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# Central Bank Objectives and Aggregate Disturbances

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Central Bank of Sri Lanka

2009

# Central Bank Objectives and Aggregate Disturbances

*by*

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## *Abstract*

The amendment to the Monetary Law Act in 2002 defines "economic and price stability" as one of Central Bank of Sri Lanka's core objectives. Using a standard aggregate demand – aggregate supply model with varying policy preferences this paper discusses the achievability of "economic and price stability" when the economy is faced with aggregate demand disturbances and aggregate supply disturbances. As demand disturbances move both output and prices in the same direction, monetary policy can counter the shock thus achieving output and price stability simultaneously. However, supply disturbances move output and prices in opposite directions, and the central bank may not be able to maintain both output and price stability. In such circumstances, extreme policy aimed purely at price stability aggravates the effect of the supply disturbance on the real economy. This confirms that, while price stability must remain the focus of a modern central bank, the stability of the real economy cannot be totally ignored in monetary policymaking.

## Introduction

I have often been intrigued by the amendment to the Monetary Law Act in 2002 which defined "economic and price stability" as one of CBSL's key objectives particularly because it somewhat differs from the perception that a central bank must aim at maintaining nothing but price stability. The objective of "economic and price stability" has been further clarified in Wijewardena (2007), citing the then Governor A.S.Jayawardena: "if you have only price stability, then you would fall into the trap of attempting to stabilize a price index which is not what is meant by price stability, in the context of a central bank. The attainment of price stability for a central bank means elimination of both excess demand and excess supply in the market so that the market is free of potential inflationary or deflationary pressures"(p.1). Wijewardena further argues that "price stability, in the context of a central bank, means the maintenance of a zero excess demand or excess supply in the total economy, commonly known as the macro economy. In that situation, all incentives for prices to rise or fall are non-existent. What is meant by economic stability in the broad objective of the Central Bank is the attainment and maintenance of this state. A central bank cannot be complacent until it has attained this level of stability. The way to attain that level of stability is to control the nominal aggregate demand by controlling the main force affecting that aggregate demand: the quantity of money in the hands of people" (pp.2-3).

Graphically, it is straightforward to illustrate Wijewardena's argument. In Figure 1 the macroeconomic equilibrium is at $E_0$ where the aggregate demand curve ($AD_0$) meets the aggregate supply ($AS_0$), and the price level and output are at ($P_0$) and ($Y_0$), respectively. As an example, a disturbance that shifts the aggregate demand curve to $AD_1^{''}$ results in an excess demand for goods and services at the given price level and given aggregate supply. To eliminate the excess demand, the price level needs to increase to $P_1^{''}$ thus generating inflation. A central bank that aims at price stability may prefer to reinstate the aggregate demand curve back at the original level of $AD_0$ through controlling interest rates and/or money in the economy, thereby eliminating excess demand, eliminating excess supply, stabilising prices, and stabilising

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output as well. As Wijewardena (2007) states, "[w]hen there is no excess demand or excess supply, then the macroeconomy is said to be in balance. Such a balance eliminates the pressure on prices to change" (p.3).

Figure 1: Economic Equilibrium and Disequilibria under Aggregate Demand Shocks
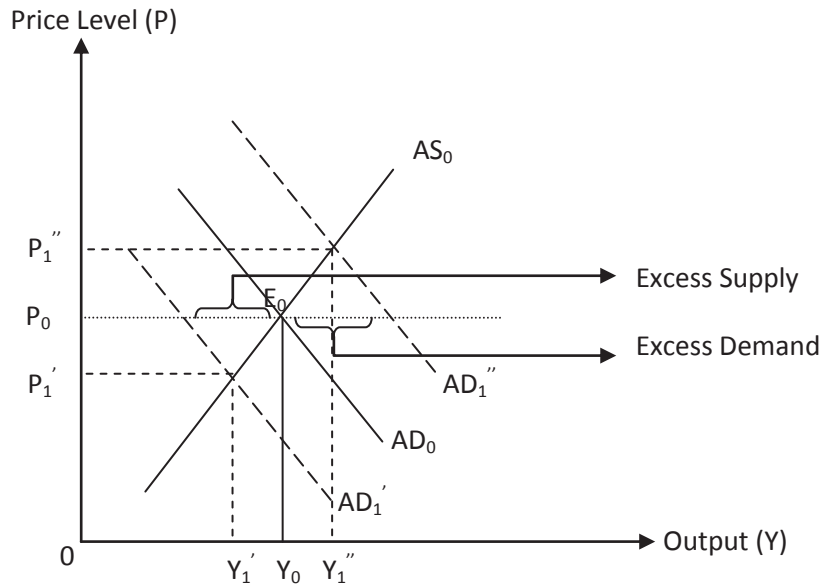


In the above example, achieving price stability and output stability through monetary policy is not conflicting with one another. However, in the case of an aggregate supply disturbance, e.g. a shift of the aggregate supply curve to $AS_1'$ in Figure 2, the policymaker is faced with a trade-off between stabilising prices or stabilising output. In such circumstances achieving "economic and price stability" may not be as straightforward as in the previous case. According to Mishkin (2008), "[i]n this case, because tightening monetary policy to reduce inflation can lead to lower output, the goal of stabilizing inflation might conflict with the goal of stabilizing economic activity." (p. 5)

