

# Study on the Influence of RMB's Entry into SDR on the Interest Rate of SDR

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## Abstract

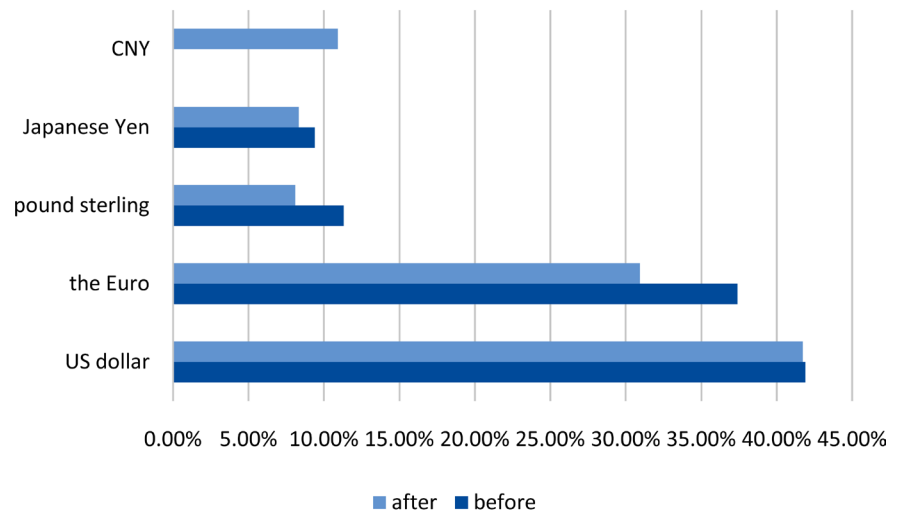
On October 1, 2016, with the approval of the International Monetary Fund, the RMB officially joined the SDR currency basket, which not only recognized the international status of RMB, but also injected new vitality into the development of the world economy. SDR interest rate is an important part of SDR valuation and pricing. Based on the background of RMB entering the SDR currency basket, this paper divides the study period into three parts to analyse the impact of RMB enter the basket on the SDR interest rate: a complete review period before the RMB included; the IMF announced that it will accept the RMB but not yet; and the RMB is officially "add to the basket". The results of the study show that RMB's participation in the SDR basket significantly improves the SDR interest rate level, helps to improve the stability of the SDR interest rate and the representation of the SDR interest rate to the global economy, and is expected to help build a new order in the international monetary system.

## Keywords

SDR Interest Rate, Coefficient of Variation, Stability, RMB

## 1. Introduction

On November 30, 2015, the Executive Board of the International Monetary Fund (IMF) announced that it would include the RMB in the special drawing rights (SDR) basket with a share of 10.92%. On October 1, 2016, the RMB officially joined the SDR and formed a new SDR currency basket together with the US dollar, the Euro, the British pound and the Japanese yen. **Figure 1** shows the changes in the weight of each basket currency before and after the RMB is included in the SDR basket. This is not only an endorsement of the internationalization status of RMB, but also a fresh force to the development of SDR.



Data source: IMF website

**Figure 1.** Comparison of currency percentage weights before and after RMB's inclusion in SDR.

The SDR has three main functions: First, as the national reserve assets, the total amount of SDR in the world remains unchanged. When the balance of payments deficit occurs, the IMF negotiates to regulate countries to carry out special drawing rights and a basket of currencies to keep the balance of payments; Second, IMF member countries can directly use SDR to repay their loans, interest and other expenses in the IMF; Third, IMF member countries can use SDR to repay loans, as gifts, or conduct various financial businesses. The SDR interest rate plays an important role in the practical application of SDR.

The interest rate of SDR is a short-term interest rate, which is the basis for calculating the interest charged by IMF on conventional (non-preferential) loans of borrowing member countries and the interest paid to financing member countries. The interest paid on the SDR holdings of member countries and the interest charged on the allocation of SDR are also calculated according to the interest rate of SDR. At the same time, the interest rate of SDR will also affect the asset liability and bond interest of some international organizations whose value is determined by SDR.

As we can see, SDR interest rate is an important part of SDR valuation and pricing. The fluctuation and actual value of SDR interest rate will influence the SDR self-financing mechanism, the development of the IMF responsibility sharing mechanism and the attractiveness of SDR, what's more, it is closely related to the future expansion and development of range of application of the SDR. Therefore, it is of great significance to study the impact of RMB on the SDR currency basket on the SDR interest rate.

