FINDING THEORETICAL AND EMPIRICAL SOLUTIONS TO THE THREE MAJOR PUZZLES OF EXCHANGE RATE ECONOMICS: APPLICATIONS IN RESPECT OF SOUTHERN AFRICAN MACROECONOMIC DATA

by

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SUMMARY

Finding theoretical and empirical solutions to the three major puzzles of exchange rate economics: applications in respect of Southern African macroeconomic data

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The thesis focuses on finding solutions to major exchange rate puzzles, which were discussed in detail by Obstfeld and Rogoff (2000). The first puzzle is the purchasing power parity puzzle. The first version of the latter puzzle is concerned with whether a real exchange rate reverts in the mean. To resolve the puzzle in the context of Southern African Development Community countries, the thesis uses Bayesian unit root testing and nonlinear nonstationarity tests associated with the smooth transition autoregressive family of models. According to Bayesian unit root test results, the nonstationarity hypothesis received small posterior probability relative to other hypotheses. In this setting, the Bayesian results strongly supported the hypothesis that all the real exchange rates were trend-stationary autoregressive processes. However, it should be pointed out that Ahking (2004) has found these tests to be biased toward trend stationarity.

Nonlinear nonstationarity tests presented evidence that four out of ten of SADC’s real exchange rates could be regarded as nonlinear globally ergodic processes, while others could be considered random walks.

The thesis relies on local-to-unity asymptotic theory and Rossi (2005a) to deal with the half-life version of the PPP puzzle. The half-life version is that a high degree of exchange rate volatility is generally associated with an implausibly slow speed of mean reversion. Depending on the robustness of the methods used, empirical evidence points to several half-lives of less than 36 months, but the confidence intervals of half-life deviations from PPP are found in all cases, as in Rossi’s work, to be too wide to be informative enough to resolve the puzzle.

In addition, the thesis undertakes Hinich and Chong (2007) class tests of fractional integration to ensure that a long memory process is not mistaken for a nonstationary process in finding solutions to the PPP puzzle. The results show that at 1 per cent and 5 per cent significance levels, the real exchange rates associated with South Africa, Mauritius and Swaziland are not fractionally integrated. Tanzania’s real exchange rate was found to be stationary-fractionally integrated but with the antipersistence property. Other currencies were found to be nonstationary-fractionally integrated.

The third puzzle is the exchange rate determination puzzle, which is as follows: In the short run there seems to be no reliable determinants of exchange rates. The thesis relies on the market microstructure approach to find the determinants of South Africa’s exchange rate. In this context, the thesis utilises autoregressive distributed lag model of cointegration to identify the fundamental and non-fundamental determinants of the rand/dollar exchange rate.

The main contribution of the thesis to the economic literature is the usage of newly developed methods in an attempt to resolve the above-mentioned puzzles.
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I also wish to thank my wife for taking care of the children when I was in England to study.
Table 1  List of acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF test</td>
<td>Augmented Dickey-Fuller test</td>
</tr>
<tr>
<td>ADF-GLS</td>
<td>ADF test proposed by Elliot, Rothemberg and Stock (1996)</td>
</tr>
<tr>
<td>AIC</td>
<td>Akaike information criterion</td>
</tr>
<tr>
<td>ARDL</td>
<td>Autoregressive distributed lag</td>
</tr>
<tr>
<td>AR(p)</td>
<td>Autoregressive order ( p ) process</td>
</tr>
<tr>
<td>CCBG</td>
<td>The Committee of Central Bank Governors in SADC</td>
</tr>
<tr>
<td>CES</td>
<td>Constant elasticity of substitution</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>CIP</td>
<td>Covered interest parity</td>
</tr>
<tr>
<td>CMA</td>
<td>Common monetary area</td>
</tr>
<tr>
<td>CPI</td>
<td>Consumer price index</td>
</tr>
<tr>
<td>DGP</td>
<td>Data generating process</td>
</tr>
<tr>
<td>DSGE</td>
<td>Dynamic stochastic general equilibrium</td>
</tr>
<tr>
<td>ESTAR</td>
<td>Exponential smooth transition autoregressive</td>
</tr>
<tr>
<td>FISTAR</td>
<td>Fractionally integrated smooth transition autoregressive</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross domestic product</td>
</tr>
<tr>
<td>GE</td>
<td>General equilibrium</td>
</tr>
<tr>
<td>GIRF</td>
<td>Generalised impulse response function</td>
</tr>
<tr>
<td>HDR</td>
<td>Highest density region approach</td>
</tr>
<tr>
<td>I(d)</td>
<td>Integrated of order ( d ), where ( d ) is a fraction</td>
</tr>
<tr>
<td>IRF</td>
<td>Impulse response function</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>KSS</td>
<td>Kapitanios, Shin and Smith</td>
</tr>
<tr>
<td>LM-type test</td>
<td>Lagrange-Multiplier-type test</td>
</tr>
<tr>
<td>LSTAR</td>
<td>Logistic smooth transition autoregressive</td>
</tr>
<tr>
<td>MAIC</td>
<td>Modified Akaike information criterion</td>
</tr>
<tr>
<td>NLADF</td>
<td>Nonlinear ADF</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary least squares</td>
</tr>
<tr>
<td>PP test</td>
<td>Phillip-Perron test</td>
</tr>
<tr>
<td>PPP</td>
<td>Purchasing power parity</td>
</tr>
<tr>
<td>SADC</td>
<td>Southern African Development Community</td>
</tr>
<tr>
<td>SBC</td>
<td>Schwarz’s Bayesian Information Criterion</td>
</tr>
<tr>
<td>SETAR</td>
<td>Self-exciting transition autoregressive</td>
</tr>
<tr>
<td>STAR</td>
<td>Smooth transition autoregressive</td>
</tr>
<tr>
<td>sup- ( t )</td>
<td>Supremum t-test</td>
</tr>
</tbody>
</table>