Figure 2: Economic Equilibrium and Disequilibria under Aggregate Supply Shocks
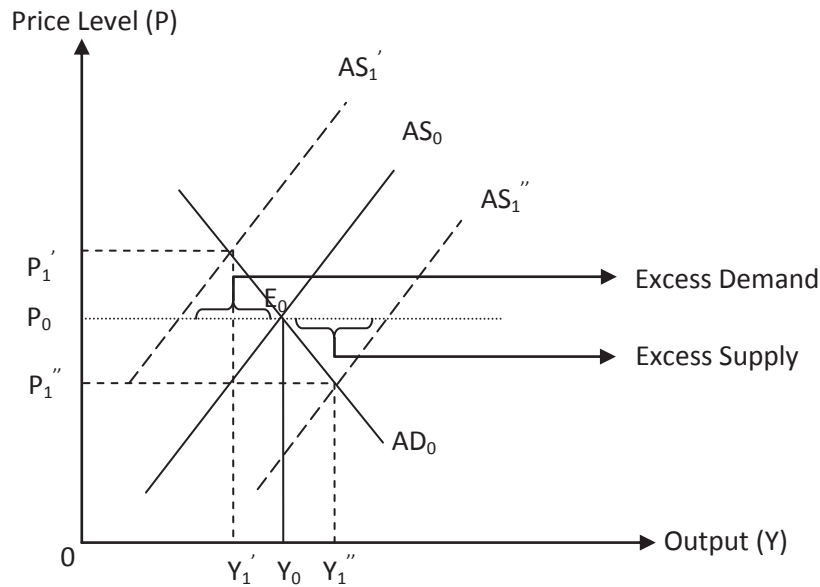


The fact that in the case of aggregate demand disturbances prices and output move in the same direction and that aggregate supply disturbances move them in opposite directions as shown in the above graphs appears to be very much applicable to Sri Lanka. Figure 3 plots the consumer price gap and real GDP gap as measured using a Hodrick-Prescott filter (see details of data in the Appendix). Also shaded in the Figure are the episodes identified by Nordhaus (2007) and Blanchard and Galí (2007) as world oil price shocks, which here is taken as the proxy for aggregate supply disturbances. During many of these episodes it can be observed that prices and output have moved in the opposite directions, and this is not true only during the 2002-2005 episode.

Figure 3: Price Gap and GDP Gap against World Oil Price Shock Episodes
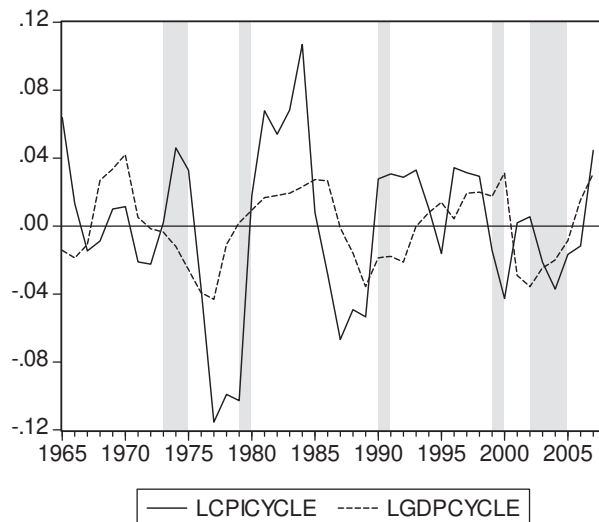
In Figure 4, aggregate demand shocks are proxied by broad money above a Hodrick-Prescott trend, and shown by the shaded area. It is observed that during the period between 1980-1985, both output and prices have been above trend and have been closely associated with positive innovations to money supply. Positive money supply shocks can again be seen associated with 1995-1999 and the most recent period in the sample where prices and output are above trend. The unshaded area refers to broad money below trend (or negative aggregate demand shock periods), and indeed associated with reduced output and prices as expected in the case of a negative demand shock. The unexplained effect of the 2002-2005 oil price shock is probably due to the fact that it was eclipsed by monetary disturbances during the period. Broadly speaking, the behaviour of prices and output in Sri Lanka has been affected by predominant shocks of the time, and Figures 3 and 4 provide short-hand evidence in this regard.

Figure 4: Price Gap and GDP Gap against Aggregate Demand Disturbances

(Shaded area – positive disturbances, unshaded area – negative disturbances)
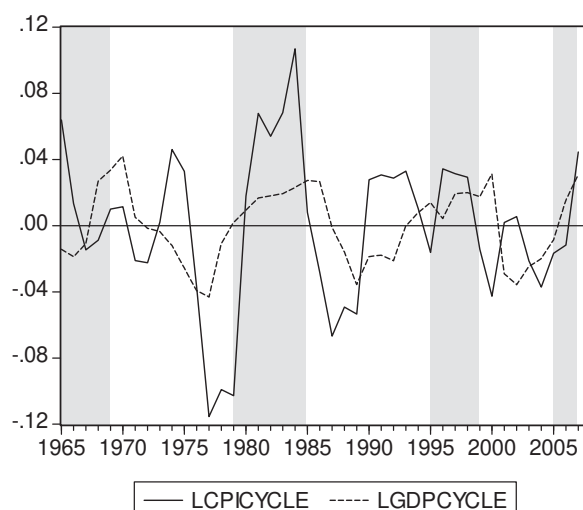


The aim of this paper is not to discuss whether "economic and price stability" are two sides of the same coin or two entirely different objectives. Indeed, many argue that "there is considerable agreement among academics and central bankers that the appropriate loss function [of a central bank] both involves stabilizing inflation around an inflation target and stabilizing the real economy, represented by the output gap" (Svensson, 2000). Another example is Cecchetti (2000), who shows that while "the primary objective of many central banks is to stabilize prices", "including a role for output stabilization in central bank objectives seem prudent. The only issue is how important should it be relative to price stability when formulating the objective" (p. 49). As Mishkin (2008) shows "[t]he ultimate purpose of a central bank should be to promote the public good through policies that foster economic prosperity. Research in monetary economics describes this purpose by specifying monetary policy objectives in terms of stabilizing both inflation and economic activity" (p.1).