This paper uses descriptive statistical analysis and analysis of variance to quantify the impact of RMB on the SDR currency basket on SDR interest rates. The analysis will be divided into three periods—a full review period before the RMB joins the SDR currency basket; the period that IMF announced the yuan in

the SDR basket but not formally incorporated into the basket; the period that RMB officially joins the basket. This paper will compare the stability of the SDR interest rate before and after the entry of the RMB into the SDR currency basket, and the impact on the representation and attractiveness of the interest rate basket.

## 2. Literature Review

In 1969, in order to solve the “Triffin problem” in the international monetary system, the countries proposed that the IMF set up a new international monetary unit—special drawing right (SDR), as a supplementation of the ordinary drawing rights. The ordinary drawing right plays the loan function, and the SDR plays the deposit function. About the definition of SDR, scholars have the following views. Agnès Bénassy-Quéré & Damien Capelle (2011) deemed that the SDR is not a currency nor a claim on the IMF, but a potential claim on central banks that have freely usable currencies [1]. Su Zhi, Hu Di, Fang Wei (2015) thought that SDR is a kind of international reserve assets and accounting units, rather than actual currency, it need to be exchanged in other currencies when using [2]. Shi Jinyue (2016) considered that the SDR was created to address international liquidity shortage and the asymmetry of the international monetary system. The SDR which is a reserve asset and unit of account, has become the unit of account for a “basket” of currencies and is a right of use of funds allocated to member states by the international monetary fund [3]. Zhao Huifang (2017) thought that SDR is established by the IMF as an addition to the original general drawing right. It is a unit of account for international reserve assets and is not a currency in circulation. It needs to be converted before it can be used for international trade or non-trade payment [4]. Clark & Ploak (2002) thought that the SDR is a multilateral instrument that provides liquidity, a store of value and an accounting unit [5].

Scholars have conducted a lot of researches on the impact of RMB's inclusion in the SDR currency basket, mainly focusing on qualitative analysis. Zhou Xiaochuan (2009) believed that the existence of SDR provides a potential choice for the reform of the international monetary system. SDR has the characteristics and potential of super-sovereign reserve currency [6]. Agnès Bénassy-Quéré & Damien Capelle (2011) believed that the inclusion of the renminbi in the SDR currency basket can reduce the volatility of the SDR and balance the possible decline in the value of the currency basket [1]. Qian Wenrui and Pan Yingli (2013) studied the short-term and long-term stability of SDR before and after the entry of RMB into SDR. It is believed that the entry of RMB into SDR currency basket is conducive to the long-term stability of SDR valuation and will reduce its short-term volatility to major currencies [7]. Zhao Ranran (2013) used the Monte Carlo experiment to simulate the performance of China's foreign exchange reserve asset portfolio before and after the RMB joined SDR. It was believed that the RMB “into the basket” could create a useful foreign exchange

reserve investment tool for China, and the economic function of SDR was enlarged by RMB [8]. Agnès Bénassy-Quéré & Damien Capelle (2014) studied the impact of the inclusion of the RMB in the SDR currency basket on the composition and stability of a basket of currencies, arguing that the addition of the RMB would make the SDR currency basket more representative and reasonable, and possibly increase the attraction of SDR as a value storage tool [9]. Qiao Yide, Ge Jiafei (2015) studied the criteria of joining the SDR basket, included the use of the RMB in international foreign exchange reserves, the use in international bonds, the share of the international foreign exchange market. Analysis of these aspects showed that the RMB has basically met the IMF standard for the SDR basket currency, and that the RMB entering the SDR currency basket will help increase the representation of the SDR and the stability of the SDR exchange rate, which is beneficial to the SDR. It will also help SDR play its role in the international monetary system more effective [10]. Su Zhi, Hu Di, Fang Wei (2015) used the scenario analysis model to study the impact of RMB's participation in the SDR currency basket on SDR. It believed that the international impact of RMB participation on SDR currency unit interest rate was not significant and would not significantly increase SDR debt or the burden of the debtor country [2]. Shi Jinyue (2016) analyzed the impact of RMB on the SDR currency basket from two aspects: the impact on the international monetary system and the impact on China itself. It is believed that the inclusion of RMB in SDR is conducive to improving the reform efficiency of the international monetary system and promoting the internationalization of the RMB [3]. Yu Enfeng and Gong Xiuguo (2017) used historical retrospective and regression methods, and found that the inclusion of the RMB increased the representation and stability of the SDR interest rate basket, and in the long run it was a Pareto improvement [11].

