Behavioral Economic View: The Episode of Won/US-Dollar Exchange Rate during the Crisis

Jeongseok Song and Myeonggil Choi

Department of Economics, Chung-Ang University, Korea; jssong@cau.ac.kr
Department of Business Administration, Chung-Ang University, Korea; mgchoi@cau.ac.kr

Abstract

Background/Objectives: This paper is motivated by recent evidence that the relation between Korean Won-US Dollar exchange rate and US federal funds rate is time-varying unlike conventional belief on the relation. Methods/Statistical Analysis: We employ the rolling window approach to figure out the influence of the crisis on the relation between the Won/US-Dollar exchange rate and the US interest rate. The rolling window approach is used in time series analysis especially when the available sample period is short. This approach can be applied in order to check the predictive performance using a finite number of windows within a considered time span. Findings: The evidences resulting from the rolling window approach show that the Won/US-Dollar exchange rate and the US interest rate appear to be negatively correlated in some periods and positively correlated in others. Those time-varying patterns in the relation between exchange rate and interest rate are difficult to be explained from the traditional view of uncovered interest parity. On the other hand, behavioral macroeconomic perspectives provide various explanations for theoretically unconventional finding in the context of rational expectation formation. Application/Improvements: Our empirical observation remains with the conjecture that investors’ fear near the crisis may lead to some anomaly. The latter hypothesis should be further studied by the behavioral macroeconomic view.

Keywords: Behavioral Economic View, Exchange Rate, Expectation, Interest Rate, Rolling-Window Approach

1. Introduction

Since 2000, behavioral issue has drawn increasingly heavy attention in finance and economics1–5. In particular, the behavioral issue has been addressed mostly in finance, rather than economics6. Such a lack of attention to the behavioral view has been pointed out by previous studies7. Future macroeconomics should be developed in a direction toward the behavior-oriented approach in the spirit of John Maynard Keynes’ General Theory7. Also, the role of psychological and sociological factors, such as fairness, herding cognitive bias, reciprocity, and social status8. In this paper, we provide an episode regarding the Won/US-Dollar exchange rate and the US interest rate as a reminder of the behavioral view. In section 2, we describe and discuss the relation between the Won/US-Dollar exchange rate and the US federal funds rate. Section 3 relates our discussion to the behavioral view. Section 4 concludes.

2. Won/Dollar Exchange Rate and the US Federal Funds Rate

The ratio of export and import to the Korean GDP is above sixty percent and thus Korean economy is often regarded as a small open economy. Korean economy has been exposed to diverse exogenous shocks such as oil price and large economies’ macroeconomic change especially for the US. In many incidences, the US federal funds rate is one of the leading indicators to the global economy. The federal funds rate is determined in a
meeting of the members of the Federal Open Market Committee that is held normally eight times a year. Figure 1 below displays the monthly level of the Won/US-Dollar exchange rate and the US federal funds rate during the period from 2000 to 2013. The Won/US-Dollar exchange rate is the value of US-Dollar in terms of the Korean Won. In Figure 1, the solid line indicates the log value of the Won/US-Dollar exchange rate on the left axis while the dashed line displays the log value of the US federal funds rate on the right axis.

Figure 1. The exchange rate vs the US federal funds rate.

The interest parity is one of the most popular theories in explaining the relation between exchange rate and interest rate differential. In particular, the uncovered interest parity (henceforth UIP) can be expressed as

$$E_{t} s_{t+1}$$

where, $i_{t}$ and $i^{*}_{t}$ denote the log of interest rate on bonds denominated in domestic and foreign currency, respectively, and $s_{t}$ represents the log level price of foreign currency in terms of domestic currency. In the meantime, $E_{t} s_{t+1}$ denotes the expected value of exchange rate at time $(t+1)$, given the information available at time $t$. Given $E_{t} s_{t+1}$ and $i^{*}_{t}$, the UIP implies that a rise in $i^{*}_{t}$ leads to an increase in $s_{t}$ equivalently. Then, the UIP in the equation (1) implies a positive correlation between the Won/US-Dollar exchange rate and the US interest rate. According to Figure 1, however, the Won/US-Dollar exchange rate and the US interest rate appear to be negatively correlated in some periods. Also, it is worth to notice that the sample period in Figure 1 includes the global crisis, which has occurred in 2008 and disturbed major economies obviously including the US.

In Figure 2, we employ the rolling window approach to figure out the influence of the crisis on the relation between the Won/US-Dollar exchange rate and the US interest rate. The rolling window approach is used in time series analysis especially when the available sample period is short. In Figure 2, the size of each rolling window is 48 months amounting to a two-year period. Figure 2 matches each window to its associated correlation coefficient between the exchange rate and the US interest rate. In Figure 2, the vertical axis represents the correlation coefficients while the horizontal axis indicates the last period of each window. The U-shaped graph in Figure 2 suggests that the positive correlation is limitedly observed at the first few as well as the last few windows. For the rest windows including the global crisis, however, negative correlation is continuously observed. This feature implies that the positive correlation predicted by the UIP no longer holds some periods near the crisis. For simple discussion, we momentarily assume that the expectation of future exchange rate is fixed at time $t$. We will discuss the relaxation of this assumption in section 3.