Assuming economic (output) stability and price stability are two objectives of monetary policy, the policy maker's choices in the short-run are analysed given aggregate disturbances in a standard textbook-type (e.g. Blanchard and Fischer, 1989, Minford, 1992, Sørensen and Whitta-Jacobsen, 2005) short-run set-up. Finally the question whether it is practicable to have a sole objective of price stability is asked, and answered in the negative. The price level can deviate from desired levels as a result of different types of aggregate disturbances. So, even if price stability is the foremost objective, the best monetary policy action depends on identifying the dominant aggregate disturbance of the time, because extreme policy may result in an even inferior outcome. The purpose of this paper is to drive home this conventional message using a simple model.

## The Model [2]

To keep the analysis as simple as possible assume a closed economy with no government. Also the issues of lags, dynamics and rigidities are assumed away for simplicity[3]. The aggregate demand of the economy is given by the following relation:

$$y_t = m_t - p_t + \mu_t \tag{1}$$

where $y_t$ is output, $p_t$ is price level, $m_t$ is current money stock and $\mu_t \sim N(0, \sigma_\mu)$ is the aggregate demand disturbance. The aggregate demand disturbance here is assumed to be encompassed in changes to real money demand.[4]

The aggregate supply schedule of the economy is given by a standard Lucas-type Phillips curve:

$$y_t = y^* + \gamma(p_t - E_{t-1}p_t) + \varepsilon_t \tag{2}$$

where y* is the equilibrium output, $\varepsilon_t \sim N(0, \sigma_\varepsilon)$ is the aggregate supply disturbance, E is the expectations operator, and $\gamma > 0$ is the slope of the short run aggregate supply curve. If actual price equals expected price, then $y_t = y^*$ unless disturbed by an aggregate supply shock.

The nature of aggregate supply disturbances could vary from those highlighted in Wijewardena (2007) such as temporary changes to the supply of agricultural products or prices of imported goods and in Mishkin (2008) such as rise in relative energy prices having only a temporary effect on inflation, to shocks which may have a longer term impact on the economy such as shocks to productivity, as highlighted by Blanchard and Quah (1989) and Blanchard (1989).

As in Bratsiotis and Martin (1999), the reaction function of the monetary authority is given by:

$$m_t = \overline{m} - \phi_p(p_t - p^*) - \phi_y(y_t - y^*) \tag{3}$$

where the monetary authority is assumed to be able to observe price and output movements contemporaneously. Here $\overline{m}$ is a constant level of money stock, p* is an explicit or implicit price target, and $\phi_p, \phi_y \geq 0$ are policy parameters attached to price stabilisation and output stabilisation, respectively. While being similar to a standard Taylor-type policy rule such as the ones that appear in Taylor (1999), equation (3) is defined in terms of monetary aggregates rather than interest rates, which is more appropriate to represent the conduct of monetary policy in Sri Lanka.

Substitute the policy rule (3) into the aggregate demand function (1), and solve for $y_t$ to obtain:

$$y_t = \frac{\overline{m} + \phi_p p^* + \phi_y y^* - (1 + \phi_p) p_t + \mu_t}{1 + \phi_y} \tag{4}$$

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[2] The model is in log-linear form.

[3] Accounting for these issues, although providing a similar result as discussed in this paper, complicates the effects of disturbances. For instance, "when lags are taken into account, the conventional wisdom must be *modified.*" (Svensson, 1999, p.344, emphasis added)

[4] The aggregate demand disturbance, $\mu_t$, can also be shown as a disturbance to the reaction function of the central bank (equation 3 below), and interpreted as the exogenous or surprise changes in monetary policy. Using a monetary policy index for Sri Lanka, Amarasekara (2008) shows that exogenous changes to monetary policy has been quite small compared to anticipated monetary policy changes.

Equate the aggregate supply equation (2) and (4) and solve for $p_t$ :

$$p_t = \frac{\overline{m} + \phi_p p^* - y^* + \gamma(1 + \phi_y)E_{t-1}p_t + \mu_t - (1 + \phi_y)\varepsilon_t}{1 + \gamma + \phi_p + \gamma\phi_y} \tag{5}$$

Take expectations at time $t$-$1$ of (5) and solve for $E_{t-1}p_t$ :

$$E_{t-1}p_t = \frac{\overline{m} + \phi_p p^* - y^*}{1 + \phi_p} \tag{6}$$

Substitute (6) into (5) to obtain the reduced-form solution for $p_t$ :

$$p_t = \frac{\overline{m} + \phi_p p^* - y^*}{1 + \phi_p} + \frac{1}{1 + \gamma + \phi_p + \gamma\phi_y}\mu_t - \frac{(1 + \phi_y)}{1 + \gamma + \phi_p + \gamma\phi_y}\varepsilon_t \tag{7}$$

Equation (7) shows that at equilibrium aggregate price level equals expected price level given by (6), and any deviations are caused by only random disturbances $\mu_t$ and $\varepsilon_t$ .

Substitute (7) into (4) and simplify to obtain the reduced-form output equation:

$$y_t = y^* + \frac{\gamma}{1 + \gamma + \phi_p + \gamma\phi_y}\mu_t + \frac{(1 + \phi_p)}{1 + \gamma + \phi_p + \gamma\phi_y}\varepsilon_t \tag{8}$$

According to equation (8), at equilibrium $y_t = y^*$ , and similar to equilibrium price, any deviation from the equilibrium is caused only by random disturbances $\mu_t$ and $\varepsilon_t$ . Equations (7) and (8) are the key equation used for the current analysis.

