

# ***Impact of Short-Term Expansionary Monetary Policy on the Economy Based on the Keynesian Model***

## ***— China's Monetary Policy in the Post-Epidemic Era as an Example***

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**Abstract:** China has entered the post-epidemic period since 2023. The monetary policy of the central bank is crucial in controlling China's macro economy in light of the three-year impacts of the pandemic of coronavirus disease 2019(COVID-19) and the present downturn in the country's GDP. The People's Bank of China, the nation's central bank, has been implementing expansionary monetary policy on the overall economy. Using the Keynesian theoretical model, this article primarily examines the short-term impacts of expansionary monetary policy, or an increase in the nominal money supply, on the real income of Chinese individuals, the total production of the nation's economy, and interest rates. The analysis concludes that an expansionary monetary policy can decrease interest rates and increase real income and total production for citizens in short term. The Keynesian model provides a theoretical perspective on the relevance of the central bank's expansionary monetary policy based on the status of the economy today.

**Keywords:** Keynesian model, monetary policy, China, macroeconomics

## **1. Introduction**

A major blow to the world economy has been dealt by the COVID-19 outbreak, which has exacerbated the division of globalization and the global economic downturn, including China [1]. The COVID-19 epidemic has had a severe negative impact on China's economy, both on the supply and demand sides. The pandemic caused China's GDP to decline 6.8% annually in just the first quarter of 2020 [2]. Profits in industry decreased 36.7% [2]. Only 67.3% of the country's industrial capacity is being utilized [2]. In actuality, the nation's per capita disposable income decreased by 3.9% [2]. The monetary policy of the People's Bank of China is an essential instrument for macroeconomic adjustment in light of the state of the current economy. During the post-epidemic phase, the People's Bank of China continues to impose multiple expansionary monetary policies to stimulate the economy, including improve aggregate demand and aggregate supply. The Keynesian model, the cornerstone and heart of contemporary Western macroeconomics, examines how an increase in nominal money supply affects the markets of goods, money and labor in order to logically connect variables like output, income, and interest rates [3]. According to Keynesian's view, central bank should pursue expansionary monetary policy in order to drop interest rates, boost investment and consumption, and

ultimately end the economic downturn [3]. To the extent that it does so, Keynesianism gives decision-makers a theoretical foundation for macroeconomics and a viewpoint from which to understand the rationale behind macroeconomic policy.

## **2. The COVID-19 pandemic's detrimental effects on China's economy**

The COVID-19 epidemic has significantly hampered China's overall economic growth by lowering investment and consumption levels on the demand side and total output on the supply side. Compared to the same period in 2019, China's GDP shrank by 6.8% and its growth rate dropped by 13.2% in the first quarter of 2020 [4]. The decrease is noticeably more serious than what the Asian financial crisis of 1998 and the global financial crisis of 2008 did to China's economy [4]. China has never had negative quarterly economic growth since the introduction of a quarterly GDP accounting technique in 1992 [4].

On the demand side, in 2020, fixed asset investment dropped by 16.1% and growth rate dropped by 22.4% from the year before. In the first quarter of 2020, the three industries saw a reduction in investment of 13.8% in the primary sector, 21.9% in the secondary sector, and 13.5% in the tertiary sector; correspondingly, the growth rates were 16.8%, 26.1%, and 21.0% lower than those of the corresponding period in 2019[4]. The consumption expenditure fell by 8.2% in nominal terms and 12.5% in real terms, with growth rates declining by 15.5% and 17.9%, respectively [4].

The COVID-19 had a disastrous effect on the supply side. The Chinese government's lockdown and travel restriction measures during the pandemic have made it difficult for numerous businesses and factories to meet demand for their products on schedule [5]. Many employees were locked down at home for months, unable to go to work, and factory production lines were forced to shut down until the end of 2022. The manufacturing subsector and supply chains bear the brunt of the financial losses, with enterprises and operations in the transportation and service sectors suffering the most [6]. The primary industry saw a 3.2% annual decline in added value, the secondary industry saw a 9.6% annual decline, and the tertiary industry saw a 5.2% annual decline [4].

