

WILL DOMESTIC PRICES RISE DUE TO CURRENCY DEPRECIATION? THE CASE OF NEW ZEALAND

Yu Hsing

Ph.D., Director, Institute of International Economic Studies, Hammond, Louisiana, USA.

E-mail: yhsing@selu.edu

ABSTRACT

Article History

Received : 22 September 2021

Revised : 3 October 2021

Accepted : 14 October 2021

Published : 30 December 2021

Based on a simultaneous-equation model, this paper shows that if the New Zealand dollar depreciates 1% versus the U.S. dollar, the consumer price in New Zealand would decrease by 0.0276%. In addition, more government borrowing as a percent of GDP, more money supply, a higher U.S. price level, a higher crude oil price, and a higher expected price level would raise New Zealand's consumer price level. Therefore, exchange rate pass-through to consumer prices is not confirmed for New Zealand.

Keywords: Exchange Rate Pass-Through, Exchange Rates, Consumer Prices, Money Supply, Crude Oil Prices

JEL Classification: E31, E52

1. INTRODUCTION

Although the New Zealand dollar has been more valuable than many other currencies, scholars and authorities may be concerned about the potential impact of currency depreciation on domestic prices due to increased import costs. Figure 1 shows that the exchange rate between the New Zealand dollar and the U.S. dollar (NZD/USD). The New Zealand dollar depreciated 63.50% from 1.4549 in 1996 to 2.3788 in 2001 mainly due to the Asian financial crisis. The New Zealand dollar continued to show a trend of appreciation during 2001-2007 because of higher interest rates but depreciated in 2008 and 2009 owing to the global financial crisis. After 2013, the New Zealand dollar exhibited a trend of depreciation from 1.2054 in 2014 to 1.5179 in 2019. Figure 2 presents the scatter diagram between the consumer price index (CPI) and the exchange rate between the New Zealand dollar and the U.S. dollar. With a few exceptions, there seemed to be a negative relationship during the sample period. As the New Zealand dollar depreciated, consumer prices declined. In other words, exchange rate pass-through (ERPT) to higher consumer prices cannot be confirmed.

There have been several recent studies of ERPT focusing on Asian countries. The degree of ERPT may vary across countries and over time (Barhoumi, 2006; Ha, Stocker and Yilmazkuday, 2019). ERPT may be affected by inflation targeting or non-inflation targeting, exchange rate regimes, degree of central bank independence (Dilla, Noer and Anggraeni, 2017; López Villavicencio and M. Pourroy, 2017; Ha, Stocker and Yilmazkuday, 2019; Pham, Nguyen, Nasir and Huynh, 2020; Anh, Quan, Phuc, Chi, and Duc, 2021), and other factors such as oil shocks (Pham, Nguyen, Nasir and Huynh, 2020; Anh, Quan, Phuc, Chi, and Duc, 2021). ERPT is generally higher in emerging economies than in developed economies (Ca'Zorzi, Hahn and Sánchez; 2007). ERPT may be affected by a threshold of inflation volatility and exhibit asymmetric impacts (Soon and Baharumshah, 2017; Soon, Baharumshah and Wohar, 2018; Pham, Nguyen, Nasir and Huynh, 2020). ERPT to the CPI is generally less than ERPT to the PPI or import prices (Mihaljek and Klau, 2008; Sek and Kapsalyamova, 2008). ERPT to consumer prices may have negative values (Ghosh and Rajan, 2006; Sek and Kapsalyamova, 2008; Dilla, Noer and Anggraeni, 2017; Anh, Quan, Phuc, Chi and Duc; 2021).

This paper examines exchange rate pass-through to consumer prices in New Zealand. This paper has several different aspects. A major contribution of this paper is to present a theoretical model suggesting that currency depreciation could lead to a lower domestic price level. An extended IS-LM-AS model is applied in the formulation of the theoretical