## Prices and Output under demand shocks

Assuming that there are no supply disturbances, *i.e.*, $\varepsilon_t = 0$ , equations (7) and (8) can be written as:

$$p_t = \frac{\overline{m} + \phi_p p^* - y^*}{1 + \phi_p} + \frac{1}{1 + \gamma + \phi_p + \gamma\phi_y}\mu_t \tag{9}$$

$$y_t = y^* + \frac{\gamma}{1 + \gamma + \phi_p + \gamma\phi_y}\mu_t \tag{10}$$

Equations (9) and (10) show that a positive aggregate demand disturbance increases the price level as well as output. However, with demand disturbances, it matters less whether the policy maker cares more about price or output stabilisation. As the policy weight on price stabilisation or output stabilisation increase price level as well as output are brought back to the equilibrium.

To make this point clearer, assuming a constant level of money ($\overline{m} = 0$ ), an equilibrium growth rate of output of 5 percent ($y^* = 0.05$ ), an annual targeted growth in prices of 2 percent ($p^* = 0.02$ ), and $\gamma = 0.5,$ Figure 5 plots policy scenarios following a demand disturbance normalised to 1. Figures 5.3 and 5.5 (5.4 and 5.6) plot the behaviour of prices and output under demand shocks for alternative values of $\phi_p$ ($\phi_y$) holding $\phi_y$ ($\phi_p$) constant at 1.

Figure 5.1 and 5.2 confirm that as higher values are assumed for the policy parameters $\phi_p$ and/or $\phi_y$, both prices and output are stabilised. In figures 5.3 and 5.5, holding the other policy parameter constant a higher $\phi_p$ or $\phi_y$ results in $p_t \to p^*$, while as shown in Figures 5.4 and 5.6, increasing either $\phi_p$ or $\phi_y$ also results in $y_t \to y^*$. Therefore, a price-stabilising central bank is benefited by the added advantage of output stability when faced with a demand shock. As long as the central bank is actively reacting to changes in either prices or output from their target/equilibrium levels, monetary policy is successful in achieving "economic and price stability". There is no conflict or trade-off between output stability and price stability.
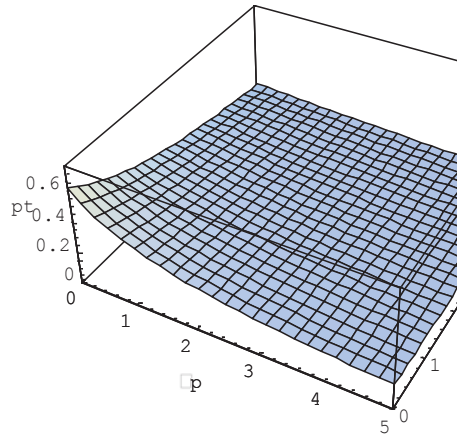


Figure 5.1
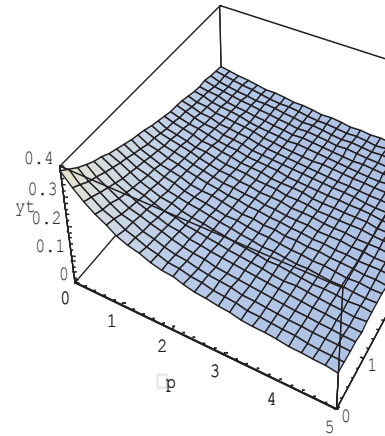


Figure 5.2

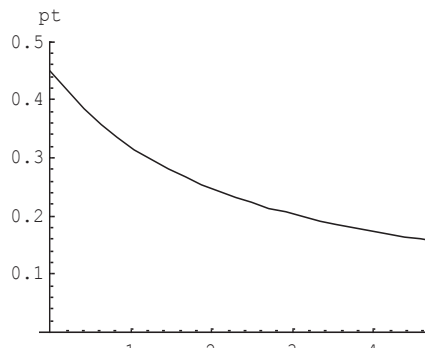Figure 5: Prices and Output under Demand Shocks and Different Policy Parameters
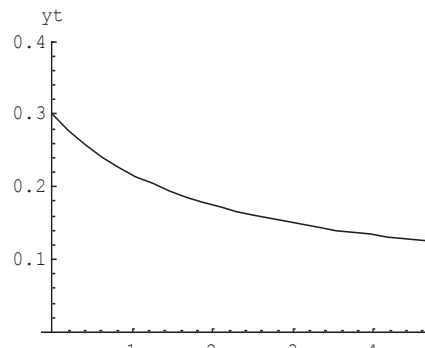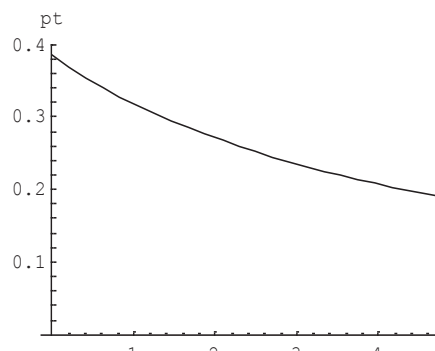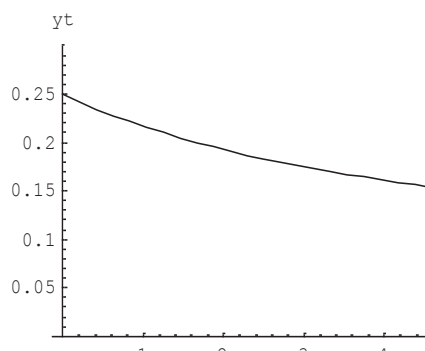