The existing literature mainly analyzes the various aspects of the RMB's participation in SDR, or analyze whether the RMB meets the SDR entry conditions [12]. The literature on the impact of RMB joining SDR on SDR interest rate is less, or only studies the performance after the inclusion of RMB [4]. There is rare research on the comparative analysis of the performance of the SDR interest rate before and after the inclusion of RMB.

Dividing periods into three parts according to the key time node of RMB's inclusion in the SDR can help see the impact of RMB's accession on SDR interest rate change more clearly and eliminate the impact of some non-related (systematic) factors on the research results. This will be the research focus of this paper.

### **3. Data**

#### **3.1. Data Processing**

This paper uses the SDR interest rate data of 2010.11-2018.12 and the yield data of SDR currency countries' representative financial instruments. According to the key time cut-off point of RMB joining SDR, the data is divided into three periods for comparative analysis: 1) A full review period before the RMB joining

SDR currency basket: 2010.11-2015.11; 2) the period that IMF announced that the RMB will be included in the SDR currency basket but not officially included yet: 2015.12-2016.10; 3) RMB officially joined the SDR currency basket: 2016.10-2018.12.

The analysis is divided into three time periods in order to see the impact of the RMB joining the basket on the SDR interest rate more clearly. Among them, the Three-month benchmark yield for China Treasury bonds data come from the official website of the People's Bank of China (<http://www.pbc.gov.cn>) and are captured on a weekly basis (same frequency as the SDR interest rate announcement), adjusted correspondingly according to holidays and festivals. The representative financial instrument yields of other basket currencies countries and SDR interest rate data come from the official website of the IMF.

### 3.2. Basic Information of SDR Interest Rate

From the year of 1974, the IMF decided to use market-based interest rates. The SDR interest rate is based on a weighted average of representative interest rates on short-term debt instruments in the money markets of the SDR basket currencies. SDR interest rate is adjusted weekly. On October 24, 2014, the Executive Board of the IMF amended the rule for setting the SDR interest rate by introducing a floor of 0.050 percent (5 basis points) and changing the rounding convention for calculating the SDR interest rate from two to three decimal places.

**Table 1** lists the weight, the amounts of currencies, and the representative financial instruments selected as the basis for calculating SDR interest rate of each currency in the SDR basket. During the research period selected in this paper, the representative financial instruments selected by issuing countries of each currency in the currency basket are as follows: Three-month US Treasury bills, three-month benchmark yield for China Treasury bonds, three-month Japanese Treasury Discount bills, three-month UK Treasury bills, three-month spot rate for Euro area Central government bonds with a rating of AA and above. During the research period of this paper, only the representative financial instruments corresponding to the euro have been adjusted once.

