

Economic effect of transparency on output and inflation

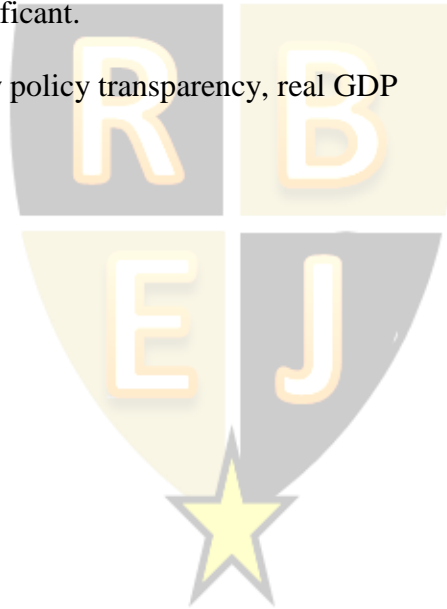
John Davison Gondwe Nhavira
Nelson Mandela Metropolitan University

Matthew Kofi Ocran
Nelson Mandela Metropolitan University

ABSTRACT

This study set out to investigate the impact of monetary policy transparency on inflation and output. It is different from prior studies as it investigates the issues associated with transparency in Sub-Saharan Africa employing random effects GLS regressions. Inflation on the other hand had five variables that were significant i.e. real interest, trade openness, transparency, real GDP and M2 growth. With regard to transparency the coefficient was found to be negatively associated with inflation. On the other hand output, trade openness was positively associated with real GDP and highly significant.

Keywords: inflation, monetary policy transparency, real GDP



Copyright statement: Authors retain the copyright to the manuscripts published in AABRI journals. Please see the AABRI Copyright Policy at <http://www.aabri.com/copyright.html>.

INTRODUCTION

It has been 22 years since the Reserve Bank of New Zealand first adopted a monetary policy transparency regime which is characterized by , political, economic, operational, procedural, and policy transparency (Geraats, 2002). One practice of monetary policy transparency under political transparency is inflation targeting. Typically, this is a narrow range of inflation rate such as 3-6 per cent. It also involves, firstly, the announcement of goals by government for monetary policy; secondly, the central bank is granted instrument independence to pursue its goals; and, thirdly, the central bank is accountable to society for attaining the goals of monetary policy. Transparency then becomes society's key for monitoring monetary policy and is a means by which the central bank is held accountable (Svensson, 1998). This practice has overshadowed the other components of monetary policy i.e. transparency.

Transparency was pioneered by New Zealand as a consequence of the Reserve Bank of New Zealand's persistent failure to deliver or attain an agreed - upon goal of low inflation. This failure is attributable to a time-consistency problem or policy reversals (Kydland and Prescott, 1977; Barro and Gordon, 1983, 1985; Rogoff, 1985). The majority of Sub-Saharan African central banks, have suffered from a time-consistency problem. Inspired by New Zealand's success in the 1990s, the central banks in Sub-Saharan Africa (SSA) and others around the world have embarked on reforming their central bank charters (Table 4). This widespread conversion to monetary policy transparency which occurred in the early 90s, poses some questions, about the performance benefits of monetary policy transparency. This research therefore sets out to investigate the impact of monetary policy transparency on inflation and output.

Descriptive Statistics

Descriptive statistics were initially used to analyse the effect of monetary policy transparency on inflation and output. Table 1 and 3 report the descriptive results for 18 Sub-Saharan countries. Table 1 reports inflation prior and after monetary policy transparency. Their average inflation rate declines from 23.72 per cent to 19.74 per cent. It also indicates when the central bank law was amended. However, countries with low transparency, such as Angola, Ethiopia, and Mozambique experienced an increase in inflation. Paradoxically, other low transparency countries such as Zambia, Sierra Leone, and Tanzania also experienced a decline in their inflation rates.

On the other hand Table 2 reports the average GDP growth rates since 1980 and shows a significant improvement in growth rates between 1980-89 and 1990-1999. On the other hand, Table 3 continues the comparison and reports real GDP prior and post monetary policy transparency. Prior to adoption of monetary policy transparency, i.e, the period 1980-1989, the average real GDP was 2.85 per cent and -1.8 per cent for the post monetary period (1990-2010). However, until 2005, the average real GDP was 4.9 per cent, indicating an increase of 2.5 per cent. When Zimbabwe is excluded, the average growth 2000 to 2005 is 5.6 per cent.

The decline in real GDP after 2005 may be attributed to the global financial crisis of 2007. It may also be argued that the global economic growth that took place in the period 1990-2005 was driven by China's demand for primary raw material and rising prices for them. However, it cannot be denied that inflation did decline substantially over the period.

Moreover, the descriptive statistics indicate that average inflation has declined by 4 per cent between the pre - and post - monetary policy adoption. Since output improves for both

monetary policy transparency economies and those who are not, it is not possible to determine from the descriptive statistics whether monetary policy transparency is beneficial to higher output performance. Table 3 continues the theme in Table 2 it is clear that post monetary policy transparency era has witnessed positive average real GDP.

The descriptive statistics are not conclusive. It is necessary that further tests be conducted to draw more definitive conclusions regarding the efficacy of monetary policy transparency. As a consequence, this study seeks in the first instance, to determine the economic effect of transparency on inflation and output employing random effects GLS regressions. As indicated above, Table 4 displays the country and year in which a select group of Sub-Saharan economies reformed their Central Bank Acts, indicating an intention to try and conform to international best practice.

