

Analysis of Influencing Factors of Foreign Exchange Interest Rate

Taking the Canadian Dollar and British Pound as Examples

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ABSTRACT

As an essential part of international trade, exchange rates profoundly impact economies that are highly dependent on trade. This paper analyses Canada and the United Kingdom's economic data based on their financial conditions. When discussing the factors influencing the exchange rate, it is found that the interest rate difference between the two countries has the most significant influence on the quarterly and annual exchange rate changes. In comparison, the inflation rate difference between the two countries ranks second. From the perspective of the GDP growth of the two countries, the foreign GDP growth rate has a more significant impact than the domestic GDP growth rate.

Keywords: Foreign exchange rate, forecast, Macroeconomy, Canadian Dollar, British Pound.

1. INTRODUCTION

With the development of globalization, there are more and more multinational companies in the global market, with their production and sales facilities in more than one country. When conducting international trade, almost all participants gain benefits, effectively reducing operating costs and improving profitability. However, multinational corporations need to obtain some foreign exchange to conduct global business, and foreign exchange rates directly affect international trade efficiency and profits. Therefore, the foreign exchange rate prediction is crucial to help enterprises use some financial instruments, such as forward and futures contracts, to hedge the risk of exchange rate changes.

Previous scholars have conducted a series of studies on the relationship between exchange rate and enterprises. Harris finds that the real depreciation of the Canadian dollar in the 1990s led to a decline in productivity [1], and Tang shows that competitive pressure for genuine currency appreciation leads firms to adopt new technologies to boost productivity [2]. Ekholm et al. (2012) explored the relationship between Norway's currency appreciation and manufacturing firms, which increases the intensity of competition and thus labour productivity in exporters [3].

Obstfeld and Rogoff (2000) then proposed the Exchange Rate Disconnect Puzzle theory, reaffirming

that the impact of exchange rates on the economy has always been a hot issue in macroeconomics [4]. The exchange rate has an interactive relationship with a country's economy, so it becomes essential to predict the exchange rate. Currency forecasting provides significant economic benefits, and as a result, it has been the subject of intense economic research for decades [6].

2. THE CHOICE OF CURRENCIES

The Canadian-led study means the Canadian dollar will be treated as a domestic currency and the British pound as a foreign currency. This is because Canada and the United Kingdom are both mature economies involved in major international trade and the World Trade Organization members. Since the hegemony of the US dollar was established in the Bretton Woods system after World War II, international monetary cooperation revolves around maintaining the stability of the US dollar exchange rate. This dominant position has brought enormous benefits to the United States. For this reason, I do not study and analyse the US dollar as a national or foreign currency. But the value of the Canadian dollar to the British pound is derived from the exchange rate between the currencies of these two countries and the US dollar. Treating the dollar as an intermediary currency eliminates as much as possible the impact of its hegemonic status.

3. MAIN FACTORS

The main factors affecting foreign exchange rates are interest rates, inflation rates, economic growth, and political and economic risks. However, since political and economic risks cannot be quantified, I will ignore this factor for the time being.

3.1. Interest Rate

The level of interest rates influences the attractiveness of a country's financial assets to investors. An increase in interest rates in one country relative to other countries leads to a rise in the attractiveness of the country's investments. This leads to a change in the direction of capital flows and, ultimately, a change in the value of local currencies. This study will use the difference in interest rates between Canada and the UK over the same period as a variable ($r_{CA} - r_{UK}$).

3.2. Inflation Rate

When a country has high inflation, the more the value of its currency falls, the less purchasing power it has compared to other currencies. Here, I choose the difference between the consumer price indices of Canada and the UK ($CPI_{CA} - CPI_{UK}$) as a measure of the difference in inflation between the two countries.

3.3. Economic Growth

All other things being equal, a faster rise in a country's real economic growth rate relative to other countries will lead to a surge in the exchange rate of that country's currency. This helps stimulate high export growth, which leads to a surge in demand for the country's currency. Besides, investors are interested in the country's economic growth potential and the return rate on capital for investment products, leading to increased demand for the country's currency. For this reason, I have chosen the GDP growth rates of Canada and the UK to measure the difference between their economies.

4. FOREIGN EXCHANGE RATE PREDICTION MODEL

Many scholars have previously constructed economic models to predict exchange rates. The Mundell–Fleming Model [7] is one example. Dornbusch [8] also recommended an asset market approach to the exchange rate. But most of the existing economic models predict exchange rates based on underlying economic conditions and are based on the assumption that economic fundamentals determine long-term trends. [9]

Formula (1) gives the change in the foreign currency exchange rate each quarter. Formula (2) shows the annual change in foreign exchange rates.

