidt-Hebbel et al., 2002).

3.5. Norway

Norway has been one of the late adopters of inflation targeting regime. Norway has started adopting the inflation targeting framework since 2001 and therefore, there are not so many studies about the effectiveness of inflation targeting in the case Norway. But the main purpose of inflation targeting regime in Norway has been the stabilization of inflation rates at low levels rather than the price stability (Roger, 2009). As having a more stable economy, Norway has targeted the inflation rates at the levels of 1-3% range.

3.6. Poland

Poland has started adopting the inflation targeting regime since 1998 and it is claimed that the overall economic outlook in Poland has been enough to support the applicability of inflation targeting framework. Especially, economic authorities of Poland has limited the scope of fiscal policies by generating a more balanced government budget. In this way, the pressure on the inflation rates and interest rates has been aimed to be smoothed and freed. In order to solve the nominal rigidities, wage indexation has been adopted (Gottschalk and Moore, 2001). However, the changing the focus from the exchange rates to interest rates for the monetary policy content has required Poland to increase the time horizon of the inflation targeting framework. As specified above, the inflation targeting has been a more radical shift on the monetary policy of Poland than it has been for other economies. Therefore, a more long term oriented inflation targeting has been suggested for Poland.

3.7. Romania

Since 2005, Romania has been adopting the inflation targeting regime. Romania has been one of the late adopters of inflation targeting but their economic perspective and targets have been more diverse and also difficult to handle. There has been high level of pressure on monetary policy of Romania because there have been demands of European Union for the membership of Romania and therefore,

high level of economic growth and dealing with the problem of disinflation have been asked by European Union (Daianu and Kallai, 2008). Under those circumstances, Romania has also adopted the inflation targeting in order to create stability in both inflation rates and output levels. As the economy of Romania has been more integrated into the global marketplace, their economy has been also more sensitive and vulnerable to the shocks as well. As a developing economy, Romania has also issues about labor market, rigidities and other related issues. Therefore, a more short term oriented inflation targeting regime has been recommended in the case of Romania in order to leave space for Central Bank to deal with many other unsettled issues such as labor market dynamics, exchange rates and others.

3.8. Republic of Serbia

Serbia has been the latest adopter of inflation targeting regime among all 27 countries. As it has been relevant in the case of Romania, Serbia has also had to deal with some other monetary policy issues. Especially it is seen that the exchange rates have presented important barriers for the implementation of inflation targeting. More importantly, the global economy has forced Republic of Serbia to be more inclined to inflation rate stability focused rather than keeping the exchange rates as the main monetary policy focus (Josifidis et al., 2009). Therefore, Republic of Serbia has adopted the inflation targeting regime together with the floating exchange rate

regime in 2009. As Serbia has recently adopted the inflation targeting, there is not much empirical study to generate meaningful conclusions.

3.9. Turkey

Turkey started adopting the inflation targeting regime in 2006. Turkey had experienced high level of inflation since 70s to 2000s. But after 2000s the inflation rates have moved to much lower points. And after 2006 Central Bank has announced the inflation targets to be achieved in the medium and the long run but in some periods the actual inflation rates have been above the target range and in some other periods the actual rates have stayed below the target range indeed (Güney and Ceylan, 2014). Although there has been a serious decline on the output growth at least in the short run, this issue has been regarded as an undesired outcome of Global Financial crisis. On the other hand, it is found out that output volatility has declined after the inflation targeting regime adopted once compared to the period before the adoption of inflation targeting.

3.10. The United Kingdom

As an early adopter of inflation targeting regime, the monetary policy evolution of the United Kingdom has followed a step-by-step process. Once the U.K. has adopted the inflation targeting regime since 1992, the political system has started focusing on the credibility and independence of Central Bank in 1997. Eventually, in 1998 the main objective of the Central Bank has been formalized. According to this, Central Bank has been kept responsible for the provision of price stability through the implementation of inflation targeting initially at the level of 2.5% (Taylor and Davradakis, 2006). And the volatilities over this target has been tried to be avoided. As a result, the findings have revealed that the U.K. has experienced price stability together with higher growth rates after the adoption of inflation targeting framework.

CHAPTER FOUR

DATA

The main methodology of this study has been Vector Auto-Regression Model analysis for the following countries separately: Czech Republic, Iceland, South Korea, Mexico, Norway, Poland, Romania, Republic of Serbia, Turkey and the United Kingdom. In order to see the effects of inflation targeting on effectiveness of monetary policy, four variables have been taken into consideration: inflation rate, interest rate, price index and output gap. Monthly CPI based percentage change series is evaluated for the calculation of interest rates. Money market rates' monthly series have been used for the interest rate variable for all countries except Turkey and Norway. In the case of Turkey and Norway, Central Bank policy rate is used as interest rate variable. Data about the output gap has been calculated by using the monthly industrial production data through the application of Hodrick-Prescott filter. The industrial inputs price index that also takes agricultural raw materials and metals price indices has been used as the price index variable where the year of 2005 has

been accepted as base year. The data for inflation rates, interest rates and output gap for every country included in the analysis have been retrieved from the IFS database of IMF. Data for the price index calculations have been retrieved from GEM database of IMF official website.

Among 27 countries that apply the inflation targeting regime, only 10 countries out of 27 countries have been included into the analysis content because there is only high frequency data for only those 10 countries in IFS database. Moreover, there is not enough data for some other countries in the IMF databases and therefore those countries are not included into the analysis. Therein those ten countries have been taken into consideration. In order to see the effects of inflation targeting on monetary policy effectiveness, for each country included in the analysis the data is split into two groups: one period before and on period after the effective date of inflation targeting regime.

Although many economies have started adopting inflation targeting regime, there has been disagreement about determining the exact date of when the targeting countries actually started to implement the inflation targeting regime. Since the inflation targeting regime implementation has been generally implemented step by step in practice. This implies different researchers have set different dates for the adoption date for the inflation targeting as those different researchers take different aspects of inflation targeting as the turning point (Pétursson, 2004). Therefore, it might not be clear cut to specify the exact timing of the adoption of the inflation

targeting framework. But here the table below is constructed based on the dates and years specified in the work of Pétursson (2004) and Hammond (2012).

The list of the inflation targeting date for the countries included in this study is such that:

Table 1: The Inflation Targeting Dates of Countries

	COUNTRY NAME	INFLATION TARGETING STARTING DATE
1	Czech Republic	January 1998
2	Iceland	March 2001
3	South Korea	April 1998
4	Mexico	January 1999
5	Norway	March 2001
6	Poland	October 1998
7	Romania	August 2005
8	Serbia, Republic of	January 2009
9	Turkey	January 2006
10	United Kingdom	October 1992

Also, the available range and number of observations of the series money market rate, CPI (%) change, industrial production and price (%) change for each country in our analysis can be seen in the Table 2

Table 2: The Available Range and Number of Observations of All Series

COUNTRY NAME	MONEY MARKET RATE SERIES			CPI (%) CHANGE SERIES			INDUSTRIAL PRODUCTION SERIES			PRICE INDEX (%) CHANGE SERIES		
	START	END	NUMBER OF OBS.	START	END	NUMBER OF OBS.	START	END	NUMBER OF OBS.	START	END	NUMBER OF OBS.
Czech Republic	1993M1	2015M3	267	1994M1	2015M3	255	1993M1	2015M2	266	1981M1	2015M8	416
Iceland	1986M11	2015M3	341	1984M1	2015M3	375	1998M1	2012M12	180	1981M1	2015M8	416
South Korea	1976M8	2015M1	462	1971M1	2015M3	531	1980M1	2015M2	422	1981M1	2015M8	416
Mexico	1981M4	2015M3	408	1958M1	2015M3	687	1970M1	2015M2	542	1981M1	2015M8	416
Norway	1964M1	2015M3	615	1957M1	2015M3	684	1957M1	2015M1	699	1981M1	2015M8	416
Poland	1990M12	2015M3	292	1989M1	2015M3	315	1985M1	2015M2	362	1981M1	2015M8	416
Romania	1995M1	2015M2	242	1991M10	2015M2	281	1990M5	2015M02	298	1981M1	2015M8	416
Serbia, Republic of	2005M8	2015M2	115	1995M2	2015M3	247	1994M1	2015M02	254	1981M1	2015M8	416
Turkey	1999M10	2015M3	186	1970M1	2015M3	543	1985M1	2014M12	360	1981M1	2015M8	416
United Kingdom	1972M1	2015M2	518	1989M1	2015M3	315	1957M1	2015M2	698	1981M1	2015M8	416

CHAPTER FIVE

METHODOLOGY

The empirical analysis of the data has been carried out in those steps:

- Initially the stationarity of time-series data has been checked in order to carry out VAR analysis with the raw data. The stationarity of data means the variance and mean of the time-series data does not change and stays constant. But if the data is not stationary, this means through time the mean and variance of data is not constant. The non-stationarity of data must be checked in order to see if the series are trend-dependent. If there is a trend in the data, this affects the reliability of data and first the trend effect must be eliminated. In this work, the non-stationarity problem has been discovered for some series and therefore the first order differences of the data have been used for the empirical analysis.

The following table shows the results of Augmented Dickey-Fuller Unit Root Test for all series after taking first order difference:

Table 3: Augmented Dickey-Fuller Unit Root Test Results

Country	CPI % Change		Money Market		Output Gap		Price Index % Change	
	Pre IT	Post IT	Pre IT	Post IT	Pre IT	Post IT	Pre IT	Post IT
Czech Rep.	-5.653498	-6.683583	-7.279209	-7.951653	-8.240647	-3.724478	-6.228963	-9.504010
Iceland	-6.985514	-7.326295	-10.37162	-13.43247	-7.816426	-4.980731	-7.103399	-8.599737
South Korea	-4.912533	-10.48298	-15.42044	-6.647066	-3.122811	-5.410180	-6.347865	-9.418701
Mexico	-6.469213	-4.596880	-10.91754	-9.823058	-6.237554	-3.320863	-6.598208	-9.182780
Norway	-9.887763	-4.848631	-17.38710	-12.08202	-25.86421	-4.309719	-7.103399	-8.599737
Poland	-3.755608	-8.902658	-8.816351	-6.250914	-3.712296	-3.654351	-6.533745	-9.266214

Table 3 (continued)

Romania	-8.907866	-6.189809	-10.25534	-10.04664	-4.436855	-3.068125	-7.923868	-7.103500
Serbia Rep.	-6.504333	-5.129397	-3.812771	-4.505247	-4.092958	-3.200497	-7.424875	-5.196400
Turkey	-9.805061	-7.051872	-6.179630	-2.358024	-10.18454	-7.377748	-7.998794	-6.955939
United Kingdom	-5.984210	-14.37556	-15.50635	-24.02453	-6.145294	-3.926573	-4.569268	-10.91208

VAR methodology has been chosen in this analysis because VAR model based methodology captures the interdependencies among different variables. In this regard, VAR model analysis provides a multivariate analysis basis.

- Based on the initial results of chosen methodology, the issue of “price-puzzle” has been come across. Price puzzle problem occurs because of the information lack of the public about the announcements of the Central Bank. In other words, the announcements of Central Bank about the inflation targeting may not generate the desired outcome immediately in the short run and the information asymmetry between Central Bank and the public in the short run might cause increase in inflation expectations and inflation itself although Central Bank applies contractionary monetary policy and this situation is called “price-puzzle”. Prize puzzle occurs when Central Bank prefers applying contractionary monetary policy, the interest rate starts increasing and this increase in interest rates is perceived as a signal for the increase in the future inflation rates. In order to deal with the problem of price-puzzle, the data of price index has been also included into the VAR models (Hanson, 2004). VAR model methodology and impulse response functions based methodology have been applied in this analysis because the similar studies investigating the effectiveness of monetary policy on the economic outlook have evaluated the same methodology (Paramanik and Kamaiah, 2014).

- Finally the impulse response functions and graphical analysis has been carried out in order to see the effects of interest rate shocks on inflation and output gap through time.

The impulse response functions on the VAR models have been calculated based on ordering of Cholesky decomposition. Based on this ordering method, the variables assumed to be interdependent to each other are ordered in a way that the ordering provides the variable affecting the others at the most and affected by others at the least (Loehlin, 1996). In order to decide the number of lags, the SC (Schwartz Criterion) has been used and the optimal number of lags has been calculated as lag of two periods. Based on those, The VAR models have the following form:

$$\begin{bmatrix} x_{t,1} \\ x_{t,2} \\ x_{t,3} \\ x_{t,4} \end{bmatrix} = \alpha_{4 \times 1} + A_{4 \times 4} \times \begin{bmatrix} x_{t-1,1} \\ x_{t-1,2} \\ x_{t-1,3} \\ x_{t-1,4} \end{bmatrix} + B_{4 \times 4} \times \begin{bmatrix} x_{t-2,1} \\ x_{t-2,2} \\ x_{t-2,3} \\ x_{t-2,4} \end{bmatrix} + \varepsilon_{4 \times 1} \quad (4.1)$$

Where $x_{t,1}$, $x_{t,2}$, $x_{t,3}$, and $x_{t,4}$ represents the macroeconomic indicators chosen for this study which are: output gap, inflation rates, price index and interest rates and $x_{t-1,i}$, $x_{t-2,i}$ represent first and second lag of related variable. Moreover, α represents the (4×1) vector of constants and A and B are (4×4) coefficient matrices.

CHAPTER SIX

RESULTS AND FINDINGS

To begin with, the descriptive analysis of the macroeconomic indicators has been carried out. Then the VAR model analysis and graphical analysis of impulse response functions have been investigated. In the initial phase of the VAR analysis, the effects of money market rates on inflation rates and output have been calculated for every country included into the analysis. Based on the findings, the problem of price-puzzle as there has been a positive association between inflation rates and interest rates. Therefore, the price index percentage change has been also included into the VAR model analysis in order to remove the effects of price-puzzle onto the findings. Eventually, the ordering of the variables has been such that based on the ordering of Cholesky decomposition: output gap, CPI % change, price index % change and money market rate. Based on this ordering, the findings imply that the output gap is the variable that influences the other all three variables at most but also output gap is the variable that is least influenced by the all other three variables. As

also specified above, the optimal number of lags has been determined as two periods lags based on Schwartz Criterion.

6.1. Descriptive Analysis

For the three macroeconomic variables (i.e. output gap, inflation rates and interest rates) that have been taken into consideration in the empirical part of the study, the descriptive analysis has been carried out in this part of the study.

Table 4: Descriptive Statistics for Pre and Post Targeting Periods for the Variable of Inflation Rates

COUNTRY NAME	IT ADOPTING DATE	PRE-TARGETING PERIOD		POST-TARGETING PERIOD	
		CPI CHANGE (%) MEAN	CPI CHANGE (%) STANDART DEVIATION	CPI CHANGE (%) MEAN	CPI CHANGE (%) STANDART DEVIATION
Czech Republic	January 1998	9.148754	1.167593	2.864177	2.647494
Iceland	March 2001	11.73863	12.28314	5.507201	3.639297
South Korea	April 1998	9.984134	7.785584	2.892475	1.502624
Mexico	January 1999	26.26083	33.53218	5.484609	3.291985
Norway	March 2001	5.436246	3.364343	1.865724	1.150809
Poland	October 1998	133.0069	270.3344	3.429120	2.745563

Table 4 (continued)					
Romania	August 2005	83.45902	84.72757	5.097784	2.462453
Serbia, Republic of	January 2009	37.65800	37.05226	6.873643	3.941465
Turkey	January 2006	47.95523	29.33737	8.353109	1.806442
United Kingdom	October 1992	6.233026	1.449658	2.137496	0.956122

Based on the data analysis represented on Table 4 above, the inflation rates, on mean, are much smaller for the industrialized economies such as Iceland, South Korea, Norway and the U.K. for the pre-targeting period. The same also holds for the EU member country, Czech Republic. On the other hand, the mean of inflation rates change within the range of 26-133 % for the developing economies included into the analysis: Mexico, Serbia, Turkey, Romania and Poland for the pre-targeting period. As the standard deviation is considered as a sign for the fluctuation, the standard deviations and volatility of the inflation rates, as expected, is much smaller for the industrialized countries such as the U.K., Norway, South Korea, Iceland and also for Czech Republic for the pre targeting period. On the other hand, the standard deviation for the developing economies is much higher but this might be due to the much higher mean values for the inflation rates of those developing economies. Once the post-targeting period is investigated, there is a series change for both developing and developed economies. The mean values of inflation rates have changed in the range of 2-10% for all countries. The inflation rates have declined for the developed economies but more importantly, the mean value of inflation rates have tremendously

declined in the case of developing economies. In the same respect, the standard deviation of inflation rates has declined as well.

Table 5: Descriptive Statistics for Pre and Post Targeting Periods for the Variable of Interest Rates

COUNTRY NAME	IT ADOPTING DATE	PRE-TARGETING PERIOD		POST-TARGETING PERIOD	
		MONEY MARKET RATE MEAN	MONEY MARKET RATE STANDART DEVIATION	MONEY MARKET RATE MEAN	MONEY MARKET RATE STANDART DEVIATION
Czech Republic	January 1998	12.24317	3.325688	3.358554	3.300347
Iceland	March 2001	13.93384	10.03138	8.719615	4.543555
South Korea	April 1998	14.23000	3.988749	4.050693	2.287364
Mexico	January 1999	44.46970	25.79682	8.504531	5.475061
Norway	March 2001	7.410067	3.040252	4.087041	2.545063
Poland	October 1998	27.77745	10.47265	6.932579	5.056768
Romania	August 2005	48.73339	32.84542	6.427217	3.332708
Serbia, Republic of	January 2009	16.43268	4.803138	11.29432	2.387007
Turkey	January 2006	46.06800	48.64988	9.216716	5.391432
United Kingdom	October 1992	9.260301	4.231018	3.972105	2.368948

Table 5 summarizes the data analysis for the interest rate variable for the pre-targeting and post-targeting periods separately. According to the results, the mean values of interest rates have been in the range of 7-14% for the developed economies such as the U.K., Iceland, South Korea, Norway and also for Czech Republic. The values of standard deviation of the interest rates have been also consistent with the mean values for the developed economies for the pre-targeting period. For the pre-targeting period, the interest rates, on average, have been between the values of 16 to 48% for the developing economies included into the analysis. On the other hand, the interest rates, on average, have been within the range of 2-5% for both developing and developed economies for the post-targeting period. This also reveals the noteworthy change in the interest rates prevailing in the developing economies where the interest rates, on average, have declined heavily. The same also holds for the standard deviation values.

Table 6: Descriptive Statistics for Pre and Post Targeting Periods for the Variable of Output Gap

		PRE-TARGETING PERIOD		POST-TARGETING PERIOD	
COUNTRY NAME	IT TARGETING DATE	OUTPUT GAP MEAN	OUTPUT GAP STANDART DEVIATION	OUTPUT GAP MEAN	OUTPUT GAP STANDART DEVIATION
Czech Republic	January 1998	0.062418	5.221657	-0.018180	6.515598

Iceland	March 2001	-0.589836	2.738519	0.157844	6.794899
South Korea	April 1998	0.068378	1.215337	-0.073767	4.521881
Mexico	January 1999	0.019463	2.266165	-0.034913	2.816546
Norway	March 2001	0.015801	5.526266	-0.050147	6.624834
Poland	October 1998	0.048567	2.676881	-0.040678	4.747241
Romania	August 2005	-0.032214	5.042372	0.051263	7.177189
Serbia, Republic of	January 2009	0.460737	10.78371	-1.120711	8.463583
Turkey	January 2006	-0.004142	4.172240	0.009664	7.125703
United Kingdom	October 1992	-0.033023	5.079559	0.052666	4.913239

On table 6, the data analysis regarding the output gap variable the results are not so direct and they have been more heterogeneous. First of all, for the pre-targeting period, the smallest output gap values, on average, are calculated for Turkey, in absolute values but the highest values are calculated for Iceland and Serbia, in absolute values. For all other economies, the output gap, on average, has been within the range of 0.01-0.06 in absolute values for the pre-targeting periods. On the other hand, for the post-targeting period, still the lowest value of output gap, on average, belongs to Turkey, in absolute values and the highest value, on average, belongs to Serbia, in absolute values. For the all other economies the output gap, on average and in absolute values has been within the range of 0.01-0.15. More interestingly, the output gap has increased in the post targeting period once compared

with the pre-targeting period for most of the economies included into the analysis. In the same respect, the standard deviation values have also increased for the most of the economies.

