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On the reliability of Japanese inflation expectations using purchasing power parity

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ABSTRACT

This paper shows how purchasing power parity (PPP) can be used to construct a measure for inflation expectations and discusses the properties of this measure from both a theoretical and an empirical perspective. Under the PPP hypothesis, inflation expectations in one country are equal to inflation expectations in another country plus the expected depreciation rate of the nominal exchange rate. Exploiting this formula, we calculate Japanese inflation expectations from the break-even inflation rates (BEI) and FX forward spreads for five countries (United States, United Kingdom, Australia, Canada, and Sweden). The resulting PPP-based measure of inflation expectations follows a trend that largely coincides with long-run developments in the Japanese BEI. However, we find that both levels of and variations in the new measure differ across the reference countries, and that a recent gap between the new measure and the Japanese BEI is not negligible from a short-run perspective. Consequently, there remain several issues that need to be addressed to assess the usefulness of this new formula.

1. Introduction

Since the Bank of Japan (BOJ) introduced the price stability target of 2% in early 2013, Japanese inflation expectations have attracted much attention in international financial markets. A variety of indicators are typically used to gauge policy effects on inflation expectations in Japan (Fig. 1), such as indicators based on surveys of bond traders, households, and enterprises, as well as market-based indicators such as the break-even inflation rate (BEI). The latter is a commonly used measure of market participants' inflation expectations that is defined as the yield spread between the nominal yield on a fixed-rate bond and an inflation-indexed bond (IIB). Generally, the market-based indicators tend to immediately react to headline news. As can be seen in the figure, the BEI seems to have been following an accelerating upward trend in response to the BOJ's recent policy changes, i.e., the introduction of the price stability target of 2% in January 2013 and quantitative and qualitative monetary easing (QQE) in April 2013.

However, in addition to inflation expectations, the BEI contains various distorting factors: that is, the BEI is equal to inflation expectations plus an inflation risk premium minus the market liquidity premium for IIBs. In the midst of the turmoil following the Lehman shock, foreign investors sold large volumes of bonds in the Japanese IIB market, which has attracted little buying since then. The response of the Japanese government was to stop issuing new IIBs and conduct a number of buyback operations. It is clear that under these circumstances, the market liquidity premium for IIBs must have been rather

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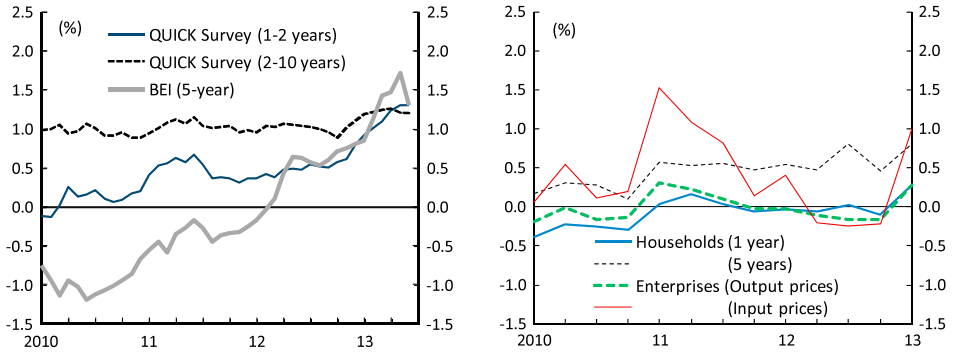

Fig. 1. Various measures for inflation expectations. Note: In the left panel, "QUICK Survey" refers to the expectations of bond market participants obtained from the "QUICK Bond Monthly Survey". The solid line denotes the expectations for 1–2 years ahead, while the dotted line denotes those for 2–10 years ahead. In the right panel, expectations are estimated using the modified Carlson–Parkin method (see Sekine et al., 2008). "Households" refers to households' expectations estimated based on the "Opinion Survey on the General Public's Views and Behavior" (expectations over the coming year and the next 5 years), while "Enterprises" refers to the expectations based on the "Tankan" (expectations for the next quarter).

unstable, and it would be imprudent to claim that all the variation in the Japanese BEI is attributable to changes in inflation expectations.

To deal with this problem, Mandel and Barnes (2013) propose to make use of purchasing power parity (PPP). Under the PPP hypothesis, inflation expectations in one country are equal to inflation expectations in another country plus the expected depreciation rate of the nominal exchange rate. Exploiting this formula, we can infer Japanese inflation expectations from, for instance, the US BEI and the yen/dollar forward spread. If the inflation risk premium in the United States and the market liquidity premium for Treasury Inflation Protected Securities (TIPS) – inflation-indexed bonds issued by the US government – are stable, we can avoid the problem stemming from the instability of the IIB market liquidity premium in Japan.

The purpose of this paper is to examine how the PPP hypothesis can be used to measure inflation expectations. First, we modify Mandel and Barnes's (2013) approach so that it is fully consistent with the PPP hypothesis. We call the resulting index the Foreign-BEI Implied Index (FBI). Second, we calculate FBIs from the BEIs and foreign exchange (FX) forward rates of five selected IIB-issuing countries, including the United States (US) and the United Kingdom (UK). Third, we explore what determines the gap between the FBIs and the BEI in the short run as well as in the long run. In doing so, we demonstrate the difficulties in measuring inflation expectation based on the PPP hypothesis.

The remainder of the paper is organized as follows. Section 2 theoretically examines the relationships between the FBI and the BEI. Section 3 calculates the FBIs from the BEIs and FX forward spreads for five selected countries. We also focus on the fact that the FBI has recently rapidly diverged from the BEI, and identify the driving forces responsible for this divergence. Section 4 concludes the paper.

2. The FBI: a PPP-based measure of inflation expectations

As mentioned above, while the BEI – the yield spread between the nominal yield on a fixed-rate bond and an inflation indexed bond – is widely used as a measure of market participants' inflation expectations, it contains not only inflation expectations, but also an inflation risk premium and an IIB market liquidity premium, i.e.:

$$\text{BEI} = \text{Inflation expectations} + \text{Inflation risk premium} - \text{IIB market liquidity premium}. \tag{2.1}$$

Given that, as explained above, the IIB market liquidity premium likely has been quite unstable over the past few years, we therefore construct an alternative measure, the FBI.

2.1. Defining the FBI

To construct our alternative, PPP-based measure of inflation expectations, the FBI, we start by defining the real exchange rate as follows:

$$\text{Real exchange rate} \equiv \text{Nominal exchange rate} \times \text{Foreign price level}/\text{Japanese price level}, \tag{2.2}$$

where the nominal exchange rate is the price of Japanese currency in terms of the foreign currency, and the foreign/Japanese price level is in terms of each country's currency unit. Rearranging and expressing all terms as expectations yields:

$$\begin{aligned}\text{Japanese inflation expectations} \equiv\ & \text{Foreign inflation expectations} + \text{Expected change of nominal exchange rate} \\ & - \text{Expected change of real exchange rate}.\end{aligned} \tag{2.3}$$