This study is different from prior studies. It investigates the issues associated with monetary policy transparency in SSA in contrast to other studies that have focused on industrial countries and emerging economies in South America. Furthermore, the majority of studies have focused on inflation targeting - a narrow definition of transparency and its effects on inflation and output. We contend that there may be other influences at play, hence the desire to use a broader definition of transparency as per Geraats (2002). It employs GLS regressions from the general to the specific.

The rest of this paper is structured as follows: Section 2 examines the literature. Section 3 gives the methodology, theoretical framework and estimation techniques. Section 4 presents the empirical findings while section 5 concludes.

LITERATURE REVIEW

We offer insight into the transparency literature. This is not the first, or only, overview of the literature on central bank transparency as prior surveys have discussed the literature based on justifying transparency based on its effects on the economy and on varying categorizations of transparency (Geraats 2002; Hahn 2002; Carpenter 2004 ;) or views of transparency (Posen 2003). Cruijnsen (2008) compiled an up-to-date- survey of the theoretical literature. This study up-dates the work of Cruijnsen (2008) but argues that expectations, coordination games and learning are really not new strands but extensions and elucidation of the finer workings of transparency and fit in under the five categorizations of Geraats (2002). We describe below the chronological development of the theoretical transparency literature.

Theoretical underpinnings of the economic effects of transparency

Early researcher's quest for the unified-theory that would enable central bankers to achieve societies' preferred social objective efficiently and effectively has been a long one. We summarise hereunder the major milestones in that quest:

Grunberg and Modigliani (1954) set out to solve the problem of prediction in the formation of expectations. This knowledge has important implications for policymakers who are interested in guiding economic agent expectations through forecasts (predictions) of interest rate and inflation paths.

Another contribution of Grunberg and Modigliani (1954) was to lay the groundwork for the communication structure of monetary policy transparency. To this end communication involves a feedback of economic agents' reaction to previous predictions, coupled with the

disclosure of the central bank's model, a forecast of alternative scenarios for inflation and interest rates in the ensuing periods subject to various caveats. For the policy maker this cycle is a source of uncertainty which must be managed. Finally, Grunberg and Modigliani (1954) did not shed light on how expectations come to be formed.

Muth (1961) extended the problem of prediction by investigating how expectations are formed. He argued that expectations are the same as the prediction. His hypothesis was that expectations of firms tend to be distributed for the same information set, about the prediction of the theory. Thirdly, a public prediction in the sense of Grunberg and Modigliani (1954) will have no significant effect on the operation of the economic system (provided it is not based on inside information). Muth (1961) therefore solved the puzzle left hanging in the Grunberg and Modigliani (1954) statement of the theory pertaining to the actual formation of expectations, the motivation of economic agents in making predictions and the existence of a fail-safe device that is the prohibition of access to inside information to set aside the checks and balances inherent in an economic system. His enduring contribution was that an economic outcome will not be significantly divergent from what people expected. In this way, a prediction becomes a tool of coordination and managing economic agent expectations.

On uncertainty, Brainard (1967) tackled the issue of consequences for policy actions arising from structural changes for the effectiveness of policy under conditions of uncertainty. Put differently, how does a lack of information affect the parties to a transaction? Brainard's (1967) work contributed immensely to our understanding of transparency. Brainard's enduring contribution was that the policymakers' actions should not contribute to creating uncertainty and should not be disruptive nor come as a surprise.

Contractual information was important for Akerlof (1970) who examined the problem from the angle of prevention of accurate predictions from being made in economic transactions at their outset. He investigated economic models in which trust or information between the parties to a transaction is important. His findings were that since information was scarce, transparency resolves the effects of the asymmetrical information for both parties thereby dispelling uncertainty.

Should policymakers be guided and restrained by postulates? Kydland and Prescott (1977) examined the problem of policymakers with discretion failing to attain an agreed - upon goal. They called this a time consistency problem. Their study had far-reaching effect not only on theoretical policy analysis, but on institutional design such that the time - consistency problem may be mitigated. They provided a politico-economic explanation for the reason for persistent inflation in the face of repeated promises to fight it as public enemy number one. Clearly, the research of the 50s up to the early 70s emphasized that economic agents, private agents', expectations were crucial to economic outcomes. The eighties, particularly with the Kydland and Prescott's (1977) study, inspired the 1990s wave of central bank reform aimed at creating commitment mechanisms that would lead to attainment of society preferred social objectives led by New Zealand (Nobel, 2004). It is the author's contention that transparency acts as a commitment mechanism.

In another study Barro and Gordon (1983) contended that the policymaker should be constrained from the outset either by legal means or by rules (or contracts) that pre-commit the course of future actions of the policymaker with an overriding social objective that reflects the social preferences of society.

An important insight of the work of Barro and Gordon (1983) model is the realization that the pursuit of two goals simultaneously (unemployment target and inflation target) without

prioritization results in the sacrifice of one of the goals. In a monetary institution setting, the likely outcome is that the policymaker will welcome surprise inflation and fall prey to the “time - inconsistency” trap. However, Barro and Gordon (1983) go further to warn that the spectre looming large over a discretionary monetary policy is the incentive for a central bank to inflate based on revenue from money creation and the benefits arising from the inverse relationship between inflation and government debt. In an extension of their earlier work, Barro and Gordon (1983b) introduced exogenous shocks and stabilization policy into the model without changing their earlier conclusions. On the other hand Backus and Driffill (1985), relying on insights from the theory of repeated games, introduced the concept of reputation as a restraining influence on central bankers.

However, problems still remained as to the nature of the rules that would constrain the central banker. So attention was directed toward institutional reforms that would make discretionary policy - making perform better. Rogoff (1985) successfully demonstrated that by delegating monetary policy to an independent central bank, a suitable balance could be attained between credibility of low inflation and stabilization. He contended that further benefits could accrue where a person who is more inflation averse than society was placed in charge. Moreover, this could be achieved without the dreaded unemployment cost. These findings were confirmed by Grilli, Masciandro and Tabellini (1991), Cukierman (1992), and Alesina and Summers (1993).