In the previous section, the article presented several variables that affect foreign exchange rates, including interest rate differentials and CPI differences between Canada and the UK and GDP growth rates in both countries. These variables are then combined with the change in the exchange rate to obtain equations (3) and (4). A linear regression analysis was performed to find a relationship between them.

$$\text{Change}_{1qtr} = \% \Delta S_{1qtr} = S_{t+1} / S_t - 1 \quad (1)$$

$$\text{Change}_{1yr} = \% \Delta S_{1yr} = S_{t+4} / S_t - 1 \quad (2)$$

$$\% \Delta S_{1qtr} = \beta_0 + \beta_1 \cdot \text{Interest Rate Differential} + \beta_2 \cdot \text{Inflation Differential} + \beta_3 \cdot \text{GDP Growth CA} + \beta_4 \cdot \text{GDP Growth UK} + \epsilon_t \quad (3)$$

$$\% \Delta S_{1yr} = \beta_0 + \beta_1 \cdot \text{Interest Rate Differential} + \beta_2 \cdot \text{Inflation Differential} + \beta_3 \cdot \text{GDP Growth CA} + \beta_4 \cdot \text{GDP Growth UK} + \epsilon_t \quad (4)$$

5. METHODOLOGY

I obtained quarterly data on interest rates, CPI, and GDP growth for Canada and the UK from the OECD Statistics website. Because of the impact of covid-19 on the global economy, I only obtained data from the first quarter of 2000 to the fourth quarter of 2020, excluding the interference of extreme events.

Based on the obtained data, I calculated the change rate of CADGBP exchange rate, the rate of change of exchange rate, and the rate of change of CPI in the corresponding period. And a linear regression was conducted to explore their impact on exchange rates. In addition, this study also tracked the historical data of CADGBP exchange rate for 80 quarters.

6. FINDINGS AND LIMITATIONS

6.1 Analysis of CADGBP historical trend

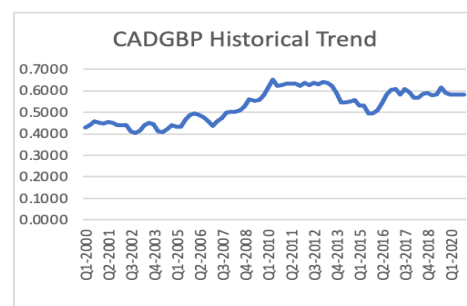


Figure 1 CADGBP Historical Trend

As shown in Chart 1, from 2000 to 2007, the exchange rate fluctuated slightly within the range of 0.4

to 0.5, with a relatively stable overall situation. Since 2007, the CADGBP showed a significant increase until it stabilized at 0.5000 in the second quarter of 2010. However, in the second quarter of 2013, CADGBP experienced a notable downward trend, with the exchange rate returning to its pre-financial crisis level, followed by a gradual recovery to 0.6000. In tracking the CADGBP exchange rate, two particular moments of CADGBP's performance deserve our special attention. The first period was the global financial crisis of 2008-2009, and the second period was 2013-2015, when the UK economy recovered.

CADGBP showed a strong upward trend from 2007, rising from 0.5031 to 0.5598. The first and second quarters of 2009 showed a clear downward trend, falling to 0.5537 and slowing down in the third and fourth quarters, fluctuating around 0.5555. The Canadian dollar was significantly more volatile during the financial crisis than during other periods. During this period, Northern Rock suffered huge losses on investments in US mortgage-related products, and the pound fell sharply as markets tightened and consumer confidence weakened. The Bank of England began cutting interest rates to reduce the negative impact of the financial crisis, and then prevented the devaluation of the GBP. However, the financial crisis also changed Canada's foreign trade environment to a large extent. With the outbreak of the financial crisis, the overall U.S. economy entered a period of recession. Still, the U.S. has been Canada's most important trading partner, with 80% of Canada's exports done by the U.S. Therefore, the quality of the US economy and the reduction of

consumer demand directly affect Canada's foreign trade. The U.S. dollar continued to depreciate against the Canadian dollar, from a peak of C\$1.1685 per U.S. dollar in February 2008 to its lowest level of C\$0.966 per U.S. dollar. The decline was a general trend.

The second period of interest occurred between 2007 and 2010. Considering the situation at that time, the main reason for this phenomenon was the recovery of the UK economy, which performed surprisingly strong, with better performance in PMI, house price index, industrial production, trade account, unemployment figures and retail sales in the second half the year. GDP growth rates in the first three quarters were 0.74%, 1.96% and 1.94% year-on-year, emerging from the shadow of recession and well above the 0.12% rise in GDP for 2012. The unemployment rate gradually declined, from 7.9% in January to 7.4% in November. Inflation was in the 2-3% range for the year, and by the end of the year it was back close to the central bank's 2% policy target.

In 2013, the US debt cliff issue resolution led to a strong rally off the lows in USD/CAD, rising from 0.99 to around 1.03. Firm U.S. economic data showed a strong recovery in economic fundamentals. Market expectations that the Federal Reserve would soon begin tapering its bond purchases further strengthened. The USDCAD unfolded an accelerated rise and surged higher to around 1.07 after the Fed's December rate meeting [5].