*Fig 5.3*



*Fig 5.4*

*Fig 5.5*



*Fig 5.6*

## Prices and Output under Supply Shocks

Equating demand disturbances to zero in (7) and (8), equations (11) and (12) are obtained.

$$p_t = \frac{\overline{m} + \phi_p p^* - y^*}{1 + \phi_p} - \frac{(1 + \phi_y)}{1 + \gamma + \phi_p + \gamma\phi_y}\varepsilon_t \tag{11}$$

$$y_t = y^* + \frac{(1 + \phi_p)}{1 + \gamma + \phi_p + \gamma\phi_y}\varepsilon_t \tag{12}$$

Equations (11) and (12) display that in the face of aggregate supply disturbances prices and output move in opposite directions. As shown in Figure 6, a negative aggregate demand disturbance ($\varepsilon_t$ = -1) increases prices and reduces output in relation to their equilibrium/target values. Unlike with demand disturbances, it now matters whether the monetary authority aims at price stabilisation or output stabilisation.

In Figure 6.1, increasing the policy weight on price stabilisation ($\phi_p$) brings the price level back to the target, but when the policy weight on output stability ($\phi_y$) is high prices deviate further from the target. Figure 6.2 shows that while increasing $\phi_p$ reduces output further away from the equilibrium, increasing the policy weight on output stabilisation has the opposite effect where output approaches the equilibrium. These are further confirmed by Figures 6.3-6.6 where one policy parameter is held constant while the other is assumed different values. The policymaker is now faced a tradeoff between stabilising prices and output thus creating an ambiguity on the ability to achieve "economic and price stability" simultaneously.
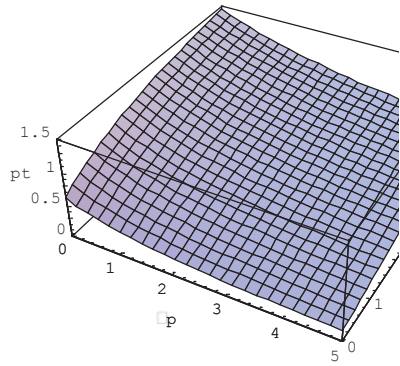
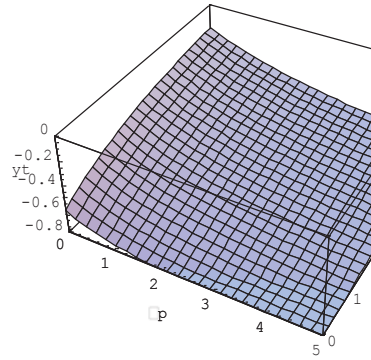Fig. 6: Prices and Output under Supply Shocks and Different Policy Parameters
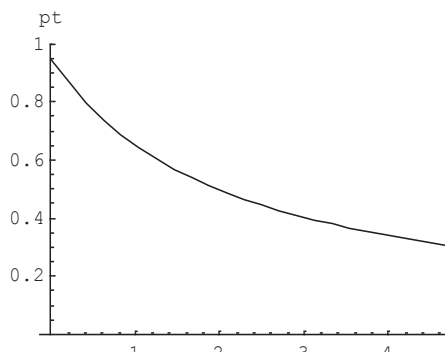


Figure 6.1


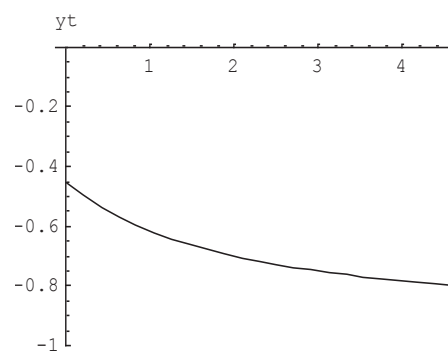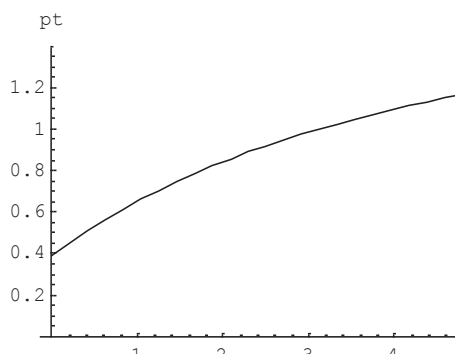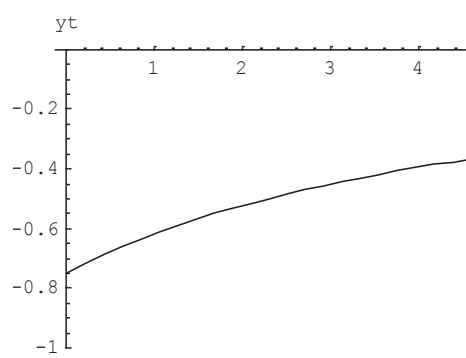
Figure 6.2



Figure 6.3



Figure 6.4



Figure 6.5



Figure 6.6

## Economic and Price stability – in terms of Variance

Since stability is the keyword in modern monetary policy making it is useful to look at price and output stability in terms of variability or variance, as in Sørensen and Whitta-Jacobsen (2005). Observing variances rather than levels have two obvious advantages. First, the constant terms in price or output equation does not play a role in the variance. Second, it does not matter whether the disturbances are negative or positive.