Morris and Shin (2002) were the first to demonstrate that transparency influences economic outcomes through its effect on the formation of inflation expectations in what is known as coordination games i.e. the central bank coordinates economic agent expectations through provision of information on how they (economic agents are performing) as well as providing information on its (central bank) policy commitments. Furthermore provide feedback on its own performance.

Crujisen (2008) reviewed the theoretical literature and also performed an empirical analysis in a paper similarly titled and concluded that it appears to arrive at an ambiguous conclusion. Nevertheless, the more recent literature argues in favour of increased transparency. In this regard Nhavira and Ocran, (2012) empirically set out to discover those factors that lead Sub-Saharan African economies to adopt transparency using a sample of 14 countries. They found that current account, real output, financial depth and trade openness are the determinants of transparency in Sub-Saharan African economies.

The thread running through the theoretical literature is that the coordination of expectations of both policymakers and economic agents is the key to running a successful, that is, effective monetary policy. The rules put in place to constrain policymakers are designed to increase the reputation and credibility of the central bank for as long as they adhere to those rules. Transparency becomes the methodology by which the central bank makes itself accountable to economic agents by adhering to the “contract”. Clearly no one would adopt a new monetary policy regime unless the outcomes are beneficial to both the policymaker and the economic agents. The policymaker needs sustainable economic growth as it makes sense from a national security perspective and for fiscal policy. On the other hand economic agents are not happy to see their hard earned income undermined by rising prices. These requirements depend on price stability.

Measurement of Transparency

The quest to understand transparency led researchers to find ways of measuring transparency thereby facilitating the investigation of the economic desirability of monetary policy transparency through its effects on macroeconomic indicators such as output and inflation.

Geraats (2002) initially developed the five categorizations of transparency. These are political, economic, procedural, policy and operational transparency. This later developed into an index of transparency in Eijffinger and Geraats (2006) which enabled the comparisons of transparency across countries and over time since the index was time-varying.

Several other categorizations of transparency exist such as those developed by Fry et al (2000), conduct the most comprehensive study with a wider country coverage based on a survey of 94 central banks. Their definition of transparency is more restrictive. Bini-Smaghi and Gros (2001), consider fifteen aspects of central bank transparency for four countries-the United States of America, the United Kingdom, Japan and the European Union. Siklos (2002), develop a similar index but expand their coverage to 20 central banks of industrial nations. Other categorizations are by Chortareas et al (2002) and De Hahn et al. (2004).

The major disadvantage of these categorizations is that they are not as comprehensive as Geraats (2002) and is constructed at a given point in time and do not provide data about changes in the degree of transparency over time. Therefore Eijffinger and Geraats (2006) overcame this constraint thereby facilitating its use in time series and panel data analysis. It is on this basis that the author selected this methodology over others.

Measuring transparency involves answering fifteen questions which carry equal weight, such that the aggregate score for a particular central bank can vary from zero to fifteen. The more transparent the central bank is, the higher is the score.

Geraats (2002) five categorizations are a form of monetary policy rule that pre-commits a central bank to a certain course of action. It in turn acts as a monitoring device for economic agents to assess the extent to which the central bank is complying with what it has committed itself to doing. Transparency can improve or deteriorate from year to year and facilitates comparison across countries. Moreover, the index of transparency can then be used as an independent variable to test for its effect on the dependent variables; growth or inflation.

METHODOLOGY

This research seeks to investigate the economic effect of monetary policy transparency on output and inflation.

Theoretical framework

Cukierman and Meltzer (1986) developed a new strand of research built on the foundation of Kydland and Prescott (1977) and Barro and Gordon (1983). They sought to determine the economic impact of transparency with inflation as the dependent variable (see equation below). They found that there was a trade - off between credibility (the level of inflation and flexibility (the degree of output stabilization). They concluded that the economic desirability of transparency was ambiguous. It is our observation that, on the contrary, the trade – off with credibility and output stabilization confirms the work of Kydland and Prescott (1977)

and that of Barro and Gordon (1983) mainly that rules tend to increase the credibility of central banks.

When the central bank chooses the quality of the inflation rate control, the degree of transparency is set. More effective inflation rate control increases transparency and makes it easier for the public to deduce the central bank's objectives by looking at past inflation. As a result, inflation expectations (which depend on the policy-maker's mean planned inflation and the actual past observations) become more sensitive to past policy outcomes. The public learns faster, credibility is higher, and the inflation bias is reduced. In addition, however, there is a detrimental effect of more transparency. The policy-makers' ability to use surprise inflation to stimulate output is reduced. When this detrimental effect is relatively strong, central banks might prefer ambiguity. It makes it easier to use positive surprise inflation when it is needed the most and negative surprise inflation in periods in which it is relatively concerned about inflation.

The Cukierman and Meltzer – model (CM) spawned several branches of literature linked to the categorization of transparency that is directly analyzed. Consequently, there are three distinct branches: political, economic and policy transparency.

When making policies, central banks are concerned with both inflation and output. There is however a trade-off between reducing inflation and increasing output. Inflation targeting has an implication on output growth. We assume that central banks are loss - minimizers or that their objective is to maximize the negative of the loss function. We develop the central bank's loss function based on Green's (1996), Lippi's (1999) and Geraats' (2009) central bank loss functions where both economic agents and the monetary authority have a goal of minimizing deviations in inflation and output from social preferences.