**Table 1.** Fundamental Situation of the SDR Currency Basket.

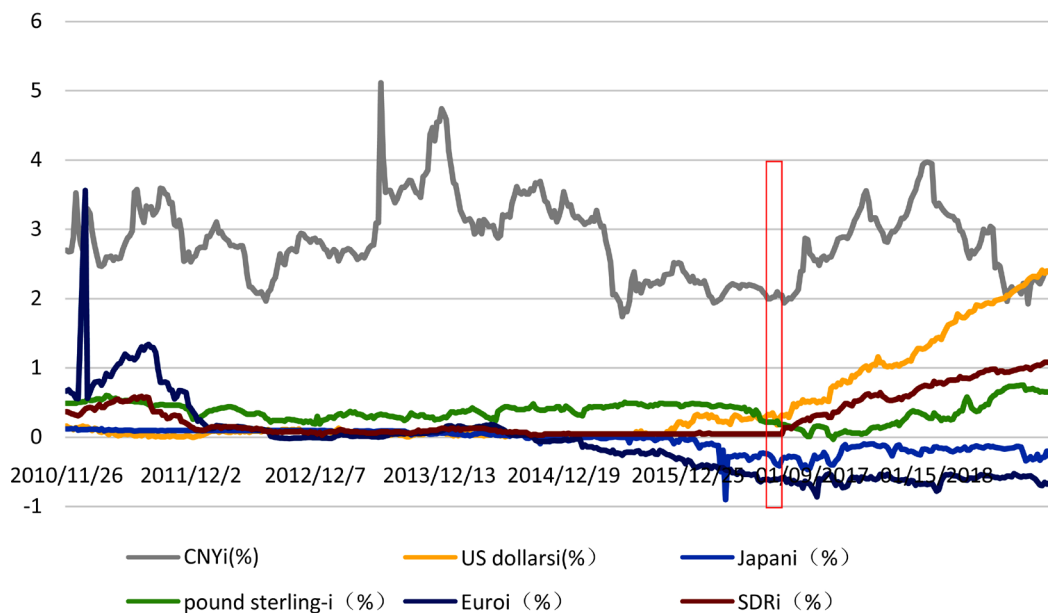
Currency	Percentage Weights (after Oct 1, 2016)	Illustrative Currency Amounts (assumed transition date = Sept 26, 2016)	Financial Instrument of Each Component Currency
U. S. Dollar	41.73	0.5825	Three-month US Treasury bills
Euro	30.93	0.3870	Repo rate (2006.1.1-2014.12.31) Three-month spot rate for euro area central government bonds with a rating of AA and above (2015.1.1-)
Chinese Yuan	10.92	1.0175	Three-month benchmark yield for China Treasury bonds
Japanese Yen	8.33	11.912	Three-month Japanese Treasury Discount bills
Pound Sterling	8.09	0.0858	Three-month UK Treasury bills

Data Source: IMF Website.

## 4. Empirical Analysis

### 4.1. The Influence on the Value of SDR Interest Rate

**Figure 2** shows the performance of the yield of the representative financial instruments of the former four issuing countries in the SDR currency basket, the interest rate of SDR and the change of Three-month benchmark yield for China Treasury bonds during the whole research period of this paper (from November 2010 to December 2018). The vertical axis of **Figure 2** represents the percentage level of the rate of return, or interest rate. As can be seen from **Figure 2**, the performance of SDR interest rate before RMB join SDR basket were: SDR interest rate kept going down, and the yield of some representative financial instruments of several countries even showed continuous negative value. The repo rate corresponding to the Euro started to be negative since August 2012, and the new representative financial instrument which was introduced in January 2015, failed to improve the continuous negative trend. The Japanese Yen also began to be negative since August 2014. The dollar has been below 0.1% for a long time in 2011-2015. The pound sterling has long been around 0.5 per cent or negative. These circumstances make the weighted average—SDR interest rate level close to zero—less attractive to SDR holders. At the same time, it can be seen from **Figure 2** that the RMB government bonds has been maintained at more than 1.5% during the whole research period, higher than the yield of representative financial instruments of the issuing countries in the SDR currency basket. Therefore, it can be expected that after the inclusion of RMB into SDR currency basket, the weighted average value of representative financial instruments of basket currencies will be increased—which is, SDR interest rate. The position marked in the red box in **Figure 2** is the time when RMB officially joined the SDR currency



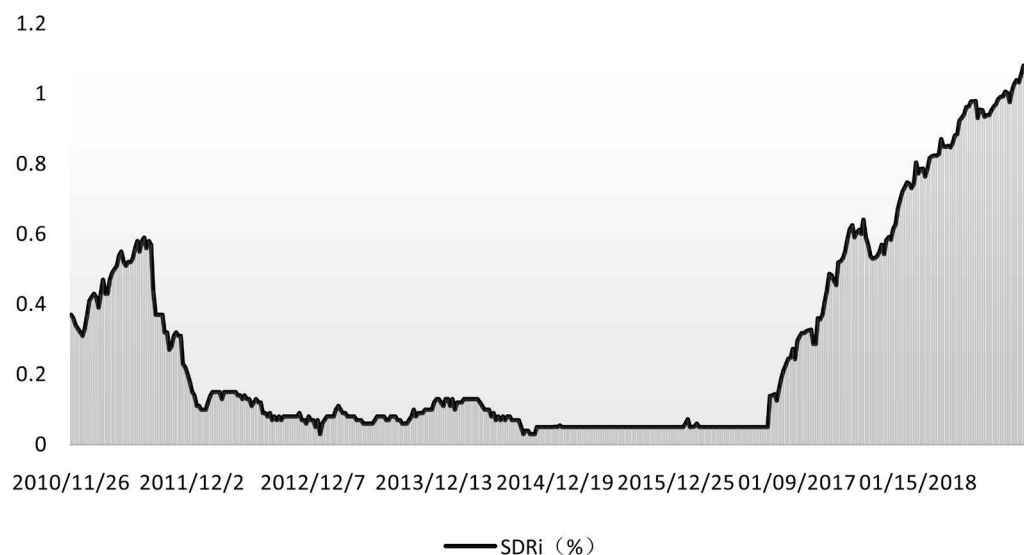
Data Source: IMF Website.

