



Herding behavior and loss functions of exchange rate forecasters over interventions and financial crises



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ABSTRACT

This study examines herding behaviors of yen/dollar exchange rate forecasters, focusing on whether their behaviors are time-varying. The empirical results show that interventions amplified herding for a one-month horizon. During the recent financial crises, herding was pronounced for the one-month forecast horizon, and anti-herding, for a one-year horizon. Quantitative Easing 1 (QE1) also saw pronounced anti-herding for one-month and one-year horizons. Their loss functions are also evaluated under a possibly asymmetric loss function. The degree and direction of asymmetry are time-varying, and their variations differ among forecasters. The results are broadly consistent with (anti-) herding and its time-varying feature.

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1. Introduction

The yen/dollar exchange market in the recent decade witnessed that exchange rate expectation plays an increasingly important role in models of exchange rate determination in international finance because several unusual events, including the so-called “subprime crisis” and “Lehman shock” as well as large-scale asset purchases, or the so-called “quantitative easing” (QE) of the monetary policy had substantial worldwide impacts.

Many studies, in particular, investigated whether swings in exchange rates and its volatility reflect investor exuberance, market frenzies, and herding behaviors of market participants (e.g., De Grauwe & Grimaldi, 2005; Lin & Lin, 2014). In line with this view, recent studies focus on the role of financial crises in herding behaviors in financial markets, as herding behavior is considered an important phenomenon that can explain a large swing in variables in financial markets; unusual economic events can significantly change expectation formation and/or make it unanimous. For instance, Philippas, Economou, Babalos, and Kostakis (2013) examined herding behavior in the US Real Estate Investment Trust (REIT) markets. Klein (2013) found that herding effects in the US and Eurozone stock markets are substantially amplified during times of market turmoil, like the recent global financial crises. However, few examined whether the recent financial crises had impacts on herding behaviors in foreign exchange markets. Therefore, this study attempts to fill this gap. Furthermore, this study attempts to uncover any impacts of QE on herding behaviors of exchange rate forecasters, which also have rarely been examined.

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This study also focuses on the impacts of central bank interventions on herding behaviors of exchange rate forecasters because, from a policy perspective, the effects of exchange rate market interventions have gained attention, and numerous studies have been undertaken in this regard (e.g., Galati, Melick, & Micu, 2005). Among these works, Frenkel, Pierdzioch, and Stadtmann (2005) found that central bank interventions and the volatility of the yen/dollar exchange rate are positively associated. Beine, Bënassy-Quéré, and MacDonald (2007) found that interventions had no impact on forecast heterogeneity between 1992 and 1994, while the impacts between 1996 and 2001 were statistically significant but ambiguously signed. Reitz, Stadtmann, and Taylor (2010) extended the sample period to the end of 2007, to consider the intervention that took place between 2002 and 2004, and they found that the interventions reduced expectation heterogeneity.

However, most of those studies might have suffered from the drawback that the regression analyses were not robust to outliers and only examined short-term forecasts (at most one-month). Therefore, this study uses a recently developed test by Bernhardt, Campello, and Kutsoati (2006), wherein it tests whether exchange rate forecasters herd or anti-herd and ensures that the analysis is robust to several factors, including outliers. This study also investigates whether (anti-) herding behaviors differ by forecasters' characteristics and forecast horizons by considering four subsample periods. It considers not only the one-month but also the three-month and one-year forecast horizons, because forecasters could form expectations differently depending on their characteristics and forecast horizons, a fact which has rarely been examined in the literature.

In addition, this study evaluates forecasters' loss functions under asymmetric loss functions and attempts to draw implications of their (anti-) herding behaviors with underlying loss functions. To this end, this study follows the method developed by Elliott, Timmermann, and Komunjer (2005). Lamont (2002), and Laster, Bennett, and Geoum (1999) studied the strategic behaviors of private sector forecasters and showed that forecast estimates could be biased upward or downward based on the asymmetric loss function. Elliott, Komunjer, and Timmermann (2008) suggested that agents are adverse to bad outcomes, and as they build these aversions into their forecasts, there might be differences in forecast errors, such as lower-than-expected yen depreciation for forecasters in Japan and the opposite for those in the US. This also raises the question whether forecasters with different characteristics form expectations differently.

The empirical results of this study show that the forecasters herded during the period January 2002 to June 2010. These behaviors did not differ by forecaster characteristics. The results also suggest that herding was pronounced for the one-month forecast horizon during the financial crisis, whereas anti-herding arose for the one-year horizon. Herding was also pronounced in response to interventions for the one-month horizon. QE of the monetary policy is likely to turn forecaster herding into anti-herding. The degree and direction of asymmetry are time-varying, and their variations differ among forecasters. These results are broadly consistent with (anti-) herding and its time-varying feature. They imply that (anti-) herding behavior seems to result from changes in forecasters' loss functions. Thus, those changes are crucial for the degree of forecast heterogeneity. These forecasts were also broadly rational under asymmetric loss functions even during the financial crises.

The rest of the paper is organized as follows. Section 2 describes the data and economic events relevant to this study. Section 3 examines the (anti-) herding behavior of forecasters, and Section 4 examines the asymmetric loss functions. Section 5 concludes the paper.

2. Data

2.1. Description of exchange rate forecasts and actuals

Every month, Consensus Economics, the world's leading international economic survey organization, surveys more than 700 private financial and economic forecasters for their estimates of key macroeconomic variables, including real GDP growth, consumer price indexes, and exchange rates. The organization's *Consensus Forecast* publications include the yen/dollar exchange rates forecast by various private forecasters for the end of the following month (F1), the next three months (F2), and the following year (F3). There are about 30 individual private forecasts in each publication. This study examines the data between January 2002 and June 2010; in order to focus on the impacts of central bank interventions between 2002 and 2004 and the financial crises between 2007 and 2008, the end of the sample period is dictated by the end of asset purchases by the Federal Reserve (FED), which took place between November 2008 and June 2010 and is known as Quantitative Easing 1 (QE1).

Because a limited number of individual private forecasters participated throughout the entire sample period, analysis is restricted to forecasters who have participated in a minimum of 24 surveys. Imposing this requirement leaves us with 26 individual forecasters and more than 2500 observations. Some of the forecasters experienced mergers, acquisitions, and/or changes in organization names (e.g., S.G. Warburg & Co. was acquired by UBS). I considered such forecasters as one continuous forecast series in order to ensure a sizable number of individual forecasters for this study. Thus, the samples cover forecasters with bases in Japan (i.e., domestic forecasters), the US, and Europe as well as financial¹ and nonfinancial institutions. See Table 1 for details on these samples.

In addition, this study attempts to investigate the underlying loss functions of individual forecasters. Because this study follows the method developed by Elliott et al. (2005), who used the generalized method of moments (GMM) estimation, and requires a fairly large number of observations to obtain reliable estimates, I require each forecaster to have participated in a minimum of 50 surveys. Imposing this requirement leaves us with 17 individual forecasters. The Consensus² forecast is not examined in this study.

¹ The forecasters are not classified as bank, security, insurance, and so on, unlike some previous studies; these days, it is difficult to clearly distinguish forecasters from among these industries.

² To examine the Consensus as an individual forecast series, I would need to assume that individual forecasters have an identical loss function although the assumption is not likely to be met.

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