Suppose the central bank aims to minimize its loss function given by:

$$L = \frac{1}{2}\lambda(\pi - \pi^T)^2 + \frac{1}{2}(1-\lambda)(y_{\text{gap}} - y_{\text{gap}}^T)^2 \quad \dots (1)$$

which is equivalent to maximizing:

$$L = -\frac{1}{2}\lambda(\pi - \pi^T)^2 - \frac{1}{2}(1-\lambda)(y_{\text{gap}} - y_{\text{gap}}^T)^2$$

where:

π , π^T , y_{gap} and y_{gap}^T denote inflation, the central bank's inflation target, output gap and output gap target, respectively. The relative weight on inflation stabilization is given by λ which is between zero and one, that is, $0 < \lambda < 1$. The central bank's objective to minimize the loss function in equation (1) gives political transparency.

We further assume that the economy is based on Phillips' expectations-augmented equation:

$$\pi = f(\pi^e, y_{\text{gap}}, s) = \pi^e + y_{\text{gap}} + s \quad \dots (2)$$

Where:

π^e and s are private sector inflation expectations and supply shock, respectively and that the aggregate demand function is given by:

$$y_{\text{gap}} = g(r, d) = -r + d \quad \dots (3)$$

where:

r and d denote the real interest rate and a demand shock, respectively. Economic transparency refers to the aggregate demand and supply anticipated by the central bank when it sets the policy rate (interest rate), procedural transparency to the central bank's decision procedure, policy transparency to the precise interest rate and operational transparency to the aggregate demand

and supply when it sets the interest rate. Substituting equations (1.) and (2) into the negative of equation (3.) and computing the first derivative with respect to the rate of interest and expressing the result in terms of the central bank's inflation target, we obtain the following:

$$\pi^T = f(r, y_{\text{gap}}^T, \pi^e, \pi, s, d) \quad \dots (4)$$

According to Walsh (1998), Lippi (1999), Sibert (2005) and Geraats (2009), inflation - targeting is closely linked to high levels of transparency. Therefore, factors that influence inflation targeting are almost similar to those factors likely to drive policymakers into adopting monetary policy transparency. From the model in equation (4), the factors include interest rate, inflation, output gap, expected inflation and all others that cause demand and supply shocks such as the external sector (current account, trade openness) and institutional factors.

Estimation Techniques

This study employs static panel data modeling based on Grunfeld (1958), and on Baltagi (1995), to investigate the influence of transparency on (i) inflation and (ii) output. The single – equation panel model is written as:

$$Y_{it} = X'_{it} \gamma + \lambda_t + \eta_i + v_{it}, \quad t=1, \dots, T, \quad i=1, \dots, N.$$

where:

λ_t and η_i are, respectively, time and individual specific effects and X'_{it} is a k^* vector of explanatory variables. N is the number of cross-section observations. The total number of observations is NT .

Empirical model

In this section equation (1) is given a concrete form. Firstly, we are interested in determining if transparency has a significant influence on (i) inflation and on (ii) output.

$$Tr_{it} = [RR_{it} \quad Y_{it} \quad FD_{it} \quad CA_{it} \quad TO_{it} \quad M2_{it} \quad P_{it}],$$

where the symbols in the equation such as RR_{it} stand for real rate of interest, P_{it} for inflation rate, Y_{it} for output, CA_{it} for current account, TO_{it} for trade openness, FD_{it} for financial depth, $M2_{it}$ for M2 growth and Tr_{it} a proxy for political, policy, operational, procedural and economic transparency.

However, since Tr_{it} is binary i.e. 1 or 0 the use of GLS with transparency as the independent variable will not produce a meaningful result. The use of probit or logit will also not produce the result required. That is determining the influence of transparency on inflation and output. We therefore adopt the approach of Hu, (2003) as follows:

$$P_{it} = [RR_{it} \quad Y_{it} \quad FD_{it} \quad CA_{it} \quad TO_{it} \quad M2_{it} \quad Tr_{it}],$$

Variable description

Table i: summarises the variables that are the subject of the study.

Diagnostic tests

In order to ensure the appropriateness of the variables incorporated in the model and the model itself, tests were conducted on both the model and the data. Table ii Lists the diagnostic tests to be conducted.

Data issues

The population is all central banks in the SSA region. The research was conducted on the cluster sample based on Dincer and Eichengreen (2009), comprising countries from Southern Africa Development Community (SADC) and East and West Africa. In order to reduce bias in the sample, three other countries were selected randomly and added to the Dincer and Eichengreen (2009) sample. The cluster sample comprising countries from SADC, the East African Community (EAC) and the West African Community (ECOWAS) includes Angola, Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, South Africa, Sierra Leone, Tanzania, Zambia and Zimbabwe.

The data covers the period 1985-2008. In this regard, the macroeconomic data for the sample for the period 1980 to 1985 was obtained from the World Development Indicators and the balance for the period 1986 to 2008 was from IMF statistics. We relied on Dincer and Eichengreen (2009) for the monetary policy transparency indices for some of the countries under study and the researcher provided indices for the balance of the sample.

EMPIRICAL RESULTS

Diagnostic Test Results

Table iii: displays the diagnostic results

The effect of Monetary Policy Transparency on the level of Inflation and Output

In order to determine the effect of monetary policy transparency, inflation and output are used as the dependent variables and three sets of regressions are run on the factors associated with the dependent variables, including whether the country practices monetary policy transparency. This investigation is primarily interested in the dummy for monetary policy transparency. We follow the general – to – specific modeling. This is reported as a part of the parsimonious model.