All those descriptive data findings provide supporting evidence for the literature and previous empirical analyses that have found out heterogeneous, various and mixed results of the inflation targeting regime for different economies especially regarding the output based variables. On the other hand, the comparison of inflation rates and interest rates before and after the adoption of inflation targeting has concluded that there is an obvious improvement on those macroeconomic variables after the adoption of inflation targeting for all of the economies included into the analysis. But these data analysis does not directly and absolutely imply that inflation targeting has improved the inflation rates and interest rates, on mean since there might be some other dynamics that might coincide with the same period.

6.2. VAR Model Analysis

In the initial VAR model analysis, the effect of money (or policy) rates on the output gap, and CPI percentage change (as inflation rate) has been investigated. In this study, the VAR models based findings have been similar to the findings of the four variable analysis case this includes interest rates, output gap, inflation rates and also price index. As there has not been much difference between the findings of 3-

variable case and 4-variable case and also because of the presence of price-puzzle problem in 3-variable case, the results regarding 4-variable case has been taken into consideration in commenting on the results.

To begin with, the positive and significant effectiveness of interest rates change on the inflation rates for some of the economies is regarded as an evidence for the presence of price-puzzle problem and therefore the price index change variable has been also included into the VAR model analysis. The VAR model analyses including the variables of output gap, inflation rates, interest rates and price index have been taken into consideration in this paper for each country with the pre and post inflation targeting periods.

Based on the VAR analyses summary outputs for the case of Czech Republic, there has no overall statistical significance in none of the models for the pre-targeting period. In case of Czech Republic for the post-targeting period, the first and second lags of output gap have been found separately effective on actual output gap in a negative way. Regarding the inflation rates it is found out that first lag of inflation rates have positive effect on actual inflation rates implying that one lag could be deterministic on the expectations of the public about the inflation rates. With respect to the money market rates, it is seen that both first and second lags of interest rates have significant and positive effect on actual interest rates. These all show that the past values of output gap, inflation rates and interest rates have been significant influence on their actual values implying that the past values affect the current values in case of Czech Republic for the period of post-targeting. But the results imply that

there is no significant effect of money market rates on output gap and inflation rates separately for the post-targeting period for Czech Republic.

The similar findings have been also captured for the case of Iceland. For the pre-targeting period, the first lag and second lag of output gap itself have been found out as effective on output gap.

But there has not been any significant effect of lagged values of interest rates and inflation rates on their actual values for the pre-targeting period. The same conclusion also holds for the model of interest rates. For the post-targeting period, the effects of output gap with its lagged values on its actual value have been found out as significant and also inflation rates with the first lag has been positively effective on its actual values. With respect to the money market rates, both the first and second lags have been found out as negatively effective on actual money market rates for post-targeting period in case of Iceland.

In case of South Korea analysis, the negative effects of the first and second lags of output gap on actual gap have been also calculated for the pre-targeting period. For the inflation rates of pre-targeting period, the first lag has been found out as positively effective on the actual inflation rates. For the post-targeting period, the same conclusions regarding the output gap and inflation rates hold but for post-targeting period, it is seen that the first lag of money market rates has been also positively influential on its actual value.

In case of Mexico, for the pre-targeting period it is seen that both the first and second lags of output gap have been negatively influential on the actual, current output gap implying that the output gap is tended to decline if the output gap has been high in the previous periods. This is also interpreted as a moving toward the trend for the output gap rather than a continuous increase or decrease on output gap. For the pre-targeting period, the first lag of inflation rates has been found out as positively effective on current inflation rates. On the other hand, it is seen that the first lag of money market rates has positive but second lag has negative effect on current money market rates. This implies that there is a movement toward the trend after two periods. For the post-targeting period, it is seen that only the first lag of output gap has significant and negative effect on current output gap. Regarding the inflation rates, the first lag has positive but second lag has negative effects on current inflation rates. For the money market rates, the first lag has positive but second lag has no effect on current money market rates.

In case of Norway, the same conclusions have been drawn for the output gap for the pre-targeting period meaning that both the first and second lags have negative and significant effect on the current output gap.

The inflation rates and policy rates VAR models have been found out as statistically insignificant. For the period of post-targeting, the negative effect of first lag on current output lag stays the same but this time effect of second lag disappears. But the second lag of inflation rates becomes negative and significant besides the positive effects of the first lag on the inflation rates. Regarding the policy rates, the

effect of the first lag disappears but this time the second lag has been found out as having positive effect on actual policy rates.

In case of Poland also both first and second lag of output gap have been found out as having negative effect on their current values for pre-targeting period. There is no statistical significance for the inflation rate model but the first lag of money market rates have negative effect on its current value for pre-targeting period. Regarding the period after the adoption of inflation targeting, the same effect of lag values of variables hold more or less for the post-targeting period. But this time, for the period of post-targeting, the effect of first lag of inflation rates on actual values is found out as positive and significant.

In case of Romania, the negative effects of both the first and second lags of output gap on the current output gap also hold for the pre-targeting period. In the same respect, the first lag of inflation rates has been found out as having positive effect on current inflation rates as it also holds for the other economies taken into consideration in this study. But there is not any significant effect of lagged values of money market rates on the current rates. For the post-targeting period in Romania case analysis, the same conclusions gathered for output gap analysis but this time both inflation rates and money market rates models are found out insignificant implying that there is no effect of previous values of inflation rates and money market rates on their actual values.

In case of Serbia, there has not been any significant effect of lagged values of output gap on its current value for the pre-targeting period and this also holds for the

inflation rates model implying that there is no effect of lag values of inflation rates on the current value. But the effect of first lag of money market rates on its current value has been significant and positive. For the post-targeting period, the effects of first lagged values of both inflation rates and money market rates on their current value are positive on their own current values but this time it is found out that only the second lag value of output gap has negative effect on its current values.

In case of Turkey, for the pre-targeting period only the first lag of output gap has negative and significant effect on its current value. Regarding the inflation rates, the positive effect of the first lag value of itself also holds for the case of Turkey but it is found out that both the first and second lagged values of policy rates have negative effect on its current value for the pre-targeting period. For the post-targeting period, the effect of the first lag of output gap on its current value as being negative stays the same but the effect of lagged values of inflation rates on their current values disappear. Regarding the policy rate, this time the effect of the first lag of policy rates turns out as positive and the second lag becomes statistically insignificant. But there is no statistical significance on the model of inflation rates implying that there is no effect of lag values on the current value of inflation rates. In this respect, after the adoption of inflation targeting, it could be hypothesized that the macroeconomic indicators of Turkey reveal trends much more similar to the ones of the other inflation targeting economies.

In case of the U.K., for the pre-targeting period none of the VAR models is statistically significant implying that none of those variables' lag values determine

the current value of those macroeconomic indicators. On the other hand, both the first and second lags of output gap have been found out as having negative and significant effect on current value of output gap. For both pre and post targeting periods, there has not been any effect of lagged values of inflation rates on its current values. However, the first lag of money market rates has negative effect on current money market rates for the period of post inflation targeting.

These entire VAR model results imply that the output gap generally has been affected its past values negatively in case of both early adopters such as the U.K. and also new adopters such as Serbia for the post-inflation targeting period. Regarding the inflation rates, the effect of the lagged values on current values have been generally positive and significant for almost all countries included in the analysis for both pre and post inflation targeting framework implementation. On the other hand, the lagged of money market /policy rate variable on its current values have been different for different economies and for pre and post inflation targeting regimes implying that the differences in monetary policy could be reflected on the results as well.

6.3. Impulse Response Functions

The impulse response functions reveal how the shocks to the specific variable affect the volatility and values of other variables. In this study, how the shocks to the

money market /policy rates would influence the output gap and inflation rates before and after the adoption of inflation targeting has been investigated for every country included into the analysis.

To begin with, the effects of shocks to the interest rates on the output gap have been in a smaller range and much more limited to a shorter period.

In case of Czech Republic, it is seen that the effects of shocks to the money market rates on output gap are not seen significantly. But more importantly, the impulse response function graphical analysis reveals that the effect of shocks to money market rates on output gap lasts for almost 14 periods for the pre-targeting period. On the other hand, it is seen that the effect of money market shocks on output gap only lasts for at most 8 periods for post-targeting period. This reveals that in post-targeting period, the effects of shocks stay more temporary. The figure below shows the response of output gap to money market rate for Czech Republic

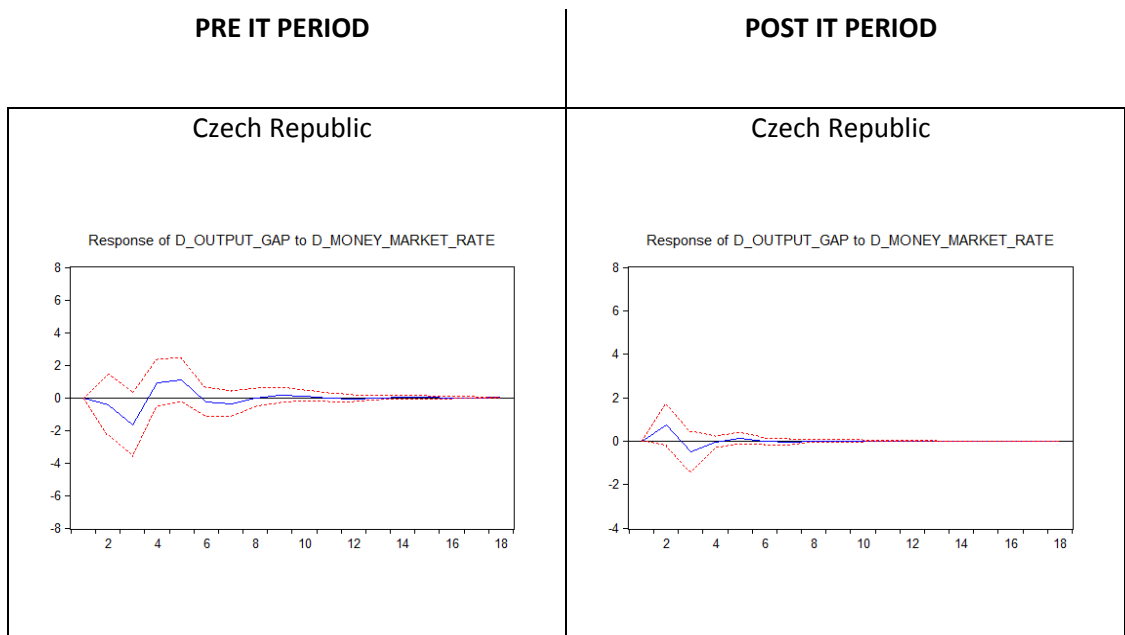


Figure 1: Response of Output Gap to Money Market Rate for Czech Republic

In case of Iceland, the effects of shocks to the money market rates on output gap could be compared in a more obvious way for the pre and post inflation targeting periods as the models are found out as statistically significant. In the pre-targeting period, the effects of shock on the output gap declines through time but the magnitude of the initial effect of shock is much higher than it has been for the post-targeting period. More importantly, the duration of the effect of shock on output is much longer in case of pre-targeting period than the post-targeting one. The figure 2 represents the response of output gap to money market rate for Iceland.

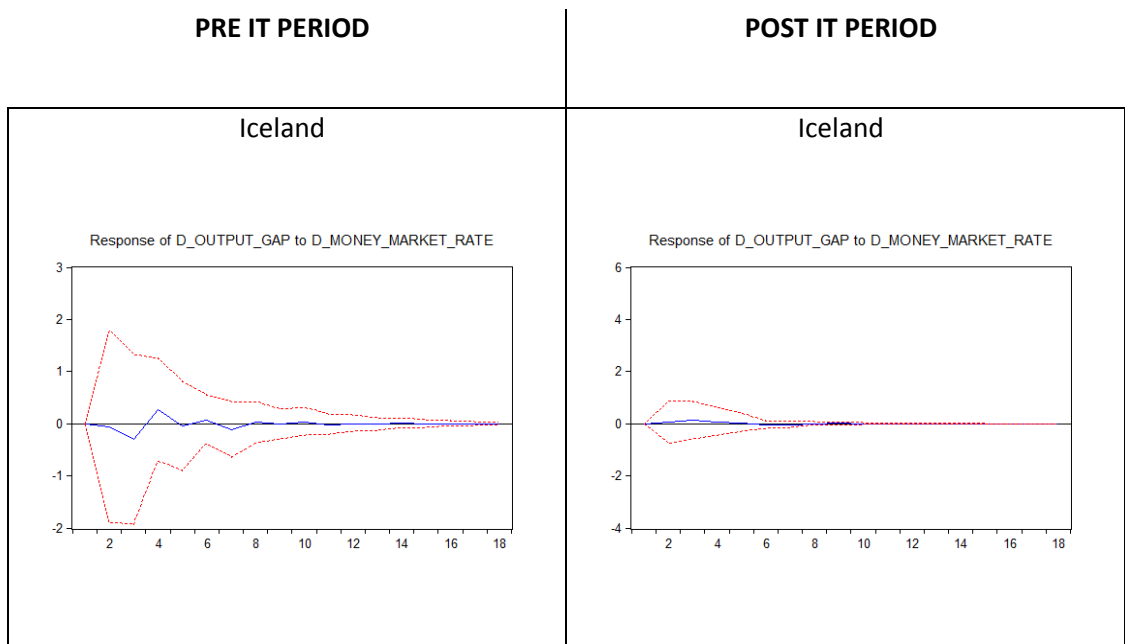


Figure 2: Response of Output Gap to Money Market Rate for Iceland

In case of South Korea, the magnitude of the effect of shock on output gap does not change much between pre and post targeting periods but the duration of the effect of shock on output gap has been much longer in case of pre-targeting period than the post-targeting one. It can be seen that the response of output gap to money market rate for South Korea in the following figure.

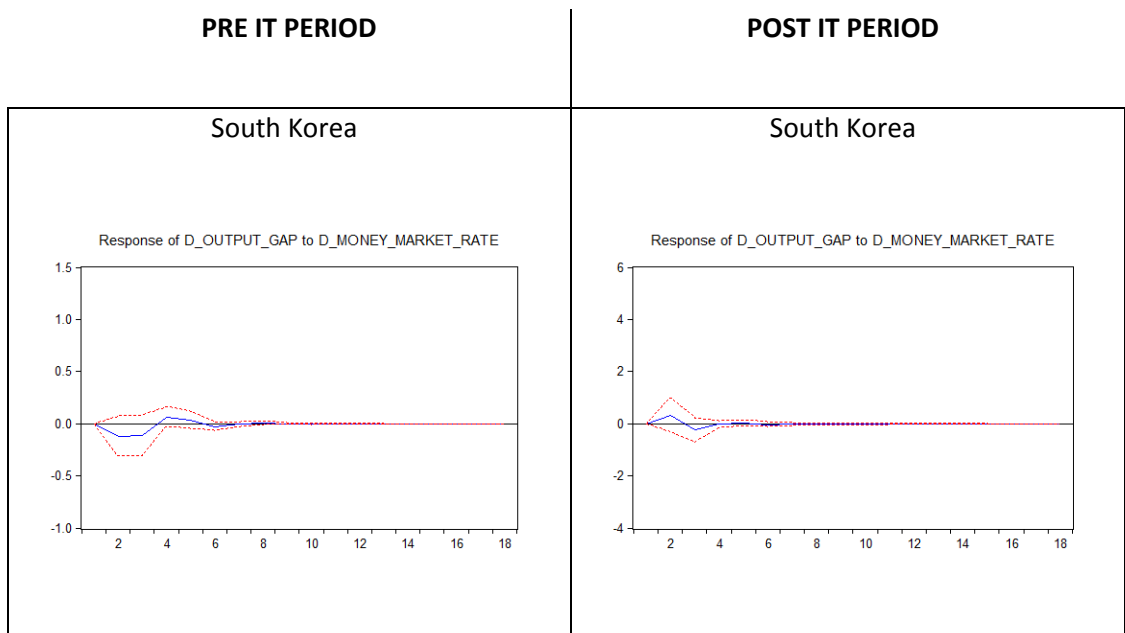


Figure 3: Response of Output Gap to Money Market Rate for South Korea

In case of Mexico, there could not be found out any significant difference between pre and post inflation targeting periods although the effect of shock on output gap seems slightly smoother in case of post-targeting period once compared to the pre-targeting period because the output gap moves within a lower range in the case of post-targeting period. Figure 4 shows the response of output gap to money market rate for Mexico.

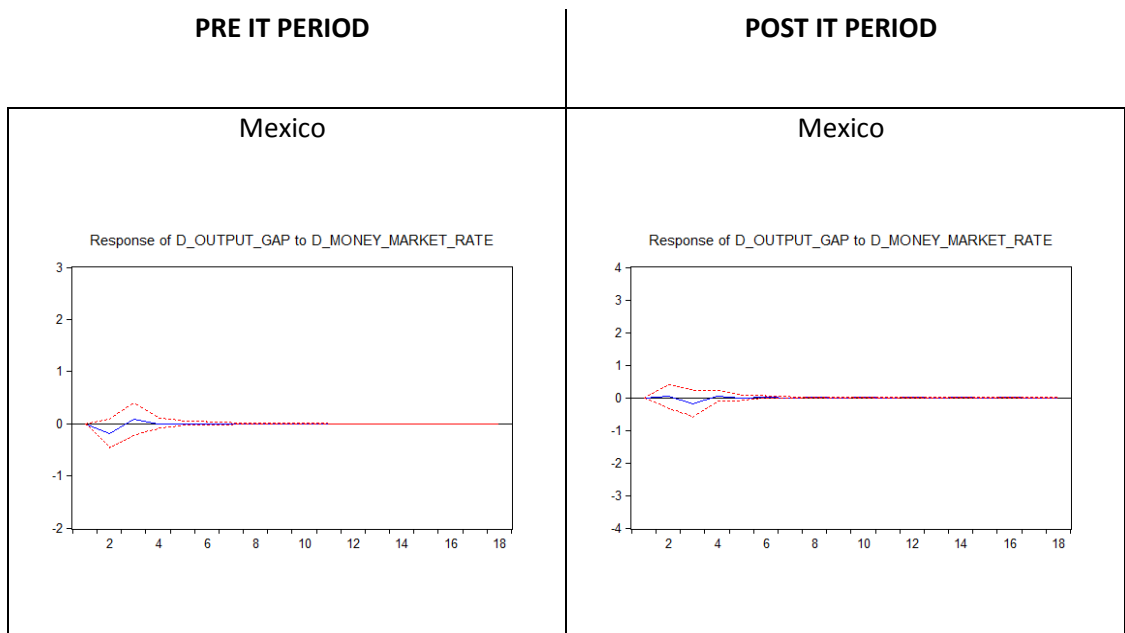


Figure 4: Response of Output Gap to Money Market Rate for Mexico

In case of Norway, the results seem contradicting with the findings relevant for the other economies. According to the impulse response analysis, the effect of shocks to money market rates on output gap moves within a larger range and for a longer duration in the case of post-targeting period than it does in the case of pre-targeting period. The response of output gap to money market rate for Norway can be seen in figure 5.