**Figure 2.** Yield performance of representative financial instruments in each currency country.

basket. It can be seen from **Figure 2** that after that, the yield rate of the U. S. dollar, pound and SDR interest rate experienced a significantly promotion, while the Euro and Japanese yen were still negative, but the downward trend was eased, and the overall change tended to be flat. The yield of RMB remains above 2% with small fluctuations, as it always be. This is also the positive influence of the inclusion of RMB.

In the last review period (2011-2015), it can be clearly observed through **Figure 3** that the SDR interest rate showed an overall trend of rising first and then decreasing. Starting from 2012, the SDR interest rate continued to be below 0.15%, close to zero. The minimum value of this stage is 0.03%, the maximum value is 0.59%, and the average value is 0.1486%, which had very low attractiveness to the holder. On November 30, 2015, the IMF announced the inclusion of the RMB in the SDR currency basket. The RMB was officially included in the SDR currency basket on October 1, 2016. During this period, the SDR interest rate was basically maintained at around 0.05% of its lower limit. The coefficient of variation was found to be 0.0734, which was almost non-fluctuating. The maximum value was 0.072% and the minimum value was 0.05%. After the RMB officially joined the SDR currency basket, (October 1, 2016), it can be seen from **Figure 3** that the SDR interest rate had increased rapidly and maintained overall growth, with an average of 0.6661%; the maximum value reached to 1.098% which was the maximum value during the whole research period; the minimum value was 0.125%, which is 2.5 times higher than the lower limit. The addition of the RMB has significantly remitted the long-term downturn caused by the ultra-low interest rates or even negative interest rates of other basket currencies.

After the official inclusion of RMB into SDR currency basket, the average interest rate of SDR (0.6661) increased by 4.48 times compared to the average interest rate of SDR (0.1486) before the accession of RMB. According to the statistical



Data Source: IMF Website.

**Figure 3.** Trend of SDR Interest Rate from 2010.11-2018.12.



results, the accession of RMB significantly increased the interest rate of SDR.

#### 4.2. The Influence on the Stability of SDR Interest Rate

It can be seen from **Table 2** that the variation coefficient of SDR interest rate was 0.0734 from December 2015 to October 2016, with almost no fluctuation. It can also be seen from **Figure 3** that the interest rate of SDR was almost maintained around 0.05% of its lower limit during this period, and the interest rate of SDR failed to reflect the changes in economic situation positively, intuitively and healthily, and its value was not fully reflected. After the accession of RMB into SDR currency basket, the variation coefficient of SDR interest rate was 0.4115, which was 57.87% lower than the variation coefficient of 0.9767 before the accession of RMB, indicating that the accession of RMB not only brought vitality to SDR interest rate, but also made SDR interest rate more stable.

According to the results of descriptive statistical analysis and anova, the average yield of RMB during the whole research period is 2.8464%, which is second only to the yield of US dollar and far higher than the average yield of other three representative financial instruments. Since the average value of Euro and Yen are negative during the study period, the coefficient of variation is not comparable, which also indicates that the yield volatility of the two currencies is relatively larger. As can be seen from **Table 3**, the variation coefficient of RMB 0.2021 is the smallest in the SDR currency basket, followed by pound 0.4048, and the maximum variation coefficient is US dollar (1.5298). The variation coefficient of SDR interest rate is 1.0755, 5.32 times larger than that of RMB. The results of the above statistical data show that the fluctuation degree of the representative financial instruments of RMB is the smallest among all the representative financial

**Table 2.** Descriptive statistical analysis of SDR interest rate.

Period	Obs.	Min	Max	Mean	Std.	CV
2010.11-2015.11	280	0.03	0.59	0.1486	0.1452	0.9767
2015.12-2016.10	46	0.05	0.072	0.0509	0.0037	0.0734
2016.10-2018.12	122	0.125	1.098	0.6661	0.2741	0.4115

Data Source: IMF Website, self calculation.