Random Effects Model-Inflation as the dependent variable

The Hausman specification test indicated that the random effects should be employed. From the regression results obtained using the random effects model, it reported that out of seven variables, only five were significant. The statistically insignificant variables were omitted to come up with the parsimonious model. The omitted variables are current account and financial depth. Table 5 reports the results. From the table the coefficient for real interest is negative as expected and significant at the 10 per cent level, indicating that real interest has a negative association to inflation, that is, all things being equal, high interest rates inhibit the inflationary spiral.

The trade openness coefficient is negatively associated with inflation and highly significant, indicating that high levels of trade openness reduce inflationary pressures. This is consistent with the findings of Hu (2003) which was a study on inflation - targeting. It is relevant to this study because inflation - targeting is similar to monetary policy transparency. It is a minor component of the monetary policy transparency framework. How does trade openness

influence inflation? A possible explanation is one that resonates with Romer (1993) and Lane (1995) who states that since the economy is open, the monetary authority is constrained into pursuing a time-consistent monetary policy, resulting in a lower inflation rate. Another explanation is that the time-consistent monetary policy, coupled with transparency, anchors economic agent's expectations, resulting in lower inflation rates. Nasser (2009) contends that countries with open economies should not have a relationship between inflation and openness. Thus, openness in countries with dependent central banks acts as a brake on the incentive of the government to generate inflation, hence the negative relationship.

The real interest coefficient is negatively and significantly associated with inflation. This is as it should be, that as inflation declines, the higher is the real interest and vice versa. Moreover, within a monetary policy transparency framework, the level of the real interest rate is an indicator of the central bank's commitment to pursue a time – consistent monetary policy, thereby inducing economic agents to anchor their inflation expectations. This is so particularly when economic agents observe that when inflation pressures rise the central bank responds by an interest rate hike. This, in time, earns the central bank credibility and reputation.

The transparency coefficient is negatively associated with inflation as expected, indicating that certain levels of monetary policy transparency act as an anchor for inflationary expectations (Haan and Hag, 1995). This then results in lower levels of inflation. The real GDP coefficient is negatively and significantly associated with inflation, indicating that an increase in real GDP would lead to a decline in inflation and vice versa. Finally, the M2 growth coefficient is positively associated with inflation, i.e., as M2 grows, inflation grows albeit at a slower pace than money supply initially.

Random Effects Model - Real GDP as the Dependent Variable

From the regression results obtained using the random effects model, it reported that out of seven variables, only one was significant. Furthermore, The Wald Chi2 gives a result that indicates that the model is valid. The statistically insignificant variables were omitted to come up with the parsimonious model. The omitted variables are current account and financial depth, real interest and transparency. Two variables which were borderline in terms of statistical significance were included in the parsimonious model. Table 6 displays the results. The trade openness coefficient was positively associated with real GDP, indicating that the more open the economy the higher the real GDP should be and vice versa (Romer, 1993). As discussed under inflation as the dependent variable, trade openness creates conditions, whereby the monetary policy being practiced is time-consistent resulting in lower inflation (Romer, 1993; Lane, 1995). The remaining two variables, inflation and M2 growth, had negative coefficients but were statistically insignificant.

CONCLUDING REMARKS

It was indicated under descriptive statistics (table 1 to 4) that inflation has declined by 4 per cent between the pre- and post- monetary policy adoption. Since output improves for both monetary policy transparency economies and those who are not, it was not possible to determine whether monetary policy transparency is beneficial to higher output performance. However, the parsimonious model with GDP growth as the independent variable did not indicate any relationship between the independent variable and transparency.

This research explored the empirical effect of transparency on inflation and output. We employed random effects GLS regressions. With regard to output, the specific model indicated that trade openness was positively associated with real GDP and highly significant, indicating that Sub-Saharan economies are generally open economies and this impacts on real GDP. Most of these economies rely on the export of primary commodities to drive their economies and in return they import finished goods. It is also a reflection of the impact of the trade liberalization and reforms of the 1980s and 1990s (Romer 1993 and Walle 1997).

With regard to inflation, the specific model revealed that five variables were significant, i.e, real interest, trade openness, transparency, real GDP and M2 growth. The indication is that where an economy wishes to bring inflation under control, it would be necessary to make the central bank transparent, the economy more open and bring M2 growth under control.

However, the regression for inflation supports the finding in the descriptive statistics that monetary policy transparency is associated with a decline in inflation rate. The beneficial effect is that it can reduce the inflation rate by .04 per cent approximately and is significant at the 1 per cent level as reported in Table 5. This finding is consistent with the findings of Hu (2003) in a related study of inflation targeting.

REFERENCES

- Akerlof, G A (1970): "The Market for Lemons: Quality Uncertainty, and the Market Mechanism", *The Quarterly Journal of Economics*, 84(3), August, 488-500.
- Alesina, A and Summers, L (1993): "Central Bank Independence and Macroeconomic Performance," *Journal of Money, Credit, and Banking*. 25, 157-162.
- Arellano, M and Bond, B (1991): "Some tests of Specification in dynamic Panel Data Models: Monte Carlo Evidence and Application to Employment Equations." *Review of Economic Studies*, 58, 277-297.
- Backus, D and Driffill, J (1985): "Inflation and Reputation." *American Economic Review* 75(3) 530-538.
- Ball, L and Sheridan, N (2003): "Does Inflation Targeting Matter?" Working Paper 9577, National Bureau of Economic Research.
- Baltagi, B H (1995): "*Econometric Analysis of Panel Data*." New York: John Wiley and Sons
- Barbosa-Filho, N H (2008): "Inflation Targeting in Brazil: 1999-2006", *International Review of Applied Economics*, 22(2), 187-200.
- Barro, R J and Gordon, D B (1983): "A Positive Theory of Monetary Policy in a Natural Rate Model", *Journal of Political Economy*, 91(4), 589-610.
- Barro, R J and Gordon, D B (1983): "Rules Discretion and Reputation in a Model of Monetary Policy", Working Paper No. 1079, National Bureau of Economic Research.
- Bini-Smaghi, L and Gros D (2001): "Is the European Central Bank Sufficiently Accountable and Transparent?" CEPS Working Paper No. 7, Brussels.
- Calderon, C and Schmidt-Hebbel, K (2008a): "What Drives the Choice of Inflation Targets Around the World?" World Bank, The Fondecyt Research Project No. 1060175.
- Calderon, C and Schmidt-Hebbel, K (2008b): "What Drives Inflation in the World?" Central Bank of Chile, Working Paper No. 491, The Fondecyt Research Project, No. 1060175.
- Carpenter, S (2004) "Transparency and Monetary Policy: What does the Academic Literature Tell Policymakers?" Working Paper, Board of Governors of the Federal Reserve System, April.