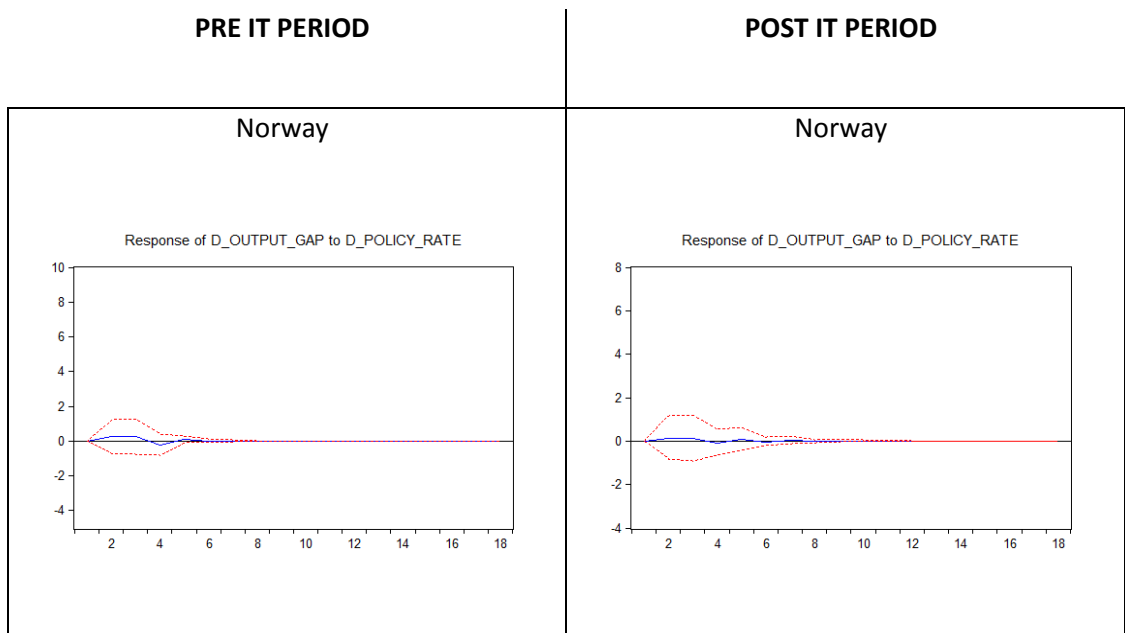


Figure 5: Response of Output Gap to Money Market Rate for Norway

Contradicting findings hold for the case of Romania. In case of Romania both the magnitude of the effect on output gap and also duration of the effect on output gap have been much higher for the post inflation targeting period than the pre targeting period. In the case of Republic of Serbia, the pre-targeting period is seen as insignificant for the output gap model but for the post targeting it is seen as significant and duration of shock takes more in case of post-targeting and there is high volatility as well. The response of output gap to money market rate for the case of Romania and the case of Republic of Serbia can be seen in figure 6.

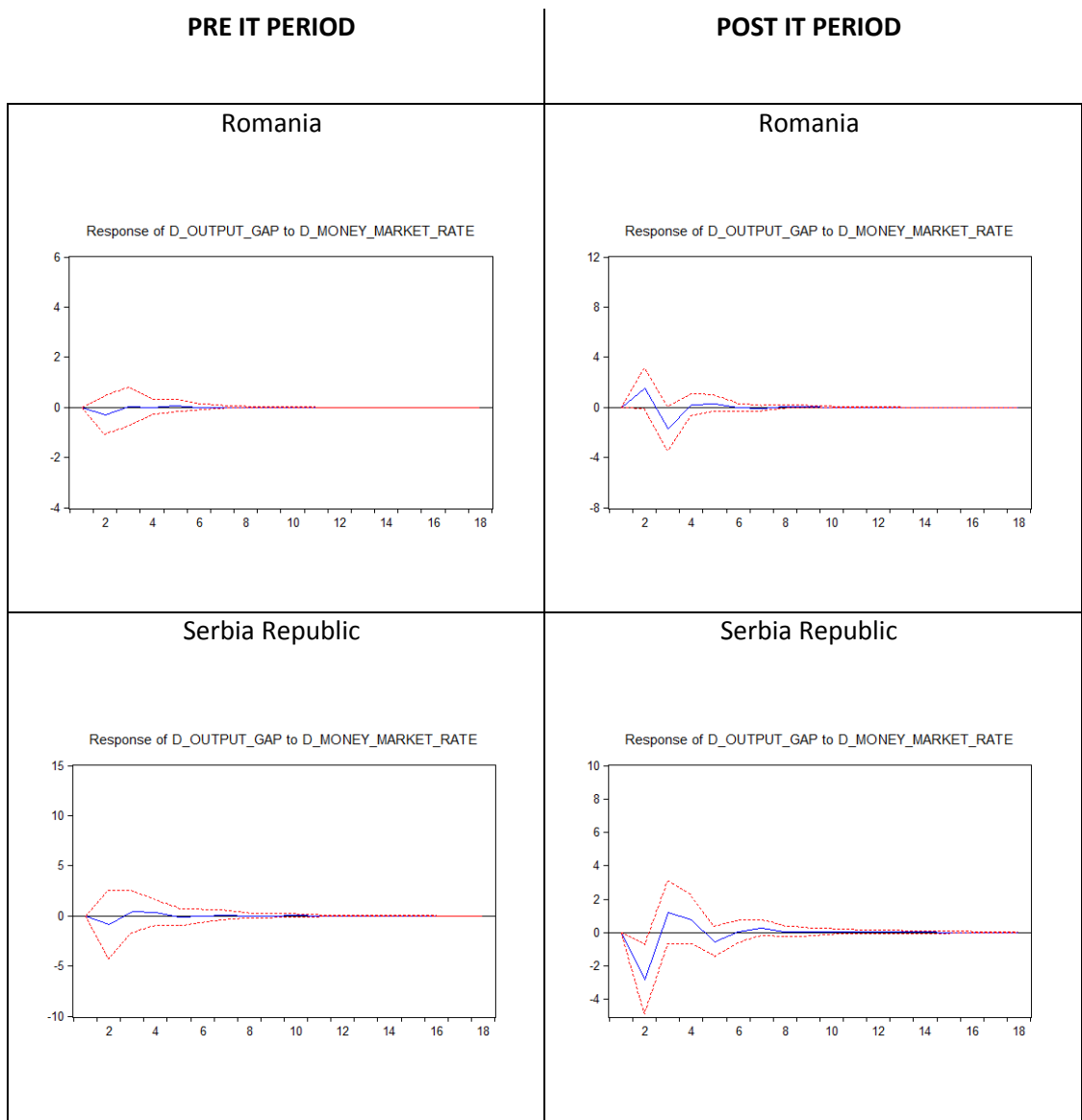


Figure 6: Response of Output Gap to Money Market Rate for Romania and Republic of Serbia

In case of Poland, the magnitude of the effect of money market shock on output gap does not change much between pre and post targeting periods but the duration of the effects of shock on output gap is much lower in case of post inflation targeting period. The figure 7 represents the response of output gap to money market rate for the case of Poland.

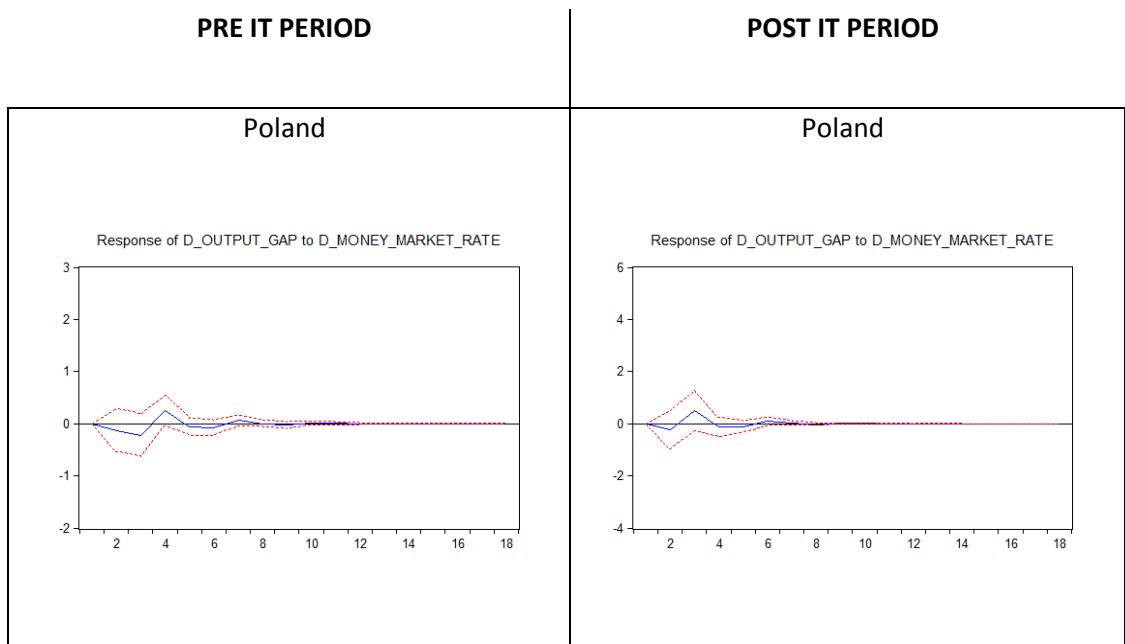


Figure 7: Response of Output Gap to Money Market Rate for Poland

In case of Turkey, the post-targeting regime obviously improves the negative effects of possible money market shocks into the economy. According to the impulse response analysis, the effects of shocks on output gap of Turkey last for a shorter period of time but the magnitude of effects of shocks on output are calculated as not much different between pre and post targeting periods. The following figure serves the response of output gap to money market rate for the case of Turkey.

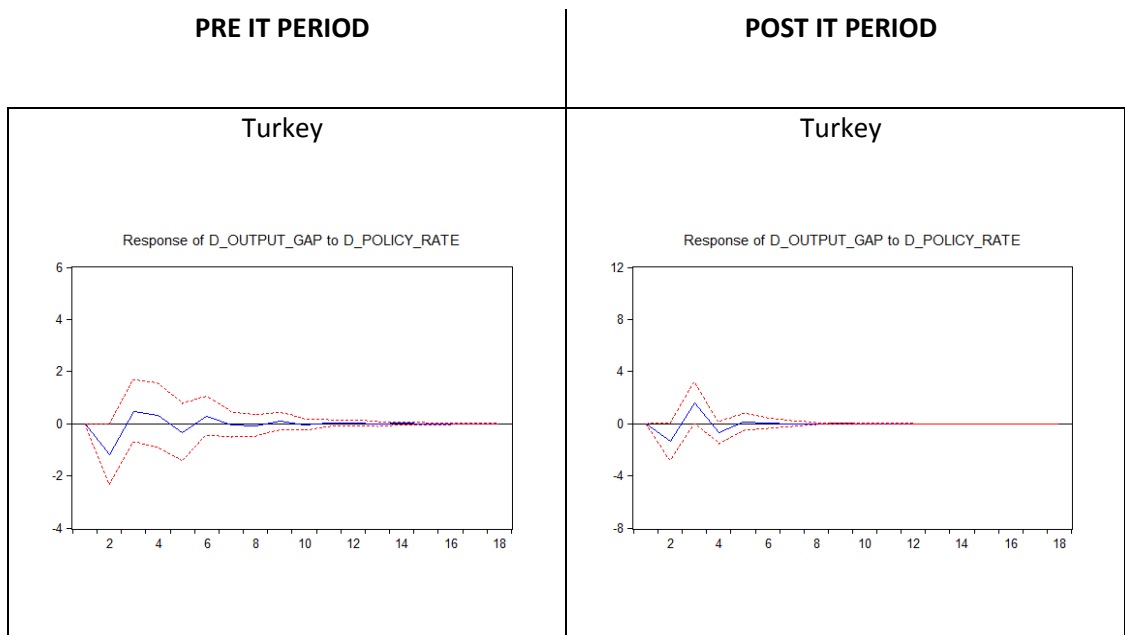


Figure 8: Response of Output Gap to Money Market Rate for Turkey

But in case of the United Kingdom the positive change on the effectiveness of shocks on the output has been much clear in the case of post-targeting period. The duration of shock are measured as smaller in case of post inflation targeting period. The figure 9 indicates the response of output gap to money market rate for the case of United Kingdom.

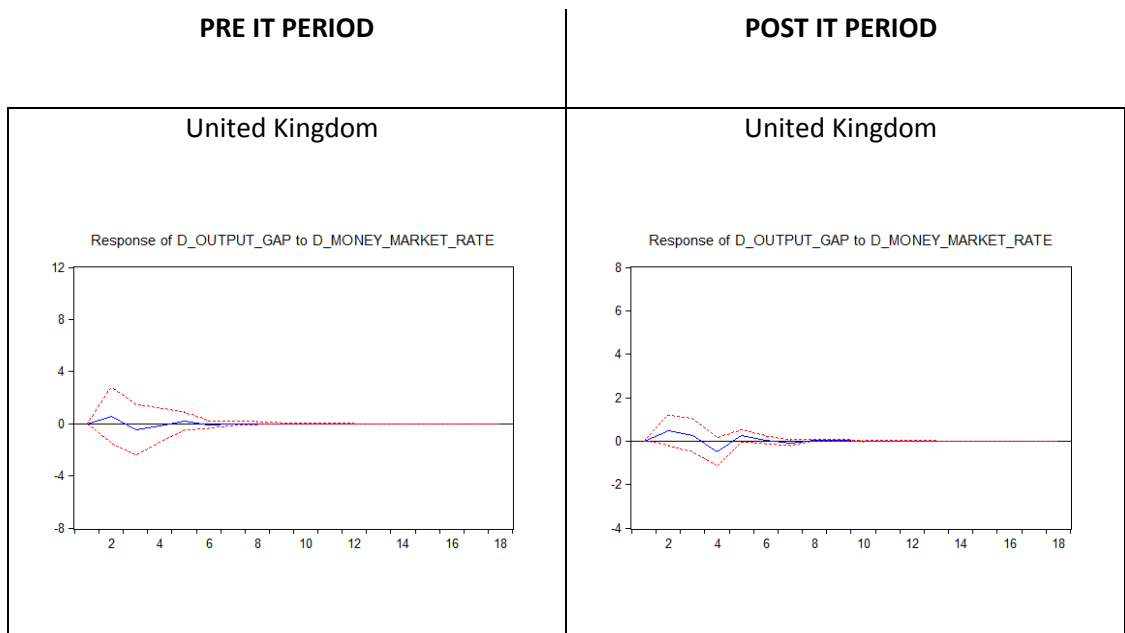


Figure 9: Response of Output Gap to Money Market Rate for United Kingdom

Once the effects of money market shocks on the inflation rates have been investigated for the same economies for both periods of pre and post inflation targeting, the results also provide contradicting and different interpretations for different economies.

To start with, in case of Czech Republic the duration of the effect on inflation rates become shorter respectively in the event of post-targeting period even if it is seen that the effects of shocks to the money market rates on inflation rates are not seen significantly. The figure below shows the response of inflation rate to money market rate for Czech Republic.

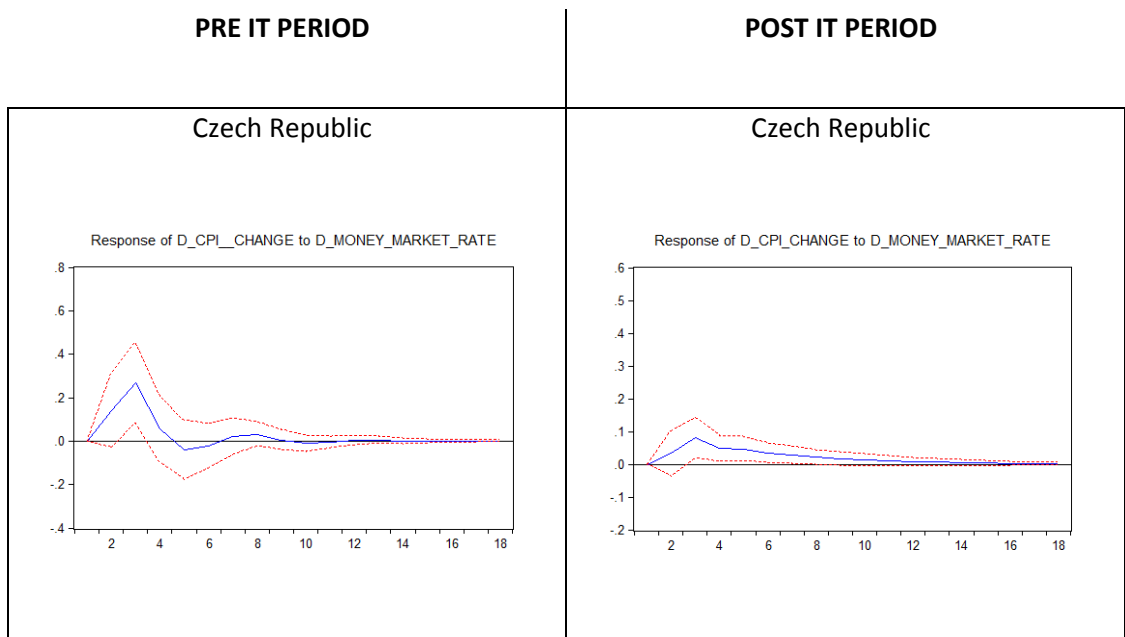


Figure 10: Response of Inflation Rate to Money Market Rate for Czech Republic

The same conclusions also hold for the case of Iceland and Romania where the fluctuations of inflation rates takes less period for the post inflation targeting period. The response of inflation rate to money market rate for the case of Iceland and Romania can be seen in figure 11.

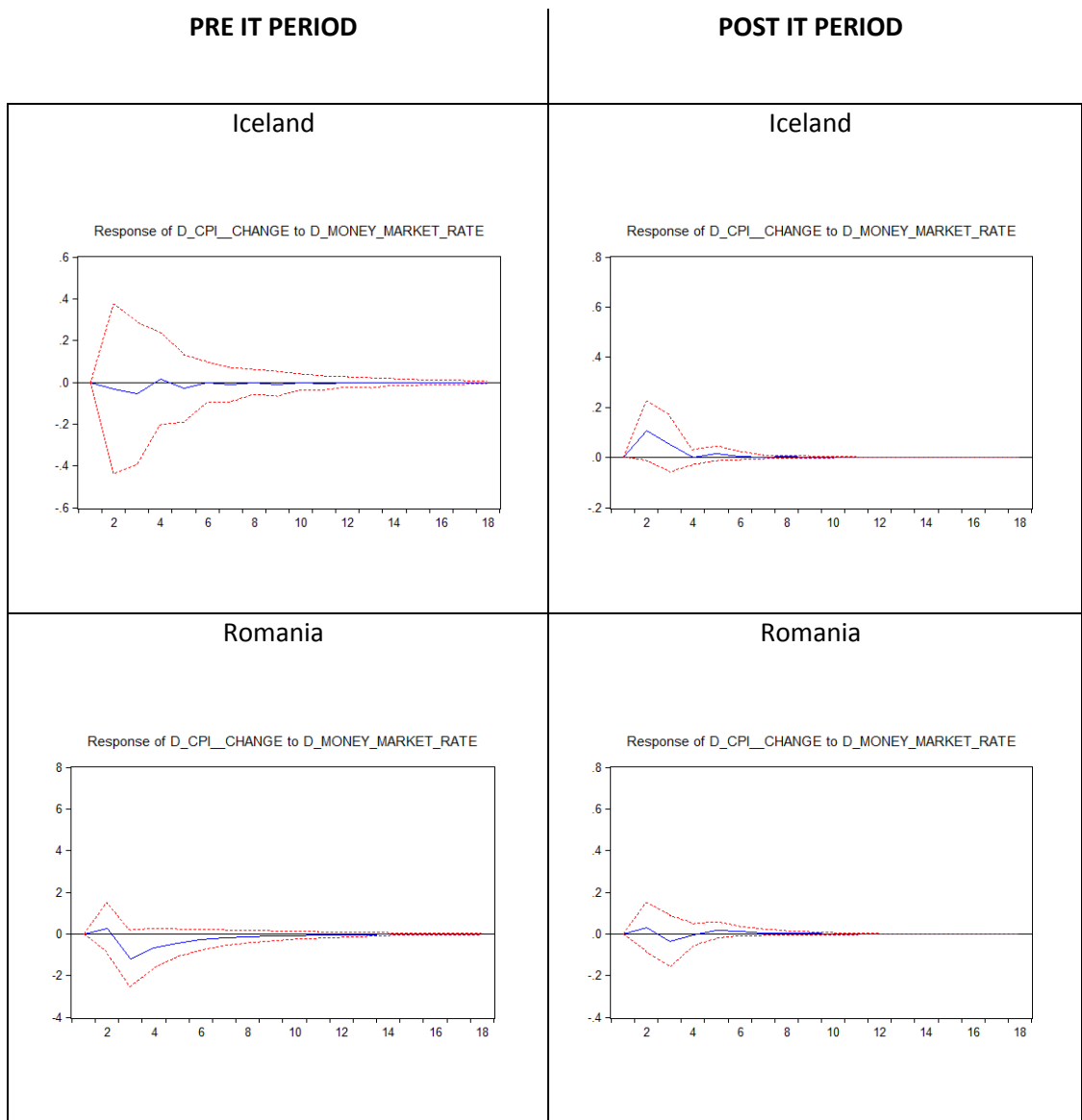


Figure 11: Response of Inflation Rate to Money Market Rate for Iceland and Romania

On the other hand, in case of South Korea although the magnitude of effect of shocks stays within a more narrow range in case of post-targeting, the duration of the effect of shock on inflation rates has been much longer once compared to the pre-targeting period. The figure 12 shows the response of inflation rate to money market rate for the case of South Korea.

