# Rate of return parity and currency crises in experimental asset markets

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## Abstract

This paper explores the impact of exchange rate uncertainty on the predictive power of rate of return parity in a laboratory environment, extending the work of Fisher and Kelly [Fisher, E.O., Kelly, F.S., 2000. Experimental foreign exchange markets. Pacific Economic Review 5, 365–388] and Childs and Mestelman [Childs, J., Mestelman, S., 2006. Rate of return parity in experimental asset markets. Review of International Economics 14, 331–347]. While these works use unchanging exchange rates, this paper allows for a change in the exchange rate between laboratory currencies. The data indicate rate of return parity is weakened by the potential for a currency crisis. The results also indicate that currency crises can be caused by self-fulfilling prophecies and that the level of reserves with which a fixed exchange rate is defended impacts the timing of a crisis but does not significantly change the likelihood of a currency crisis.
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## 1. Introduction

A specific type of rate of return parity, known as uncovered interest rate parity, has been the focus of a great deal of empirical research. Some researchers find little support for uncovered interest rate parity, but there does appear to be some support for the concept. Over longer time horizons Chinn and Meredith (2004) find support, while other researchers taking a slightly different approach find

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support for uncovered interest rate parity only over exceptionally short periods of time (Chaboud and Wright, 2005). The common trend for these and other works finding support for uncovered interest rate parity seems to be that interest rate parity is supported in specific conditions using specific assets.

Until recently, it has been difficult to methodically test the factors that cause rate of return parity to be observed. Work in experimental economics (Fisher and Kelly, 2000; Childs and Mestelman, 2006) has supported the viability of rate of return parity in experimental asset markets with perfectly fixed exchange rates; Fisher and Kelly (2000) use a single currency and Childs and Mestelman (2006) use separate currencies linked by an unchangeable exchange rate. This paper extends the previous experimental results by presenting experimental evidence concerning rate of return parity in the face of a potentially unstable exchange rate. The experimental environment links two separate currencies by a fixed exchange rate defended by a finite reserve of foreign exchange. If the reserves are ever exhausted, the exchange rate between the currencies is changed.

This laboratory environment also allows for the consideration of second generation models of currency crises, while clearly ruling out first generation model explanations. Obstfeld (1986) proposed this approach to currency crises, in which the beliefs of investors are key. The motive for the crisis in this approach is the expectation that the monetary authority will change its behaviour after a crisis has occurred. The new behaviour is expected to correspond to a lower value of the domestic currency. In this way, the crisis is expectation driven. Obstfeld (1998) proposes a more game theoretic approach to the issue of currency crises caused solely by the choices of currency traders. In this work, and others, the size of monetary authority's reserve plays a key role in determining whether or not a currency crisis will occur.

The first step in understanding currency crises driven by self-fulfilling prophecies is to demonstrate that such events are in fact possible without the confounding effect of uncertain economic fundamentals. The experimental environment presented in this paper allows, but does not guarantee, that a currency crisis will occur making any currency crises observed in the experiment consistent with the spirit of second generation models of currency crises.

To summarize, the experiment presented in this paper extends the work of Fisher and Kelly (2000) and Childs and Mestelman (2006). This experiment utilizes a potentially unstable exchange rate while the early papers use a perfectly fixed exchange rate. The change in the experimental environment allows for a more robust exploration of rate of return parity as well as allowing an initial consideration of second generation models of currency crises in a laboratory setting.

The remainder of the paper is organized as follows. Section 2 presents the theories that are explored in the experimental environment. Section 3 presents a detailed description of the experiment. Section 4 discusses the results of the experiment. Section 5 concludes.

## 2. Theory and predictions

There are two basic predictions examined in this paper, rate of return parity and the possibility of a self-fulfilling prophecy driven currency crisis. Rate of return parity is discussed in Section 2.1. Currency crises are discussed in Section 2.2.

### 2.1. Rate of return parity

Rate of return parity is based on the exhaustion of all potential arbitrage opportunities. Consider two assets that pay financial dividends. Call one asset red, and the other blue. The exhaustion