The variances of price equation (7) and output equation (8) can be computed to be:

$$\sigma_p^2 = \frac{1}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\mu^2 + \frac{\left(1 + \phi_y\right)^2}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\varepsilon^2 - \frac{2\left(1 + \phi_y\right)}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_{\mu\varepsilon}$$

(13)

$$\sigma_y^2 = \frac{\gamma^2}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\mu^2 + \frac{\left(1 + \phi_p\right)^2}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\varepsilon^2 - \frac{2\gamma\left(1 + \phi_p\right)}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_{\mu\varepsilon}$$

(14)

Equations (13) and (14) show variances of prices ($\sigma_p^2$) and output ($\sigma_y^2$) to be functions of the variance of demand disturbances ($\sigma_\mu^2$), variance of supply disturbances ($\sigma_\varepsilon^2$), and the covariance between demand and supply disturbances ($\sigma_{\mu\varepsilon}$). Lower the variance, the higher the stability of prices and output.

## Price and Output Stability under demand shocks

Again isolating demand shocks equations (13) and (14) reduce to:

$$\sigma_p^2 = \frac{1}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\mu^2$$

(15)

$$\sigma_y^2 = \frac{\gamma^2}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\mu^2$$

(16)

Similar to section (4), in the face of demand shocks, whether the monetary authority stabilises prices or output does not matter much as more active monetary policy reduces both price and output variability simultaneously. A price-stabilising central bank does not face a policy trade-off in this case. Also noticeable is that, for the parameter values assumed here, increasing $\phi_p$ reduces both price and output variability at a greater rate than the effect of a higher $\phi_y$.

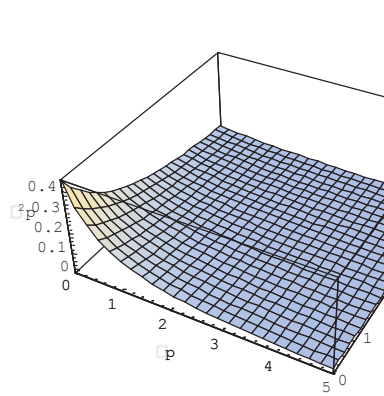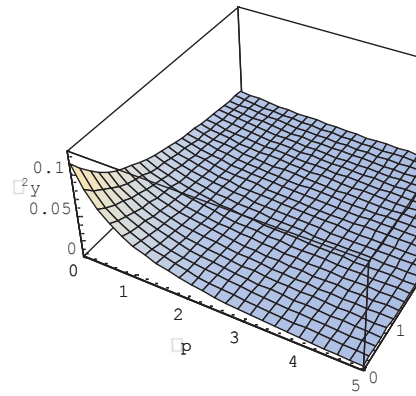Fig. 7: Price and Output stability under Demand Shocks and Different Policy Parameters
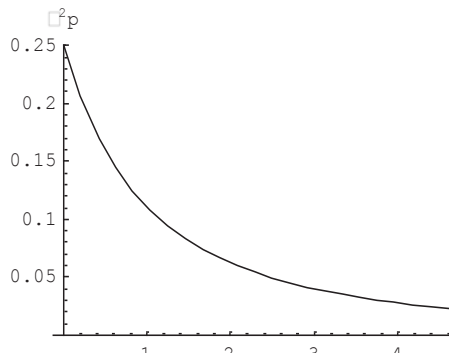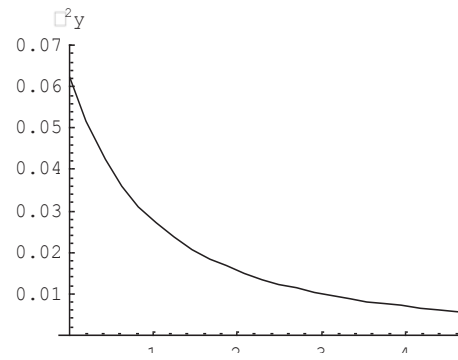


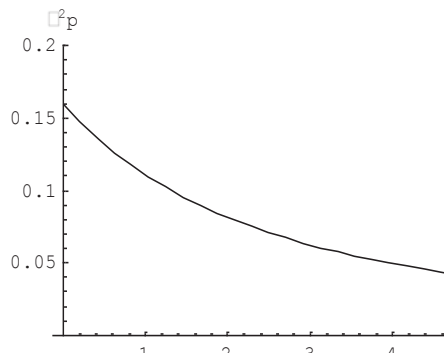Figure 7.1


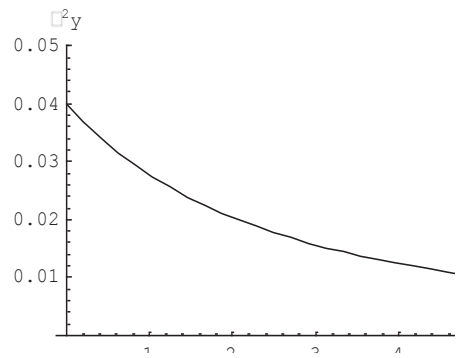
Figure 7.2



Figure 7.3



Figure 7.4



Figure 7.5



Figure 7.6

## Price and Output Stability under supply shocks

With reference to supply shocks only, equations (13) and (14) can be written as:

$$\sigma_p^2 = \frac{\left(1 + \phi_y\right)^2}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2} \sigma_\varepsilon^2 \tag{17}$$

$$\sigma_y^2 = \frac{\left(1 + \phi_p\right)^2}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2} \sigma_\varepsilon^2 \tag{18}$$

Again it is observed that increasing the policy weight on price stabilisation indeed reduces the variance of price level while increasing the policy weight on output stabilisation increases the variance of price level. With regard to the variance of output it has the opposite effect. Therefore, as discussed earlier the presence of supply shocks presents the challenge of a policy trade-off to a monetary authority.