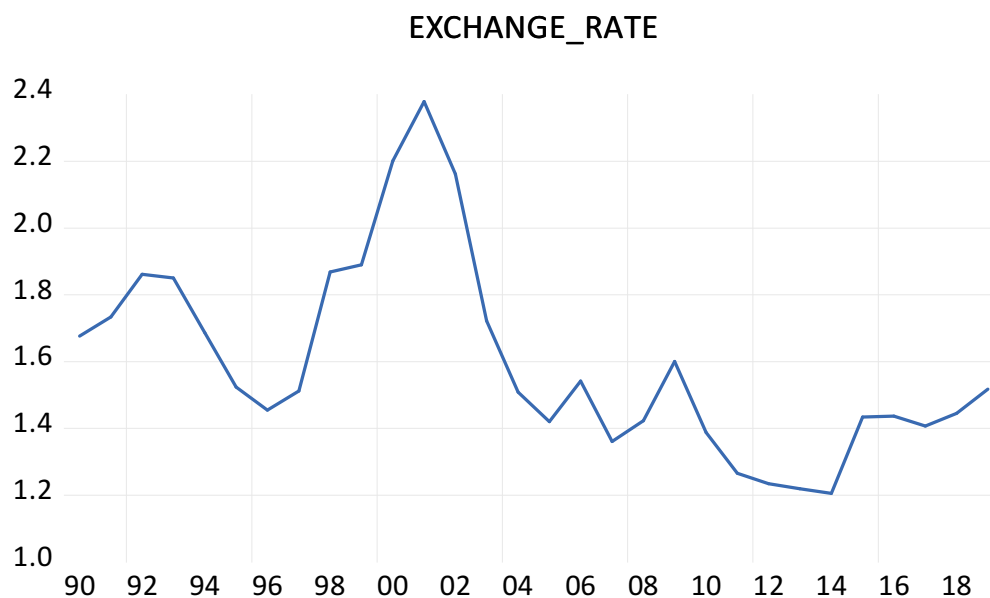


Figure 1: The Exchange Rate between the New Zealand Dollar and the U.S. Dollar during 1990-2019

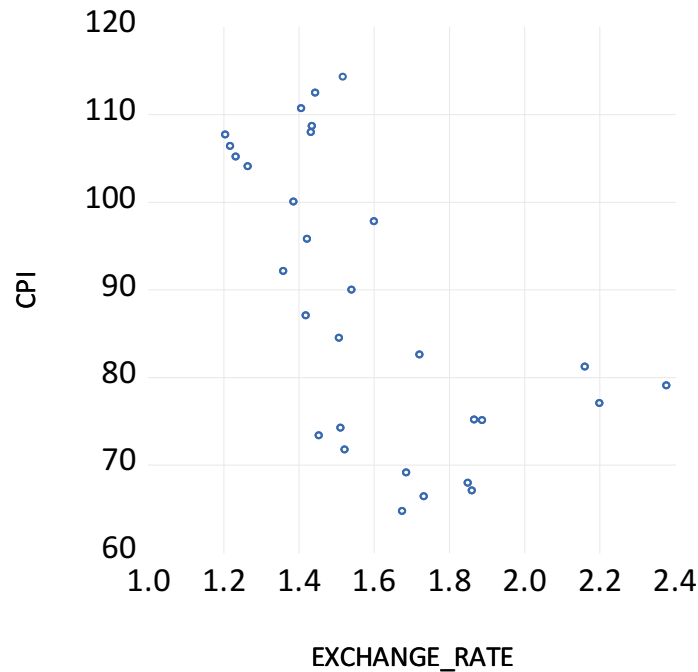


Figure 2: The Scatter Diagram between the CPI and the Exchange Rate during 1990-2019

model. Besides the exchange rate, several other relevant variables are incorporated in the model. External shocks including crude oil prices are considered as a higher crude oil price is expected to shift aggregate supply to the left.

2. THE MODEL

Suppose that aggregate spending is determined by real income, government taxes, government spending, the real interest rate and the real exchange rate, that real money demand is a function of the nominal interest rate, real income and the nominal exchange rate, and that the price level is affected by the expected price level, the output gap, the nominal exchange rate, and the energy cost. We can express macroeconomic equilibrium in the goods and money markets as (Romer, 2006):

$$Y = W[Y, T, G, R - \pi^e, \varepsilon(P^* / P)] \quad (1)$$

$$M / P = X(R, Y, \varepsilon) \quad (2)$$

$$P = S(P^e, Y - Y^*, \varepsilon, E) \quad (3)$$

where

Y = real GDP in New Zealand,

T = government taxes,

G = government spending,

R = the nominal interest rate,

π^e = the expected inflation rate,

ε = the nominal exchange rate measured as units of the New Zealand dollar per U.S. dollar,

P^* = the price level in the U.S.,

P = the price level in New Zealand,

M = the money supply,

P^e = the expected price level in New Zealand,

Y^* = potential real GDP, and

E = the energy cost.