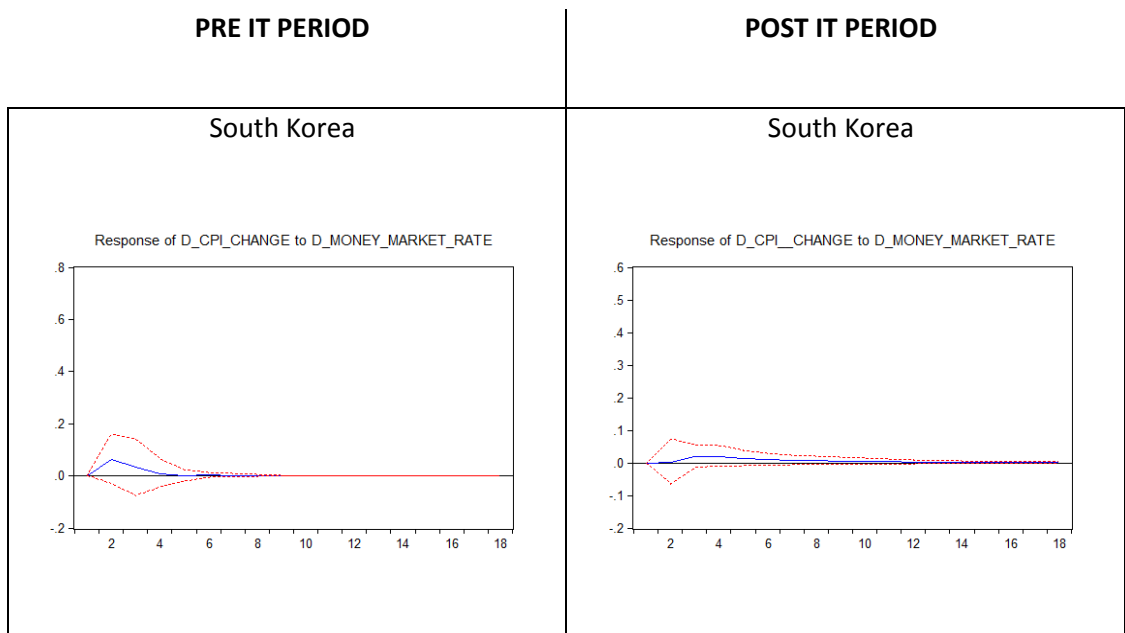


Figure 12: Response of Inflation Rate to Money Market Rate for South Korea

The reverse holds in case of Mexico. For Mexico case it is found out that the magnitude of the effect of shock on inflation rates does not change much differ among pre and post targeting periods but the duration of the effect of shock is much shorter in case of post-targeting period. The response of inflation rate to money market rate for the case of Mexico can be seen in the following figure.

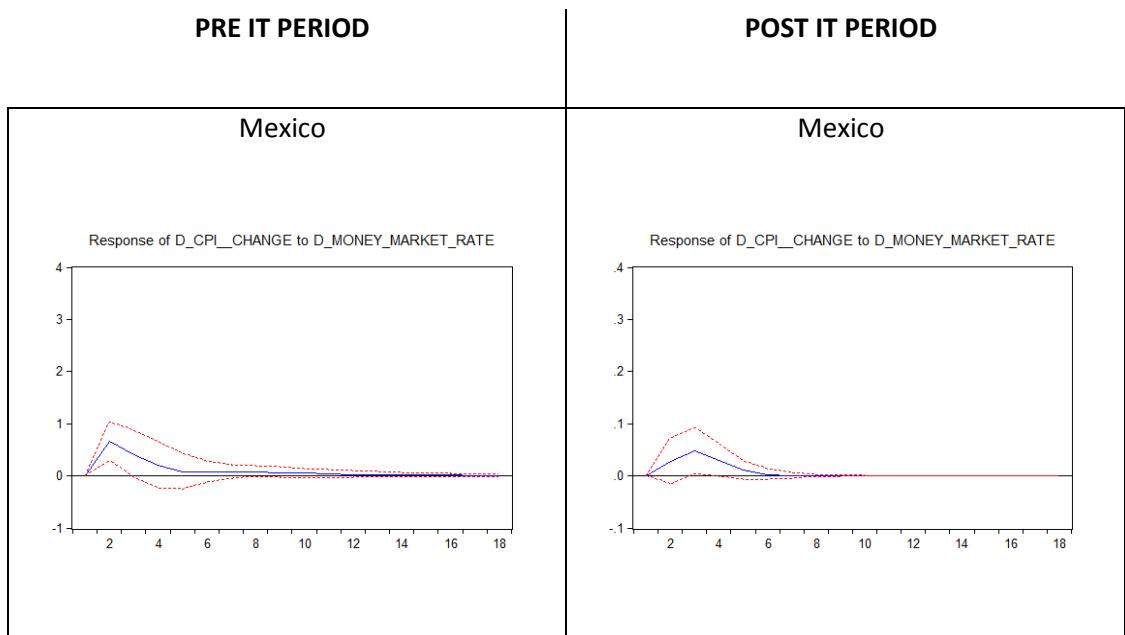


Figure 13: Response of Inflation Rate to Money Market Rate for Mexico

On the other hand, in case of Norway the post-targeting period demonstrates a longer duration of the crisis for the effect of shocks on inflation rates. This finding contradicts with the findings gathered in the case of other economies. The figure 14 represents the response of inflation rate to money market rate for Norway.

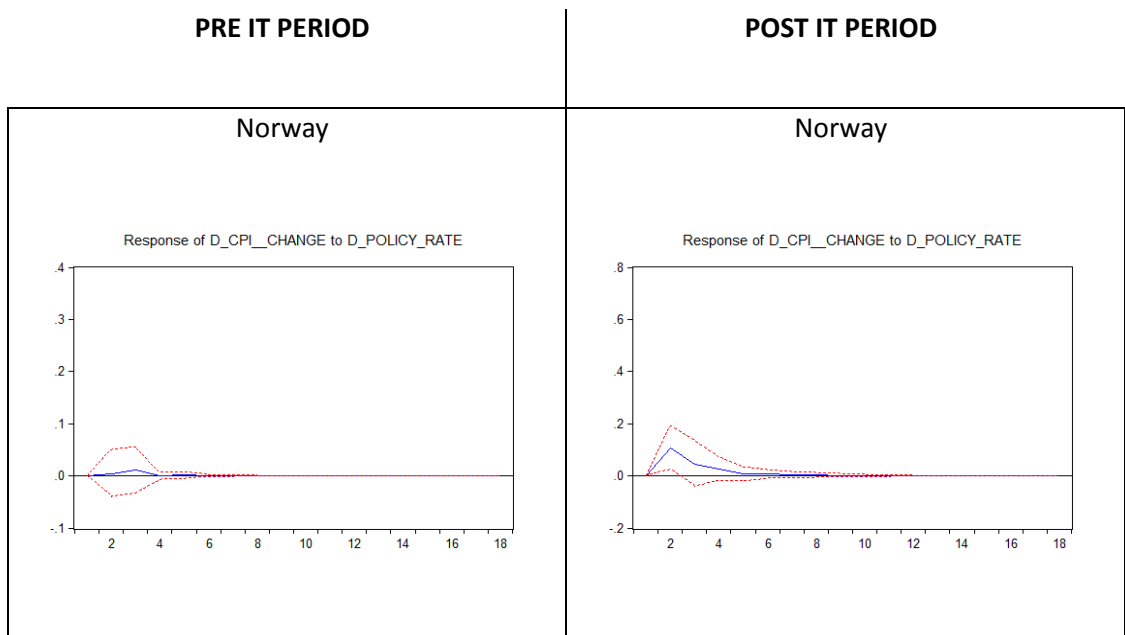


Figure 14: Response of Inflation Rate to Money Market Rate for Norway

In case of Poland, the duration of the effects on inflation rates does not change much between pre and post inflation targeting periods. The pre-targeting period analysis is found out as insignificant but the model found out as significant in case of post-targeting. The following figure indicates the response of inflation rate to money market rate for the case of Poland.

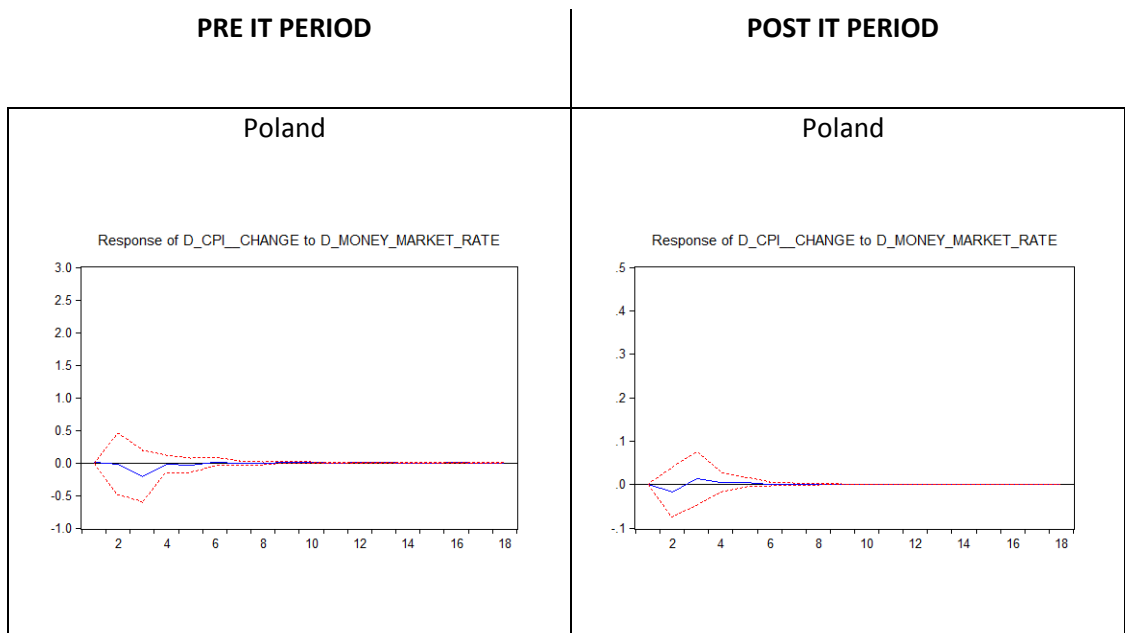


Figure 15: Response of Inflation Rate to Money Market Rate for Poland

In case of Republic of Serbia, the impulse response analysis reveals that the effects of money market shocks on inflation rates stay for a much longer duration after the adoption of inflation targeting regime. Different from other analyses for other economies, this time the inflation rates model is not significant in case of post-targeting. The response of inflation rate to money market rate for the case of Republic of Serbia is showed in the figure 16.

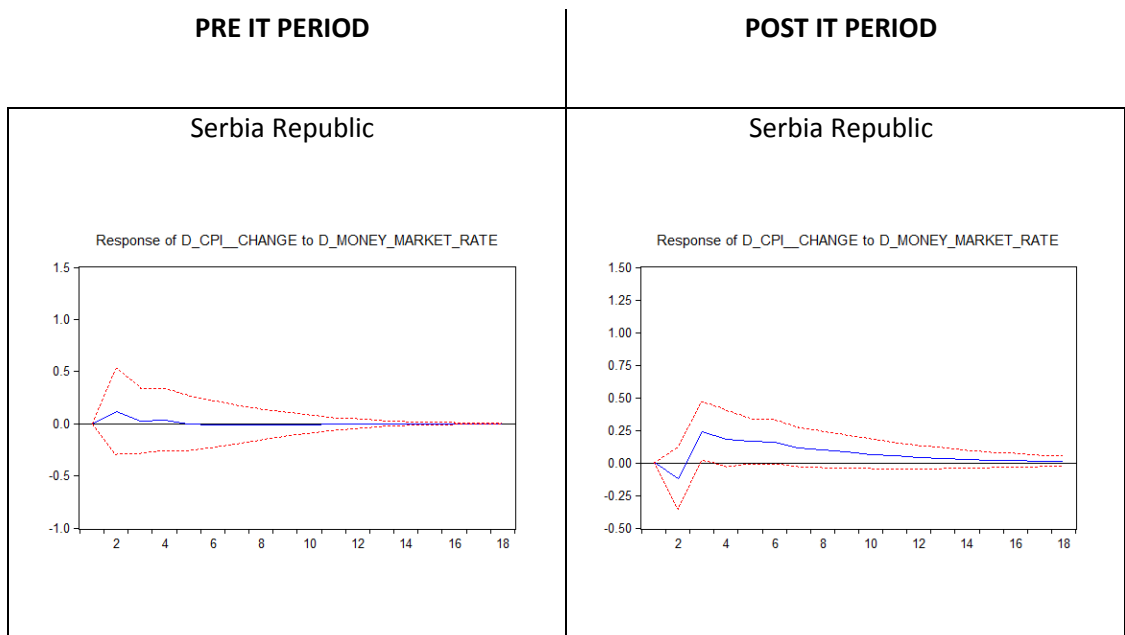


Figure 16: Response of Inflation Rate to Money Market Rate for Republic of Serbia

On the other hand, in case of Turkey and the U.K., the effect of shocks to the money market rates on the inflation rates has moved for a shorter period of time after the adoption of inflation targeting regime. For the case of Turkey, the model of pre-targeting period has been found out as significant but the model of post-targeting period has been found out as insignificant. This implies that post inflation targeting might eliminate the effect of policy rates on inflation rates. But the reverse holds for the case of the U.K.. After inflation targeting adoption, the insignificant model on inflation rates become statistically significant implying that there might be significant effect of money market rates on inflation rates after the adoption of inflation targeting. The figure 17 illustrates the response of inflation rate to money market rate for the case of Turkey and United Kingdom.

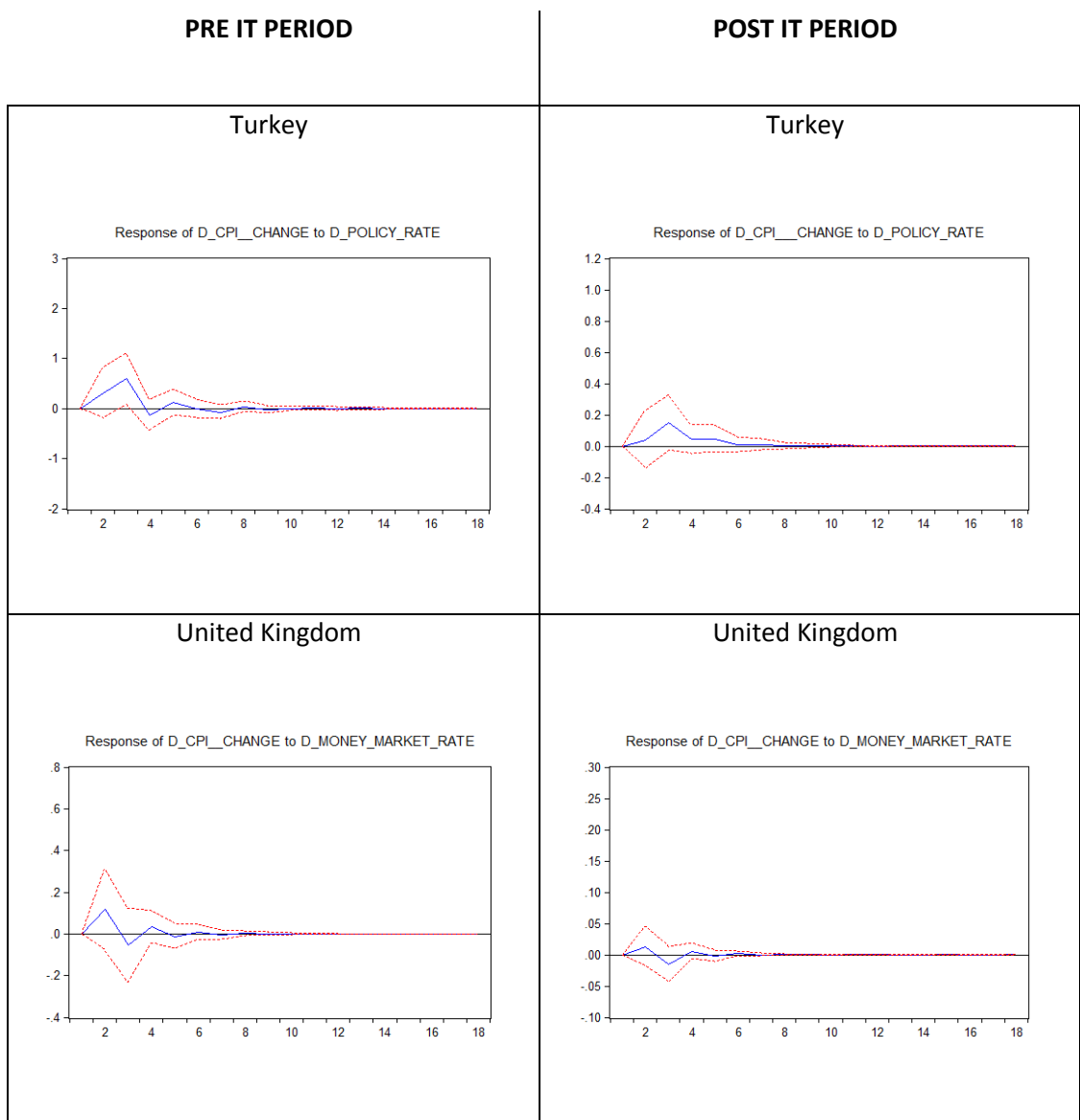


Figure 17: Response of Inflation Rate to Money Market Rate for Turkey and United Kingdom

All those findings reveal that the effects of inflation targeting regime on the macroeconomic outlook and also the general interaction among different macroeconomic indicators (output gap, interest rates and inflation rates) do not differ much once compared to the pre-targeting period. More importantly, the results imply that for almost all economies (except Turkey and Romania) the effect of interest rates

on inflation rates have been found out statistically significant for the post-targeting period regardless of the effect for the pre-targeting period implying that the effectiveness of monetary policy on inflation rates has been turned out to be significant after the adoption of inflation targeting framework. The same conclusion also holds for the effectiveness of monetary policy on output gap. After the adoption of inflation targeting framework, the effectiveness of monetary policy on output gap has been calculated as statistically significant although it has not been found out as significantly effective for the economies of Czech Republic, Republic of Serbia and the U.K. for the pre-targeting period.

CHAPTER SEVEN

CONCLUSION

The world economies since Great Depression have tried different monetary policy tools and framework and regimes in order to handle with the changing economic structure. As the globalization has increased owing to the liberalization of many economies after Cold War, more and more economies have been integrated into the global marketplace and the interconnectedness among different economic units have increased as well. Although the global integration of economies has created an economic environment which includes many growth and development opportunities, this has also brought many risks for the economies. The exchange rates are proved to be hard to control and eventually the fixed exchange rate regime has been abandoned and exchange rates are allowed to freely float without direct control of Central Bank. Moreover, increasing inflation and price instability have been found out as detrimental on the economic growth and general outlook since 1970s.

