Optimal Levels of Reserves and Hedging Sudden Stops Recessions for Egypt: A Stochastic Control Approach

Ahmed S. Abutaleb1 and Marwa G. Hamad2

Abstract

This paper discusses the issue of optimal international reserves in Egypt during the period 1977-2007. We derive, using stochastic control, the optimal level of reserves to maximize the welfare of the society as measured by the utility of the consumption. The paper also presents a new approach to manage international reserves. It is proposed that part of the reserves will be held as risky assets. The risky assets are sensitive to the volatility index (VIX) of the Chicago Board Options Exchange (CBOE). The analysis reveals that the actual normalized level of reserves is in excess of the optimal one. Hence, the study recommends reducing the international reserves to the optimal level. This is almost 25% of the current levels of reserves. We also present a scenario whereby the reserves are reduced by almost half of its existing levels in year 2007. We then invest a small portion, through a sovereign wealth fund, in VIX based options. In case of crisis (sudden stop) the payoff of the options will yield an amount that is almost the same as the kept value of reserves. Following this strategy allows for an opportunity gain in the range of (1-2)% of GDP. Moreover, the study proposes the activation of other institutions role in the society to attract long term investments, maintaining a certain limit of coordination among fiscal and monetary policies and consolidating the norms of ethical standards in the financial system.

Key words: International Reserves, Sudden Stops, Stochastic Control.

1 Previously with MIT/Lincoln Lab, Lexington, Mass, USA, and currently with Cairo University, School of Engineering, Giza, Egypt
2 Information and Decision Support Center (IDSC), The Cabinet of Ministers, The Government of Egypt, Cairo, Egypt.