**Table 3.** Comparison of t rates in RMB with those in other currencies (2010.11-2018.12).

Currency	Obs.	Min	Max	Mean	Std.	CV
U. S. Dollar	419	-0.01	2.41	0.4187	0.6405	1.5298
Euro	423	-0.8594	3.5597	-0.0937	0.5339	-5.6961
Chinese Yuan	419	1.7431	5.1132	2.8464	0.5754	0.2021
Japanese Yen	419	-0.9	0.13	-0.0419	0.1531	-3.6479
Pound Sterling	419	-0.03	0.75	0.3667	0.1484	0.4048
SDR	448	0.03	1.098	0.2795	0.3006	1.0755

Data Source: IMF Website, self calculation.

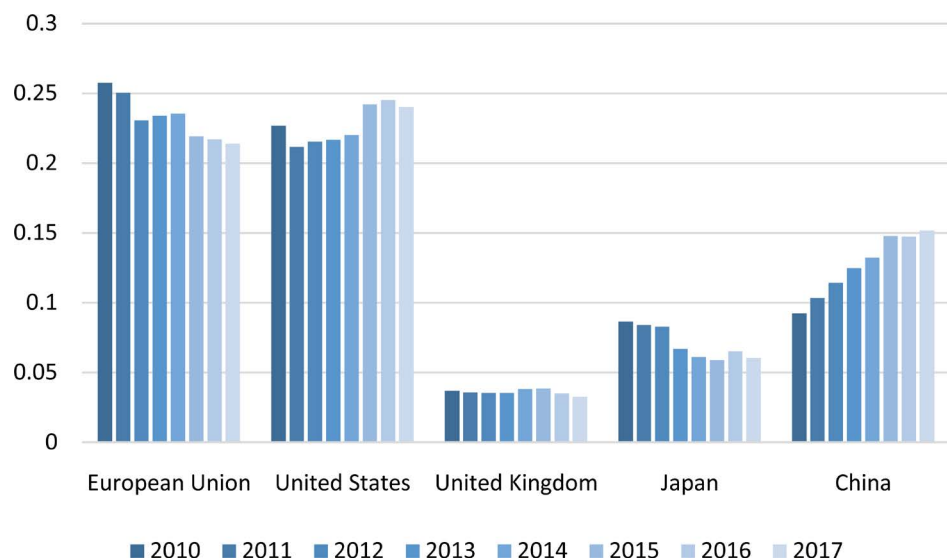


instruments of basket currencies. The inclusion of RMB will help to reduce the weighted fluctuation range of various financial instruments, which means reduce the fluctuation degree of SDR interest rate. After the official inclusion of RMB into SDR currency basket, the variation coefficient of SDR interest rate is 0.4115, which is 57.87% lower than that before the inclusion of RMB into SDR currency basket (0.9767), indicating that the inclusion of RMB is conducive to enhancing the stability of SDR interest rate.

### 4.3. The Influence on the Representation of SDR Interest Rate

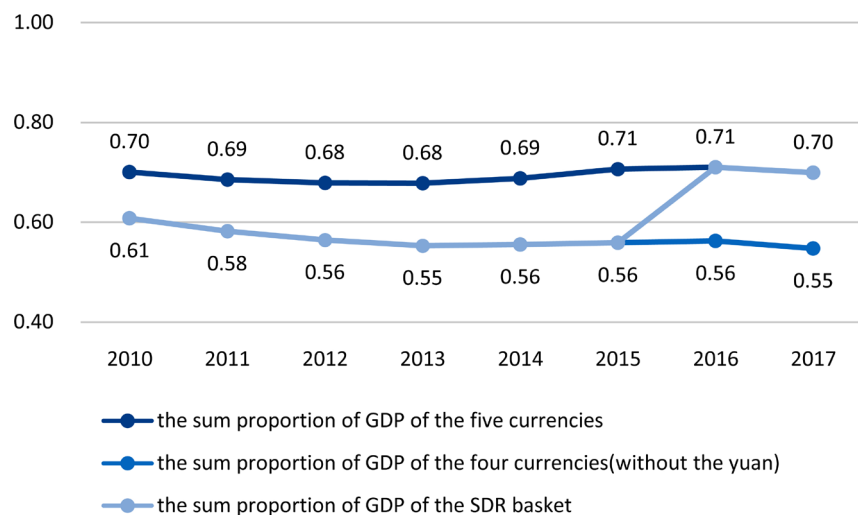
As can be seen from **Figure 4**, since 2010, the GDP proportion of Euro and Japan has been decreasing. The GDP of Japan has decreased from 8.642% in 2010 to 6.039% in 2017, a decline of 30.12%. The Euro's share of global GDP fell from 25.755% in 2010 to 21.414% in 2017, a decline of 16.85%. In contrast, China, as a developing country, has witnessed rapid development in recent years. Its proportion of GDP of global has been rising continuously, from 9.249% in 2010 to 15.167% in 2017, with a growth rate of 63.99%. China's proportion of GDP in 2015 was 3.83 times than that of the UK and 2.52 times than that of Japan. The rapid development of China makes it play an increasingly important role in the global economy and the RMB plays an increasingly important role in international financial activities.