The negative correlation in Figure 1 and Figure 2 is inconsistent with the UIP theory in the following two ways. First, the value of US-Dollar in late 2000 has sunken two or three years before the crisis although the US federal funds rate has increased at that time. This feature can be shown by the hump-shaped part from
2004 to 2007 in Figure 1. Secondly, the quantitative easing immediately following the crisis has pulled down the US federal funds rate almost to zero level while the Won/US-Dollar exchange rate has skyrocketed. In sum, we observe some unconventional relation between the Won/US-Dollar exchange rate and the US interest rate before and after the crisis.

Prior to the crisis, the aforementioned increase in the US interest rate failed to bring the dollar money back to the US. Rather, the rising US interest rate from 2004 to 2007 has escalated investors’ fear of overheated US housing market, which was driven by substantial home loan. Unfortunately, however, drastically increasing home loan in the US was backed up by subprime mortgage loan companies. Combining the high interest rate with the heavy loan, the US dollar may not have been appealing and rather scary to investors. The resulting concern on the US economy can explain why the Dollar was substantially depreciated from 2004 to 2007 despite the rise in the US interest during the same period.

After many US mortgage loan companies become troubled in 2008, the global economy immediately dived into a big turbulence, which Alan Greenspan mentioned as ‘once-in-a-century credit tsunami’. As many precedents, the 2008 global crisis also has caused more than lucrative loss and further contagious fear of uncertainty. Due to the lack of reliable information, investors become obsessed by secure asset such as gold. According to the history of gold price since 1970, time trend of gold price particularly exhibits a sharp increase from 2000s. Although gold is traditionally alternative value-storage to the US-Dollar in many previous crises, gold cannot replace a liquid currency for good time since asset values in modern economies are too large to be contained only in gold.

Around the closing of the crisis, investors began holding the US dollar despite extremely low interest rate following the quantitative easing. This feature is illustrated by the sudden appreciation of the US Dollar at the end of 2008 in Figure 1. The irony can be depicted as the key currency benefit, but the latter is overly simple explanation. Thus far, no theoretical model consistently can explain why the key currency issue does matter sometimes but not at other times.

### 3. Behavioral View

The aforementioned inconsistency between real economic phenomena and standard theory can be addressed in diverse directions. First of all, economists should keep making their efforts to fill the gap by polishing the existing models. What comes up next is the choice of perspectives. Moderate adjustment of the neoclassical synthesis may not seem to improve the existing models. The episode reviewed in this paper also suggests that the orthodox UIP theory may hold or not even within the same decade. However, note that the decade includes the global crisis, which has stimulated underlying behavioral aspects of economic agents: scarce information and huge fear of uncertainty. Then, the agents tend to become far more risk-averse than normally they are.

Financial market suffers greater volatility than many relevant theories predict. Some empirical findings cast doubt on the rationality in financial market. For example, a 20-percent decline in stock prices only for a single day occurred in October 1987 even in the absence of any significant news. In addition, our own example is the notarious failure of Long-Term Capital Management (LTCM) with its team members including two Nobel laureates, Robert Merton and Myron. The lesson from the failure of the LTCM implies that mechanically perfect model may not guard irrationally contagious attack such as the Russian moratorium in 1998.

So far as, most of the economic theories seem to work properly within a range of values for their model parameters. However, we often have no information about true values of the parameters while real economies change dramatically and thus the parameter values. Still, a possible concern is that model reconstruction with mostly similar variables may not be a fundamental solution to many unexplained economic phenomena.

In particular, the argument of ‘expectation’ is crucial in reforming many existing macroeconomic theories. Back to the equation (1), we will be under more flexible circumstance in explaining the exchange rate and the US interest rate if we allow \(E_{t+1} s_{t+1}\) to respond to the US interest rate. Obviously, such a linkage between the expectation and the interest rate is a typical argument in the spirit of the Rational Expectation Hypothesis (REH). In a wide range of context, however, the expectation argument may not be so informative unless one considers what information to incorporate into the expectation formation. Traditional models hardly reflect the behavioral pattern of economic agents, but rather incorporate some forecasts or beliefs on the values of...
quantitative variables. If models successfully incorporate behavioral patterns into the expectation, then they will fill the gap between apparently unexplained findings and model prediction. In the context of behavioral economic view, economic agents’ expectation can explain not only financial market phenomena but also labor market issues such as job seeking, which takes a recent highlight thanks to big data$^{15}$.

4. Conclusions

In this paper, we consider a recent episode about the Won/US-Dollar exchange rate and the US interest rate and argue that the episode cannot be explained by the standard economic theory, that is, the uncovered interest parity. We notice that the unconventional phenomena occurred during the period including the global crisis in 2008. We also conjecture that investors’ fear of uncertainty near the crisis may have led to some anomaly in the relation between the Won/Dollar exchange rate and the US interest rate. We also suggest some possible reconciliation between existing theories and behavioral in the line with Arkelof (2011). In particular, we note that behavioral patterns can be contained in the information set relevant to economic agents’ expectation. All the relevant issues remain as enormous task in the future$^7$.

5. References