6.2 Analysis Linear regression analysis

Table 1. Quarterly Liner Regression Analysis

	Coefficients	Standard Error	T stat	P - value
<i>Intercept</i>	0.00654051	0.0053481	1.22295914	0.22502731
<i>Interest</i>	-1.86679103	0.82902999	-2.25104449	0.02719793
<i>Inflation</i>	0.96419830	0.43560546	2.21346696	0.02978759
<i>GPA_{CA}</i>	0.01667565	0.34848070	0.04785244	0.96195616
<i>GPA_{UK}</i>	-0.17181471	0.26661498	-0.64443006	0.52118733

$$\% \Delta S_{1qtr} = 0.0065 - 1.8668 \text{ Interest Rate Differential} + 0.9642 \text{ Inflation Differential} + 0.0168 \text{ GDP Growth CA} - 0.1718 \text{ GDP Growth UK} \quad (5)$$

According to the coefficients in table1, I can obtain the quantitative relationship between the four

independent and dependent variables, where interest rate and GPA_{UK} play a negative correlation to the dependent variable, however, Inflation rate and GPACA play a positive role to the dependent variable. Among them, the largest contribution is the interest rate.

Table 2. Annually Liner Regression Analysis

	Coefficients	Standard Error	T stat	P - value
<i>Intercept</i>	0.05814475	0.01366804	4.25406693	5.98991
<i>Interest</i>	-7.2091842	1.62167272	-4.4455235	2.98509

Inflation	3.62997421	0.92161154	3.93872476	0.00018197
GPA_{CA}	-0.2198994	0.67610892	-0.3252425	0.74590311
GPA_{UK}	-2.0652566	0.70192991	-2.9422547	0.0.00433

$$\% \Delta S_t / \text{yr} = 0.0581 - 7.2091 \text{ Interest Rate Differential} + 3.6300 \text{ Inflation Differential} - 0.2198 \text{ GDP Growth CA} - 2.0652 \text{ GDP Growth UK} \quad (6)$$

According to the coefficients in table2, we can obtain the quantitative relationship between the four independent variables and the dependent variable, where interest rate, GPA_{CA} and GPA_{UK} play a negative role on the dependent variable, however, inflation rate and play a positive role on the dependent variable. Among them, the largest contribution is the inflation rate.

According to the coefficients obtained from the linear regression, we can obtain the relationship equation between the quarterly rate of change of the exchange rate. The significance level set in the linear regression is 95%, and the statistical significance can be tested by comparing the p-values of the linear regression. However, from the data outcome, the p-values of all the independent variables and intercepts are more remarkable than 0.01, indicating that they are not statistically significant at the 99% confidence interval. Only the interest rate difference and the inflation rate difference were statistically significant within the 95% confidence interval.

Based on the coefficients obtained from the linear regression, we can obtain the equation of the relationship between the annual rates of change in exchange rates. Statistical significance can be tested by comparing the p-values of linear regression. However, from the data available, the p-values of the inflation rate differential and UK GDP growth are less than 0.001, indicating that they are statistically significant within the 99% confidence interval. The p-values of interest rate differentials, ca GDP growth and intercept are much greater than 0.01, indicating that they are not statistically significant at 99% and 95% confidence intervals. By comparing the R-squared of the two equations, I find that the regression curve of the annual exchange rate has a better fit.

7. CONCLUSIONS

In this report, I examine the significant factors that can impact exchange rates. Again, I found that the difference in interest rates between the two countries affected quarterly and annual exchange rate changes. The difference in inflation rates between countries came in second. From the perspective of GDP growth in two countries, the foreign GDP growth rate will be more influential than the domestic GDP growth rate.

Since the exchange rate is a core issue in international trade, it is of great importance to study the valuation model of the exchange rate. However, since using this model requires the exclusion of many other temporal disturbances. During the study, this paper ignored the effects of some international events, such as wars and pandemics. Thus, the future research needs to consider how to eliminate differences in the events that will have an impact on the world economy.

REFERENCES

- [1] Harris R G. Is There a Case for Exchange-Rate-Induced Productivity Changes[Z]. Canadian Institute for Advanced Research Working Paper, 2001, No.164
- [2] Tang Y. Does Productivity Respond to Exchange Rate Appreciations? A Theoretical and Empirical Investigation [Z]. Bowdoin College Working Paper, 2010
- [3] Ekholm K, Moxnes A, Ultveit-Moe K. Manufacturing Restructuring and the Role of Real Exchange Rate Shocks[J]. Journal of International Economics, 2012, 86 (1): 101-117
- [4] Obstfeld M, Rogoff K. The Six Major Puzzles in International Macroeconomics : Is There a Common Cause[Z]. NBER Working Paper, 2000, No. 777
- [5] Review of foreign exchange market in 2013 and Prospect in 2014. Ccb.Com 2013.
- [6] Stepnicka, M.; Cortez, P.; Donate, J.P.; Stepnickova, L. Forecasting seasonal time series with computational intelligence: On recent methods and the potential of their combinations. Expert Syst. Appl. 2013, 40,1981-1992.
- [7] Mundell, R.A. Capital mobility and stabilization policy under fixed and flexible exchange rates. Can. J. Econ. Political Sci. 1963, 29, 475–485.
- [8] Dornbusch, R., Exchange rate expectations and monetary policy. *Journal Of International Economics* 1976, 6, 231-244.
- [9] Yasir, M., Durrani, M., Afzal, S., Maqsood, M. et al., An Intelligent Event-Sentiment-Based Daily Foreign Exchange Rate Forecasting System. *Applied Sciences* 2019, 9, 2980.