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19 October 2016

Online at https://mpra.ub.uni-muenchen.de/74664/
MPRA Paper No. 74664, posted 26 Oct 2016 23:56 UTC

Evolution of Exchange Rate Pass-through: Evidence from The Gambia

By

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Abstract

The degree to which a change in exchange rate is reflected in changes in the domestic prices is termed exchange rate pass through (ERPT). In this work, we trace the evolutionary path of the ERPT to domestic prices in The Gambia using 60 windows of rolling VARs from 2002m1 to 2012m12. Our findings show pass through is higher in the long run than in the short run, and that irrespective of the horizon considered EPRT has been declining since 2002. Hence, exchange rate fluctuations those not seem to pose any significant threat to monetary policy in The Gambia.

Keywords: Exchange Rate Pass Through, Inflation, Rolling VAR, The Gambia

1. Introduction

According to Goldberg and Knetter (1997) ''exchange rate pass-through is the percentage change in import prices in local currency resulting from a one percent change in the exchange rate between the exporting and importing countries''. Theoretical literature as well as the empirical findings are not unanimous on the effect of exchange rate on prices.

The two extreme cases of the impact of exchange rate on prices are the classical 'Law of One Price', where pass through is zero, and 'the Keynesian-fix-price idea incorporated in the open economy IS-LM model of the Meade-Mundell type' (Ziet, 1993). The classical Law of One Price works under perfect competition, homogeneous goods, and goods arbitrage where the real exchange rate is equal to one (absolute PPP) or equal to a constant (relative PPP). So changes in exchange does not affect prices. Under condition of imperfect goods substitutability, goods are priced as a markup added up to unit cost. Changes in exchange rate, given a constant unit cost and markup, will be completely reflected in the prices, hence pass through is complete (Goldberg and Knetter, 1997).
Models of imperfect competition, where domestic and foreign firms interact strategically to set prices and quantity are reminiscent with incomplete pass through (Dornbusch 1987).

Moreover, there are direct and indirect channels through which exchange rate changes affect domestic inflation (Laflachell, 1996). A fall in exchange rate directly increases the prices of imported finished and intermediate goods in local currency. When the exporting firm absorb some of the changes in exchange rate into its markup ERPT will be incomplete. This practice is called pricing to market (PTM).

The indirect channel works through making domestic products cheaper for foreign buyers, which increases demand for domestic products and finally raises aggregate demand. Finally, the increased aggregate demand raises domestic prices. In the short run when nominal wages are constant, real wages will be move down as prices rise. However, as workers demand higher pay to level their real wages, cost of production will raise and domestic prices will raise further.

It is of relevance to policy in that the effectiveness of monetary and exchange rate policies depend on how exchange rate changes affect domestic prices. Precisely, if exchange rate change is inflationary, then policy makers need to factor the exchange rate in their efforts to put inflation under control. Therefore, a low ERPT will give a greater freedom to monetary authorities to follow independent monetary policy and inflation targeting.

Empirical works of Campa and Goldberg (2005) for OECD and Hamid Faruqee (2006) for Euro area show short run pass through is lower than long run pass through, and all are found to be incomplete. Hakan Kara and Fethi Ogunc (2008) investigated the ERPT for Turkey employing a monthly VAR model based on McCarthy (1999) and found that exchange rate pass through has been reduced post IT in Turkey by any measure of inflation. Dedeoglu and Kaya (2014) employing a rolling VAR method, traced the trajectory of the pass-through coefficient and found that it has reduced after the development of inflation targeting in Turkey.

A handful of studies has been done on African economies which are supportive of incomplete pass through. Boamah (2012) uses a VAR approach for a selection of West African countries and found that ERPT is incomplete, highest in Ghana and lowest in Nigeria. Frimpong and Adam (2010) studied pass through for Ghana, using data on exchange rate, domestic inflation, interest rate (T-bill), and foreign price (US-inflation) in a VAR framework. They show incomplete pass through of 0.025 associated with a one percent depreciation of the exchange rate after a quarter, and 0.09 after eight quarters.

There is no work on exchange rate pass through that has attempted to investigate the evolution of the pass-through in The Gambia, and to this gap we intent to contribute.

2. Data and Methodology

We estimate the exchange rate pass through using monthly data from 2001M12 to 2012M12, collected from the IM IFS website and World Bank Global Economic Monitor databases online. We use the consumer price index instead of import or producer prices, which are not available for the Gambia. The UK Brent oil price is used as an indicator of supply shocks, M2 money supply is used an indicator of monetary policy stand, and finally we used the nominal effective exchange rate as a measure of exchange rate. Oil price control for the effect of international shocks on inflation and money supply controls for the effect of monetary policy effect on prices. All variables are seasonally adjusted using Census X12 and taking in their natural logarithmic form.