**Figure 5** shows the change trend of the sum proportion of GDP of the SDR basket during the whole research period (from Nov. 2010 to Dec. 2018). As it showed in **Figure 5**, before the inclusion of RMB, the proportion of GDP of the SDR currency basket were under 60% (The combined proportion of GDP of all the world's economies is 100%). After the inclusion of RMB into the SDR currency basket, the GDP of the economies of all currencies in the SDR basket accounted for a larger proportion of global GDP, which was 71% in the year of



Data Source: World Bank national accounts data, and OECD National Accounts data files.

**Figure 4.** The proportion of GDP of the five currency countries.



Data Source: World Bank Website—World Development Indicators.

**Figure 5.** Change of the sum proportion of GDP of the SDR basket

2016, increased 27% compared to the year of 2015 (56%).. From the perspective of statistics, the accession of RMB enhances the representation of SDR currency basket to the global economy. At the same time, the accession of RMB also means that developing countries have a place in SDR, which also improves the representation of SDR currency basket in global economies.

For a long time after its creation, the value of SDR was determined by the currencies of major developed countries, including the US dollar, Japanese yen, British pound, French franc and German mark. In 2000, the Euro replaced the French franc and German mark. There are only four currencies in the currency basket, which is not only small in number but also unreasonable in structure. The role of developing countries is not reflected in the SDR, which also makes the participation of developing countries insufficient and is not conducive enough to the development and promotion of SDR in the global scope in some sense. Including China's official currency into the SDR basket shows the determination and reform of SDR and IMF, it can not only help the IMF gain more support and recognition in the developing world, improve the international influence of SDR, but also help to break the American hegemony in the world economy, create a new international monetary system, to some extent weaken the dollar "monolith" pattern, reflect the economic development of developing countries.

## 5. Conclusions

For the future development of SDR, profitability will be a very important factor in making SDR possessing the attributes of super-sovereign currency, improving the practicality of SDR, and expanding the scope of SDR, and SDR interest rate is one of the important aspects. Through research, this paper found that the RMB included in the SDR currency basket has significantly increased the SDR interest rate. After the RMB join the SDR currency basket, the average SDR

interest rate (0.6661%) increased by 4.48 times compared with the average before (0.1486%). Through the coefficient of variation and analysis of variance, this paper argues that the inclusion of RMB in the SDR currency basket will help to improve the stability of SDR interest rate and slow down its fluctuation. At the same time, as a representative of the world's major developing countries, China can help enhance the representation of SDR and its interest rate in global economies and world monetary and financial instruments, and help increase the possibility and feasibility of SDR becoming a super-sovereign currency in the future.

For China, the inclusion of RMB into the SDR basket is both an opportunity and a challenge—for example, the participation of RMB in the SDR currency basket can help accelerate the internationalization of RMB, reduce the cost of overseas financing for Chinese companies, and help build a new order in the international monetary system. However, it may also increase the pressure to maintain the stability of the RMB value, weaken the independence of Chinese monetary policy, and cause China to be easier involved in the global financial crisis. In the future development process, China should not only seize the opportunity to develop its economy, but also identify and prevent risks based on the situation, and make use of this opportunity to usher in a more vigorous development of Chinese economy.

The limitations of this paper may be that the impact of RMB “into the basket” on SDR interest rate levels and volatility may include interference from other factors, leading to the amplification of research results—for example, the rise in SDR interest rates may be caused by the gradual improvement of global economic situation. The research in this paper did not eliminate the impact of such environmental factors on the results. This is also the direction of future research and the difficulties to be overcome.

### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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