Those changes taking place in the economic environment have caused the economic authorities to try different policy approaches ranging from Gold Standard to inflation targeting. Since 1990s, the most heavily accepted and implemented policy approach has emerged as the inflation targeting regime. Although it is argued that Central Banks cannot actually control the inflation rates and even target the desired inflation rates, many studies have favored the direct and indirect importance of inflation targeting regime in constituting the stability in the macro outlook of any economy. However, there is still no consensus on the actual effectiveness of inflation targeting regime on the macroeconomic outlook once compared to the pre-targeting period. There have been mixed results about the comparison of performances of targeting and non-targeting economies. Also, the most of the literature still focuses on the direct effect of inflation targeting regime on levels and volatility of inflation rates. But there is still not enough literature about the direct and indirect effectiveness of inflation targeting regime on macroeconomic growth and other indicators. In order to fulfill this gap in the literature, this study has focused on how the performance of inflation targeting economies has changed before and after the adoption of inflation targeting regime. The descriptive data analysis for the pre-targeting and post-targeting period has revealed that there is a certain influence of adoption of inflation targeting regime on the interest rates and inflation rates especially. Based on the numerical analysis, the interest rates and inflation rates have declined significantly for both developing and developed economies after the adoption of inflation targeting. Especially there is a noteworthy decline in the interest rates and inflation rates for the developing

economies after the adoption of inflation targeting once compared to the pre-targeting period. But the numerical analysis does not reveal any significant change on output gap between the pre and post period. VAR model analysis has revealed that there is not a direct effect of inflation targeting regime on the macroeconomic indicators but based on the impulse response functions analysis, there is a certain change on the effects of shocks on macroeconomic indicators, output gap and inflation rates under the inflation targeting regime. But the change has not been found out as desirable for every country in the post-targeting period.

Especially, for the economies of the U.K. and Turkey, there has been an obvious decline in the duration and magnitude of the effects of possible shocks on the output gap and inflation rates once those economies have adopted the inflation targeting regime. On the other hand, the positive outcome would not be obtained for the economies of Norway and Serbia. These findings have signaled that the effects of shocks on macroeconomic indicators change between pre and post targeting periods but in which direction these changes take place is assumed to be dependent on differences about the macroeconomic structure of the economies and how the economy has implemented the inflation targeting regime. Once the differences among countries for the post-targeting period is investigated, for the effects of shock on both output gap and also inflation rates have been found out as heterogeneous and various implying that the inflation targeting regime could result in differences in the responsiveness of different economies to the shocks. Those findings provide supporting evidence for the previous literature that have concluded the effectiveness of inflation is not clear cut and the heterogeneous

results have also obtained among analysis of different economies as the previous literature has suggested. In this respect, it is concluded that the inflation targeting regime could be evaluated in a way that the responsiveness of the economy to the shocks could be improved under the inflation targeting regime but this might depend on many conditions prevailing in the economy. Therefore, this area of search requires a much more detailed analysis.

