The Japanese yen futures returns, spot returns, and the risk premium ☆

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Abstract

Japanese yen currency dynamics are investigated in spot and futures markets. Maturity is proposed as a proxy for the time-varying risk premium. As the maturity of a yen futures contract nears, there is less uncertainty implying a small absolute risk premium. A longer maturity is associated with uncertainty about the economy, the underlying currency, and the contract; and implies a high risk premium. Models that include maturity in addition to the futures–spot basis as explanatory variables exhibit better empirical performance in explaining futures returns and spot returns. The results are robust to different sample periods, forecast horizons, and estimation techniques.
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1. Introduction

The Japanese foreign exchange market has seen an extraordinary growth after its liberalization in the 1980s and has become the second largest market in the world. The Japanese yen derivatives trading has a much greater volume than other currencies. There is also an increasing debate about

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whether the yen will emerge as a vehicle for other Asian currencies.[1] In this financial environment, investors and monetary authorities show an increasing awareness of the risks connected with Japanese yen trading.

In a risk-neutral world, the forward/futures rates are unbiased estimates of the future spot rates. This is called the Expectations Hypothesis (EH), or Uncovered Interest Parity (UIP). According to the EH, the expected currency return is equal to the difference between the futures rate and the current spot rate of the currency. This difference is called the futures–spot basis. The EH further states that, in a risk-neutral world, high interest rate currencies are expected to depreciate to maintain the equilibrium. However, numerous studies in the finance literature have found this not to be so (see, for example, Frankel & Froot, 1987; Backus, Foresi, & Telmer, 2001, and Inci & Lu, 2004). In other words, a regression of the change in the Japanese yen on the futures–spot basis (or the U.S.–Japanese interest rate difference according to covered interest parity) should produce a regression slope coefficient of 1.0. However, the coefficient is found to be significantly less than 1.0; in fact, often times negative. Fama (1984) named the phenomenon as the forward premium puzzle (FPP) and proposed a time-varying risk premium to account for it. The risk premium must be negatively correlated with the expected spot depreciation and must be more volatile than the expected spot depreciation to account for the FPP.

Research since then has moved in two directions. The first direction has focused on developing sophisticated theoretical models to identify unobservable state factors (local and/or common) that drive the domestic and the foreign economies, as well as exchange rate movements that accommodate the FPP. The main problem with these models is that the state variables seldom have a meaningful economic interpretation. This paper introduces an economically meaningful variable to proxy for the time-varying part of the unobservable risk premium.

The second direction the research has moved over the last two decades has focused on the persistence of the FPP with respect to different sample periods, or with respect to different estimation techniques. In general, studies using different currencies and sample periods find evidence of the FPP. However, some recent studies (such as Meredith & Chinn, 1998; Baillie & Bollerslev, 2000, and Flood & Rose, 2002) claim that the puzzle has diminished slightly in recent years. On the other hand, some econometricians (such as Baxter, 1994) have developed different estimation methodologies to explore the FPP. The aim has been to filter out potential nonstationarities and to establish the actual relationship between currency movements and the basis. Hsieh (1993) and Bansal (1997) have found that the FPP is extensive in different futures/forward markets. Finally, Longstaff (2000) has shown that the validity of EH in term structure of interest rate literature can depend on the maturity of the investment.

To address the concerns explored in this second line of research, the analyses in this study are performed on two subsamples. The original sample period of 1982 to 2001 is split into the 1980s and the 1990s to determine whether the puzzle has been as dominant in the recent decade. The nonstationarity problem is eliminated by taking the first difference of the currency data. Exchange rate movements are examined not only with traditional estimation techniques, but also with complex GARCH innovations. Both spot markets and futures markets for the Japanese yen are

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[1] A vehicle currency in foreign exchange literature is generally regarded as a currency dominating others in a certain region of the world. The vehicle currency is used in goods exchange in foreign trade, and in currency exchange in the foreign exchange market. In short, it is the international medium of exchange regarded by other currencies. Historically, the U.S. dollar was the vehicle currency in Europe after the Second World War until the breakdown of the Bretton Woods system in the first half of the 1970s. Then the German mark became the vehicle currency until the introduction of the euro. The Asian crises in 1997–1998 began the debate about whether the U.S. dollar should be replaced by the Japanese yen as the vehicle currency for the Far East region. A more detailed discussion is provided in Hartmann (1998).