As shown in Figure 8.1, when $\phi_y$ is low, variability of prices is low, and increasing $\phi_p$ slightly reduces price variability further. Figure 8.2 displays that this is at the cost of increasing output variability. Holding one policy weight constant, Figures 8.3-8.6 lends further support to this trade-off.
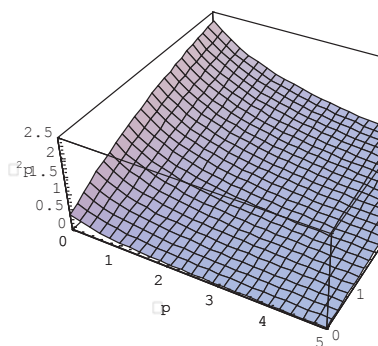
Fig. 8: Price and Output stability under Supply Shocks and Different Policy Parameters
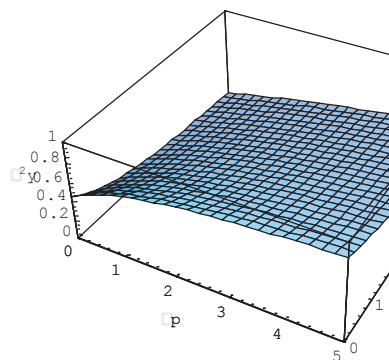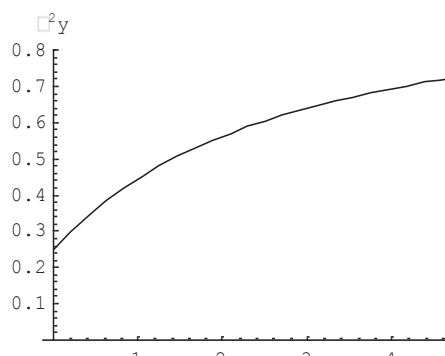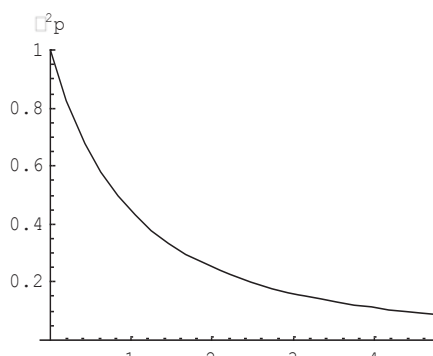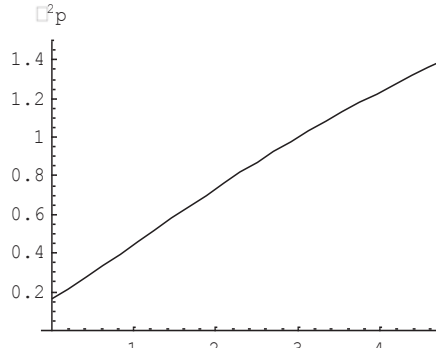


Figure 8.1
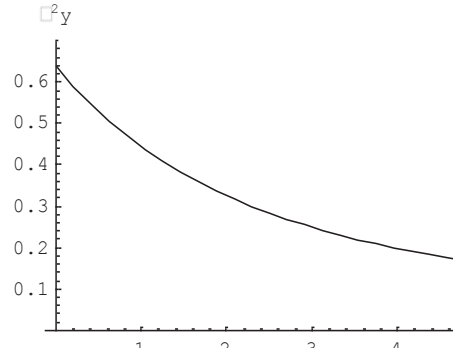


Figure 8.2

Figure 8.3

Figure 8.4



Figure 8.5

Figure 8.6

## Optimal Monetary Policy

Having discussed the effects of the type of the shock that the economy is faced with have on monetary policy making, let us now look at the loss function of a central bank. As in Cecchetti and Ehrmann (1999) and Cecchetti, Flores-Lagunes, and Krause (2006), a standard "quadratic loss function where policymaker seeks to minimise the sum of squared deviations or output and prices from their target paths" is assumed here:

$$L = E_{t-1}\{\alpha(p_t - p^*)^2 + (1 - \alpha)(y_t - y^*)^2\} \tag{19}$$

where the central bank's overall objective is to minimise the loss given by (19) and $\alpha$ is the central bank's "relative aversion to inflation variability" (Cecchetti and Ehrmann, 1999).

In terms of variance, equation (19) can be written as:

$$L = E_{t-1}\left\{\alpha \, \sigma_p^2 + (1 - \alpha)\sigma_y^2\right\} \tag{20}$$

As in Guender and Gillmore (2010) and assuming independently and identically distributed shocks (*i.e.,* $\sigma_{\mu,\varepsilon} = 0$), and substituting (13) and (14) into (20):

$$L = \frac{(\alpha + \gamma^2 - \alpha\gamma^2)}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\mu^2 + \frac{\left(1 + (1 - \alpha)\phi_p\left(1 + \phi_p\right) + \alpha\left(2 + \phi_y\right)\phi_y\right)}{\left(1 + \gamma + \phi_p + \gamma\phi_y\right)^2}\sigma_\varepsilon^2 \tag{21}$$

Differentiating the loss function with respect to the policy weight $\phi_p$ results in:

$$\frac{\partial L}{\partial \phi_p} = -\frac{2\left(\alpha + \gamma^2(1-\alpha)\right)}{\left(1+\gamma+\phi_p+\gamma\phi_y\right)^3}\sigma_\mu^2 + \left(\frac{(1-\alpha)\phi_p+(1-\alpha)(2+\phi_p)}{\left(1+\gamma+\phi_p+\gamma\phi_y\right)^2} - \frac{2\left(1+(1-\alpha)\phi_p(2+\phi_p)+\alpha(2+\phi_y)\phi_y\right)}{\left(1+\gamma+\phi_p+\gamma\phi_y\right)^3}\right)\sigma_\varepsilon^2 \tag{22}$$