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APPENDIX

IMPULSE RESPONSE GRAPHS OF ALL COUNTRIES FOR PRE AND POST TARGETING PERIOD

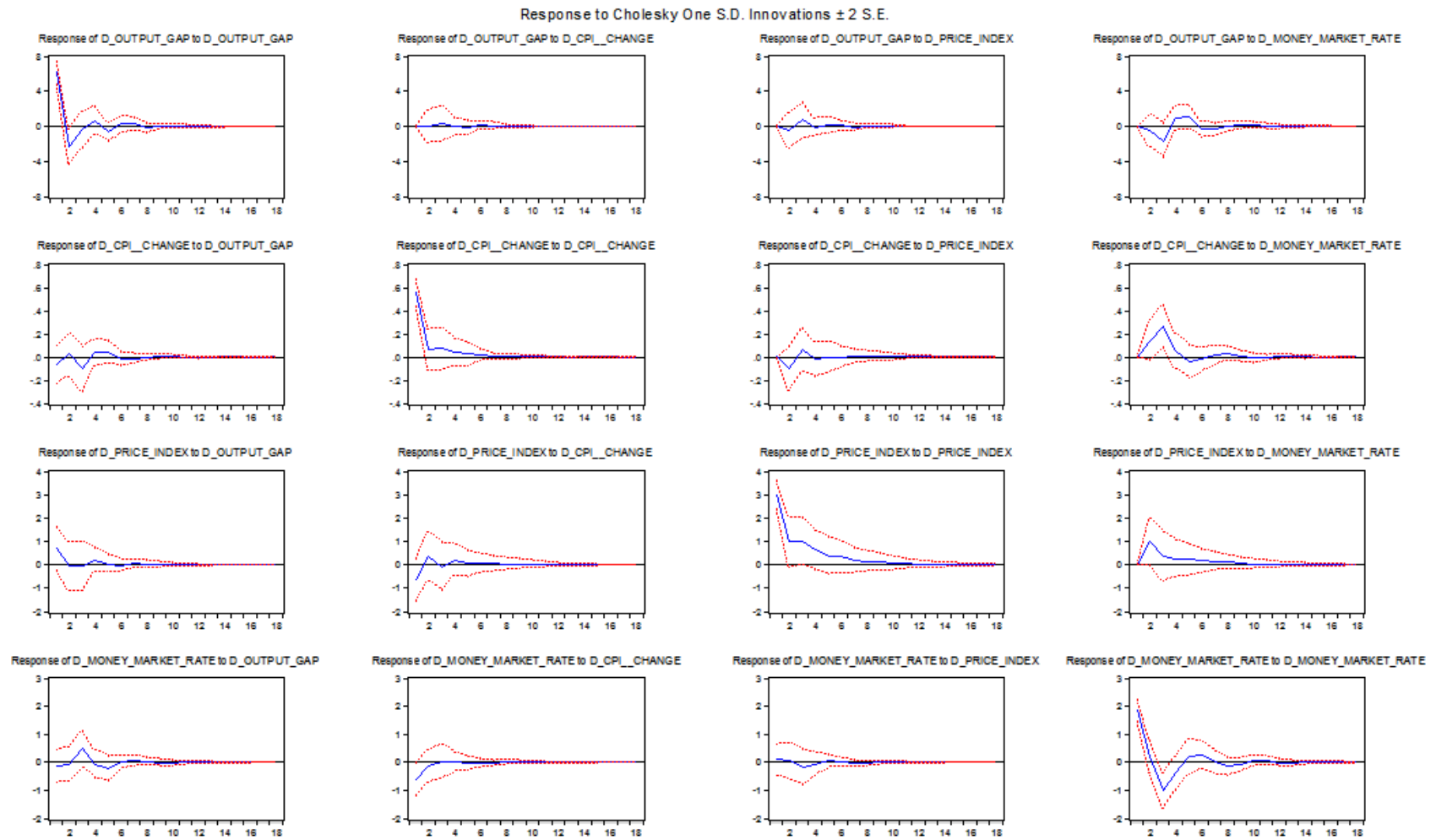


Figure 1: Impulse Response Functions of Czech for Pre Inflation Targeting

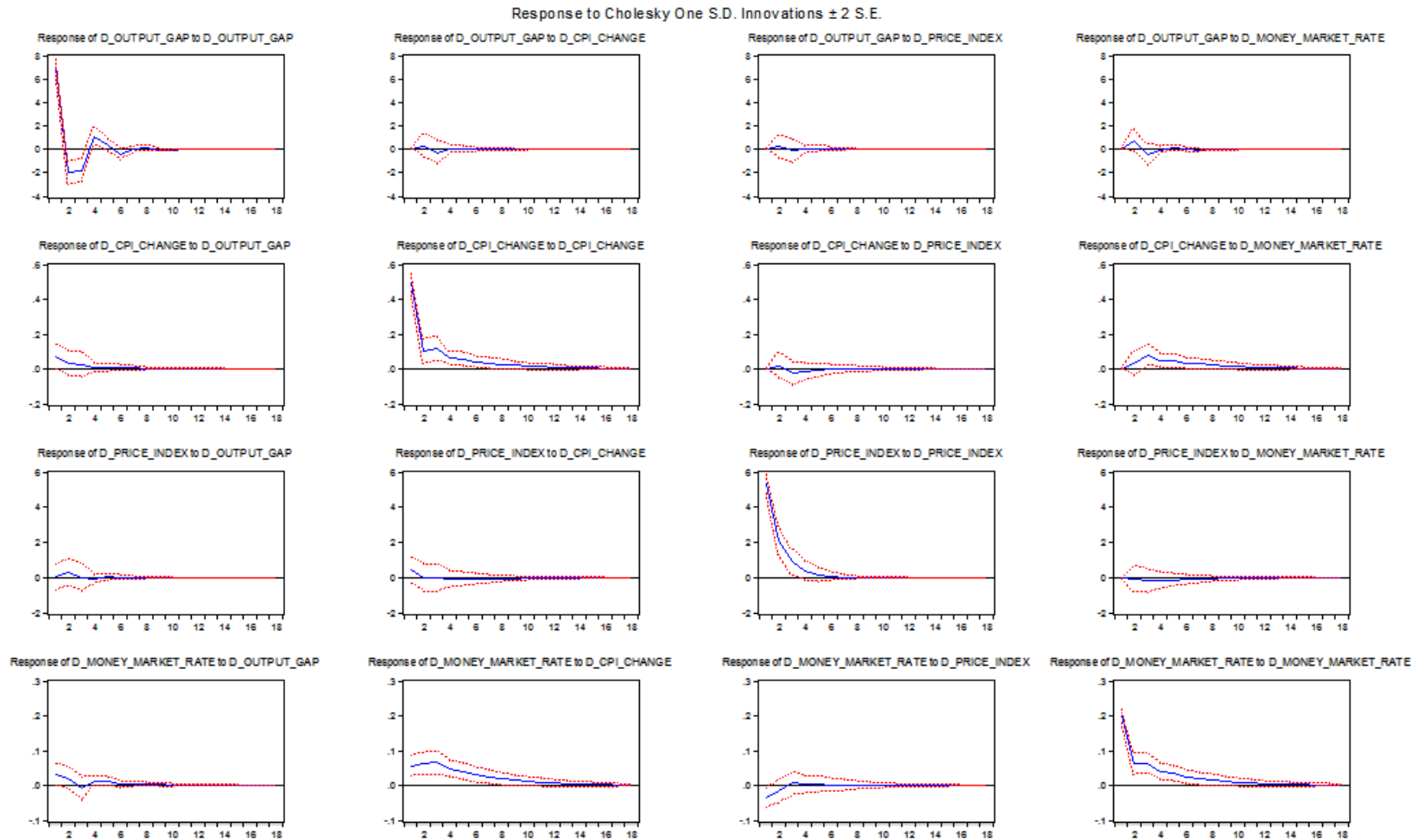


Figure 2: Impulse Response Functions of Czech for Post Inflation Targeting

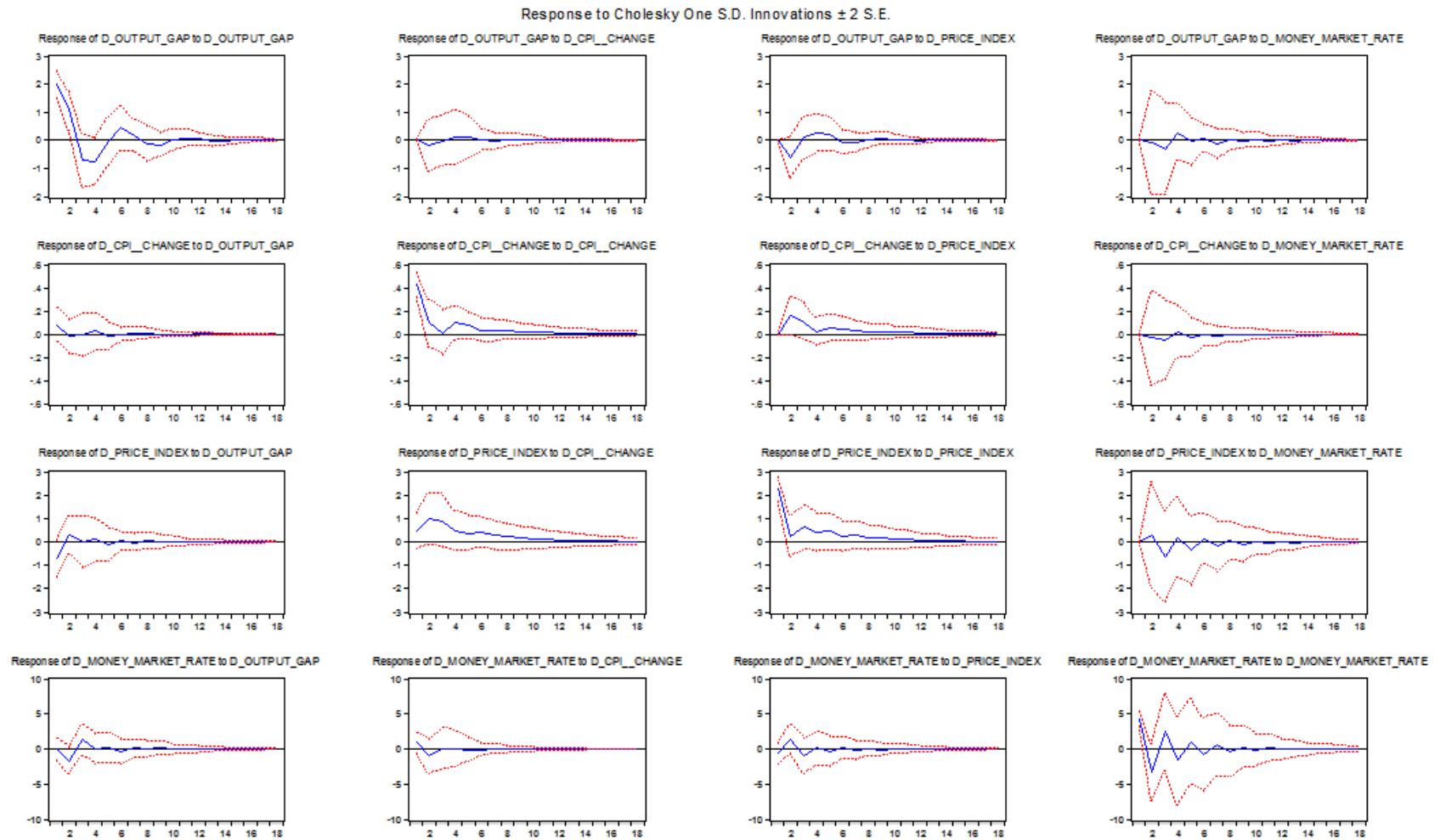


Figure 3: Impulse Response Functions of Iceland for Pre Inflation Targeting

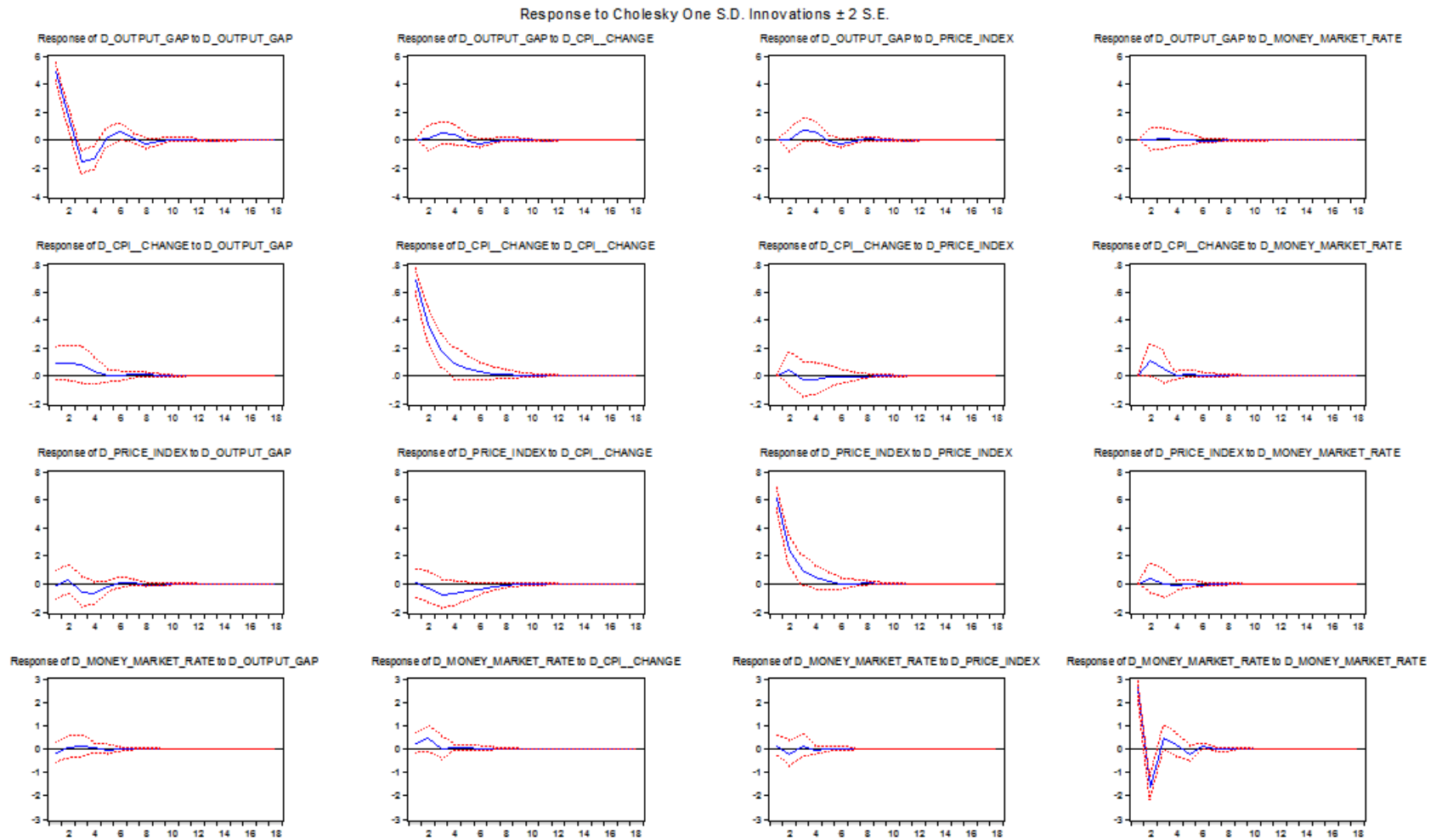


Figure 4: Impulse Response Functions of Iceland for Post Inflation Targeting

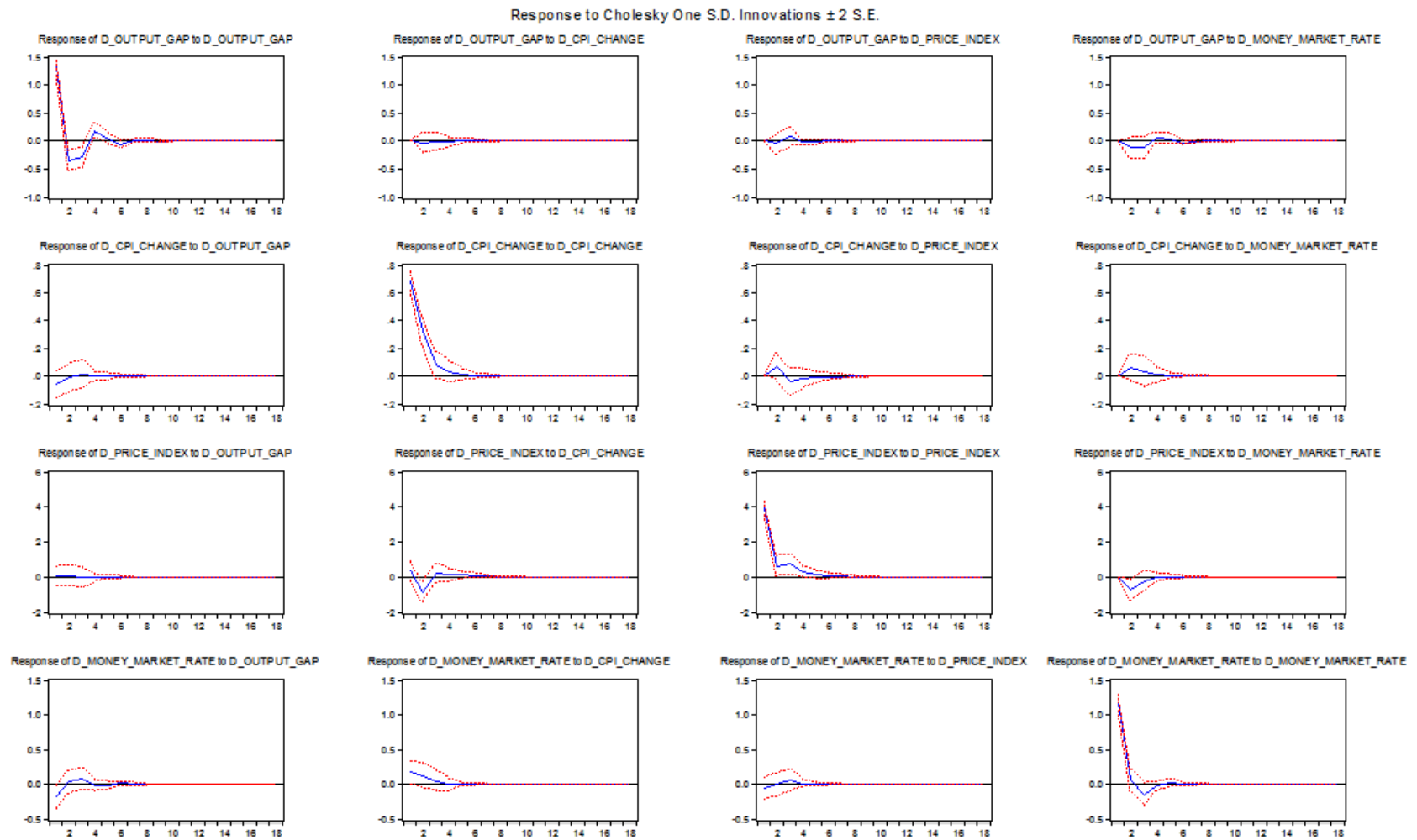


Figure 5: Impulse Response Functions of Korea for Pre Inflation Targeting

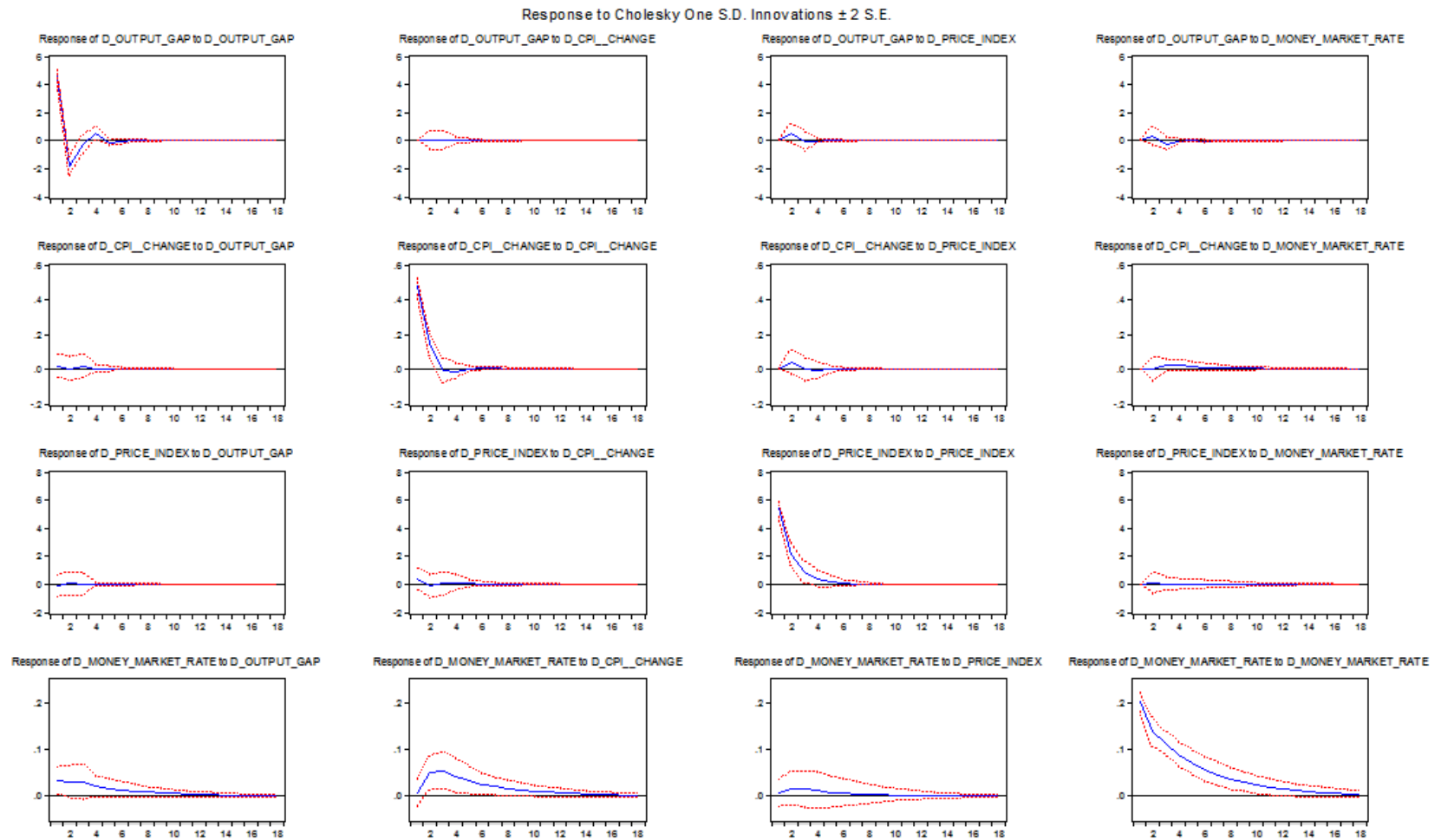


Figure 6: Impulse Response Functions of Korea for Post Inflation Targeting

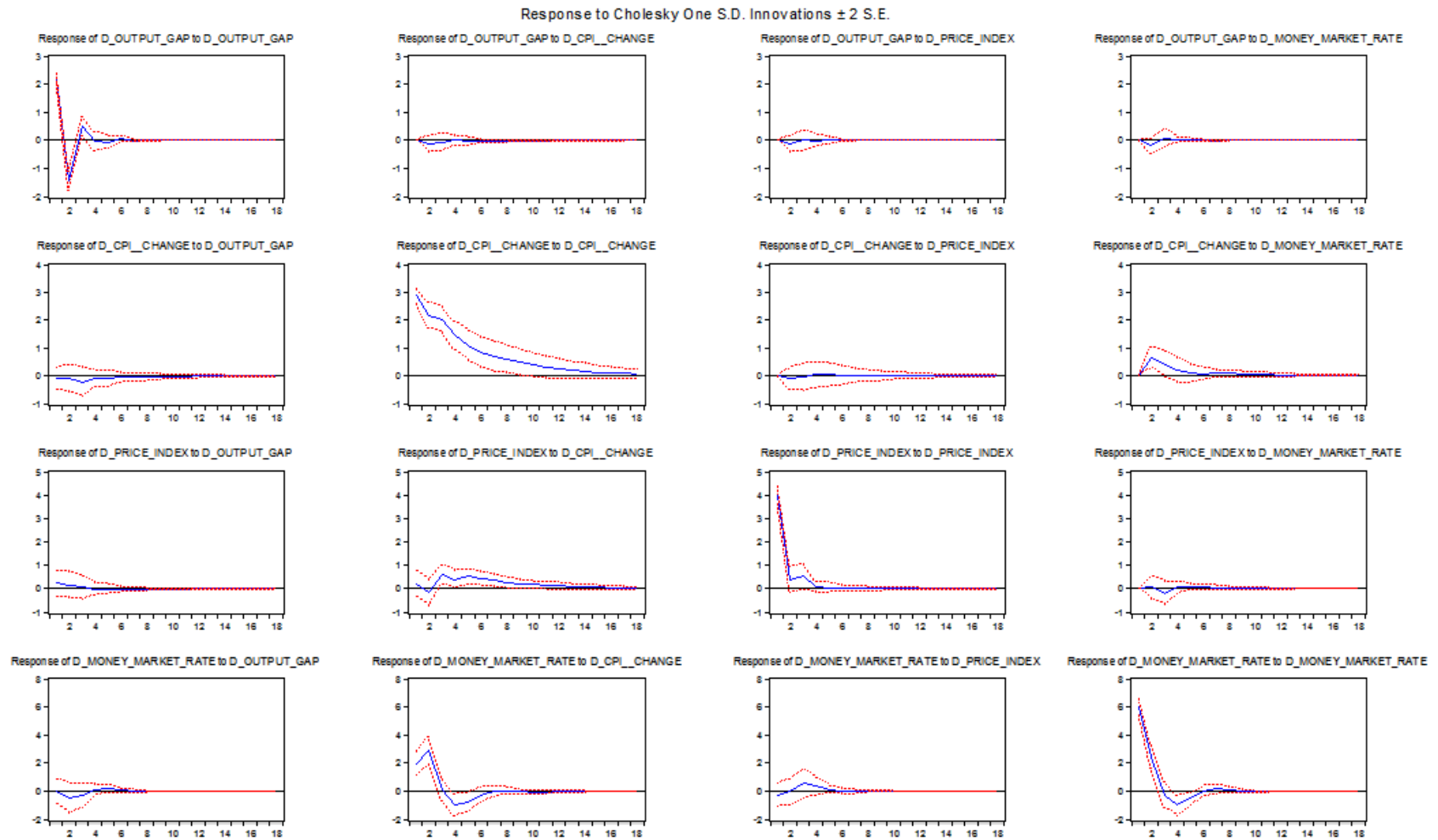


Figure 7: Impulse Response Functions of Mexico for Pre Inflation Targeting