Suppose that Y^* is a constant in the short term. Solving for the three endogenous variables, we obtain \bar{P} as:

$$\bar{P} = \bar{P}(\varepsilon, M, G - T, E, P^*, P^e) \quad (4)$$

The partial derivative of the equilibrium P with respect to the nominal exchange rate can be expressed as:

$$\frac{\partial \bar{P}}{\partial \varepsilon} = [-X_R S_\varepsilon (1 - W_Y) - W_\varepsilon X_R S_Y - W_R X_Y S_\varepsilon + W_R X_\varepsilon S_Y] / |J| > 0 \text{ if } X_\varepsilon < 0 \\ < \text{or} > 0 \text{ if } X_\varepsilon > 0. \quad (5)$$

where $|J|$ is the Jacobian matrix with a positive sign. The sign in equation (5) is unclear as the sign of the first three terms is positive whereas the sign of the last term depends on the sign of X_ε . The exchange rate may affect real money demand through the substitution effect and the wealth effect (Arango and Nadiri, 1981). If $X_\varepsilon < 0$ or if the substitution effect dominates the wealth effect, the sign in equation (5) would be positive. If $X_\varepsilon > 0$ or if the wealth effect dominates the substitution effect, the sign in equation (5) would be unclear.

3. EMPIRICAL RESULTS

The data were taken from the International Financial Statistics, the St. Louis Federal Reserve Bank, and the World Economic Outlook. The CPI in New Zealand is used as the dependent variable. The exchange rate is measured as units of the New Zealand dollar per U.S. dollar. An increase means depreciation of the New Zealand dollar. M3 money is selected to represent the money supply. Fiscal policy is represented by government borrowing as a percent of

GDP. The average crude oil price per barrel is chosen to represent the energy cost. The U.S. price level is represented by the CPI in the U.S. The expected CPI is estimated as the average CPI in the past three years. The sample ranges from 1990 to 2019. Annual data for the average crude oil price before 1990 is not available.

Table 1 presents the estimated regression and related statistics. Except for government borrowing as a percent of GDP due to negative values in some years, other variables are transformed to a log scale in order to reduce the degree of multicollinearity. The GARCH process is employed to correct for potential autoregressive conditional heteroskedasticity. Approximately 99.82% of the change in the consumer price index (CPI) can be explained by the six right-hand side variables. All the right-hand side variables are significant at the 1% or 2.5% level. The CPI is positively associated with government borrowing as a percent of GDP, M3 money, the U.S. CPI, the crude oil price, and the expected CPI and negatively affected by the exchange rate.

Table 1: Estimated Regression for the Log(CPI) in New Zealand

<i>Variable</i>	<i>Coefficient (Probability)</i>
Intercept	-0.9440 (0.0000)
Log (NZD/USD exchange rate)	-0.0276 (0.0189)
Log(M3 money)	0.1359 (0.0000)
Government borrowing/GDP ratio	0.0022 (0.0001)
Log(crude oil price)	0.0208 (0.0021)
Log(U.S. CPI)	0.2190 (0.0000)
Log(Expected CPI)	0.2056 (0.0000)
R-squared	0.9982
Adjusted R-squared	0.9978
Sample period	1990-2019
Number of observations	30
Mean absolute percent error	0.5959%
Root mean squared error	0.6333%

Notes: The NZD/USD exchange rate is measured as units of the New Zealand dollar per U.S. dollar. An increase means depreciation of the New Zealand dollar.

Specifically, if the NZD/USD exchange rate rises 1% or if the New Zealand dollar depreciates 1%, the consumer price would decline by 0.0276%. A 1 percent increase in M3 money would result in a 0.1359% rise in the consumer price. If government borrowing as a percent of GDP rises by 1 percentage point, the log of the consumer price would increase by 0.0024, suggesting that fiscal expansion results in a partial crowding-out effect. When the crude oil price rises 1%, the consumer price would increase by 0.0208%. A 1% increase in the U.S. CPI would cause New Zealand's CPI to rise by 0.2190%. If the expected CPI rises 1%, the CPI would rise by 0.1056%. These results suggest that exchange rate pass-through to consumer prices is not confirmed and that the impact of other relevant variables cannot be overlooked.

The finding that depreciation of the New Zealand dollar leads to a lower consumer price in this study is consistent with Ghosh and Rajan (2006), Sek and Kapsalyamova (2008), Dilla, Noer and Anggraeni (2017), and Anh, Quan, Phuc, Chi and Duc (2021) but is in contrast to other previous studies. Currency depreciation tends to shift aggregate demand to the right due to expected increase in net exports and aggregate supply to the left due to increased import costs. On the other hand, the J-curve effect may occur and cause the trade balance to deteriorate initially as the value effect is greater than the quantity effect due to long-term contracts and price rigidity. Expected currency depreciation tends to increase international capital outflows and reduce demand for domestic goods and services. Both tend to shift aggregate demand to the left. Another possible reason is that the wealth effect dominates the substitution effect in real money demand, shifting aggregate demand to the left and reducing the price level. Hence, it would be possible that currency depreciation may cause the consumer price to decline.