- Chortareas, G., Stasavage, D and Sterne G (2002a): “Does it Pay to be transparent? International Evidence from Central Bank Forecasts” *Federal Reserve Bank of St. Louis Review*, 84(4), 99-117.
- Cukierman, A and Meltzer, A (1986): “A theory of ambiguity, credibility and inflation under discretion and asymmetrical information” *Econometrica* 54, 1099-1128.
- Cukierman, A (1992): *Central Bank Strategy, Credibility, and Independence*. Cambridge: MIT Press.
- Croissant, Y and Millo, G (2008): “Panel Data Econometrics in R: The Plm package” *Journal of Statistical Software*, 27(2). <http://www.jstatsoft.org/v27/i62/>
- Crujisen, van der C A B (2008): “The Economic Impact of Central Bank Transparency: A Survey”, D.N.B, Working Paper, CEPR Discussion Paper No.6070.
- Dincer, N N and Eichengreen B (2009): “Central Bank Transparency: Where, Why, With What Effects?” Working Paper, 13003, National Bureau of Economic Research.
- Eijffinger, C W and Geraats, P M (2006): “How Transparent are Central Banks” *European Journal of Political Economy*, 22(1), 1-21.
- Fry, MDJ., Mahadeva, L., Rober, S and Sterne,G (2000): “Key Issues in the Choice of Monetary Policy Framework.” In L. Mahadeva and G. Sterne (eds.) *Monetary Policy Frameworks in a Global Context*. London: Routledge 1-216.
- Galindo, L M and Ros, J (2008): “Alternatives to Inflation Targeting in Mexico”, *International Review of Applied Economics*, 22(2), 201-14.
- Geraats, PM (2001): “Precommitment, Transparency and Monetary Policy Discussion Paper Series 1: Economic Studies 2001, 12 Deutsche Bundesbank, Research Centre.
- Geraats, P M (2002): “Central Bank Transparency”, *Economic Journal*, 112(483), 532-565.
- Geraats, PM (2005): “Transparency and Reputation: The Publication of Central Bank Forecasts.” *Topics in Macroeconomics* 5 (1), 1-26.
- Geraats, P M (2009): “Trends in Monetary Policy Transparency CESIFO”, Working Paper 2584, Category 7: Monetary Policy and International finance www.SSRN.com
- Gerlach, S (1999): “Who Targets Inflation Explicitly?” *European Economic Review*, 43, 1257-1277.
- Goncalves, C and Carvalho, A (2008): “Who Chooses to Inflation Target?” *Economic Letters*, 99, 410-413.
- Green, J H (1996): “Inflation Targeting: Theory and Implications” Staff Papers, International Monetary Fund, 43(4), 779-795.
- Grilli, V., Masciandaro, D and Tabellini, G (1991): “Political and Monetary Institutions and Public Financial Policies in the Industrial Countries. “ *Economic Policy* 13, 341-392.
- Grunberg, E and Modigliani, F (1954): “The Predictability of Social Events,” *Journal of Political Economy* 62, 465-478.
- Haan de, J and Hag van’t, G J (1995): “Variation in Central Bank Independence across Countries: Some Provisional Empirical Evidence, *Public Choice* 85, 335-351.
- Hahn, V (2002): *Transparency in Monetary Policy: A Survey*” Ifo Studien Zeitschrift fur empirische Wirtschaftsforschung 48 (3), 429-455
- Hausman, J (1978): “Specification Tests in Econometrics”, *Econometrica*, 46, 1251-1271.
- Hausman, J and Taylor, W (1981): “Panel Data and Unobservable Individual Effects”, *Econometrica*, 49, 1377-1398.
- Hu, Y (2003): “Empirical Investigation of Inflation Targeting”, 3rd Chapter of PhD. Dissertation,

