REAL EXCHANGE RATE DETERMINANTS IN TRANSITION ECONOMIES:
Do Macroeconomic Fundamentals and Political Risk Play a Role?

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Background

Introduction

Armenia witnessed an impressive economic growth during its transition from Soviet central to a market economy. By mid-2000s, Armenia was able to achieve a sustained economic growth, which was accompanied by drastic appreciation of Armenia's national currency by 43% between March 2003 and Sept 2007.

Rapid appreciation triggered alarms and gave rise to speculative theories of government manipulation to pocket hard currency and benefit government-connected importers. Central Bank denied all wrongdoing and insisted that drastic increases in dollar remittances and economic growth were major cause.

The real exchange rate (RER) is an important relative price that significantly impacts the long-run development and growth of the economy and social welfare. An increased understanding of exchange rate determinants and impacts should be quite useful in evaluating macroeconomic and monetary policies and anticipating their short and long run impacts.

The development of models that can successfully predict future exchange rates has become one of the major objectives of macro and monetary economists worldwide. All past developments in exchange rate modeling and estimation were undermined in Meese and Rogoff (1983) that showed that none of these models were able to out-perform the simple random walk model in out-of-sample forecasting.

Problem Statement

Rapid movements in exchange rate have generated serious social effects and speculative arguments and accusations dominate public-private debate. Scientifically robust explanations are timely and crucial to avoid further speculation and manipulations for political gains.

Objectives

- Identify the modeling approach that better suits the small sample properties of our study based on the evaluation of the out-of-sample forecasting power of various estimation approaches.
- Investigate the role of macroeconomic fundamentals on the real exchange rate dynamics in Armenia.
  - Do macroeconomic fundamentals influence RER?
  - Is there a politically motivated manipulation?
- Assess the potential of improving the out-of-sample forecasting performance of the real exchange rates model by accounting for the changes in the political climate and investment risk.

Data and Methodology

Model

This study follows the equilibrium real exchange rate approach pioneered by Edwards (1989) and subsequently adopted as a standards workhorse in analyzing real exchange rate dynamics.

$$\Delta \log e_t = \gamma_0 + \sum_{i=1}^{n} \gamma_i \left(fund_i \right)_t - \theta \log e_{t-1}$$
$$- \sum_{j=1}^{m} \lambda_j \left(policy_j \right)_t + \phi nomdev_t + \varepsilon_t$$

Where e is the real exchange rate, *fund* is a set of economic fundamentals, *policy* represents macroeconomic policy variables, and *nomdev* stands for nominal devaluation.

Data

Monthly data for 2004-2009 from IMF IFS, WEO, and National Statistical Service. Monthly observations for 2010 were preserved for out-of-sample forecasting.

- real effective exchange rate (*reer*)
- openness of trade (*open*)
- net foreign assets (*nfa*)
- domestic credit growth (*dcre*)
- productivity (*prod*)
- government spending (*gov*)
- remittances (*remit*)
- nominal devaluation (*nomdev*)
- political risk rating (*politic*)

Political risk measures are obtained from International Country Risk Guide (ICRG). ICRG Political Risk Rating has 12 indicators and covers 140 countries since 1984. Indicators are added to produce the aggregate political risk rating (*politic*).

Method

A. Multiple econometric approaches are utilized to analyze real exchange rate dynamics in relation to economic fundamentals and political risk.

- Vector Autoregression (VAR)
- Vector Error-Correction Model (VECM)
- Autoregressive Distributed Lag Model (ARDL)
- Random Walk

B. Models are evaluated for their out-of-sample forecasting performance based on the root mean sum squared error (RSME) and compared to the simple random walk (Table 1).

C. Individual political risk indicators are used in the ARDL specification to investigate if, as suggested by many, accounting for political risk will improve out-of-sample forecasting performance.

