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Are global shocks leading indicators of currency crisis in Viet Nam? [☆]

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ABSTRACT

This paper aims to identify leading indicators of a currency crisis in Viet Nam based on an early warning system for the period 1996–February 2016. This paper found that global financial shocks (e.g., regional and global financial crisis, unexpected changes in monetary policy of largest economies such as the United States and the People's Republic of China), and domestic credit growth rate are leading indicators of a currency crisis in Viet Nam in all three models. Deficits in trade balance, international reserves, and overvaluation of the dong are also good indicators. In addition, a model in which a currency crisis or turbulence in the foreign exchange market is defined based on the exchange market pressure and parallel market premium, with window length of 2 months, outperformed for predicting a currency crisis in Viet Nam. Empirical results suggested that probability of predicting a true currency crisis was 77.5%.

1. Introduction

The main objective of this paper is to identify leading indicators and a suitable early warning system (EWS) model of a currency crisis in Viet Nam. The EWS for currency crisis was built to aim at identifying abnormal fluctuations and recession in the foreign exchange market in advance to allow governments to adopt preemptive policy measures (Kaminsky et al., 1998a,b). However, forecasting the exact time of a currency crisis is likely complicated not only for policy makers but also for researchers.

Almost all studies on the EWS for a currency crisis employ either parametric approach (i.e., regression-based) or non-parametric approach (or signal approach) (Comelli 2013). The signal approach for a currency crisis was developed by, Frankel and Rose (1996), Kaminsky et al. (1998a,b), Kaminsky and Reinhart (1999), Berg and Pattillo (1999), and Zhuang (2005). For a signal approach, vulnerability indicators were transformed into a weighted average of binary signals. The authors evaluated the validity of both macroeconomic and financial indicators in predicting a currency crisis in advance in which they compared the behavior of these variables in periods preceding crises. Deviations of these variables from their “normal” levels beyond a certain threshold value could issue warning signals of a currency crisis within a specified period of time (Kaminsky et al., 1998a,b). According to the paper, 105 indicators were listed and classified into six groups, including the external sector, the financial sector, the real sector, the public finances, institutional and structural variables, and political variables. However, among them, export, money supply growth, deficits in current accounts, real overvaluation, gross domestic product (GDP) growth, fiscal deficits, international reserves to short-term debt ratio, as well as financial stability, were found to issue signals for a currency crisis within the next 24 months.

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Unlike a signal approach, the parametric EWS is regression-based, typically logit or probit, where the crisis variable is regressed on a set of macroeconomic and financial indicators. It, therefore, could estimate probability of forecasting a true crisis. Based on a multivariate probit-based methodology, [Berg and Pattilo \(1999\)](#) found that this approach outperformed non-parametric in terms of scores and goodness-of-fit in forecasting the 1997 crisis. [Bussiere and Fratzscher \(2006\)](#) applied a multinomial logit regression-based EWS and argued that the model is outperformed binomial one in predicting episodes of a currency crisis in 32 emerging markets for the period 1993–2001. Moreover, the paper shed light on defining a currency crisis by employing exchange market pressure (EMP) in the parametric model. Similar to [Bussiere and Fratzscher \(2006\)](#), [Aizenman and Hutchison \(2012\)](#) focused on the extent that the global financial crisis caused external market pressure and found that emerging countries with higher total foreign liabilities had greater exposure and were much more vulnerable to the financial crisis.

EWS for a banking and currency crisis has also been studied by Vietnamese researchers such as [Than et al. \(2008\)](#), [Ngoc Duy and Ngoc Huy \(2009\)](#), [Trinh et al. \(2010\)](#), and [Thanh Son \(2012\)](#). Most of them employed the non-parametric methodology to identify indicators for a currency crisis. [Thanh et al. \(2008\)](#) found that 39 macroeconomic and financial indicators, such as international reserves, short-term debt to international reserves ratio, and foreign currency liabilities to foreign currency assets in banking system, could issue signals of a crisis. On the other hand, an EWS study by [Trinh et al. \(2010\)](#) found that current account to GDP ratio outperformed others in predicting a currency crisis in Viet Nam.