- Department of Economics, Georgetown University.
- King, M (1997): “Changes in U.K. Monetary Policy: Rules and Discretion in Practice”, *Journal of Monetary Economics*, 39, 81-97.
- Kydland, F E and Prescott, E C (1977): “Rules Rather than Discretion in Practice”, *Political Economy Journal*, 85 (3), 473-492.
- Lane, P (1995): “Inflation in Open Economies” *Journal of International Economics*, 42, 327-347.
- Lippi, F (1999): *Central Bank Independence Targets and Credibility*, Edward Elgar Publishing Inc, Cheltenham
- McNees, S K (1987): “Prospective Nominal GNP Targeting: An Alternative Framework for Monetary Policy”, *New England Economic Review*, September/October, 3-9.
- Mishkin, F S (2007): *The Economics of Money, Banking, and Financial Markets, Eighth Edition*; Pearson Addison Wesley.
- Morris , S and Shin, H S (2002): “Social Value of Public Information” *The American Economic Review* 92(5)
- Muth, J F (1961): “Rational Expectations and the Theory of Price Movements.” *Econometrica* 29, 315-335.
- Nasser, O M., Sachida, A and Mendonca de M J C (2009): “The Openness-Inflation Puzzle: Panel Data Evidence “. *International Research Journal of Finance and Economics* 28, 169-181.
- Nhavira, JDG., Ocran, MK (2012): Determinants of Monetary Policy Transparency” *Journal of Studies in Economics and Econometrics*.
- Posen, A S (2003): “Six Practical Views of Central Bank Transparency” in Paul Mizen, ed., *Central Banking, Monetary Theory and Practice: Essays in Honour of Charles Goodhart*, Vol.1, Cheltenham: Edward Elgar.
- Rogoff, K (1985): “The Optimal Degree of Commitment to a Monetary Target”, *Quarterly Journal of Economics*, 100(4), 1169-90.
- Romer, D (1993): “Openness and Inflation: Theory and Evidence”, *Quarterly Journal of Economics*, 108, 869-903.
- Ross, S.A. (1973), The economic theory of Agency: The Principal’s problem. *American Economic Association* 63 ec(2) 134-139.
- Sibert, C A (2006): “Is Central Bank Transparency Desirable?” CEPR Discussion Paper No. 5641.
- Siklos, P L (2002): “ *The Changing Face of Central Banking: Evolutionary Trends Since World War II*” Cambridge: Cambridge University Press.
- Sorenson, J R (1991): “Political Uncertainty and Macroeconomic Performance”, *Economic Letters*, 37, 377-381.
- Svensson, L E (1998a, 199b): “Does the P* Models Provide any Rationale for Monetary Targeting?” CEPR Discussion Papers 2198, C.E.P.R. Discussion Papers.
- Taylor, JB (1993): “Discretion versus Policy Rules in Practice”, *Carnegie-Rochester Conference Series on Public Policy* 39195-214.
- Walsh, C E (1998): “*Monetary Theory and Policy*” Massachusetts Institute of Technology, Massachusetts.
- Walle van de , N and Bratton, M (1997): “ *Democratic Experiments in Africa*. “ New York: Cambridge University Press.
- World Bank (2005): “Agricultural Growth and Land Reform in Zimbabwe: Assessment and

Recovery Options”, Report No.3199-zw February 28, Environment, Rural and Social Development Department-AFTS1, Country Department 3 Zimbabwe Africa Region.

APPENDIX

Table 1: Inflation prior and after Monetary Policy Transparency

		Pre- MPT	Post-MPT	Difference
	Reform of	Ave-	Ave-	
Country	CB Act	Inflation*	Inflation*	between post- and
	Year	1980-89	1990-2010	pre monetary policy
				transparency
Ethiopia	1994	4.6	19.0	14.4
Ghana	2002	47.23	29.3	-17.9
Kenya	1995	13.58	14.9	1.3
Malawi	1989	16.3	17.95	1.7
Mauritius	2004	11.15	9.8	-1.4
Nigeria	1991	20.89	24.8	3.9
Rwanda	1999	4.7	12.95	8.3
Uganda	1993	100.1	14.25	-85.9
Zambia	1996	27.86	24.9	-3.0
Lesotho	2000	14.6	10.65	-4.0
Namibia	1997	14.6	11.05	-3.6
South Africa	2000	14.6	10.9	-3.7
Sierra Leone	2000	62.95	25.6	-37.4
Zimbabwe	2010	61.7	33001730.75	33001669.1
Tanzania	1995	30.07	14.95	-15.1
Botswana	1996	10.8	15.6	4.8
Angola	1997	0	57.65	57.7
Mozambique	1992	9.21	21.4	12.2
Average		23.72	19.74	-4.0

Source: TransparencyDincer and Eichengreen (2007) except for* by author

Source: inflation data World Bank data base

average figures exclude Zimbabwe

Table 2:Sub-Saharan Africa Country Real GDP average growth rates

	Average	Average	Average							Average
	1980-89	1990-9	2000-5	2006	2007	2008	2009	2010	Total	2006-10
Angola	3.5	1	9.9	19.5	23.9	13.8	2.4	1.6	61.2	12.24
Botswana	10.9	5.6	5.6	5.1	4.8	3.1	-3.7	8.6	17.9	3.58
Ethiopia	2	3.3	4.7	11.5	11.8	11.2	10	8	52.5	10.5
Ghana	2.6	4.3	5.1	4.6	6.5	8.4	4.7	5.7	29.9	5.98
Kenya	4.1	2.2	3.4	6.3	7	1.6	2.6	5	22.5	4.5
Malawi	2.4	3.8	3.4	7.7	5.8	8.6	7.6	6.6	36.3	7.26
Mauritius	5.9	5.3	4	4.5	5.9	5.5	3	4	22.9	4.58
Mozambique	-0.9	5.7	8.4	4.5	5.9	5.5	3	4	22.9	4.58
Lesotho	4.1	4.3		5.3	4.3	5	4.5	4.5	23.6	4.72
Namibia	1.1	4	4.7	7.1	5.4	4.3	-0.8	4.4	20.4	4.08
Nigeria	0.8	2.4	5.8	6.2	7	6	7	8.4	34.6	6.92
Rwanda	2.5	-1.6	5.1	9.2	5.5	11.2	4.1	6.5	36.5	7.3
Sierra	0.5	-5.4	13.7	6.4	5.5	3.6	-1.7	2.8	16.6	3.32
South Africa	1.4	2	3.9	5.6	5.6	3.6	-1.7	2.8	15.9	3.18
Tanzania	3.8	2.7	6.5	7	6.9	7.3	6.7	6.5	34.4	6.88
Uganda	2.3	7.2	5.6	10.8	8.4	8.7	7.2	5.2	40.3	8.06
Zambia	1	0.2	4.7	6.2	6.2	5.7	6.4	7.6	32.1	6.42
Zimbabwe	3.3	2.7	-5.7	-3.5	-3.7	17.7	6	9	-9.9	-1.98

