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Cointegration Tests of Purchasing Power Parity in Africa

JOSEPH M. KARGBO *
American Express Financial Advisors, Inc., Falls Church, Virginia, USA

Summary. — Despite two decades of implementing economic reforms, there is still a significant gap between official and black market exchange rates in Africa. African policy makers continue to implement exchange rate policies based largely on the assumption that purchasing power parity (PPP) holds. This paper examines whether there is empirical support for PPP in Africa. We used Johansen's cointegration technique and error correction modeling on annual data for black market exchange rates and CPI in 30 countries covering 1960–97. We found strong support for the PPP doctrine as a useful guide for exchange rate policy reform in Africa.

Key words — African countries, black market exchange rates, cointegration tests, PPP

1. INTRODUCTION

The purchasing power parity (PPP) theory is an essential building block in international monetary economics. As a theory of exchange rate determination, PPP asserts that the change in exchange rates between two currencies is determined by the relative prices of the two countries. The contemporary treatment of PPP dates back to the works of Swedish economist Gustav Cassel in the early part of the 20th century (see, for example, Bahmani-Oskooee, 1993a, 1993b; Bigman, 1984; Cassel, 1916, 1921; Dornbusch, 1988; Officer, 1976). At the same time, our thinking about exchange rates and the balance of payments in various countries has been influenced significantly by the revolutionary developments in the global monetary system that started during the 1970s with the introduction of the generalized floating exchange rate regime, to developments in international banking and information networks, coupled with rapid and sweeping changes in national monetary policies. These developments revived interest in the PPP doctrine, motivated mainly by the belief that the equilibrium exchange rate is determined by the PPP relation. Thus, over time, a flexible exchange rate will move toward that equilibrium.

There has been a lot of controversy concerning the usefulness of the PPP doctrine as an exchange rate determination model. Some economist even questioned its validity. For example, Frenkel (1981, p. 145) observed:

> During the 1970s short-run changes in exchange rates bore little relationship to short-run differentials in national inflation rates and frequently, divergences from PPPs have been cumulative.

Other researchers, such as Baillie and Selover (1987), Kravis and Lipsey (1978), and Taylor (1988) found no support for long-run PPP. Bahmani-Oskooee (1993a) found mixed results about the existence of PPP in 25 developing countries that he studied. There was no support for PPP when effective exchange rates were used in testing for PPP, but he found support for PPP in seven out of the 25 countries when bilateral exchange rates were used in the analysis. Research by Aggarwal and Simmons (2002), Cheung and Lai (1993), Fleissig and Strauss (2000), Kim (1990), Liu (1992), and

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Salehizadeh and Taylor (1999) also provided empirical support for long-run PPP. [1] To the extent that PPP holds, it provides a link between the prices of goods in various countries, which when coupled with interest rate parity, enhances our understanding of exchange rate behavior. Studies which found prolonged deviations from PPP cast doubt on the ability of PPP-based models to provide satisfactory explanations for the behavior of exchange rates. Aizenman's (1984) paper provided a model that integrated deviations from PPP with an analysis of the determinants of exchange rates, thereby providing a link between the two strands.

The common thread among all of the studies cited above is that they used official exchange rates, and concentrated exclusively on industrialized countries, with the exception of Aggarwal and Simmons (2002), Bahmani-Oskooee (1993a, 1993b), Liu (1992), and Salehizadeh and Taylor (1999) who concentrated on developing countries. [2] Moreover, the above studies used a variety of measures, such as the CPI, wholesale price index (WPI), gross domestic product (GDP) deflator, wage rates and food price indexes as national prices. As a group, industrialized countries are characterized by relatively low inflation rates, similar levels of economic development and macroeconomic policies, high degree of political and economic interdependence (e.g., the European Union and Organization for Economic Cooperation and Development), and the free flow of capital goods and services. On the other hand, the majority of developing countries generally experience high inflation rates, exchange rate and trade controls, rapid monetary growth, capital flight, structural (real) shocks, large and persistent government budget deficits, lack of highly efficient markets, and poor data management techniques, such as delays and interruptions in statistical releases of national data. All of these factors could distort the proper functioning of prices and exchange rates in the economy. A large number of African countries have experienced annual inflation rates as high as 370% during 1985–95. [3] The Communauté Financière Africaine (CFA) franc zone countries experienced lower inflation rates compared to other African countries during the 1960s through the early 1980s. [4] At the same time, several African countries have also experienced real shocks, such as reductions in terms of trade, droughts, oil shocks, civil wars and other forms of political instability (Kargbo, 1994, 2003; Krichene, 1998). The above problems could have destabilizing effects on the PPP relation in African countries. Research has shown that PPP may be a more relevant theory in higher-inflation countries than those with very low inflation rates (see for example, Bahmani-Oskooee, 1993a, 1993b; Dornbusch, 1988; Officer, 1976). It is argued that monetary growth in higher inflation countries could overshadow the effects of real factors. Whether this is the case in our sample of countries under study is a matter to be determined as the analysis in this paper unfolds.

Pervasive corruption and implementation of inappropriate policies enhanced the development of parallel market for foreign exchange and other goods, speculative activities in agricultural trade, and the smuggling of essential goods to neighboring African countries. Black market exchange rates depend on underlying supply and demand factors for foreign exchange, thus, to a large extent reflect the government's exchange rate policies in the country. Exchange rate controls and lack of access to the official exchange rate market could result in a burgeoning black market for foreign exchange. Over the years, the importance and coverage of black markets varied across African countries. In some countries, e.g., the CFA franc zone, the black markets for foreign exchange were thin. In others, e.g., Uganda, Algeria, Ghana and Sierra Leone, the black market was broad, and the black market exchange rate was the relevant marginal rate for a majority of transactions (see Edwards, 1989; Nagayasu, 1998; World Bank, 1986). Even though a large number of African countries have adopted more flexible exchange rate regimes during the past couple of years, there is still a significant gap between official and black market exchange rates. The black market premium—that is the percentage excess of the black market price of foreign currency (e.g., dollars) over the official exchange rate ranged from a low of 2% in the CFA franc zone to over 15,000% in Uganda during 1980–97. The terms *black* market and *parallel* market convey the same meaning in this paper, thus, they are used interchangeably.

Recently, a number of economists have focused their attention on investigating whether or not there is empirical support for long-run PPP in African countries. The interest in PPP studies in Africa emanated from the fact that several African countries have been implementing World Bank and IMF (International Monetary Fund) supported monetary and macroeconomic reform policies during much of