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Are the effects of monetary policy on output asymmetric in Pakistan?

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ABSTRACT

This research mainly investigates whether the response of output to monetary policy actions is symmetric or not. We test all the three main forms of asymmetries in the impact of monetary policy discussed in the literature so far. Also, we make some hybrid cases to go further in the detail of the tested asymmetries. While mainly following the methodology given by Cover (1992), we make some necessary variations to the procedure. We find evidence in the favor of asymmetry in the effects of monetary policy actions on output. Our results indicate that monetary policy actions seem ineffective in periods of high growth while having strong effects on output during low growth periods. Further, output responds strongly to tight monetary policy actions when the economy is in low growth phase. We also find some support for the argument that negative money supply changes affect output whereas positive changes do not. The findings also suggest that output responds only to small monetary policy shocks and big shocks do not significantly explain the variations in the transitory component of output. The results of hybrid case give further insight that output strongly responds to small negative monetary policy shocks. Wald test rejects the hypothesis of symmetry in the favor of asymmetry in the response of output to monetary policy actions in all the cases.

1. Introduction

> "*Monetary policy was a string. You could pull on it to stop inflation but you could not push on it to halt recession. You could lead a horse to water but you could not make him drink.*" (Friedman, 1968, pg. 1)

A considerable amount of literature exists to determine the effectiveness of monetary policy in the real economy. Today it is well established that money can affect output over the short horizons. However the next question is whether or not this effect is symmetric with respect to direction of policy change, size of policy shock and/or state of the economy. This issue is as vital as the first one because the same kind of policy assuming symmetric effects of any kind of policy action may not provide the required results as expected by the policymakers.

Since the Great Depression, the issue of possible asymmetry in the response of output to changes in monetary policy has been under discussions. However until the start of 1990s researchers did not try to empirically test the issue. Generally, these asymmetric effects are explained on the basis of asymmetric information and nominal rigidities. A number of theoretical models explain the asymmetry in the relationship of monetary policy and aggregate output. These models include standard Keynesian model with convex aggregate supply curve, credit constraint models, the liquidity trap theory, and menu cost models.

International experiences also indicate such type of asymmetries present in the impact of monetary policy. In the US tight monetary policy slowed down the economy during the years 1988 and 1989 whereas in 1990 when the government eased the policy the economy did not respond accordingly (see Morgan, 1993). Similarly Japan's expansionary policy, during its great recession starting in the late 1990s, failed to achieve recovery. More recently again in the USA, Federal Reserve's overnight federal funds rate has been at 0.25% since December 2008 yet it failed to induce banks to lend and rebound the consumer spending. These practical evidences motivate economic researchers to investigate the issue empirically.

Empirically, the first distinction made in the effects of changes in nominal demand was about the different effects of anticipated and unanticipated changes in monetary policy on output, and was done by Barro (1977), Mishkin (1982), and Frydman and Rappoport (1987). However the notion of asymmetry in the effects of monetary policy actions was actually realized after the seminal work by Cover in 1992. He gave empirical support to the traditional Keynesian view that output reduces in response to monetary contractions while monetary policy expansions fail to raise output. Another well-known type of asymmetry, tested by Ravn and Sola (1996), is the asymmetric impact of large versus small monetary shocks. Moreover, the impact of monetary policy on

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output may not be symmetric during different phases of business cycle also. Weise (1999), Garcia and Schaller (2002), Lo and Piger (2005) and others supported the existence of asymmetry related to the state of economy. More recently, a considerable amount of empirical research on this issue is emerging as case studies for different developing countries as well, e.g., Aye and Gupta (2012) and others. Concluding the results of this existing research, we observe that in most of the cases data gives strong evidence that policy actions taken during recessions have large and significant effects on output than those taken during expansions. The evidence for asymmetry related to the sign of policy action is mixed in other countries. Cover (1992) and some other researchers like DeLong and Summers (1988) and Morgan (1993), supported that positive and negative monetary shocks have asymmetric effects. On the other hand, Ravn and Sola (1996) find that positive and negative monetary shocks have symmetric effects. Also literature shows that output responds strongly to small negative shocks.

These asymmetries in the response of output to changes in monetary policy can have strong implications for an economy concerning issues such as the conduct of policy and the costs of changes in nominal demand. A considerable literature on the possible asymmetry of monetary policy exists but it is mostly done for the United States and some other countries. However, in the case of Pakistan, no such work exists till date and it remains a quite unexplored area in Pakistan. Motivated by this, the present study is a kind of an attempt to initiate research in this area and to test the asymmetric response of output to changes in monetary policy in Pakistan. The prime objective of this study is to investigate whether the response of output to monetary policy actions is symmetric or not. More specifically, the present study addresses the following three questions related to the asymmetry in the effects of monetary policy: Are the effects of monetary policy shocks on output asymmetric with respect to different stages of business cycle? Are the effects of positive and negative monetary policy shocks on output asymmetric? Are the effects of big and small monetary policy shocks on output asymmetric?