Minimising the loss function, *i.e.,* equating (22) to zero, and solving for $\phi_p$ provides the optimal policy weight on price stabilisation that the central bank should assume given both demand and supply disturbances and given preferences of the central bank as shown in equation (23):

$$\phi_p = \frac{\gamma - \alpha\left(1 + \gamma + \phi_y\right)}{(1-\alpha)\gamma} + \frac{\left(\alpha + (1-\alpha)\gamma^2\right)}{(1-\alpha)\gamma\left(1+\phi_y\right)}\frac{\sigma_\mu^2}{\sigma_\varepsilon^2}$$

(23)

The optimal policy weight on price stabilisation as given in equation (23) is dependent on the policy weight on output stabilisation ($\phi_y$), slope of the aggregate supply equation ($\gamma$), the relative preference of the central bank of price stability ($\alpha$), and also the ratio of the variances of shocks faced by the economy ($\sigma_\mu^2/\sigma_\varepsilon^2$), thus complicating monetary policymaking. Higher the occurrence of demand disturbances in the economy, higher the optimal policy weight on price stabilisation, while higher the occurrence of supply disturbances, lower will be the optimal policy weight on price stabilisation.

A central bank which is solely concerned about price stability (α = 1), will assume an extremely high (∞) value for Øp irrespective of the shocks faced by the economy, thus stabilising prices at any cost to output. However, this is merely a hypothetical scenario and no central bank can ever ignore the impact of such extreme policy on the real economy and the society's welfare, so the preferences of a typical central bank are marked by a high α but never α = 1 i.e., always a combination of "economic stability" and "price stability". As Svensson (2000) argues succinctly with reference to inflation targeting: "[w]hereas there may previously have been some controversy about whether inflation targeting involves concern about real variability, there is now considerable agreement in the literature that this is indeed the case: Inflation-targeting central banks are not what King (1997) referred to as "inflation nutters"" (p.6). Svensson further explains that "concern about output stability translates into a more gradualist policy" rather than diverting the central bank's focus from price stability (also see Svensson, 1997, and Ball, 1999).

In fact, while most modern central banks do recognize price stability as the core objective, quite often it is not recognised as the sole objective, or provisions are made for central banks to rethink the effects of their policies on the real economy. Examples are the Federal Reserve Act of 1977 which defined the monetary policy objective for the USA as "maintain[ing] long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates", and the Bank of England Act of 1998, which defines the objectives of the Bank of England as maintaining price stability, and "subject to that, to support the economic policy of Her majesty's Government, including its objectives for growth and employment". The objective of the European System of Central Banks is similar. While maintaining price stability is defined as the primary objective, "without prejudice to the objective of price stability" it is expected to support the objectives of the European Union which are maintaining "a high level of employment and sustainable and non-inflationary growth". Even the Reserve Bank of New Zealand, which is considered the best and foremost example for inflation targeting, while defining the primary objective being "achieving and maintaining stability in the general level of prices", allows the government to "direct the Bank to formulate and implement monetary policy for any economic objective, other than the [price stability objective]" and "the Bank shall formulate and implement monetary policy in accordance with any [such] economic objective."

## Summary and Conclusion

The simple model utilised here reaffirms the conventional wisdom that the objectives of price stability and output stability are complementary when the economy is faced with demand shocks, but the policy maker faces a tradeoff between stabilising prices *vis-à-vis* output during supply disturbances. This theoretical implication is compatible with Sri Lanka's experience as shown in Figures 3 and 4. Extreme policy may disturb the economic equilibrium further, so the best central banking policy can never totally ignore its effects on the real economy. Identifying the source of the disturbance is crucial to make best judgement as to the course of monetary policy to be pursued.

Provided a central bank acts in the public interest, due to the nature of aggregate disturbances faced by an economy, it is best to leave room for the central bank to determine the best course of action to tackle the disturbances that hit the economy at a given time. As Blinder (1998) shows in the context of the Federal Reserve, "the goals of monetary policy are set forth in legislation but are sufficiently imprecise that they

require considerable interpretation by the central bank.....The so-called dual mandate requires the Fed to give tacit or explicit content to the vague phrases "maximum employment" and "stable prices" and then to decide how to deal with the short-run trade-off between the two. This interpretative role enhances the Fed's *de facto* power, which is considerable" (p.54).

In the final analysis, the Central Bank of Sri Lanka's broader objective to maintain "economic and price stability" rather than restricting its mandate to "price stability" has granted it power to conduct better monetary policy in a global environment of uncertainty and various economic fluctuations. The objective also emphasises that the performance of the central bank must be assessed in line with the dominant aggregate disturbance faced by the economy at the time. This is what was recognised by Governor Jayawardena's comment on "not falling into the trap of attempting to stabilise a price index" and Deputy Governor Wijewardena's interpretation of pursuing the "macroeconomic equilibrium". It is also essential to maintain a system of checks and balances to ensure whether this broader mandate is appropriately utilised to maintain, where necessary, a balance between economic and price stability in the short run, and to achieve price stability in the long run, which in turn is generally accepted as being conducive for long-run economic stability.

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## Data Appendix:

All series are defined in logs and detrended using a Hodrick-Prescott Filter ( $\lambda = 100$ ) to obtain the gap/cycle series. All series are annual data.

CPI: IMF International Financial Statistics Line 64...ZF CPI:COLOMBO 455 MNUAL WRKRFAM (2005=100) (Units: Index Number)

GDP: IMF International Financial Statistics Line 99BVPZF GDP VOL. (2005=100) (Units: Index Number)

Broad Money: IMF International Financial Statistics Line 35L..ZF MONEY PLUS QUASI-MONEY (Units: National Currency) (Scale: Millions)