## **3. Expansionary Monetary Policy**

### **3.1. Keynesian Theory**

#### **3.1.1. Assumption**

A few presumptions must be met in order to examine expansionary monetary policy using the Keynesian model. First off, this research is predicated on the notion of a closed economy because the Keynesian model employed in this article solely examines the domestic economy and ignores import and export or international trade. Secondly, the nominal wage of workers in the labor market is rigid, which means that the nominal wage is fixed in the short run. Lastly, the total employment is less than the full employment level [7]. In the labor market, the labor supply exceeds the labor demand, meaning that the labor demand determines how much labor is used in production [3].

#### **3.1.2. Keynesian Model**

In the goods market, the real income( $Y$ ) is equal to the total expenditure( $E$ ). The total expenditure is consistent with total consumption( $C$ ), total investment( $I$ ), and government spending( $G$ ). The total consumption( $C$ ) has a positive relationship with the Income after tax( $T$ ). Investment has a positive relationship with interest rates( $r$ ). In the short run, this paper assumed that both government spending( $G$ ) and tax( $T$ ) are fixed as well as the exogenous variable  $c$  and  $g_0$ . If the goods market is at equilibrium, then

$$E = Y = C + I + G \quad (1)$$

$$C = c + b(Y - T) \quad (2)$$

$$I = g_0 - g_1 r \quad (3)$$

$$G = G_0 \quad (4)$$

$$T = T_0 \quad (5)$$

$$E_0 = c - bT_0 + g_0 + G_0 \quad (6)$$

The function of the real income and the interest rates (Formula 7), also known as the "Investment-Saving(IS)" function, is derived from formulas (1) through (6).

$$r = \frac{E_0}{g_1} - \frac{1-b}{g_1} Y \quad (7)$$

This paper assumed that, at the level of equilibrium, real money supply( $m_s$ ) and real money demand( $m_D$ ) are equal in money market. The real money supply is equal to nominal money supply( $M_S$ ) divided by price level( $p$ ). The real money demand has a positive relationship with the real income( $Y$ ) and a negative relationship with the interest rates( $r$ ).  $m_0$  is an exogenous variable which is fixed. The equilibrium of the money market (Figure 1) implies the following equations.

$$m_s = m_D = m_0 - m_1 r + m_2 Y \quad (8)$$

$$m_s = \frac{M_S}{p} \quad (9)$$

### Money Market

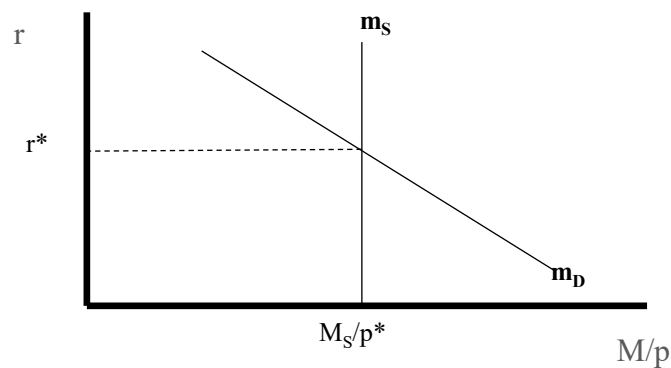


Figure 1: Diagram of money market at equilibrium

Based on the formula (8) and (9), it has the another function (Formula 10) of the real income and interest rates, which called the "Liquidity Preference-Money Supply(LM)" function.

$$r = \frac{m_0 - m_s}{m_1} + \frac{m_2}{m_1} Y \quad (10)$$

The IS-LM model, also known as the Hicks-Hansen model, illustrates the relationship between the interest rates and the real income of the money market and the goods market, respectively. The acronyms stand for "Investment-Saving" (IS) and "Liquidity Preference-Money Supply" (LM). The equilibrium of the money and goods markets is indicated by the point where the "LM" and "IS" curves intersect (Figure 2).

