



Monetary policy and commodity terms of trade shocks in emerging market economies[☆]



Seedwell Hove^{a,*}, Albert Touna Mama^b, Fulbert Tchana Tchana^c

^a Macroeconomics and Fiscal Management Global Practice, World Bank, Zimbabwe Country Office, Harare, Zimbabwe

^b School of Economics, University of Cape Town, Cape Town, South Africa

^c Macroeconomics and Fiscal Management Global Practice, World Bank, Washington, DC, USA

ARTICLE INFO

Article history:

Accepted 19 March 2015

Available online 18 April 2015

Keywords:

Commodity terms of trade

Monetary policy

DSGE

ABSTRACT

Commodity terms of trade shocks have continued to drive macroeconomic fluctuations in most emerging market economies. The volatility and persistence of these shocks have posed great challenges for monetary policy. This study employs a New Keynesian Dynamic Stochastic General Equilibrium (DSGE) model to evaluate the optimal monetary policy responses to commodity terms of trade shocks in commodity dependent emerging market economies. The model is calibrated to the South African economy. The study shows that CPI inflation targeting performs relatively better than exchange rate targeting and non-traded inflation targeting both in terms of reducing macroeconomic volatility and reducing the losses of a non-benevolent central bank. However, macroeconomic stabilisation comes at a cost of increased exchange rate volatility. The results suggest that the appropriate response to commodity induced exogenous shocks is to target CPI inflation.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

For many years, commodity terms of trade shocks have been shaping the macroeconomic dynamics of many emerging market economies (EMEs) (Kose, 2002; Mendoza, 1995). These shocks have proved to be very volatile and persistent, especially in commodity exporting emerging countries, resulting in significant macroeconomic volatility. The recurrence of large commodity terms of trade shocks has called into question the ability of alternative monetary policy frameworks to stabilise emerging market economies.

Several studies have analysed the macroeconomic implications of alternative monetary policy regimes under domestic and external shocks in small open economies (see e.g., Laxton and Pesenti, 2003; Gali and Monacelli, 2005; Medina and Soto, 2005; Devereux et al., 2006). They largely focus on shocks such as productivity shocks, interest rate shocks and demand shocks. While these shocks are important for EMEs, an important channel of fluctuations in EMEs has to do with the fact that their exports are undiversified and dominated by a few primary commodities. As such, these studies did not explain the case for country specific

commodity terms of trade shocks.¹ Because of the high volatility and persistence of commodity terms of trade shocks, their consideration may help to account for the high volatility of exchange rates and other macroeconomic variables observed in most EMEs (Chen and Rogoff, 2003). Also, commodity terms of trade shocks may induce unfavourable trade-offs between inflation and output gap variability. The risks they pose in EMEs call for policy intervention.

On policy responses to external shocks, the literature has given much prominence to the role of flexible exchange rates (see e.g., Friedman, 1953; Chia and Alba, 2006; Edwards and Yeyati, 2005), but Devereux (2004) has shown that flexible exchange rate without activist monetary policy may not achieve the desired outcomes. Recent studies have shown that alternative monetary policy regimes such as inflation targeting can play a role in dampening cyclical macroeconomic fluctuations and improve welfare in small open economies (see e.g., Svensson, 2000; Cuche-Curti et al., 2008). The choice of monetary policy regimes also matters because wages and prices of non-tradable goods are sticky in the short-run and the speed at which relative prices adjust depends crucially on the monetary policy regime. Although the role of monetary policy can be ascertained, the question that remains is, which monetary policy regime is effective in dealing with commodity terms of trade shocks in EMEs.

This study develops a multi-sector New Keynesian Dynamic Stochastic General Equilibrium (DSGE) model to evaluate the appropriate monetary policy responses to commodity terms of trade shocks in commodity dependent EMEs. Precisely, the paper analyses the

[☆] The authors would like to thank the anonymous referees and the participants at the ERSA/SARB workshop on Monetary and Macroeconomic Modelling, University of Pretoria seminar and CSAE conference in Oxford, UK for their many helpful comments. Financial support from Economic Research Southern Africa (ERSA) is gratefully acknowledged.

* Corresponding author. Tel.: +263 772 133 007.

E-mail addresses: seedieh@yahoo.co.uk, seedwellh@gmail.com (S. Hove), albert.touna.mama@gmail.com (A. Touna Mama), ftchanatchana@hotmail.com (F. Tchana Tchana).

¹ See e.g., Devereux et al. (2006), Gali and Monacelli (2005) and Mendoza (1995).

relative merits of CPI inflation targeting (CIT) rule compared with non-traded inflation targeting (NTIT) rule and exchange rate targeting (ET) rule in the face of commodity terms of trade shocks in commodity dependent EMEs. Within the same framework, the paper also examines the monetary policy implications of productivity shocks in the commodity sector. The model is framed in the new open economy macroeconomics (NOEM), which integrates nominal rigidities and monopolistic competition.² It builds closely on the work of [Devereux et al. \(2006\)](#) and [Gali and Monacelli \(2005\)](#) and extends their models by incorporating the commodity sector to account for country specific commodity terms of trade shocks in a broader monetary model using the framework of [Cashin et al. \(2004\)](#). The model is calibrated to the South African economy, a typical commodity dependent emerging market economy. South Africa is ideal for this analysis because it has a significant portion of trade (about 30% of GDP) which is concentrated in primary commodities such as gold, platinum and diamonds. Commodity exports account for about half of export earnings ([Stokke, 2008](#)), while the South African Rand is considered a commodity currency because of its sensitivity to the movement of commodity prices ([Cashin et al., 2004](#)).