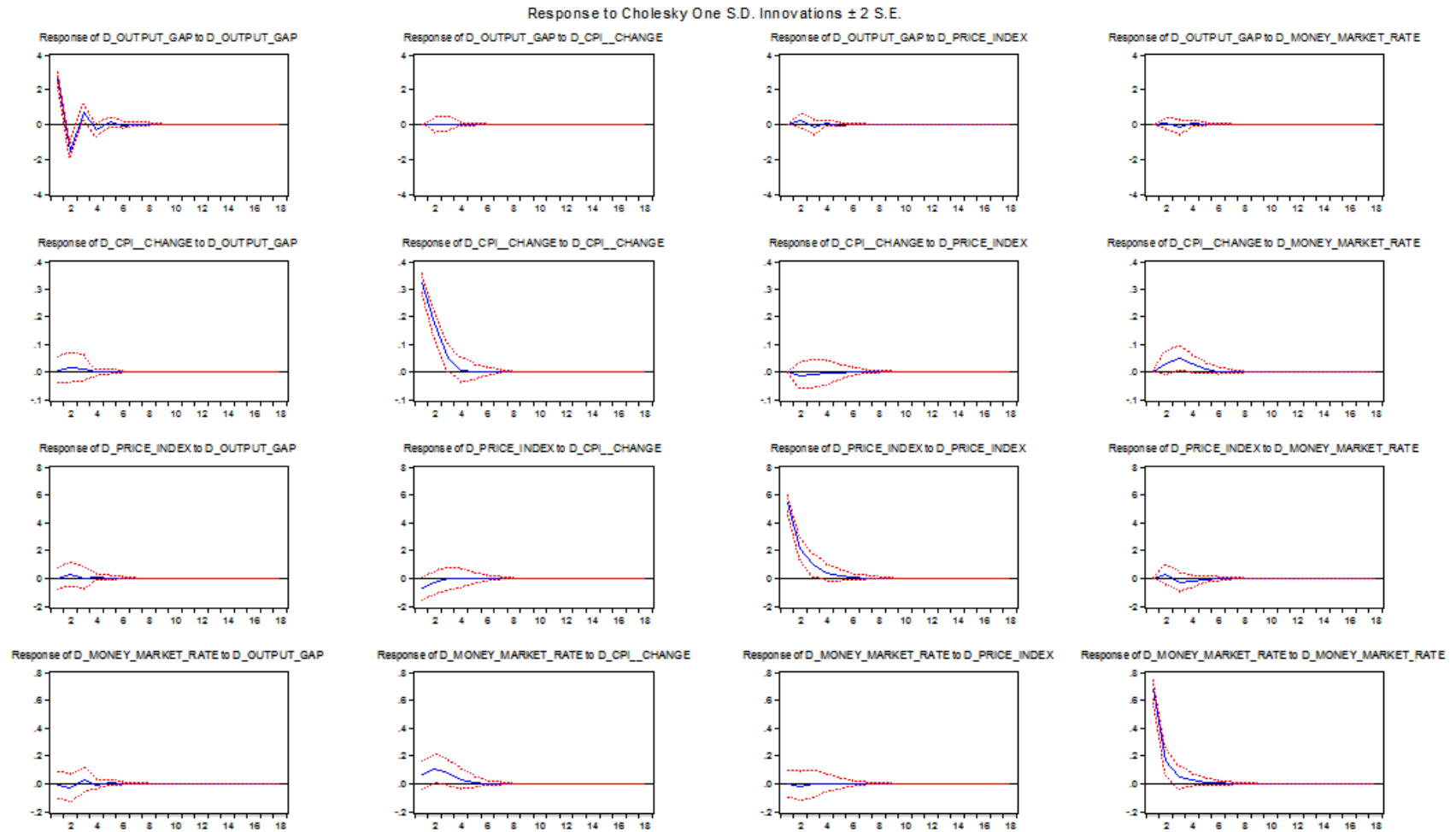


Figure 8: Impulse Response Functions of Mexico for Post Inflation Targeting

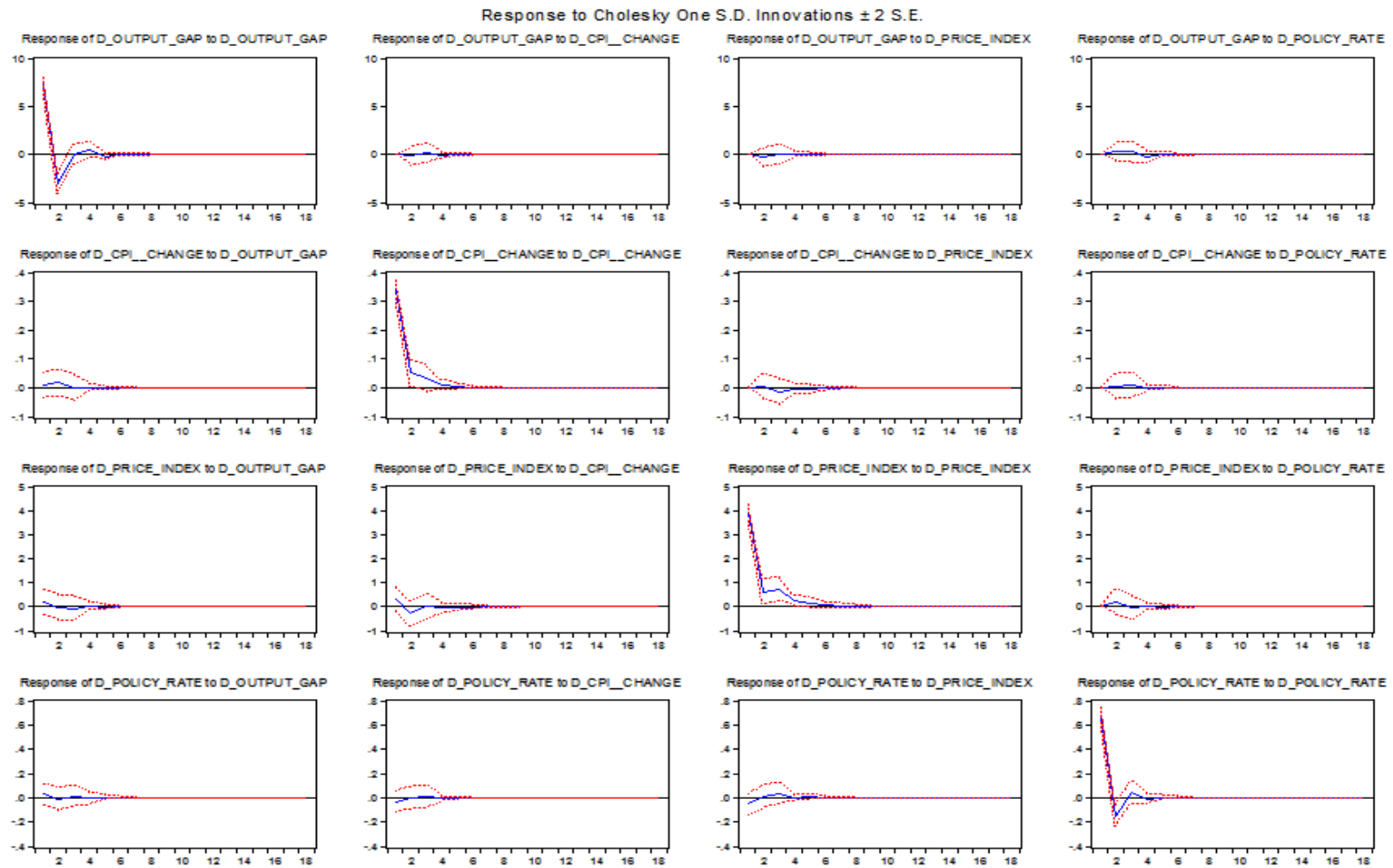


Figure 9: Impulse Response Functions of Norway for Pre Inflation Targeting

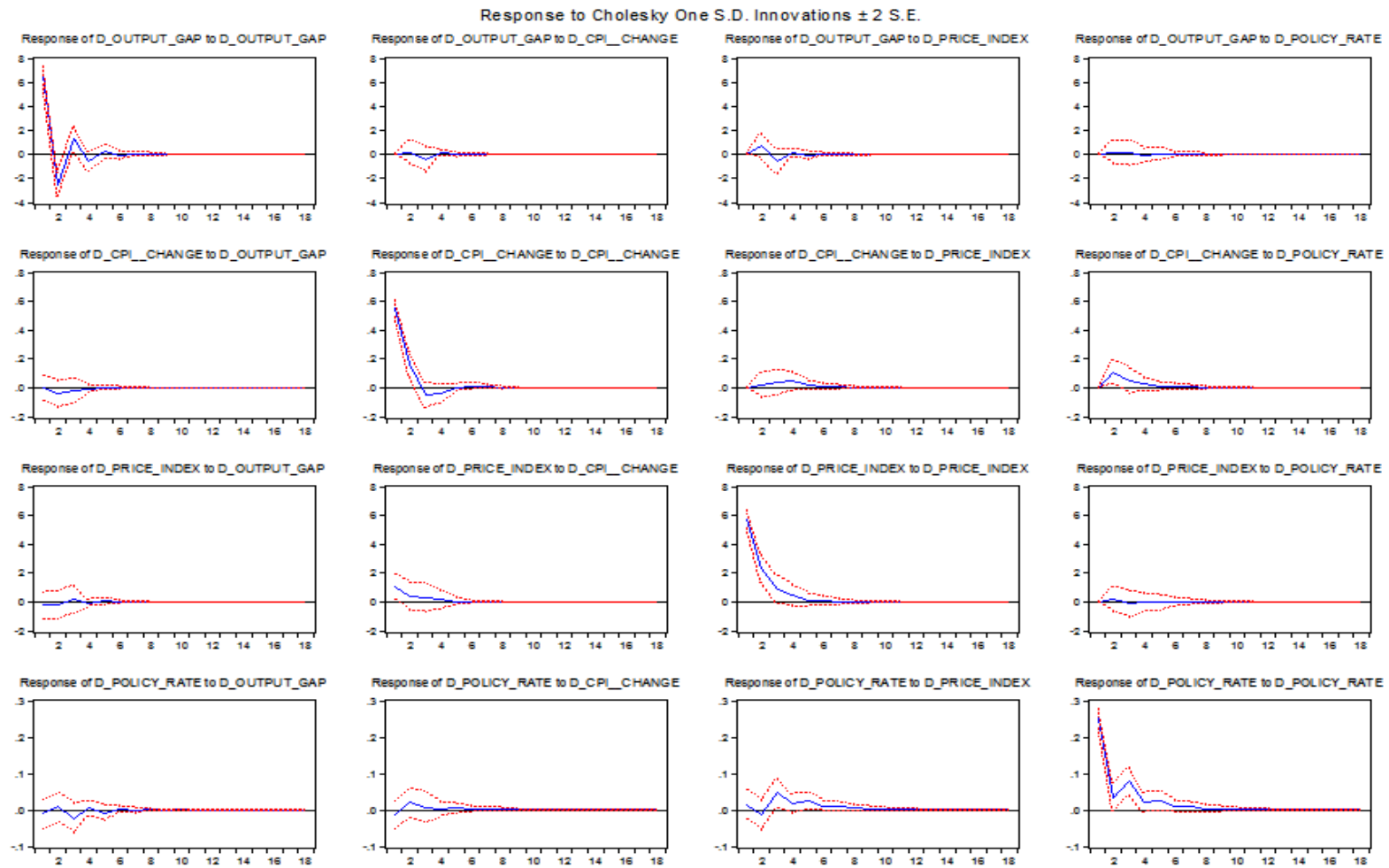


Figure 10: Impulse Response Functions of Norway for Post Inflation Targeting

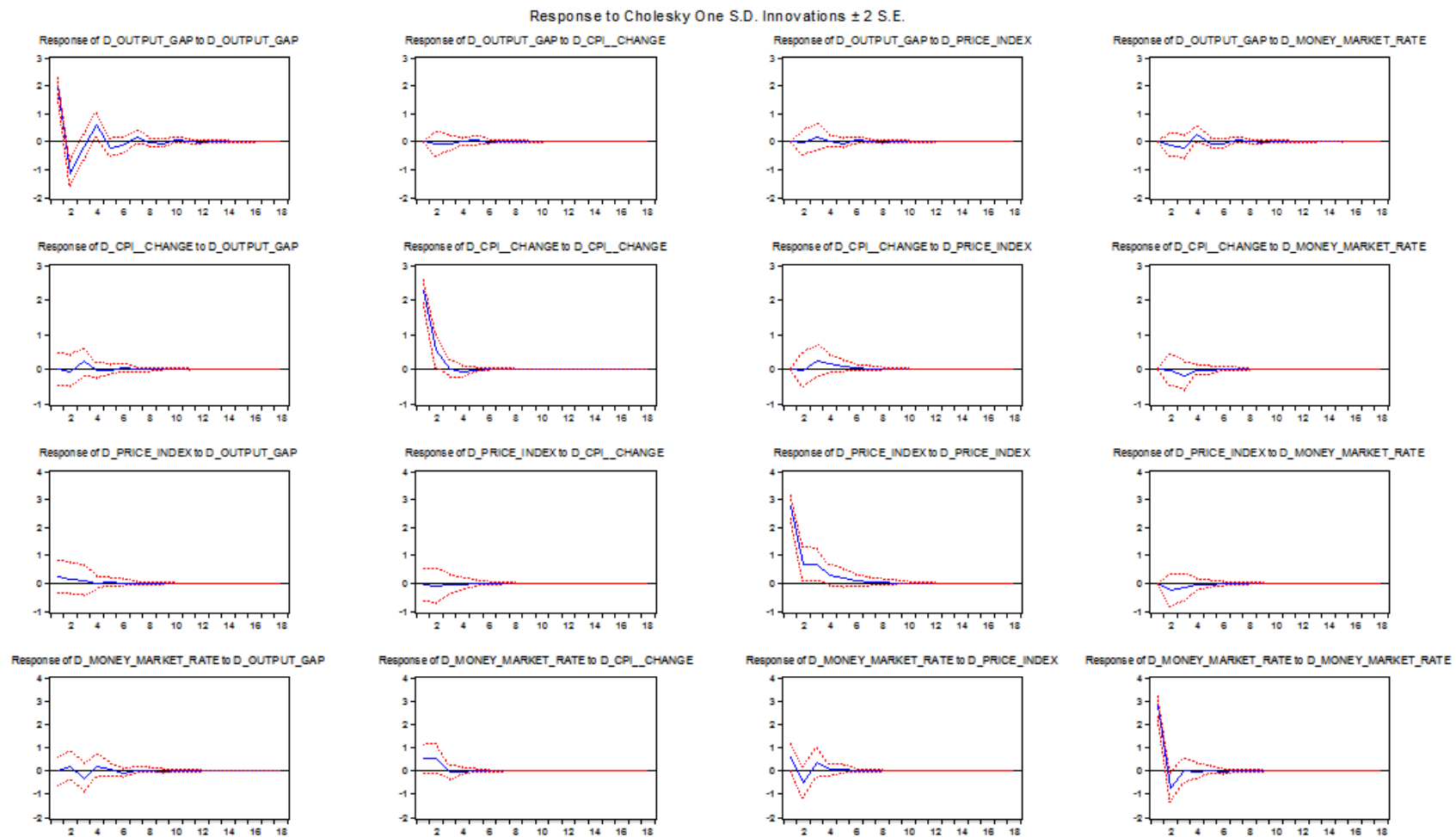


Figure 11: Impulse Response Functions of Poland for Pre Inflation Targeting

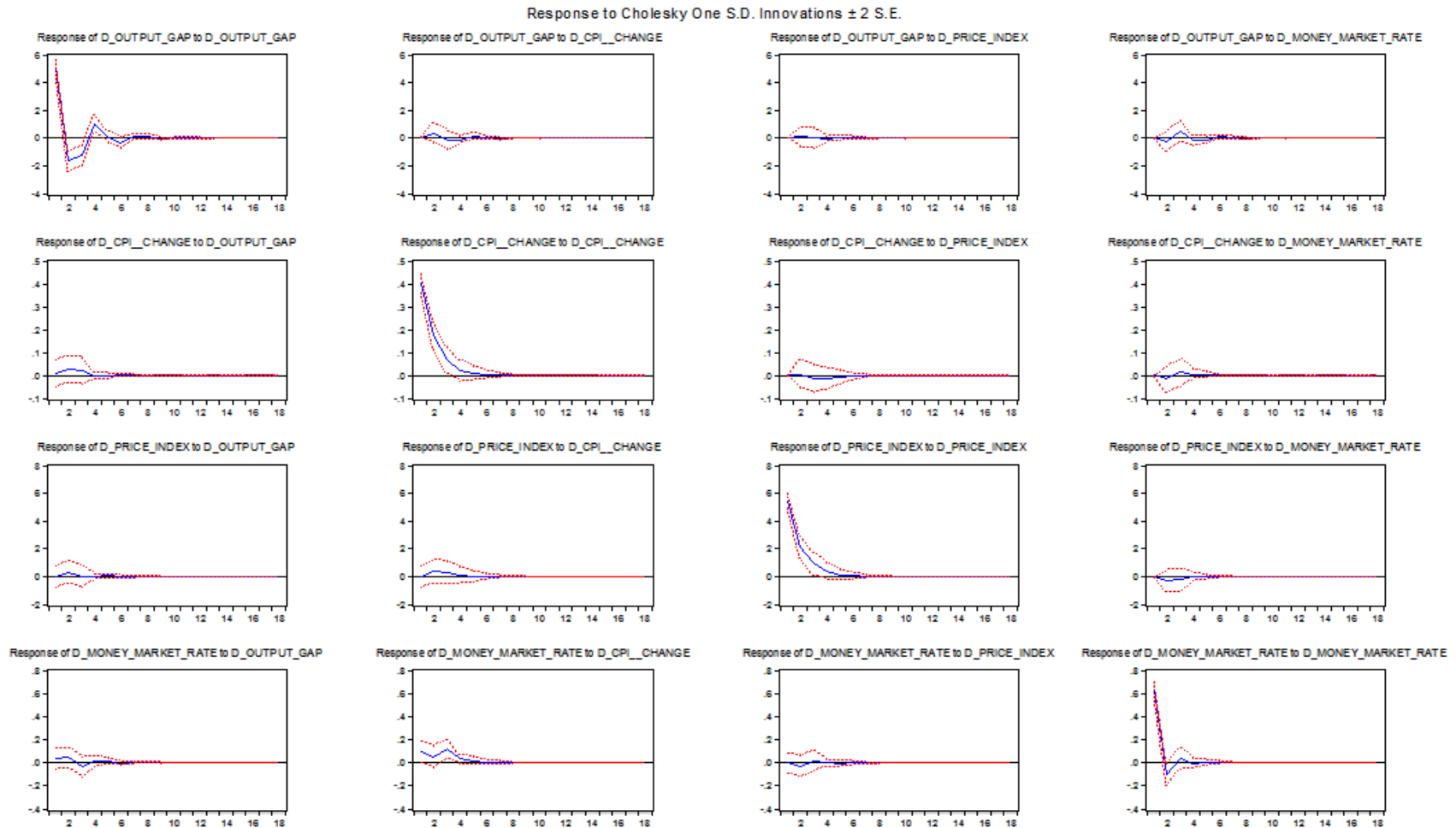


Figure 12: Impulse Response Functions of Poland for Post Inflation Targeting

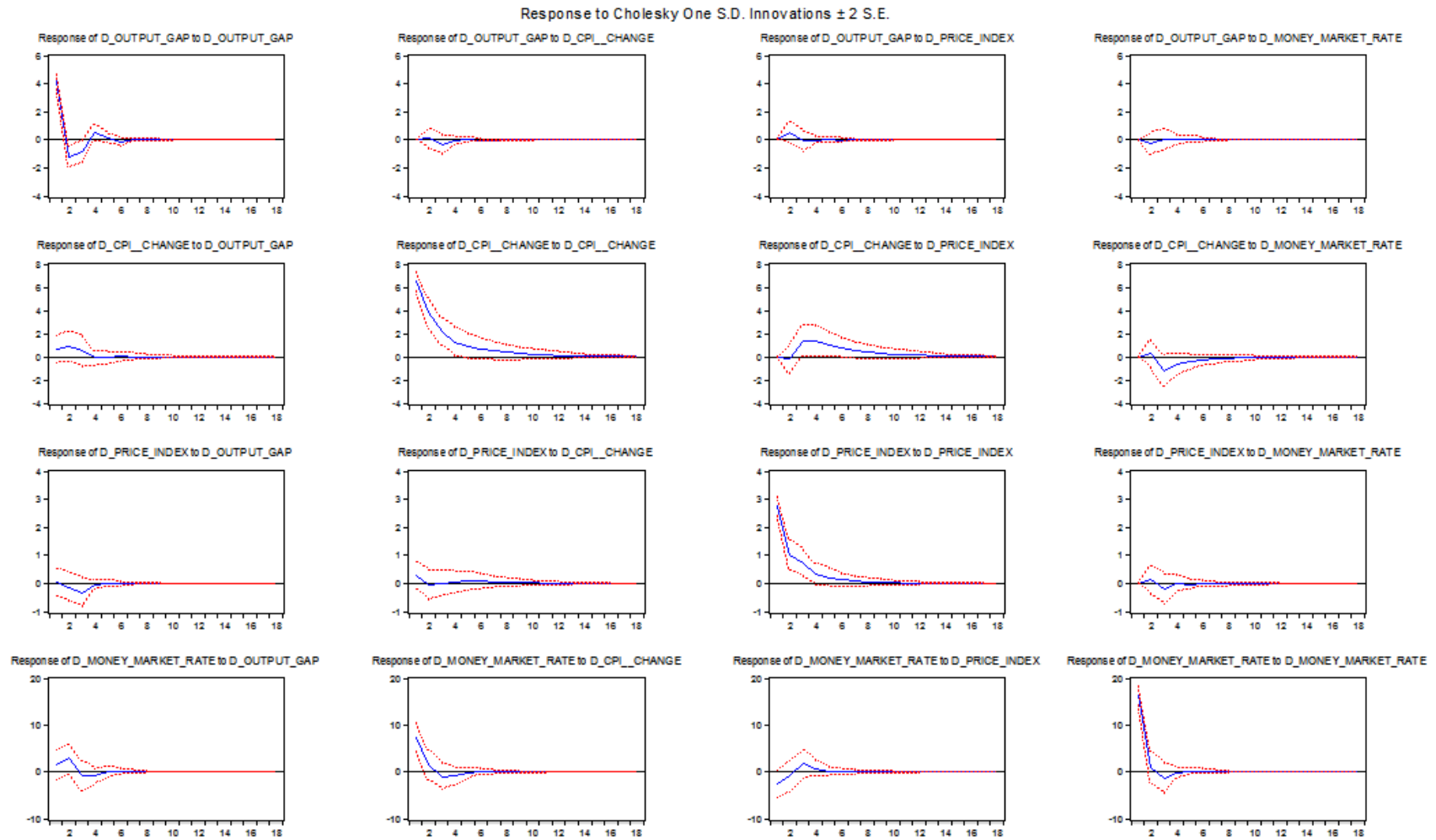


Figure 13: Impulse Response Functions of Romania for Pre Inflation Targeting

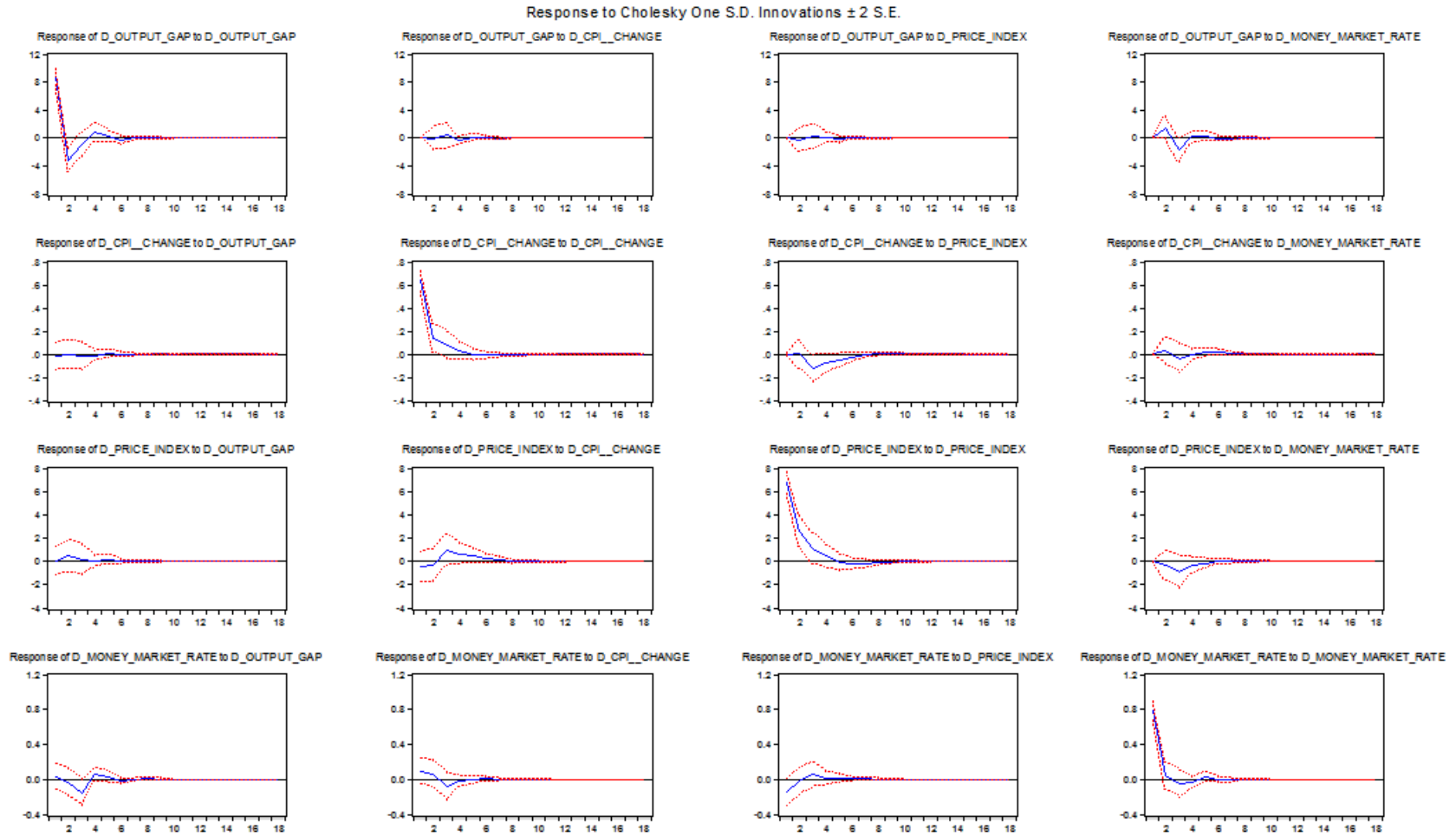


Figure 14: Impulse Response Functions of Romania for Post Inflation Targeting

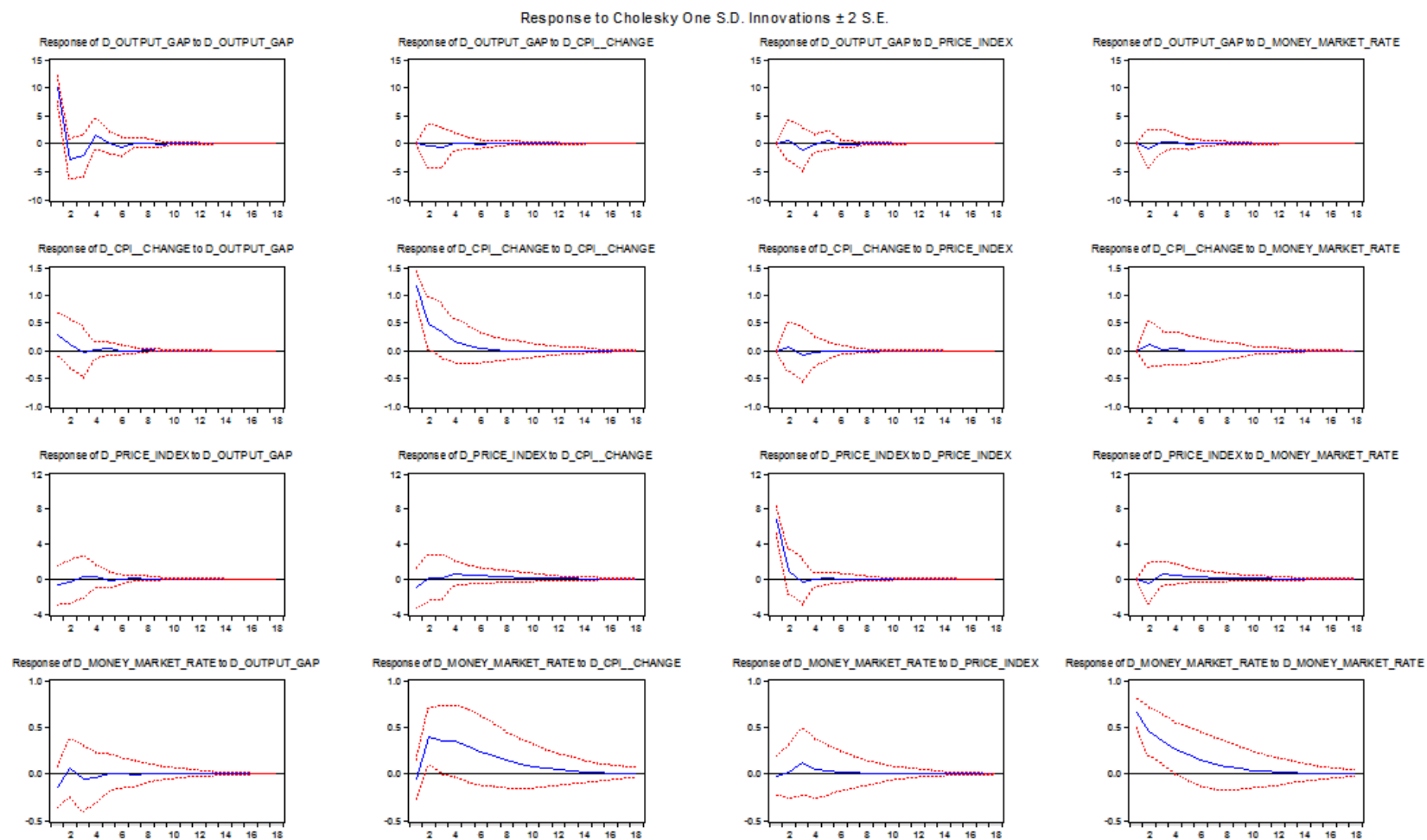


Figure 15: Impulse Response Functions of Republic of Serbia for Pre Inflation Targeting