We use a rolling VAR method to evaluate the evolution of the pass-through in the Gambia. This method allows the researcher to detect any instability or structural shifts in the pass-through (De Gregorio et al., 2007). Using a rolling windows of 60 months, we estimate rolling VARs, derive impulses, and estimate the pass-through coefficient as:

$$ERPT_{t,t+s} = {}^{DP_{t,t+s}}/_{EP_{t.t+s}}$$

where $DP_{t,t+s}$ is the cumulative response of CPI to an exchange rate shock, and $EP_{t.t+s}$ is the cumulative response of exchange rate to exchange rate shock, and $ERPT_{t,t+s}$ is the pass through coefficient in time t over s horizon. AIC is used to establish the optimal lag in each window of VAR.

We estimate the pass-through using a four variable recursive VAR based on McCarthy (1999) and also found in Dedeoglu and Kaya (2014). Variables are ordered as follows: oil price-> money stock -> exchange rate -> consumer price. For lack of data we have not included output gap as a measure of demand shock, rather we include money stock as a proxy, in as much as monetary policy is responsive to demand shocks. Supply shock is identified by the dynamics of oil price; monetary policy shocks by money stock; and exchange rate shocks are then identified. The Based on Cholesky decomposition, structural shocks are derived according to the following equations:

$$\pi_t^{oil} = E_{t-1}\left(\pi_t^{oil}\right) + \varepsilon_t^{oil} \qquad (1)$$

$$\Delta e_t = E_{t-1}(\Delta e_t) + \varepsilon_t^{oil} + \varepsilon_t^{\Delta e} \qquad (2)$$

$$\Delta m_t = E_{t-1}(\Delta m_t) + \varepsilon_t^{oil} + \varepsilon_t^{\Delta e} + \varepsilon_t^{\Delta m} \qquad (3)$$

$$\pi_t^{cpi} = E_{t-1}(\pi_t^{cpi}) + \varepsilon_t^{oil} + \varepsilon_t^{\Delta e} + \varepsilon_t^{\Delta m} + \varepsilon_t^{cpi} \qquad (4)$$

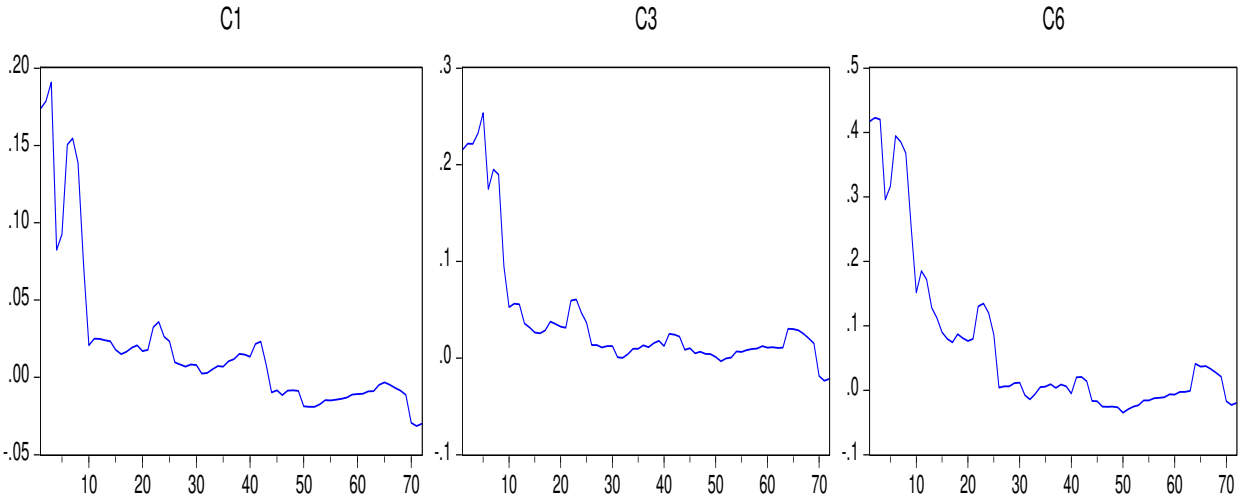
Where $\pi_t^{oil}, \Delta e_t, \Delta m_t, and\ \pi_t^{cpi}$ refer to oil price, change in exchange rate, change in money stock, and consumer price inflation.

