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Conditional pricing of currency risk in Africa's equity markets

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ABSTRACT

In this paper, we sought to establish whether Africa's volatile currencies drive equity risk premia. We use the SDF framework to estimate various conditional specifications of the International Capital Asset Pricing Model through generalized method of moments technique. Our results show strong evidence of conditional, time-varying currency risk premia in equity returns. Currency risk is also perceived by international investors as important in informing the equities pricing kernel. Interestingly, we find evidence that international investors are concerned about Africa's small size equity markets and build the impact of anticipated low trading into their pricing calculus.

1. Introduction

Africa's equity markets have recently attracted increased interest among international investors. According to AfDB (2013), total external financial flows to Africa reached a historic high of an estimated USD 186.3 billion in 2012, up from USD 158.3 billion in 2011, while the flow of foreign direct investment and portfolio investment has quadrupled since 2001. Although the interest in Africa's equity markets as important investment destinations has been explained by the recent fast pace of growth of Africa's economies (AfDB, 2013), Africa's equity markets are also considered attractive for portfolio diversification purposes because they tend to exhibit low correlations with the rest of the world (Alagidede et al., 2011; Harvey, 1995). Indeed, many of the stock markets in Africa performed better, on a risk-adjusted basis, than most markets around the world during the 2007/8 financial crisis with some markets actually realizing positive returns (Allen et al., 2011).

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In practice, portfolio diversification benefits are evaluated against associated risks. In particular, international investors, whose returns are denominated in foreign currencies, find it necessary to adjust their returns for currency risk. In a fixed exchange rate regime, exchange rate fluctuations are minimal, if any, and governments guarantee the convertibility of their currencies. Thus, if monetary policy can achieve stability in inflation rates, real exchange rates would be stable and foreign investors would worry less about real exchange rate fluctuations.[1] When nominal exchange rates are flexible, monetary policy management becomes more complex, and, real exchange rates typically exhibit volatility.

When exchange rates are volatile, international portfolio investors face the prospects of earning negative risk-adjusted returns on the foreign assets in their portfolios. Thus, they might demand a premium commensurate with the perceived risk of exchange rate fluctuations. But, how volatile are real exchange rates in Africa? Kodongo and Ojah (2011) developed a representative trade-weighted real exchange rate index (against the US dollar) for Africa, labeled the "Afro". To make it more comparable with similar indexes, we have slightly modified the Afro index to incorporate time-varying weights.[2] Thus, we now construct the Afro index at time t, I_t, as:

$$I_t = I_{t-1}\prod_{j=1}^{n}\left(RER_{j,t}/RER_{j,t-1}\right)^{W_{jt}} \tag{1}$$

where $RER_{j,t}$ and W_{jt} are, respectively, the local currency-US dollar real exchange rate and the weight of country j at time t; $W_{jt} = \frac{X_{jt}}{\sum X_{jt}}$ $(X_{jt} = \varphi_{jt} + \phi_{jt}, \sum_{j=1}^{n} W_{jt} = 1)$, such that $\varphi_{jt} = \frac{\text{Country } j\text{'s imports from USA in month } t}{\text{Country } j\text{'s total imports in month } t}$; and $\phi_{jt} = \frac{\text{Country } j\text{'s exports to USA in month } t}{\text{Country } j\text{'s total exports in month } t}$. We obtain the direction of trade data from the IMF and the World Trade Organization.

The time series trend of the Afro index, for the period January 1999 through December 2013, is juxtaposed against the OITP (other important trading partners), MAJOR and BROAD indexes of the Reserve Bank of the USA, in Fig. 1.[3] The OITP index is constructed from currencies of emerging countries which we believe to be in direct competition with African countries for capital flows. The MAJOR index comprises of (the most studied) currencies of major industrial economies and is used here for benchmarking purposes. The graph shows not only a high correlation among the indexes (indicating their comparability), but also that the Afro index had a larger dispersal of values than the other indexes.

To scientifically validate our visual observations, we use the standard deviation to measure the variability of real exchange rates and the following commonly used metric of short run volatility in exchange rates (see e.g., Chowdhury, 1993 and Sun et al., 2002):

$$V_t^S = \sqrt{m^{-1}\sum_{i=1}^{m}\left(\ln R_{t+i-1} - \ln R_{t+i-2}\right)^2} \tag{2}$$

where R_t is the real exchange rate at time t, and $m$is the order of moving average (for this analysis, we have set $m = 2$). In the results, presented in Table 1, the standard deviation indicates that the Afro index was the most variable of the four indexes during the 1999–2013 period. The volatility metric also shows that the Afro index is highly volatile, even though it is comparatively less volatile than MAJOR, perhaps an indication of greater flexibility of the currencies of industrial countries that comprise the latter. In spite of the high volatility of African exchange rates, foreign direct and portfolio investments to Africa actually increased during this period (AfDB, 2013). Given these observations, it is interesting to ascertain whether international investors, whose portfolio holdings increased during this period, deemed Africa's volatile exchange rates to constitute a significant additional risk to their portfolio positions.

[1] However, investors will still be concerned about unexpected currency devaluations/revaluations.

[2] The resulting series has a correlation of 99.8% with the series constructed by Kodongo and Ojah (2011).

[3] The countries whose currencies are included in each index are as follows: AFRO — Botswana, Egypt, Ghana, Kenya, Mauritius, Morocco, Namibia, Nigeria, South Africa, and Tunisia; OITP — Mexico, China, Taiwan, Korea, Singapore, Hong Kong, Malaysia, Brazil, Thailand, Philippines, Indonesia, India, Israel, Saudi Arabia, Russia, Argentina, Venezuela, Chile and Colombia; MAJOR — Euro Area, Canada, Japan, United Kingdom, Switzerland, Australia, and Sweden; BROAD — all MAJOR and all OITP currencies. Monthly trade data are not available for Botswana and Namibia; we use annual data assuming that trade is evenly spread throughout each year.