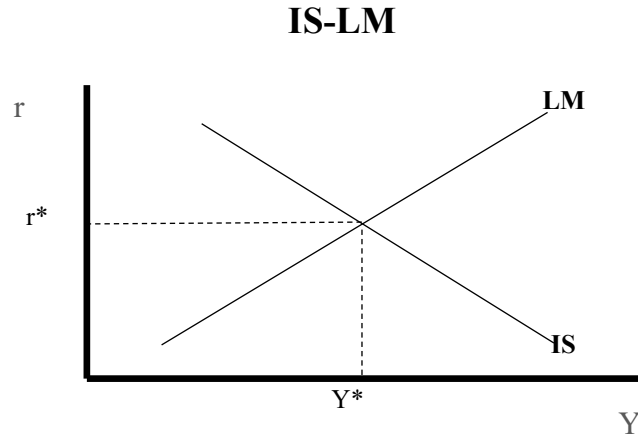


Figure 2: Diagram of IS-LM model at equilibrium

The real wage level ( $w/p$ ) in the labor market is determined by dividing the nominal salary ( $w$ ) by the level of prices ( $p$ ). At equilibrium, the labor supply ( $L_s$ ) always exceeds the labor demand ( $L_D$ ) (Figure 3).

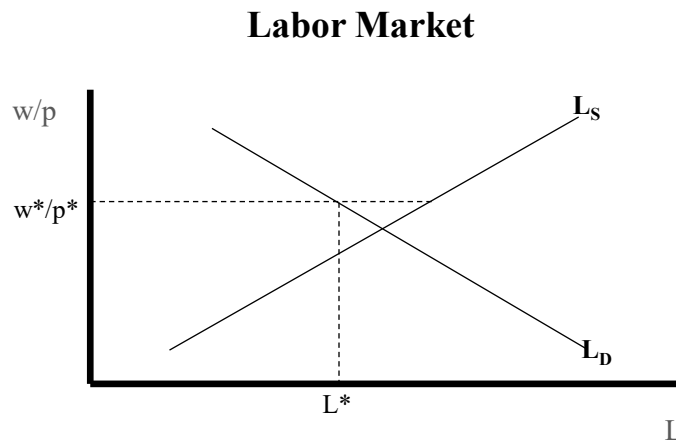


Figure 3: Diagram of labor market at equilibrium

The total production output is only determined by the labor participation or the labor demand ( $L_D$ ) (Figure 4).

### Production

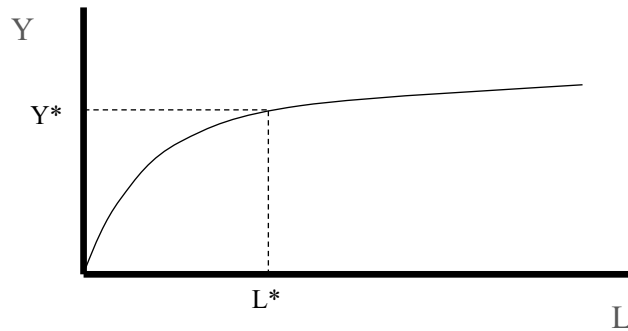


Figure 4: Diagram of production function at equilibrium

As shown in figure 5, the aggregate supply (AS), as indicated by the level of the total production output, and the aggregate demand (AD), as determined by the real income, are equal at the starting level of equilibrium.

### AS-AD

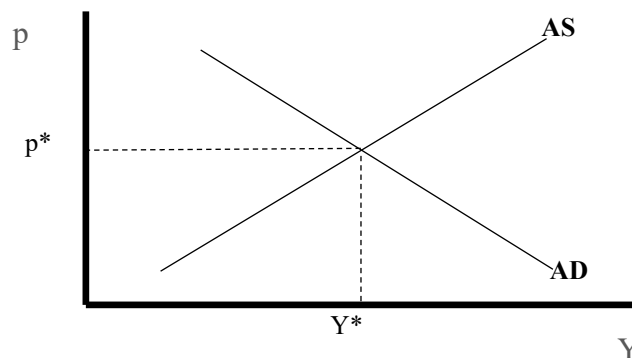


Figure 5: Diagram of AS-AD at equilibrium

#### 3.1.3. Analysis

According to Keynesian Theory, expansionary monetary policy leads to an increase of the nominal money supply ( $M_S$ ), from  $M_{S1}$  to  $M_{S2}$ , in the money market. Supply of the real money ( $m_S$ ) will rise from  $m_S$  to  $m_S'$ , and then  $m_S$  is greater than  $m_D$ . The excess of money in the money market will make people more willing to purchase bonds, and then the price of bonds will rise. Since the interest rates have a negative relationship with the price of bonds, interest rates will fall from point A to point B (Figure 6).