The multi-sector DSGE set-up allows the distinction between non-traded inflation and CPI inflation which provides a richer framework for analysing dynamic macroeconomic responses to commodity shocks. The choice of a DSGE model is motivated by several factors. For instance, DSGE models are micro-founded in the sense that they are explicitly derived from the constrained optimising behaviour of households and firms in the economy ([Tovar, 2008](#)). Further, their structural nature permits clear identification, interpretation and discussion of alternative policy interventions and their transmission mechanisms ([Smets and Wouters, 2003](#)). Finally, as argued by [Woodford \(2003\)](#), DSGE models help to overcome the Lucas critique because the estimated deep structural parameters are less likely to change when policies change.

This paper contributes to the literature in two main ways. First, it incorporates the commodity sector in the multi-sector DSGE model of a small open commodity dependent emerging market economy. This allows explicit examination of the country-specific commodity terms of trade shocks and their implications for monetary policy. This characterisation especially in a dynamic equilibrium setting is not common to small open economy models. The paper argues that CPI inflation targeting is the appropriate monetary policy for commodity dependent emerging market economies because it stabilises both output and inflation. Its stabilising power is attributed to its forward looking nature, credibility and a flexible exchange rate which help to insulate the economy from external shocks.

Secondly, assuming an exogenous central bank loss function, the paper evaluates the implications of alternative monetary policy regimes for optimal monetary policy in countries which are prone to commodity shocks. This is important because different monetary policy rules contain important trade-offs for the economy. Most work done on commodity dependent emerging economies such as South Africa do not evaluate the policy implications of alternative monetary policy rules (see e.g., [Steinbach et al., 2009](#); [Alpanda et al., 2010](#)). Also, these studies did not consider one important feature of the economy; the exposure to commodity terms of trade shocks, an important source of economic fluctuations. Thus, this paper offers guidance for the formulation of monetary policy in South Africa and other commodity dependent emerging market economies.

The analysis shows that commodity terms of trade shocks have less impact on some macroeconomic variables such as aggregate output, non-traded output, exported output, consumption, labour and CPI inflation under CIT than under NTIT and ET rules. However, the stabilisation of the economy by CIT comes at the expense of high real and nominal

exchange rate fluctuations. The analysis also shows that the economy achieves less volatility in aggregate and sectoral output, consumption, labour and CPI inflation under CIT rule. On the other hand, NTIT rule delivers less volatility in non-tradable inflation. The comparison of central bank loss functions shows that CIT rule results in less social loss than other rules when the central bank prefers to stabilise inflation, interest rates and exchange rates. However, when the central bank cares more about output stabilisation, it achieves less central bank loss by targeting non-traded inflation, but the difference with CPI inflation targeting is very small.

The rest of the paper is structured as follows. [Section 2](#) develops the model while [Section 3](#) describes the calibration of parameters and solution of the model. [Section 4](#) analyses the results. [Section 5](#) provides the sensitivity analysis and [Section 6](#) concludes and provides policy recommendations.

2. The model

2.1. Basic outline of the model

The model describes a small open commodity exporting emerging market economy which has three domestic economic actors: consumers, firms and monetary authorities. There is one external sector which is the rest of the world. There are two production sectors in the domestic economy: traded and non-traded sectors. The traded sector (commodity export sector) produces primary commodities which are completely exported. This sector is meant to characterise the production and export of commodities, especially minerals in South Africa. The non-traded sector produces final goods which are consumed domestically. The commodity export sector is perfectly competitive while the non-traded goods sector faces monopolistic competition. The asymmetric consideration of the two sectors allows deeper analysis of their linkages in the presence of commodity terms of trade shocks. The external traded sector supplies imports to the domestic economy.

The model also features nominal rigidities in the form of [Calvo \(1983\)](#), staggered price setting in the non-traded sector. The nominal friction allows the model to reproduce realistic inflation dynamics and makes the framework suitable for the evaluation of monetary policy ([Clarida et al., 1999](#)). Capital stock is assumed to be constant.³ Consumers own firms and supply labour to the firms in return for profits and wages. Labour is assumed to be perfectly mobile across sectors which implies that nominal wages are similar in traded and non-traded sectors. The economy is assumed to be small relative to the rest of the world. Monetary policy is modelled as a Taylor rule that incorporates interest rate smoothing.

2.2. Consumers

There is a representative household who maximises its intertemporal utility subject to an intertemporal budget constraint. The household utility function is:

$$U = E_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{1-\sigma}}{1-\sigma} - \eta \frac{L_t^{1+\psi}}{1+\psi} \right) \quad (1)$$

where β is the subjective discount factor, η is the marginal disutility of work, σ is the inverse of the elasticity of substitution between consumption and labour and ψ is the inverse of wage elasticity of labour supply. σ and ψ are strictly positive while $0 < \beta < 1$. L_t is the total labour supply in both traded and non-traded sectors. C_t is a composite consumption

³ [McCallum and Nelson \(1999\)](#) argue that the capital stock may be irrelevant for the dynamics of the small open economy because its variation contributes very little to the business cycle fluctuations, at least in the US. Also, the inclusion of capital may make the analysis complex.

² See [Lane \(2001\)](#) for a detailed survey of the new open economy macroeconomics.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات