



Does the central bank's intervention benefit trade balance? Empirical evidence from China

Yu-Ming Hsiao ^a, Sheng-Chieh Pan ^b, Po-Chin Wu ^{c,*}

^a Department of International Business, Hsin Sheng College of Medical Care and Management, No. 418, Gaoping Sec., Zhongfeng Rd., Longtan Township, Taoyuan County 325, Taiwan, ROC

^b Department of Leisure and Recreation Management, China University of Technology, No. 530, Sec. 3, Zhongshan Rd., Hukou Township, Hsinchu County 303, Taiwan, ROC

^c Department of International Trade, Chung Yuan Christian University, No. 200, Chung Pei Rd., Chung Li 320, Taiwan, ROC

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ABSTRACT

This paper employs the intervention indices measured from the modified Weymark (1997) model and modified trade models to evaluate the role of China's intervention behavior in the trade balances with its four major trade partners. In our constructed trade models, the intervention effects comprise direct and interactive phases, and their overall effects are diverse. Empirical results show that intervention actions actually create the largest trade advantage for China in the China–Japan case followed by the China–US case creating the next largest trade advantage for China. However, the trade balance is worsened in the China–European Union case and in the China–Taiwan case. Considering the J-curve effect and the negative interactive effect in the China–European Union case, the rate of the Chinese renminbi against the euro is not an appropriate intervention object for China.

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1. Introduction

China has played an important role in promoting world economic growth in recent years. According to the Chinese National Bureau of Statistics report, China's GDP leapfrogged over Germany's allowing China to become the world's third-largest economy in 2007, and China has replaced Japan as the world's second-largest economy since the second quarter of 2010. Rapid economic growth has allowed China to accumulate a huge trade surplus and attract a great amount of foreign capital inflow.

Regretfully, this enormous balance of payment surplus also brought about the appreciation pressure of Chinese currency, the renminbi (RMB). Until 2005, the RMB had been artificially pegged to the US dollar within a narrow band. However, this policy has recently come under attack. The Chinese government is now forced to appreciate the RMB in order to reduce the US trade deficit. Sun and Ma (2007) employed a sticky-price monetary model to simulate the anticipated appreciation pressure of the RMB. They indicated that market-oriented interest rates can alleviate part of the appreciation pressure automatically. However, if government abandons the intervention in the foreign exchange market, the pegged regime will eventually collapse due to the persistent appreciation pressure. Considering the flexibility of intervention operations, China eventually made a reform from pegging to the US dollar to a basket of major trading partner currencies in July 2005.

Many prior studies argued that China's huge trade surplus mainly comes from the undervaluation of the RMB, which is highly correlated with China's heavy intervention in the foreign exchange market. Therefore, researchers attempted to estimate the RMB equilibrium exchange rate and investigate the extent of the RMB deviation from its equilibrium level. Early studies used the purchasing power parity theory to estimate the RMB equilibrium exchange rate (Yang & Dou, 2004;

* Corresponding author. Tel.: +886 3 265 5206; fax: +886 3 265 5299.

E-mail address: pochin@cycu.edu.tw (P.-C. Wu).

Yu, 2000). More recently, however, researchers adopted the economic fundamentals approach (Coudert & Couharde, 2007; Goh & Kim, 2006). Coudert and Couharde (2007) agreed that the RMB was undervalued, especially with respect to the US dollar during the period 2002–2005. In contrast, Wang, Hui, and Abdol (2007) argued that the RMB fluctuates closely around its long run equilibrium level. While many researchers continuously engage in estimating the RMB equilibrium exchange rate, there is still no consistent conclusion about the misalignment of the RMB. Therefore, it is not appropriate to assert that the RMB is intentionally undervalued to benefit China's trade advantages.

Whether the misalignment of the RMB is the result of the central bank's intervention in the foreign exchange market and whether the intervention action can benefit China's international trade have not been well investigated in previous studies. To verify these topics, this paper will first measure the intervention degree of the central bank and then evaluate its effect on China's trade balance.¹ Unfortunately, due to the consideration of policy effectiveness, only a few countries have made this intervention information public until recently.² To overcome this problem, researchers attempted to employ an open economy model to measure the exchange market pressure (EMP) and the central bank's intervention action³ (Fischer, 2006; Frenkel, Pierdzioch, & Stadtmann, 2005; Humpage, 2003; Ito, 2007; Jun, 2008; Neely, 2005; Pontines & Siregar, 2008; Sarno & Taylor, 2001).

Weymark (1997) proposed an open economy model to quantify the intervention degree by employing observable data. From 1997 on, extensive studies applied the Weymark model to measure the degree of intervention and policy effectiveness (Hsiao, Pan, & Wu, 2010; Jeisman, 2005; Wu & Hsiao, 2004). The main advantage of the Weymark model is that it can be applied to all kinds of managed floating exchange rate regimes and can measure multi-intervention activity. Therefore, this paper first modifies the Weymark model to evaluate China's exchange market pressure (EMP) and intervention index, which is valuable for providing insight into the RMB misalignment problem.

To analyze the effect of an intervention policy on a country's international trade, we further modify the trade model commonly used in previous studies (Han, 2000; Kumar & Dhawan, 1991; Mckenzine & Brooks, 1997; Nikolas, 2010; Perea & Steinherr, 1989). Previous studies specified trade flows as the function of income, relative price, exchange rate and exchange rate volatility, and they neglected the role of intervention actions on trade balance. For example, Mckenzie (1999) showed that the impact of exchange rate volatility on trade flows is ambiguous in both theoretical and empirical studies. Feng and Alon (2007) reported that currency depreciation creates a larger impact on a firm's price adjustment than currency appreciation. Voon and Ran (2006) indicated that both the volatility and misalignment of the real exchange rate have a negative impact on Chinese exporters; therefore, the abatement in the RMB misalignment can stimulate export trade.

Moreover, Sun and Ma (2007) stated that if there is no government intervention in the foreign exchange market, the appreciation pressure will cause an excess in foreign reserves accumulation and cause the exchange rate regime to become unstable. This implies that monetary authority can promote trade growth by reducing exchange rate volatility, especially in a developing economy. In other words, the central bank's intervention plays an important role in influencing the exchange rate volatility and trade flows. Overall, the purpose of this paper is twofold: first, to measure China's central bank's intervention behavior by employing the Weymark model; second, to re-examine the relationship between trade and exchange rate volatility by considering the impact of intervention activities. These two issues are virtually neglected in previous studies.

The remainder of this paper is organized as follows: Section 2 briefly introduces the specification of empirical models, including Weymark's (1997) modified open economy model and modified trade model. Based on Weymark's modified open economy model, we can establish China's EMPs and intervention indices. Moreover, we add the measured intervention index term and the cross terms relating that index to the level and the volatility of the exchange rate into the traditional trade model to form our modified trade models, from which we can investigate the effect of intervention on trade. Section 3 briefly describes the data sources and methodology. We take China's four major trade countries as examples to evaluate China's bilateral intervention indices and their effects on trade balances. Section 4 shows the empirical results. Finally, the paper ends with our conclusions and policy implications.

2. Empirical models

2.1. Open economy model

This paper first modifies the open economy model, proposed by Weymark (1997), to measure the EMP and intervention index in China. Using the estimated EMP and intervention index, we can investigate the central bank's intervention policy thoroughly. The Weymark model, in logarithms, is shown in Eqs. (1) through (7), i.e.,

$$y_t = \bar{y} + \alpha\{p_t - E[p_t | t-1]\} + v_t^y \quad (1)$$

$$p_t = ap_t^n + (1-a)p_t^{tr} \quad (2)$$

$$p_t^{tr} = p_t^* + e_t \quad (3)$$

¹ For our knowledge, very few of previous studies had completed these investigations.

² Except for Japan, Germany and the US, no other country actively publishes the central bank's intervention information.

³ While some prior studies adopted foreign reserves as the proxy variable of intervention behavior, it is under criticism. Ito (2007) argued that as the purpose of monetary authority's exchange in foreign market is for routine requirement, not for disturbing exchange rates; then that exchange cannot be regarded as intervention behavior. Therefore, foreign reserves variation is not an appropriate proxy variable of intervention action.

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