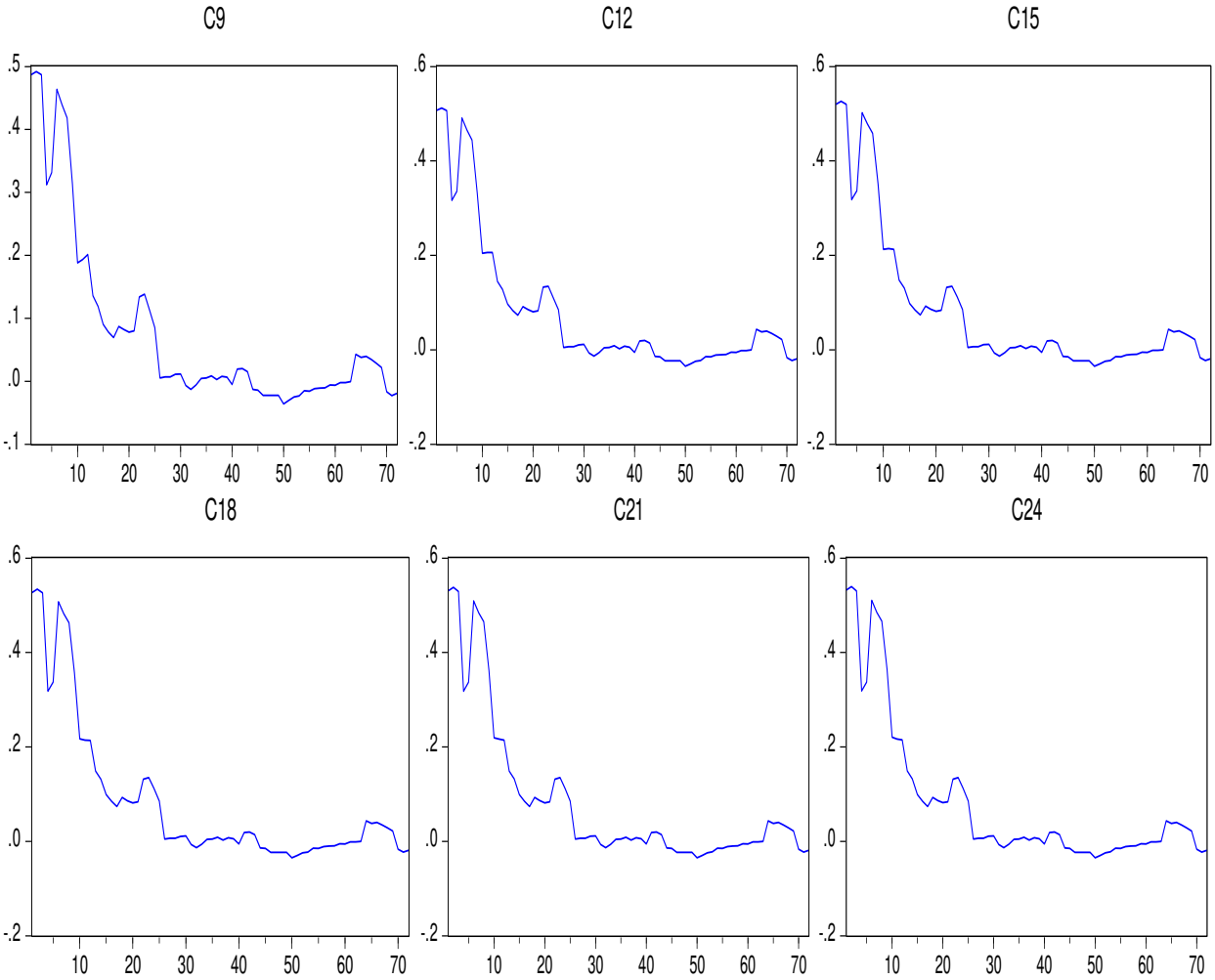
3. Estimation and Empirical Findings

To trace the evolution of the pass-through to consumer prices, we estimate a rolling VAR of 60 windows, where the first window spans 2001m12- 2006m11 period and the last window 2009m1 – 2012m12, a total of 73 windows. Rolling VARs are suited for their ability to examine parameter changes and possible instability in an unstructured fashion. Since all our variables are I (1) [see appendix], we follow McCarthy (1999) and Dedeoglu and Kaya (2014) to run a VAR in difference according to the procedure highlighted above (rolling VARs of 60 windows). For a maximum of six (6) lags, we used AIC to choose the optimal lag.

The graphs of the evolution of the ERPT are shown below and evidence show that over the longer horizon ERPT effects are higher. For example, ERPT for one month 20% whereas for 24 months reaches 55% in every 100% depreciation of the exchange rate. Another evidence is that ERPT has been declining drastically, infact in almost all horizons it approaches zero. In line with Taylor (2000) this can be explained in term of the low inflation environment maintain during this period. Inflation during the sample period has been kept under control, and never exceeded single digit.

Table ERPT Evolution





4. Conclusion

This paper investigates the evolution in the exchange rate pass-through for The Gambia using rolling VARs of 60 windows. Using different horizons, our findings are dual. One, in line the empirical literature reviewed, pass through in the short run is smaller than the long run pass through. Second, irrespective of the horizon chosen, pass through has been on the decline under the period of consideration. In line with Taylor (2000) these findings can be explained in the context of the slow inflation environment and the successful attempt by the Central Bank of The Gambia (CBG) to control inflation.

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Appendix

A. Unit Roots Test

Variable	Level		Difference	
	Constant	Cons. & Trend	Constant	Cons. & Trend
OIPR	-1.941 (0.31)	-2.769 (0.21)	-9.046* (0.00)	-9.068* (0.00)
NEER	-3.565* (0.00)	-3.351 (0.06)	-8.706* (0.00)	-8.866* (0.00)
M	-2.733 (0.07)	-1.937 (0.62)	-10.728* (0.00)	-11.176* (0.00)
CPI	-2.900* (0.04)	-2.919 (0.16)	-4.761* (0.00)	-5.276* (0.00)

B. Graphs