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The proof is in the pudding: Arbitrage is possible in limited emerging markets[☆]

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ABSTRACT

We investigate whether arbitrage trades exist in emerging markets with trading barriers. Using two-year intraday data for 16 Argentinean and Egyptian depository receipts and their underlying stock, we find large intraday deviations from parity. We extend the standard arbitrage identification procedure to account for volumes and precise dynamic measures of trading costs, resulting in 9.81% and 15.32% of Argentinean and Egyptian matched trades identified as arbitrage opportunities, which we show, result in real profitable arbitrage trades. Arbitrage profits of USD 1.8 million from Argentinean and USD 1.2 million from Egyptian depository receipts were estimated over the sample period.

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1. Introduction

Arbitrage, the simultaneous purchasing and selling of identical assets to take advantage of price differences, has been referred to as “one of the central concepts of financial economics” (Mitchell et al., 2002). In this paper, we study arbitrage in the market for emerging market depository receipts (DRs) and examine its role in the efficient pricing of those cross-listed equities.

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In theory, since DRs and their underlying stock represent identical claims on a firm's cash flows, arbitrage should keep their prices in parity, as long as arbitrage costs are sufficiently small. In financial models, the costs of arbitrage are typically assumed to be zero, so arbitrage opportunities disappear almost as quickly as they appear. As prices diverge, arbitrageurs intervene to bring prices back to parity by buying the underpriced security in one market and selling the other at a higher price in the other market, thereby making risk-free profit. A unique feature of DRs that ensures efficient arbitrage is their *fungibility*, which allows arbitrageurs to exchange freely between the cross-listed pair.

We examine two central questions involving the efficiency of arbitrage operations in the DR market. The first is whether arbitrage opportunities exist between DRs and their underlying stocks. The lack of such opportunities confirms that markets are efficient and integrated since prices of identical securities align across different markets. Should we find evidence of arbitrage opportunities, however, their existence only compromises market efficiency if such risk free profitable opportunities persist without being utilized or explained by microstructure limitations to arbitrage. This poses the second question on how arbitrage opportunities disappear and the role of arbitrageurs in this process.

Most of the empirical literature on arbitrage so far has focused on studying the first question of whether arbitrage opportunities exist. Early studies rely on daily closing prices and find no evidence for significant deviations from parity between DRs and their underlying stocks (Rosenthal, 1983; Kato et al., 1991; Park and Tavakkol, 1994). Yet because different markets have different trading hours, a daily analysis provides a more global picture since it usually compares prices that do not occur in the same point in time. This motivated more recent studies to rely on intraday data. They still find either zero arbitrage opportunities (Miller and Morey, 1996) or extremely small, infrequent, and short-lived ones (Suarez, 2005a).

These previous results are not surprising given that those studies use samples from developed market DRs in which trading costs are relatively low, liquidity is relatively high, and trading barriers are absent. But these conditions do not hold in many emerging markets, and emerging market DRs have increasingly come to dominate foreign cross-listing (Global Finance, 2010). A recent study by Gagnon and Karolyi (2010) provides evidence for large deviations from parity in emerging market DRs. Such deviations were attributed to large transaction costs and trading barriers that could limit arbitrage operations from taking place. Their underlying data are sampled daily, however, and *“as a result (they) cannot know for certain whether the patterns in price deviations are economically real or artifacts of asynchronous trading between the two securities”*.

Our paper contributes to the arbitrage literature as follows. First, it extends previous studies studying whether arbitrage opportunities exist by conducting the first intraday contemporaneous analysis on DRs from emerging markets. We provide evidence on the presence of large arbitrage opportunities, after accounting for various limits to arbitrage present in those markets, and confirm the hypothesis that they appear in markets exhibiting lower degrees of efficiency and integration (Suarez, 2005a). Second, our study provides an original empirical analysis on the role of arbitrageurs in eliminating arbitrage opportunities. This was so far a largely unexamined question that draws on a slim body of literature that tests whether trades are important for price convergence between cross-listed stocks (Kaul and Mehrotra, 2007). Our results show the importance of arbitrage trades in eliminating arbitrage opportunities.

This study focuses on two emerging markets: Argentina and Egypt. We use two years of intraday data on Argentinean stocks listed on the Buenos Aires Stock Exchange (BCBA) and cross-listed as American DRs (ADRs) on US exchanges, as well as Egyptian stocks listed on the Egyptian Stock Exchange (EGX) and cross-listed as Global DRs (GDRs) on the London Stock Exchange (LSE). The inclusion of different host and destination countries enables us to compare results across settings. Furthermore, our sample overcomes asynchronicity problems by focusing on overlapping periods when arbitrageurs could trade both the DR and the underlying stock. In the emerging markets we study, both local markets allow full fungibility¹ between the DR and its underlying stock, ensuring feasibility of arbitrage

¹ There is no restriction on the conversion of Argentinean stock to ADRs (Auguste et al., 2006), and such conversions have been shown to aid capital flight during Argentinean crisis. This is the same case in Egypt, as supported by data obtained from the Egyptian Depository and Clearing House. It reveals a large number of issuances and cancelation between Egyptian GDRs and their underlying stock.

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