In addition to testing these three main types of asymmetry we also make their hybrid cases in order to have a deeper insight into this issue. For this purpose we also investigate the following: Are the effects of positive and negative monetary policy shocks on output asymmetric with respect to different stages of business cycle? Are the effects of big positive monetary policy shocks on output different from that of small positive shocks and are the effects of big negative monetary policy shocks on output different from that of small negative shocks?

By addressing these questions, the study tries to make the following contributions to the empirical literature on the asymmetric effects of monetary policy. First, it is an attempt to initiate research in the area of asymmetric response of output to monetary policy actions in Pakistan. Secondly, it tests all the three main forms of asymmetries in the effects of monetary policy together, that have been discussed in the literature so far. Third, in order to acquire more insight into this issue we make some hybrid cases of asymmetry. We mainly follow the methodology given by Cover with some important variations to the procedure. Our results indicate that monetary policy actions seem ineffective in periods of high growth while having strong effects on output during low growth periods. Further, output responds strongly to tight monetary policy actions in recessionary periods. We also find some support that negative money supply changes affect output whereas positive changes do not. The findings also suggest that output strongly responds to small negative monetary policy shocks.

The rest of the study is organized as follows. The next section discusses the history and the theoretical foundations of asymmetric effects of monetary policy. Section 3 deals with the choice of variables and data issues and we explain the model and the estimation procedure in the fourth section. Section 5 reports the results with their detailed analysis. Finally, Section 6 attempts to bring together the main findings for concluding remarks.

2. Asymmetric effects of monetary policy

2.1. The history

The idea of asymmetric effects of monetary policy is not new. We can find its roots in the Great Depression at the end of 1920s when it was realized that an expansionary policy may not work. Before that the impact of monetary policy was considered to be symmetric and it was believed that by changing monetary policy central bank can lower or stimulate the level of economic activity equally well. After the economic downturn in 1929 short term nominal interest rates reached at the level of lower than one percent but this expansionary policy could not work to dampen the effects of depression. On the other hand tight monetary policy seemed to have more powerful impact on slowing down the economy. Thus Economists realized that changes in nominal demand may not necessarily have symmetric effects on output. In 1936 the well known liquidity trap theory by Keynes explained the limits of expansionary policy in detail. He talked about the idea that the economy responds differently in expansionary and contractionary periods. He stated: "*The substitution of a downward for an upward tendency often takes place suddenly and violently, whereas there is, as a rule, no such sharp turning point when a upward is substituted for a downward tendency.*" (Keynes, 1936, pg. 314). Friedman and Schwartz (1963), while re-examining the Great Depression, concluded that monetary policy was not easy rather it was tight at that time. Thus during 1960s and 1970s the belief in the notion of asymmetry weakened as the hypothesis did not find any empirical support. However Friedman and Schwartz showed only that the tight policy was effective at that time, not that expansionary policy was equally effective as the tight monetary policy.

The practical experiences in the world kept the notion of asymmetric impact of monetary policy alive in the later years. The USA pursued a tight monetary policy during the years 1988 and 1989 and it succeeded in slowing down the economy, on the other hand, in 1990 when the government eased the policy the economy did not respond accordingly (see: Morgan, 1993). Similar cases were found in Italy and Japan also.

In the future years, these experiences led to more theoretical research in this area which suggested the reasons why easy policy may be less effective than contractionary monetary policy. Later on other forms of asymmetry were also explained and empirically tested. For example, it was realized that different sizes of monetary policy action can have varying impact on output. Also output can respond asymmetrically to the monetary policy actions taken at different stages of business cycle, i.e., recessions and boom.

2.2. Theoretical foundations and the sources of asymmetric effects

Theoretical literature provides a number of possible reasons for asymmetric output response to changes in monetary policy. Generally, these asymmetric effects are explained on the basis of asymmetric information and nominal rigidities.

We get different results of contractionary and expansionary monetary policies when the nominal wages and prices are rigid downward and flexible in the upward direction. Menu cost models explain the strategy of keeping prices constant in response to a small shift in nominal demand so as to avoid the menu cost. Hence big monetary shocks can be neutral whereas small monetary socks can be non neutral, creating asymmetry in the effects of monetary policy. In addition, there are more chances of facing credit constraints during recessionary periods than in expansions. According to credit-rationing hypothesis explained by Bernanke and Gertler (1989), a tight monetary policy will increase the cost of capital as well as lessen the liquidity which in turn leads to a contraction of investment demand for the investors who are already facing credit constraints. Also, Nominal shocks have quite different effects in developing countries compared with developed countries. Output is argued to be determined on the demand side in developed