Source: World Bank Data base

Table 3: Real GDP prior and after Monetary Policy Transparency

	Pre-MPT	Post-MPT	Post-MPT	Post-MPT	Post-MPT	Difference between post- and Pre monetary policy transparency
	Ave-Real GDP	Ave-Real GDP	Ave-Real GDP	Ave-Real GDP	Ave-Real GDP	
Country	1980-89	1990-9	2000-2005	2006-2010	1990-2010	
Angola	3.5	1	9.9	12.24	3.61	0.11
Botswana	10.9	5.6	5.6	3.58	1.46	-9.45
Ethiopia	2	3.3	4.7	10.5	3.03	1.03
Ghana	2.6	4.3	5.1	5.98	1.97	-0.64
Kenya	4.1	2.2	3.4	4.5	1.41	-2.7
Malawi	2.4	3.8	3.4	7.26	2.18	-0.23
Mauritius	5.9	5.3	4	4.58	1.61	-4.29
Mozambique	-0.9	5.7	8.4	4.58	1.85	2.75
Lesotho	4.1	4.3	0	4.72	1.4	-2.71
Namibia	1.1	4	4.7	4.08	1.46	0.36
Nigeria	0.8	2.4	5.8	6.92	2.14	1.34
Rwanda	2.5	-1.6	5.1	7.3	2	-0.5
Sierra	0.5	-5.4	13.7	3.32	1.25	0.75
South Africa	1.4	2	3.9	3.18	1.09	-0.31
Tanzania	3.8	2.7	6.5	6.88	2.18	-1.62
Uganda	2.3	7.2	5.6	8.06	2.66	0.36
Zambia	1	0.2	4.7	6.42	1.85	0.85
Zimbabwe	3.3	2.7	-5.7	-1.98	-0.65	-3.95
Ave	2.85	2.8	4.9	5.7	1.8	-1.05
Ave excl Zim	2.82	2.8	5.6	6.1	1.9	2.8

Source: World Bank Data base

Table 4.: Reform of Central Bank Act by country and Year

	Reform of
Country	CB Act Year
Ethiopia	1994
Ghana	2002
Kenya	1995
Malawi	1989
Mauritius	2004
Nigeria	1991
Rwanda	1999
Uganda	1993
Zambia	1996
Lesotho	2000
Namibia	1997
South Africa	2000
Sierra Leone	2000
Zimbabwe	2010
Tanzania	1995
Botswana	1996
Angola	1997
Mozambique	1992
Average	

Source: Dincer and Eichengreen (2007)

Table 5: Parsimonious Model – Dependent variable –Inflation

Inflation	Coefficient	Robust STD. error	z	P> z
Real Interest	-.098213	.0487506	-2.01	0.044
Trade openness	-.1829437	.0826278	-2.21	0.027
Transparency	-.041323	.0089582	-4.61	0.000
Real GDP	-.0905981	.0525031	-1.73	0.084
M2 growth	.3585684	.0763842	4.69	0.000
_ Cons	.9498274	.1452926	6.54	0.000
Sigma_u	.17265613			
Sigma_e	.32670287			
Rho	.21831748			

(Fraction of variance due to u_i)

Random effects u_i ~ Gaussian Wald Chi2 (5) = 75.48

Corr (u_i, x) = 0 (assumed) Prob>Chi2 = 0.0000

Table 6 Parsimonious Model Dependent variable – Real GDP

Real GDP	Co efficient	Robust STD. error	z	P> 2
Trade openness	.2301086	.102157	2.25	0.024
Inflation	-.089763	.0633246	-1.42	0.156
M2 growth	-.0875523	.0717885	-1.22	0.223
_Cons	.6795062	.1249286	5.44	0.000
Sigma u	.1125473			
Sigma e	.36350765			
Rho	.08747571			

(Fraction of variance due to u_i)

Random effects u_i ~ Gaussian Wald Chi2 (3) = 10.59

Corr (u_i, x) = 0 (assumed) Prob >Chi2 = 0.0142

Table i: List of Variables

Variables	Symbol	Expected sign	Definition	Source
Institutional variable				
Transparency	Tr _{it}		Transparency rating as per Geraats(2006)	Dincer and Eichengreen(2007) and author
Structural variable				
Current account	CA _{it}		Current account position as a percentage of nominal GDP	World Bank database
Trade openness	TO _{it}	+	The average ratio of the sum of imports and exports of goods and services to GDP	World Bank database
Financial depth	FD _{it}	+	Ratio of M2 to nominal GDP	World Bank database
Monetary growth	M2 _{it}	+	Monetary growth per cent	World Bank database
Macroeconomic variable				
Real Interest rates	RR _{it}	+		World Bank database
Consumer price index	P _{it t}	+	CPI (per cent)	World Bank database
GDP Growth	Y _{it}	+	Real GDP growth (per cent)	World Bank database

Table ii: Diagnostics tests

Tests	Description
correlation	Tests for multicollinearity
Chow test	Tests if variables add predictive power
Breusch-Pagan test	Tests if error terms have constant variance
Hausman test	Tests to determine model to be used fixed effects or random effects
Wald-Chi-squared test	Tests whether the model is correctly specified

Table iii: Diagnostics results

Tests	Description
correlation	Multicollinearity was not detected
Chow test	variables add predictive power
Breusch-Pagan	Heteroskedsticity detected
Hausman	random effects model indicated
Wald-Chi-squared	Models are correctly specified