### Money Market

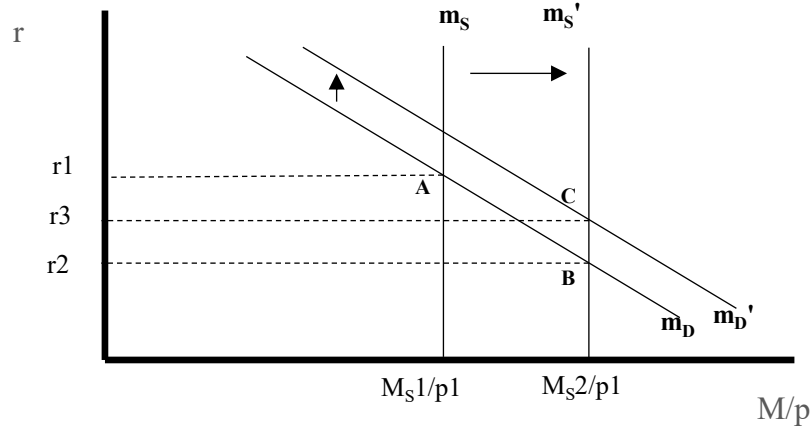


Figure 6: Diagram of the change in the money market

A drop in interest rates will cause the LM curve to change from LM to LM' at any real income level, and this paper will then go from point A to point B. When the interest rates decline, investment and real income will rise because the interest rate is likewise endogenous with the products market, which is out of balance. After then, the IS curve will shift downward, beginning at point A. Furthermore, a rise in real income will raise the demand for real money, which will decrease bonds demand and drive down bonds price. The decrease of bonds price will lead to rise in interest rates. Therefore, there will be an upward movement along the LM curve, starting from point B. The movement will stop by point C where both the IS curve and LM curve reach a new equilibrium (Figure 7).

### IS-LM

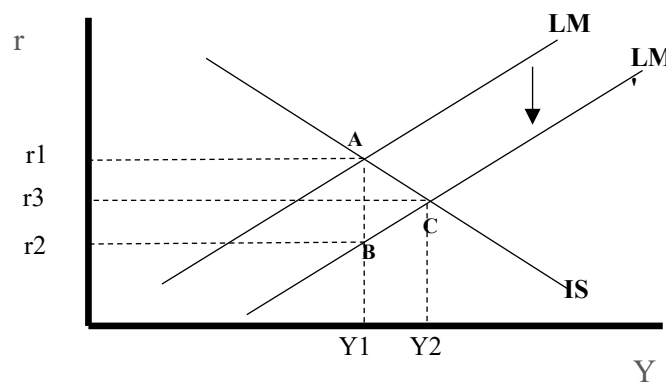


Figure 7: Diagram of the change in the IS-LM model

At whatever price point, the increase in real income will cause the AD curve to shift to the right (Figure 8). At point C, the aggregate demand is greater than the aggregate supply. Then the price level will rise.

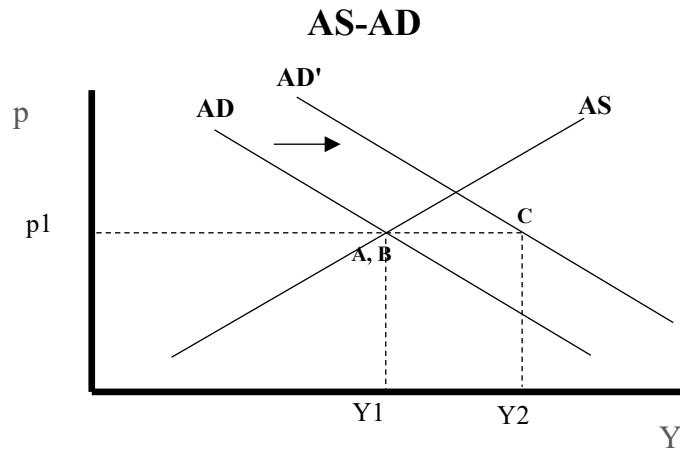


Figure 8: Diagram of the change in the AS-AD model

Price is endogenous with the money market. The real money supply will decrease as a result of price level increases. Supply of the real money supply will fall from  $m_s'$  to  $m_s''$ , and then  $m_s$  is less than  $m_p$ . The decrease of real money supply in the money market will make people become less willing to purchase bonds, and then the price of bonds will fall. Therefore, the interest rates will rise from point C to point D (Figure 9).

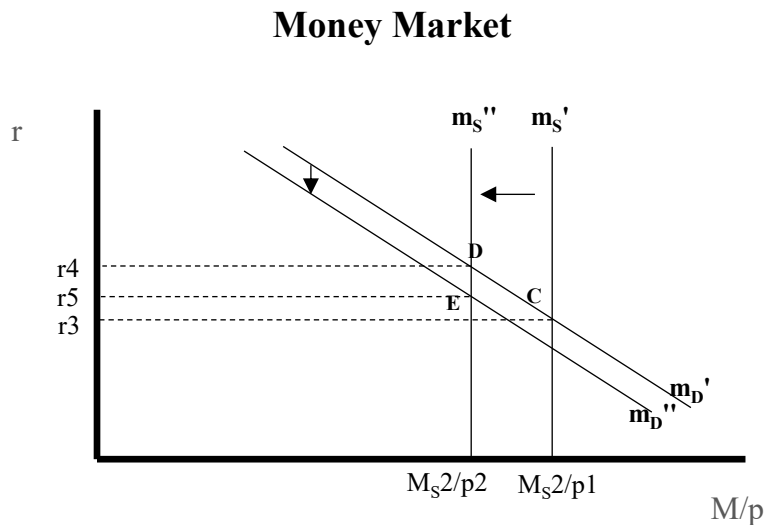


Figure 9: Diagram of the change in the money market

At any level of real income, The LM curve will shift upward from  $LM'$  to  $LM''$ , as a result of the interest rates increase, and then this paper will move from point C to point D. An increase in interest rates will result in less investment and real income in the goods market. Then, there will be an upward movement along the IS curve, starting from point C. Furthermore, a decline in real income will result in a decline in the demand for real money, which will increase bonds demand and drive up bonds price. The interest rates will fall. Then, there will be a downward movement along the LM curve, starting from point D. Movement will stop by point E where both the goods market and the money market reach a new equilibrium (Figure 10).

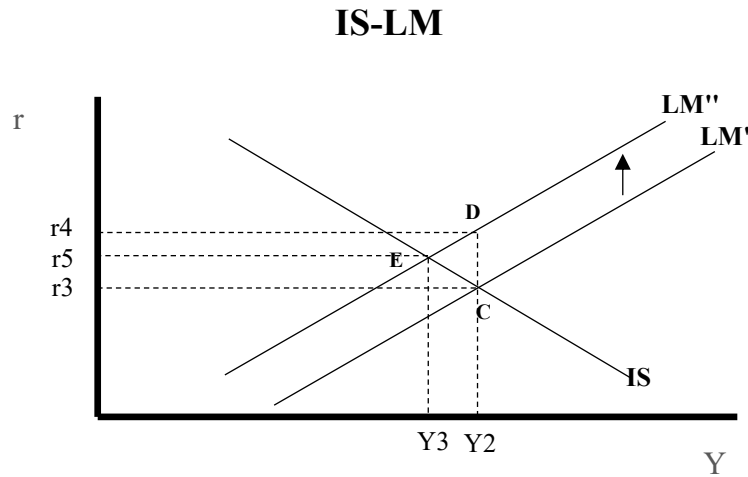


Figure 10: Diagram of the change in the IS-LM model

Price is also endogenous with the labor market. The rise in price level will lead to a fall in real wages where the nominal wage is rigid. Then the total labor participation in production, which is determined by the labor demand, will increase (Figure 11). The total production output will increase as well (Figure 12).

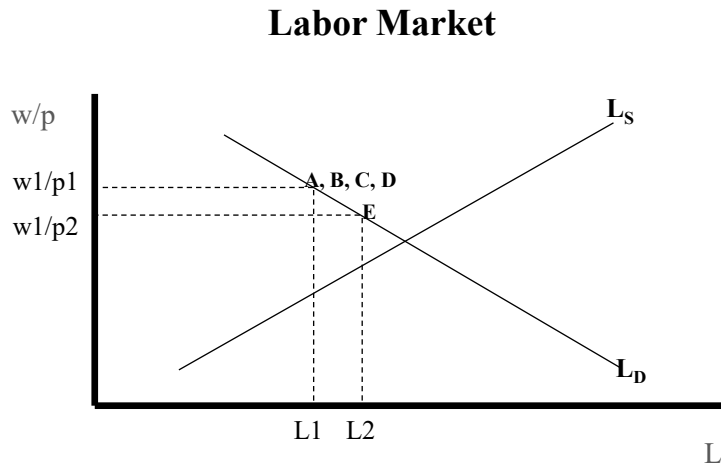


Figure 11: Diagram of the change in the labor market



### Production

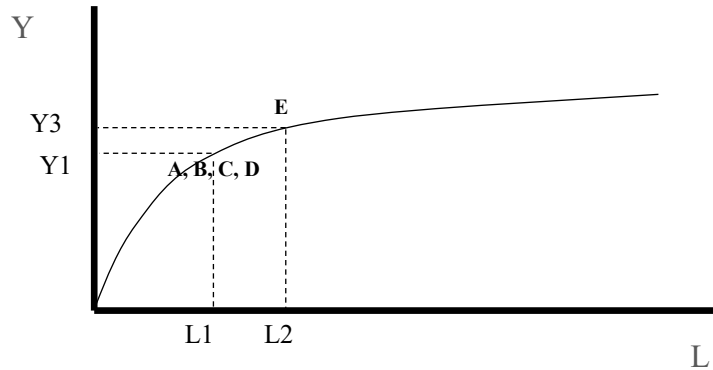


Figure 12: Diagram of the change in the production level

On the demand side, the change of the goods market and the money market will result in an up-left movement along the AD curve, starting from point C/D. On the supply side, the change in labor market will result in an up-right movement along the AS curve, starting from point A/B. The movement will stop by point E where both the AS curve and the AD curve reach a new equilibrium (Figure 14).

As a result, if comparing the initial equilibrium at point A to the final equilibrium at point E, the interest rates change from  $r_1$  to  $r_5$  and the real income or the total production output changes from  $Y_1$  to  $Y_3$  (Figure 13&Figure 14). Thus, it follows that an increase in the nominal money supply will inevitably result in an increase in real income or total output as well as a decrease in interest rates.

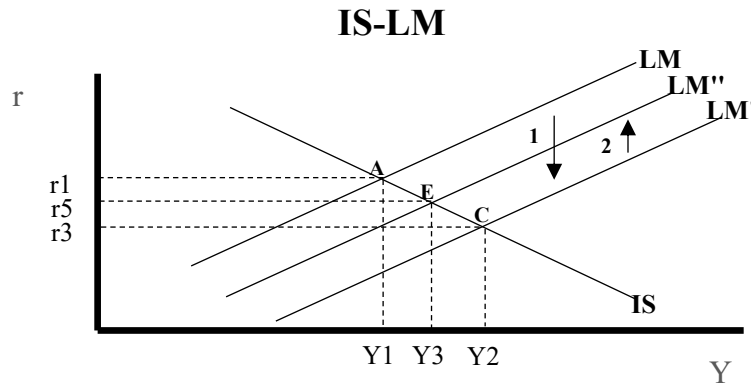


Figure 13: Diagram of the change in the IS-LM model

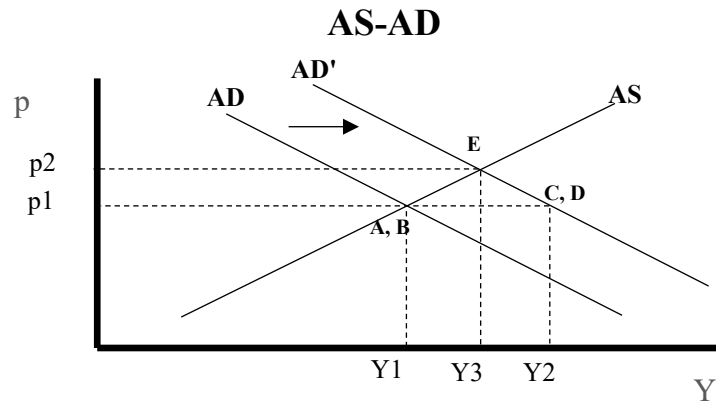


Figure 14: Diagram of the change in the AS-AD model

### 3.2. An overview of the actual monetary policies of the People's Bank of China in 2023

The People's Bank of China has been implementing expansionary monetary policy since 2023 in an effort to boost the money supply to improve the economy [8]. The bank extensively employed a variety of strategies in the first half of 2023, including reserve requirement ratio reductions, re-lending and re-discounting, medium-term lending facilities (MLF), and open market operations, to precisely and successfully raise the money supply, preserve systemic liquidity, and encourage financial support for entities [9]. High-quality economic development provides a suitable liquidity environment [9].

The current total money supply is growing rapidly. By the end of June, there had been an 11.3% year-over-year increase in the balance of the broad money supply (M2), a 3.1% year-over-year increase in the balance of the narrow money supply (M1), and a 9.8% year-over-year increase in the balance of currency (M0) in circulation [9].

Several commercial banks have issued an adjustment of loan interest rates, reducing the one-year, three-year and five-year loan interest rates by 10 basis points to 40 basis points. The International Monetary Fund (IMF) has released statistics showing that during the first three quarters of 2023, the real GDP growth rate was 5.0%, which represents a 2.8% rise from 2022 [10].

### 3.3. Limitation

This study, which applies Keynesian model theory to China's present monetary policy, is merely a theoretical macroeconomic analysis. This study does not address the role and significance of any specific monetary policy but simply analyzes expansionary monetary policy from a macro level. All the theoretical assumptions about the Keynesian model indicate that this is an ideal deduction. In reality, the formulation of macroeconomic policies is always more complex, requiring consideration of many factors including foreign exchange reserve, international trade and complexity of labor market, etc. Furthermore, a wide range of factors influence economic growth. Monetary policy, together with fiscal policy, is only a macroeconomic adjustment mechanism. In fact, the implementation of every policy may not be perfect. Keynesianism advocates that expansionary monetary policy should be implemented during economic recession, but it is not applicable in all circumstances [11]. Expansionary monetary and fiscal policies, according to many academics, are not a magic bullet for stopping and managing economic crises. Each of these measures may contain factors that will deepen future economic crises and breed the seeds of inflation [3].

## 4. Conclusion

In 2023, China has entered the post-epidemic era. The monetary policy of the central bank will be crucial in controlling China's macro economy given the effects of the three-year pandemic and the present downturn in the country's GDP. This article mainly uses the Keynesian theoretical model to analyze the impact of the central bank's expansionary monetary policy on the total output of the entire Chinese economy, people's real income, and interest rates in the short term. This study ultimately finds, based on Keynesian theory, that a rise in the nominal money supply results in an increase in total output and real income as well as a decrease in interest rates. Objectively, this argument is also supported by the macroeconomic statistics regarding the Chinese economy. Though the actual situation is often more complex and requires comprehensive consideration of many factors, the Keynesian model's explanation of the economic stimulation of expansionary monetary policy is, to a certain extent, consistent with the purpose of the central bank's current monetary policy.

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