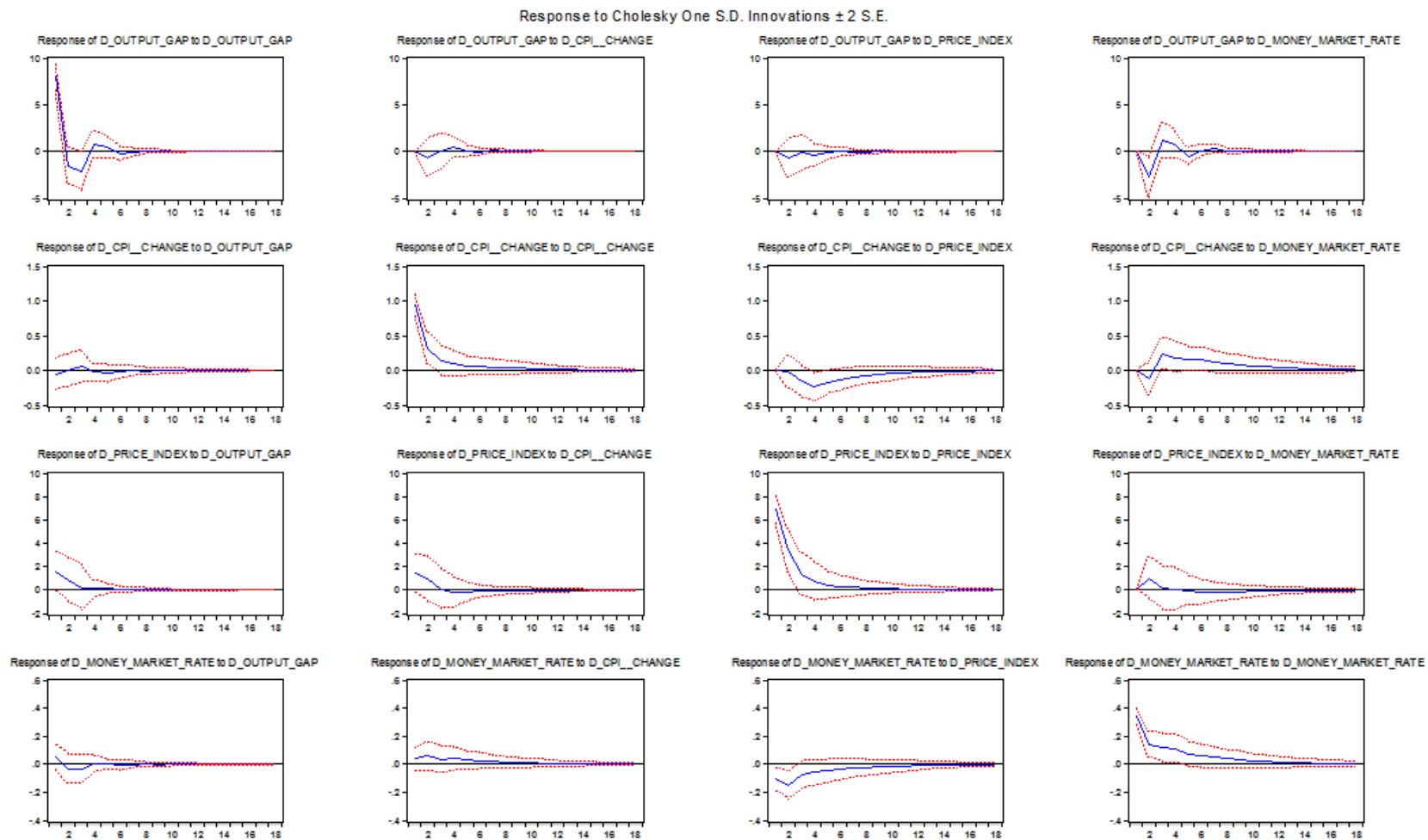


Figure 16: Impulse Response Functions of Republic of Serbia for Post Inflation Targeting

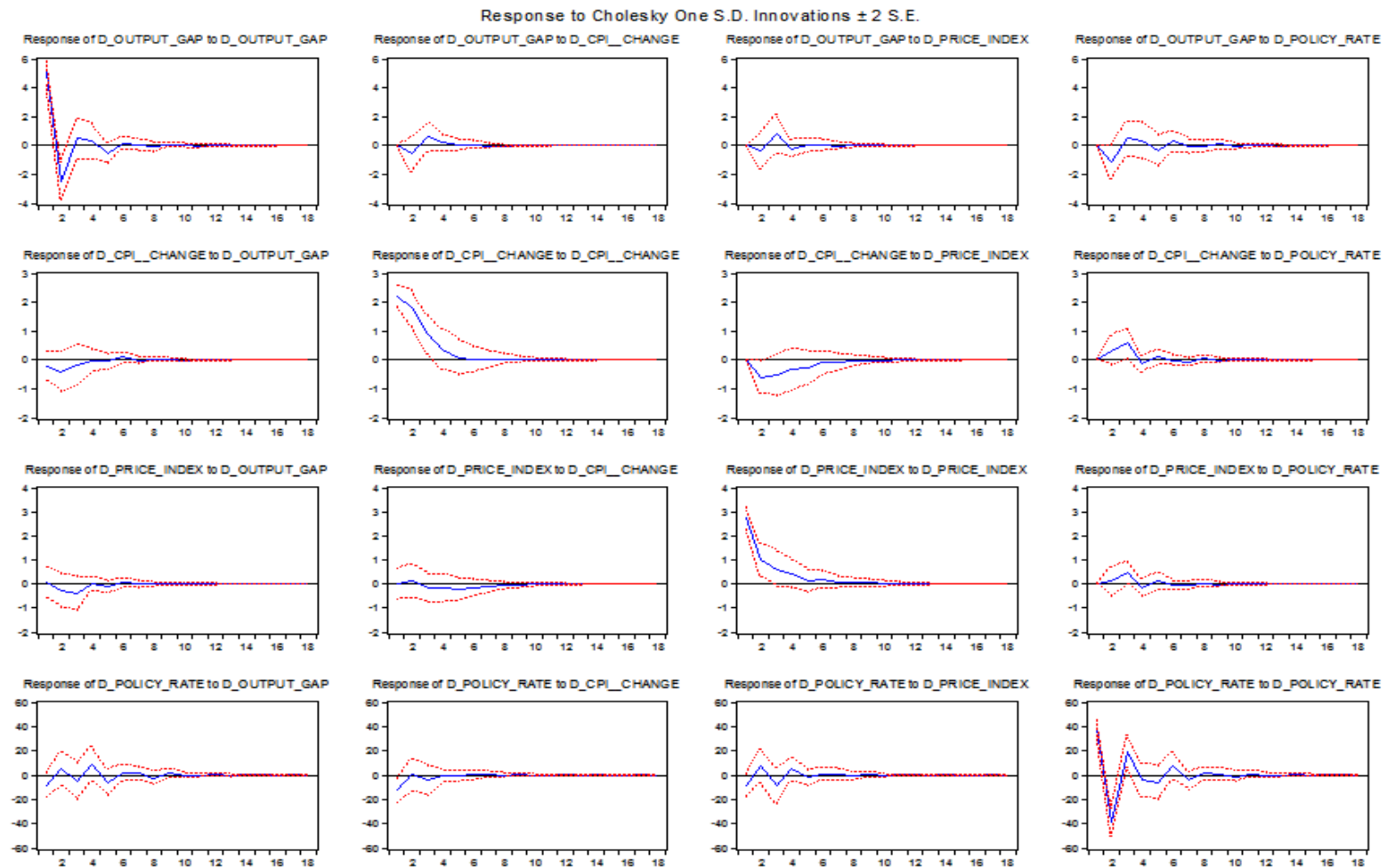


Figure 17: Impulse Response Functions of Turkey for Pre Inflation Targeting

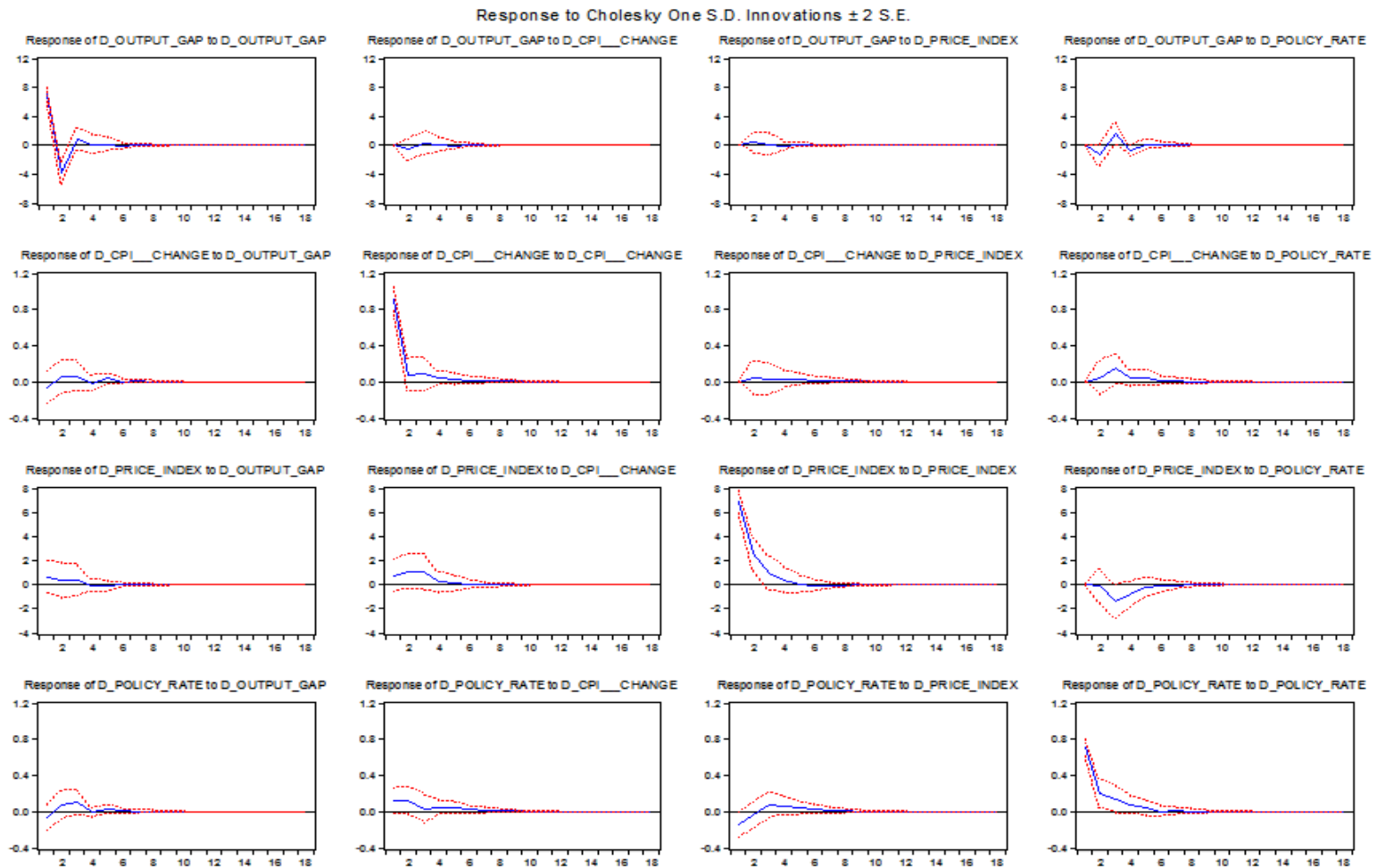


Figure 18: Impulse Response Functions of Turkey for Post Inflation Targeting

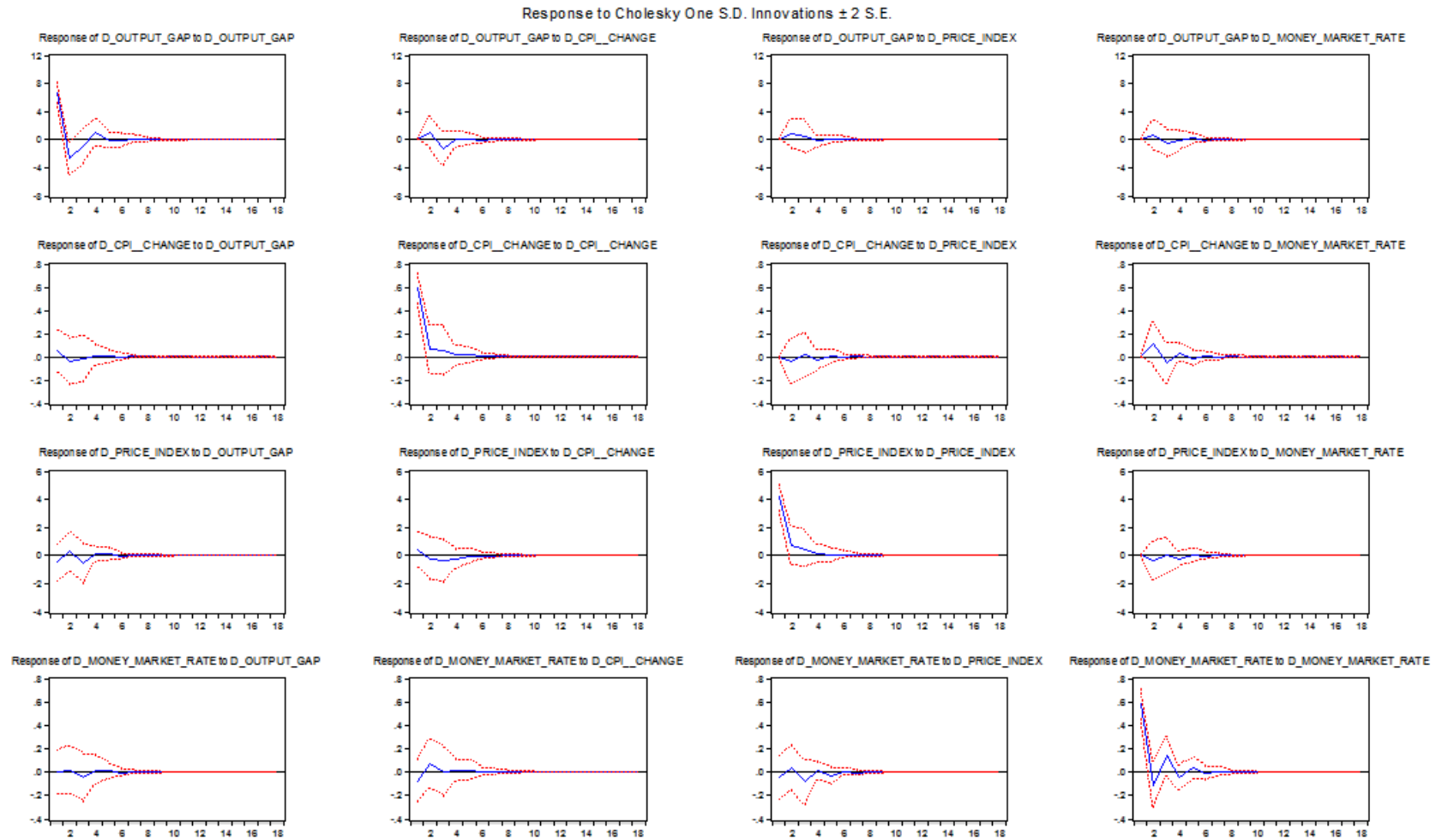


Figure 19: Impulse Response Functions of United Kingdom for Pre Inflation Targeting

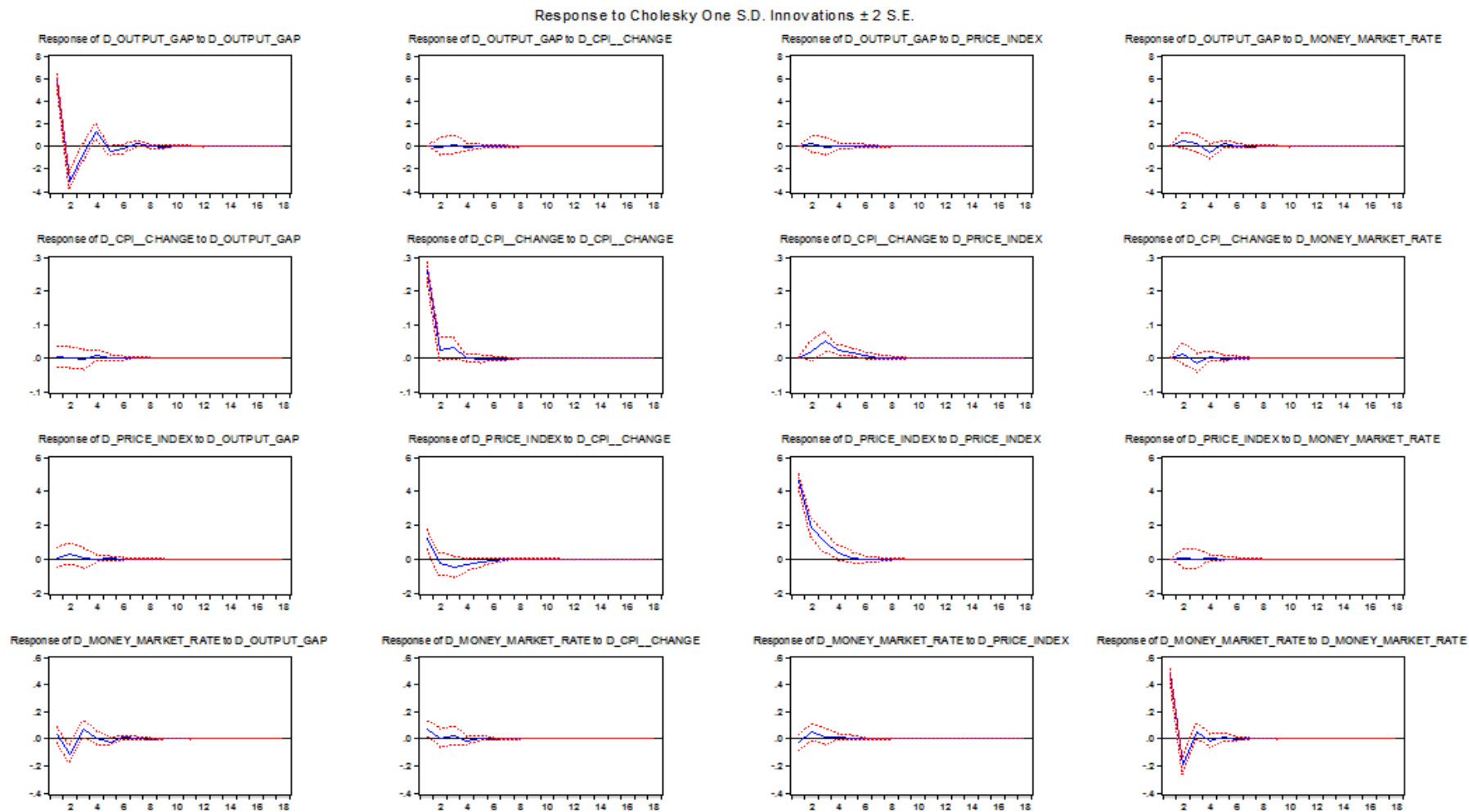


Figure 20: Impulse Response Functions of United Kingdom for Post Inflation Targeting