ARTICLE IN PRESS

Journal of International Money and Finance xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of International Money and Finance

journal homepage: www.elsevier.com/locate/jimf

The first arrow hitting the currency target: A long-run risk perspective

Takashi Kano [a,b,c,*], Kenji Wada [a]

[a] Graduate School of Economics, Hitotsubashi University, Japan
[b] Centre for Applied Macroeconomics Analysis, Australian National University, Australia
[c] Tokyo Center for Economic Research, Japan

ARTICLE INFO

Article history:
Available online xxxx

JEL classification:
E52
E58
F31
F41

Keywords:
Japanese yen/U.S. dollar exchange rate
Term structure
Fama regression
Long-run risk
Abenomics

ABSTRACT

This paper reconsiders the successful currency outcome of the first arrow of Abenomics. The Japanese yen depreciation against the U.S. dollar after the introduction of the first arrow co-moves tightly with long-term yield differentials between Japan and the United States. The estimated term structure of the sensitivity of the currency return of the Japanese yen to the two-country interest rate differential indeed shifts up and becomes steeper after the onset of Abenomics. To explain this structural change in the term structure of the Fama regression coefficient, we employ a long-run risk model endowed with real and nominal conditional volatilities as in Bansal and Shaliastovich (2013). Under a plausible calibration, the model replicates the structural change when nominal uncertainty dominates real uncertainty in the U.S. bond market. We conjecture that the arrow was shot off from the U.S. side, not the Japan side.

1. Introduction

One of the most striking events that international financial markets recently encountered might be the sharp depreciation of the Japanese yen (JPY) against the U.S. dollar (USD) started at the end of 2012. Since 78.97 JPY/USD was recorded in October 2012, the JPY keeps depreciating to 123.17 JPY/USD by August 2015. The depreciation rate of the JPY within the two-year window is 56.0%. Given the prolonged appreciation of the JPY against the USD after the Lehman shock and the subsequent global financial crisis (GFC), the change in the direction of one of the major currencies was so drastic that identifying a fundamental source behind the rapid JPY depreciation is a serious challenge for researchers of exchange rates in both academia and policy circles.

Many insist that the JPY depreciation was a unique direct consequence of the "first arrow" of "Abenomics"—the bold monetary easing policy adopted by the Bank of Japan (BOJ). Abenomics refers to the economic policy initiative of Prime Minister of Japan Shinzo Abe for fighting against chronic deflation in Japan since the general election of the Lower House of the Diet in December 2012. Abenomics was armed with the "three arrows" of economic policies: bold monetary easing, aggressive fiscal stimulus, and structural reforms. As the first arrow, soon after the then the Liberal Democratic Party (LDP) Governor Abe won the general election, the large-scale government bond purchasing program was announced by newly appointed

* Corresponding author at: Graduate School of Economics, Hitotsubashi University, Naka 2-1, Kunitachi-city, Tokyo 186-8601, Japan.
E-mail addresses: tkano@econ.hit-u.ac.jp (T. Kano), em162005@g.hit-u.ac.jp (K. Wada).

http://dx.doi.org/10.1016/j.jimonfin.2017.02.024
0261-5606/

BOJ Governor Kuroda in April 2013.[1] The above view that the first arrow hit the currency target has gotten strong popularity among academic researchers and market commentators in Japan. This is because the JPY depreciation just started not in April 2013 but November 2012, when most market participants expected a radical change in the monetary policy regime of the BOJ in near future due to a strong political pressure from an anticipated new government run by the LDP under new Prime Minister Abe.[2] The effect of the first arrow on the JPY depreciation is frequently cited as a successful outcome of Abenomics.

In this paper, we develop a new view toward the exchange rate implication of the first arrow. We start our discussion relying on an empirical finding by Kano and Morita (2015). Kano and Morita observe that the JPY depreciation after the first arrow has no correlation with the 1 and 2 year short-term interest rate differentials between Japan and the United States, rather it goes in tandem closely with the 5 and 10 year long-term ones. As reported by them, Fig. 1 plots (the minus of) the logarithm of the JPY/USD rate along with the nominal government bond interest rate differentials with the 1, 2, 3, 5, 7, and 10 year maturities between Japan and the United States since January 2012. Notice that after the first arrow shot off in November 2012 the interest rate differentials of the Japanese Government Bond (JGB) and the U.S. Treasury Bill/Note (UST) sharply falls over all maturities. The fall in the two-country interest rate differential is more striking with longer maturities of 5, 7, and 10 years than with shorter maturities of 1, 2, and 3 years. The JPY spot rate depreciates against the USD along tightly with such sharp falls in the longer-term interest rate differentials, not in the shorter-term ones.