ARDL Methodology

The benefits of the ARDL (Pesaran and Shin, 1998) and Bounds testing (Pesaran, *et al.*, 2001) approach can be summarized as follows:

- Has better small sample properties.
- The testing approach is simple and once the cointegrating vector and the lag order have been identified the model can be estimated by OLS;
- This approach does not require pre-testing of the variables for the existence of unit-roots and thus minimizes the potential of uncertainty and it is applicable irrespective if the regressors in the model are purely I(0) or I(1); and
- The approach is adequate even when the model under consideration has endogenous regressors.

Key Findings

- Results provide a strong support for ARDL over the VAR and VECM in out-of-sample forecasting. Furthermore, results indicate that the ARDL model perform slightly better compared to the random walk (Table 1).
- Results suggest no significant improvement in forecasting power due to inclusion of political risk as suggested by the literature.
- Findings empirically confirm the theoretical findings of Pesaran and Shin (1998) and Pesaran *et al.* (2001) for this analysis.

Table 1. Out-of-Sample Forecasting Performance

Model	RMSE
VAR	0.2123
VECM	0.1062
ARDL	0.0130
Random Walk	0.0305

Table 2. Long-run parameter estimates from ARDL models

Model	base model	politic	democr	secon	extconf	intconf	invest	govstab
open	0.1891*	0.1928**	0.2246***	0.1891*	0.2357**	0.1880*	0.1797*	0.2015*
nfa	-0.0749*	-0.0790**	-0.1181***	-0.0750*	-0.1182***	-0.0739*	-0.0723*	-0.0908**
prod	0.1558	0.1436	0.0574	0.1536	0.0771	0.1574	0.1525	0.1526
dcre	-0.3794**	-0.3805**	-0.4078***	-0.3778**	-0.4357**	-0.3752**	-0.3550**	-0.3908**
gov	0.0079	0.0059	0.0453	0.0070	0.0337	0.0054	-0.0008	0.0268
remit	0.1618*	0.1396*	0.1999***	0.1625*	0.2101**	0.1574*	0.1300	0.1853**
nomdev	0.4617***	0.4300***	0.3892***	0.4616***	0.4553***	0.4584***	0.4366***	0.4627***
politic		0.0143						
democr			0.0795***					
secon				-0.0021				
extconf					0.0729*			
intconf						0.0039		
invest							0.0630	
govstab								-0.0316
ecm	-0.0986***	-0.1058***	-0.1148***	-0.0987***	-0.0989***	-0.0994***	-0.1047***	-0.0976***
constant	2.6395**	2.1926*	3.4471***	2.6627**	2.8437**	2.6210**	2.4280**	2.8219**

*** p<0.01, ** p<0.05, * p<0.1

Results and Implications

- Results strongly indicate that RER dynamics over the study period were driven by economic developments.
  - 10% reduction in trade restrictions and 10% growth in the inflow of remittances each generate approximately 2% real exchange rate appreciation.
  - 10% positive changes to the net foreign assets and domestic credit will induce permanent real exchange rate depreciation by approximately 1 and 4 percent, respectively.
- Results weigh against the claim that the government and the Central Bank directly manipulated the exchange rate.
- Policymakers and monetary authorities should take the natures and magnitudes of these relationships into account when designing monetary and/or macroeconomic policies to facilitate real long-term economic growth.
- The multi-directional impact of changes in various endogenous components of the economy is a major challenge in assessing macroeconomic dynamics in the economy. Our results help policymakers to understand these relationships and anticipate real exchange rate effects from policy changes that are not directed at the exchange rate as well as the multiple effects of policies that are directed at the exchange rate.
- Results also indicate that nominal devaluation can be a valuable tool for affecting the real exchange rate, however its effectiveness will depend on the magnitude of the nominal devaluation and country's ability to finance sustained interventions.
- Political risk indicators are often correlated with the main political and economic events in Armenia, but had a very weak or no effect on real exchange rate.
  - Major foreign investors to Armenia are Diaspora. Earlier studies suggest ethnic identity and in-country connections are more important motivational and triggering factors behind investment decisions than conventional business related concepts.

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