This paper contributes to the EWS existing literature in novel ways as follows. *First*, this is the first time global shock is considered as one of leading indicators in the EWS model for a currency crisis. The model found that this variable impacts negatively and significantly on probability of a crisis. *Second*, while most studies on EWS of a crisis in Viet Nam employed non-parametric models ([Than et al., 2008](#); [Ngoc Duy and Ngoc Huy, 2009](#); [Thanh Son, 2012](#)), the author employed a combination of parametric and non-parametric approaches for identifying indicators and probability of a currency crisis in Viet Nam. Explanatory variables in this model could be in the absolute form (model 1) or be coded as “1” if its value exceeds the threshold and “0” otherwise (model 2). *Third*, to overcome limitations of model 2, this paper employs model 3 in which codes are written in Eviews program that could avoid manual converting explanatory variables into dummy ones. In this program, we set the maximum number of errors of 1000 and grid search of three. *Fourth*, unlike recent studies on EWS in Viet Nam, this paper uses real overvaluation as an explanatory variable of a currency crisis model instead of nominal exchange rates. *Lastly*, this research extends study period from 1996 to February 2016 so that it covers all recent crises (Asian financial crisis, the global financial crisis, European debt crisis, and unexpected shocks in monetary policies of large economies such as the United States [US] and the People’s Republic of China [PRC]) that could cause negative impacts on Viet Nam’s economy in general, and on the financial market in particular.

The main findings of this paper are as follows. *First*, this paper found that global financial shocks (e.g., regional and global financial crisis, unexpected changes in monetary policy of largest economies such as the US and the PRC), and domestic credit growth rate are leading indicators of a currency crisis in Viet Nam. Others, such as deficits in trade balance, international reserves in import’s weeks and overvalue of dong, should be good signals of a currency crisis. *Second*, among three main models (including of six sub-models) with different window lengths, model 1 (in which dependent variable CC, for currency crisis, is defined based on the EMP and parallel market premium, and all explanatory variables are expressed in absolute values with a window length of 2 months) outperformed in predicting a currency crisis-hit period in Viet Nam. Empirical results of model 1 suggested that the probability of predicting a true currency crisis was 77.5%; probability of predicting a crisis-hit period with signal was 64.6%.

The remainder of this paper is structured as follows. Section 2 will give a definition of a currency crisis in Viet Nam based on the EMP index and other events in which the central bank, the State Bank of Viet Nam (SBV), launched their policy measure related to exchange rate. Section 3 employs parametric and non-parametric models to identify leading indicators and probability of a currency crisis in Viet Nam. In addition, Model 3 is also applied to check robustness of findings. The results obtained from models and comments on these will be presented in Section 4. Section 4 presents the summary and conclusion.

2. Model specifications

2.1. Currency crisis or foreign exchange market turbulences in Viet Nam

The EWS of a currency crisis could be valuable for policy makers in the sense that it could be used for detecting underlying economic weakness and vulnerabilities, and allowing the adoption of preemptive measures to reduce the risks of experiencing a crisis ([Bussiere and Fratzscher 2006](#)). Currency crisis usually refers to a situation in which the economy is under pressure of a sharp depreciation in local currency value. Therefore, in most papers, currency crisis is defined as (i) large devaluations adjusted for interest rate differentials, and (ii) large devaluations which exceed the devaluation in the previous period by some multiple ([Kumar et al., 2003](#)). In this case, the monetary authorities have to defend the domestic currency by selling foreign exchange reserves or raising the domestic interest rate ([Glick and Hutchison 2011](#)).

Since the official foreign exchange market was established in 1994, Viet Nam has experienced several “currency crises.” However, unlike most countries, the magnitude of Viet Nam’s currency crisis is not large as those of other currency crises such as the Asian financial currency crisis, the Russian Federation financial crisis (1998 and 2014), etc. In practice, currency crises in Viet Nam happened and lasted for a shorter period such as weeks, 1 month, or 2 months. Based on definition of currency crisis suggested by [Kumar et al. \(2003\)](#), [Goldstein et al. \(1999\)](#), and [Bussiere and Fratzscher \(2006\)](#), the paper sheds light on new approach of currency crisis definition in which Viet Nam could suffer from a currency crisis or exchange rate turbulences if

- (i) Exchange market pressure (EMP) at time i is above its country average EMP and two standard deviations (SD)

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