To scrutinize more deeply the data association between the JPY/USD rate and the term structure of the two-country interest rate differentials, we conduct simple Fama regression exercises below. Let S_t denote the JPY/USD spot rate at period t, $y_{t,n}$ the JGB rate to maturity n, $y^*_{t,n}$ the UST rate to maturity n. We then regress the JPY depreciation rate $s_{t+1} - s_t \equiv \log S_{t+1} - \log S_t$ on the interest rate differential to maturity n:

$$s_{t+1} - s_t = \alpha_n + \beta_n(y_{t,n} - y^*_{t,n}) + \epsilon_{t,n}, \tag{1}$$

where α_n is constant, β_n is the Fama regression coefficient, and $\epsilon_{t,n}$ is an i.i.d. error term. We also estimate an alternative Fama regression specification with the one-period excess currency return $rx_{t+1} \equiv s_{t+1} - s_t + y^*_{t,1} - y_{t,1}$ as the dependent variable:

$$rx_{t+1} = \alpha^{rx}_n + \beta^{rx}_n(y_{t,n} - y^*_{t,n}) + \epsilon^{rx}_{t,n}, \tag{2}$$

where α^{rx}_n is constant, β^{rx}_n is the Fama coefficient, and $\epsilon^{rx}_{t,n}$ is an i.i.d. error term. We investigate the monthly data of the JGB rates, the UST rates, and the JPY/USD rate spanning the period between January 2008 and August 2015. We estimate the two specifications using (i) the whole sample, (ii) the first subsample before Abenomics between January 2008 and November 2012, and (iii) the second subsample after Abenomics between December 2012 and August 2015.[3]

Table 1 reports the OLS point estimates of the Fama coefficients to maturity n and the corresponding standard errors for specification (1) in panel (a) and for specification (2) in panel (b), respectively. The first two raws of panel (a) basically repeat the conventional argument of a random-walk exchange rate: in the whole sample after the Lehman shock the JPY depreciation rate against the USD has no statistically significant relation with the two-country interest rate differential over all the maturities. The third and fourth raws of the same panel show that this covariance structure between the currency return and the interest rate differential is essentially preserved in the first sub-sample period before Abenomics, while the slope of the term structure becomes slightly steep over maturities. The term structure of the Fama regression coefficient, however, drastically changes its shape in the second sub-sample period after the onset of Abenomics. The fifth and sixth raws of panel (a) uncover that (i) the level of the term structure shifts up and (ii) the slope of the term structure becomes steeper. In particular, the point estimate of the Fama coefficient to the 10 year maturity is 2.269 at the conventional statistical significance level. The OLS regression of the alternative specification, which is reported in panel (b), conveys the almost same inferences as drawn in panel (a) except the fact that the negative dependence of the one-period excess currency return on the interest rate differentials to the shorter maturities of 1, 2, and 3 years become statistically significant in the first sub-sample period.[4]

Fig. 2 confirms the structural change in the term structure of the Fama regression coefficients between the two subsample periods graphically. The solid gray line represents the estimated term structure of the Fama coefficient in currency return specification (1) in the first sub-sample period, while the dashed gray line the estimated term structure of the Fama coefficient in excess currency return specification (2). The solid and dashed black lines correspond to the second sub-sample period after Abenomics. Confirm that the term structure of the Fama coefficient is almost flat and there is no strong data association between the currency return and the yield differential before Abenomics. In the second sub-sample period, the term structure shits up over all maturities and its slope becomes steeper enough to make the correlation between the currency return and the 10 year yield difference a large positive with a statistical significance.

A relevant economic model for the exchange rate effect of the first arrow of Abenomics, therefore, needs to explain the above structural change in the term structure of the sensitivity of the currency return to the two-country interest rate differential. A successful economic model should have an implication on a relation between a nominal exchange rate and a term

[1] Ueda (2013) provides detailed chronology and typology of the BoJ's unconventional monetary policy measures.

[2] Ueda (2013) emphasizes a significant role of the enormous political pressure placed on the BOJ in the large asset price movements in Japan between November 2012 and May 2013.

[3] We also conduct the same regression exercises changing the first subsample to that between January 2009 and November 2012 in order to exclude any possible effects of the Lehman shock on our inferences. Our results reported below, however, are immune against the change in the first subsample period.

[4] Hence, a risk premium explanation for the failure of the uncovered interest parity condition, especially, at the shorter maturities, is also applicable to our sample.

Please cite this article in press as: Kano, T., Wada, K. The first arrow hitting the currency target: A long-run risk perspective. J. Int. Money Fin. (2017), http://dx.doi.org/10.1016/j.jimonfin.2017.02.024