4. SUMMARY AND CONCLUSIONS

This paper has examined the impact of exchange rate pass-through on the consumer price in New Zealand. Other relevant variables are also considered. An extended IS-LM-AS model is employed to derive a reduced-form equation. The results show that a 1% increase in the NZD/USD exchange rate would lead to a decrease in the consumer price by 0.0276%, suggesting that exchange rate pass-through to consumer prices is not confirmed. Furthermore, more government borrowing as a percent of GDP, more money supply, a higher U.S. consumer price, a higher crude oil price, and a higher expected consumer price would raise the consumer price level in New Zealand.

There are several policy implications. Recent trends of depreciation of the New Zealand dollar versus the U.S. dollar from 1.2054 in 2014 to 1.5179 in 2019 tend to increase global competitiveness and stimulate exports without a positive impact on consumer prices. Although more government borrowing as a percent of GDP tends to raise consumer prices, New Zealand's authorities have pursued fiscal prudence, and moderate increase in government borrowing would not cause too much concern. On the other hand, recent increase

in world crude oil prices tends to cause domestic prices to rise. Authorities may need to contain the expected inflation or price level as its impact on the domestic consumer price is relatively large.

References

- Anh, V. T., L. T. T. Quan, N. V. Phuc, H. M. Chi, and V. H. Duc (2021) "Exchange rate pass-through in ASEAN countries: an application of the SVAR model" *Emerging Markets Finance and Trade* **57**, 21-34.
- Arango, S. and M. I. Nadiri (1981) "Demand for money in open economies" *Journal of Monetary Economics* **7**, 69-83.
- Barhoumi, K. (2006) "Differences in long run exchange rate pass-through into import prices in developing countries: An empirical investigation" *Economic Modelling* **23**, 926-951.
- Campa, J. and L. Goldberg (2005) "Exchange rate pass through into import prices" *The Review of Economics and Statistics* **87**, 679-690.
- Ca'Zorzi, M., E. Hahn, and M. Sánchez (2007) "Exchange rate pass-through in emerging markets" working paper.
- Cheikh, N. B. and W. Louhichi (2016) "Revisiting the role of inflation environment in exchange rate pass-through: A panel threshold approach" *Economic Modelling* **52** (Part A), 233-238.
- Dilla, S., A. A. Noer, and L. Anggraeni (2017) "Do inflation targeting really reduced exchange rate pass-through?" *International Journal of Economics and Financial Issues* **7**, 444.
- Ghosh, A., & Rajan, R. S. (2006) "A tale of two cities revisited: Pass-Through in Hong Kong and Singapore" Available at SSRN 927971.
- Ha, J., M. Stocker and H. Yilmazkuday (2019) "Inflation and exchange rate pass-through" Public Research Working Paper, No. 8780, The World Bank.
- López Villavicencio, A. and M. Pourroy (2017) "IT Countries: A breed apart? the case of exchange rate pass-through" *The Case of Exchange Rate Pass-Through*, October 10, GATE WP.
- Mihaljek, D. and M. Klau (2008) "Exchange rate pass-through in emerging market economies: what has changed and why?" *BIS papers* **35**, 103-130.
- Pham, T. A. T., T. T. Nguyen, M. A. Nasir, and T. L. D. Huynh, (2020) "Exchange rate pass-through: A comparative analysis of inflation targeting & non-targeting ASEAN-5 countries" *The Quarterly Review of Economics and Finance*. <https://doi.org/10.1016/j.qref.2020.07.010>
- Romer, D. (2006) *Advanced Macroeconomics*, 3rd edition, Boston: McGraw-Hill/Irwin.
- Soon, S. V. and A. Z. Baharumshah (2017) "Exchange rate pass-through (ERPT) into domestic prices: Evidence from a nonlinear perspective" *Economics Bulletin* **37**, 1160-1167.
- Soon, S. V., A. Z. Baharumshah, and M. E. Wohar (2018) "Exchange rate pass-through in the Asian countries: does inflation volatility matter?" *Applied Economics Letters* **25**, 309-312.

To cite this article:

Yu Hsing. Will Domestic Prices Rise Due to Currency Depreciation? The Case of New Zealand. *Journal of International Money, Banking and Finance*, Vol. 2, No. 2, 2021, pp. 237-243