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The Impact of Interest Rate Liberalisation on the Effectiveness of Monetary Policy and Economic Structure Adjustment

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ABSTRACT. *This paper builds, calibrates and simulates Stockman's (1981) cash-first dynamic stochastic general equilibrium model (DSGE). After explaining, analysing and predicting the full liberalisation of interest rates, the rise in nominal deposit interest rates will generate China's macroeconomic and macroeconomic structure. Impact. The steady-state equation, impulse response and numerical simulation analysis of the model show that the rise of nominal deposit interest rate will effectively curb the growth of investment and capital stock by increasing the real interest rate of deposits and the marginal cost of corporate capital, and increase the proportion of consumption in GDP, thus contributing to the improvement of economic structure. And promote economic sustainable development; in the face of external shocks, rising interest rates can reduce macroeconomic fluctuations; the impact of monetary policy shocks on the real economy is enhanced, monetary policy interest rate transmission channels are more smooth; interest rate rise will curb investment and macro The fear of a negative impact on the economy has not been supported by the model. This paper believes that in the future, we should unswervingly and steadily push forward the interest rate marketisation reform.*

Keywords: *Interest Rate Liberalisation; Monetary Policy; Economic Structure Adjustment*

1. Introduction

On June 8, 2018, the People's Bank of China adjusted the deposit interest rate floating range ceiling to 1.1 times the benchmark interest rate while lowering the benchmark interest rate for deposits and loans. This is the opening of the loan interest rate ceiling and deposit interest rate in October 2004. After the lower limit, the interest rate marketisation reform is an important step towards substantiveisation. Looking at countries and regions that adopt progressive interest rate liberalisation reforms, the release of deposit interest rates is the most critical step and is placed in the final stage of the reform process (Zhang et al., 2012). This is mainly because liberalizing the loan interest rate is conducive to maintaining a certain spread, and obtaining necessary preparation time for financial institutions to enhance capital

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pricing and risk management capabilities and improve profitability. Relevant regulators have also obtained sufficient preparations to strengthen financial supervision. Avoid the phenomenon of vicious competition after the release of deposit interest rates. At the same time, when the financial system is still not developed enough, the marketisation of loan interest rates has far more effect on the allocation of financial resources than the allocation of financial interest rates to financial resources[1]. However, since the release of the interbank lending market interest rate in 1996, China's interest rate liberalisation reform has experienced a full 16 years. Compared with major countries, the reform process is still relatively slow, and this is largely due to Interest rate liberalisation may be a concern for financial stability and macroeconomic shocks[2].

Although many countries have experienced different levels of financial crisis and economic turmoil at the same time or in the interest rate market reform, it cannot blame the interest rate market reform itself. Inappropriate macroeconomic policies and failed financial supervision should Take on greater responsibility. In response to the impact of rising real interest rates on economic growth after the marketisation of interest rates, some countries have adopted loose monetary policies. Excessive liquidity and excessive credit expansion have caused the society to accumulate a large number of risks, which will eventually burst after several years. Initiating a financial crisis, countries such as Japan, Northern Europe and Southeast Asia are typical examples of such situations[3]. At the same time, after the interest rate is liberalized, the narrowing of interest rates will bring challenges to the profitability of financial institutions. The increase in competition will make interest rate risks more prominent. However, the collapse of financial institutions is more closely related to improper financial supervision. The US S&L crisis and the Korean financial crisis are Belongs to this type of situation. As the problem of asset and liability maturity mismatch was more serious, in order to reduce the pressure on the spread, the savings and lending institutions aggressively expanded the real estate credit business but ignored the loan risk, which eventually led to the collapse of large-scale institutions [4].

In macroeconomics, the idea of interest rate liberalisation and equilibrium interest rates can be traced back to the concept of natural interest rates proposed by Wicksell (1898). The interest rate that is consistent with physical capital return or productivity, consistent with capital supply and demand, and maintains price neutrality is the natural interest rate. It is Wicksell that really opens the analytical framework that links product equilibrium to monetary equilibrium and is an important source of Keynes's thinking. However, for a long period of time, natural interest rates were not taken seriously, until the recent new Wicksell framework advocated by Woodford (2003) and others made people realize the importance of natural interest rate[5]. If artificially lower interest rates and long-term below the natural interest rate level, then the over-investment tendency is difficult to be effectively controlled, the financial sector will gain greater benefits through large-scale innovation and disintermediation, or the financial sector will not be able to effectively mobilize savings and further curb Investment and economic growth, and ultimately the real sector's rate of return is forced to fall to the same level as the

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low level of regulated interest rates, and the inflation rate will remain high for a long time. It can be seen that interest rate liberalisation is an important part of improving the market economic system and exerting the role of market allocation of resources. It is the key to strengthening the efficiency of currency regulation and is a necessary condition for improving the independent operation mechanism of financial institutions and improving their competitiveness. Therefore, it is undoubtedly of great significance to study the possible impact of the interest rate marketisation on the Chinese economy[6].

At present, the existing theoretical research often uses local analysis and static methods to discuss the macroeconomic impact of real interest rate rise. However, due to the different model construction and assumptions, the conclusions are not consistent. In terms of empirical research, it is mainly to examine the macroeconomic performance of different real interest rate levels, and does not directly discuss the impact of rising interest rates on the macro economy. This is largely due to the fact that traditional econometric analysis is based on structural stability, while interest rate liberalisation is a structural change. Even when the systemic structure changes, even the econometric model that can explain the past history well, It is sure to make good off-sample predictions and effective policy development for the future. At the same time, most countries adopt the path of progressive interest rate marketisation reform. It is difficult to make a clear quantitative analysis of the impact of nominal interest rate rise on macroeconomic operation and economic structure after interest rate marketisation based on existing experience. Traditional research has focused on the relationship between macroeconomic variables and the lack of an examination of microeconomic actors' behavior, which easily leads to the so-called Lucas critique; Lucas, 1976. At the same time, because the general equilibrium and the effects of various exogenous random shocks are not considered, the conclusions obtained are not general and cannot provide a reliable reference for decision-making. To this end, this paper analyzes and explains the impact of rising nominal interest rates on China's macroeconomic and economic structure through the dynamic stochastic general equilibrium model (DSGE). Compared with the traditional measurement method, the dynamic stochastic general equilibrium model can avoid the Lucas criticism caused by the structural changes of the model parameters. Its analysis conclusions have the characteristics of dynamic, random and general equilibrium, which can provide a reliable reference for macroeconomic decision-making. The paper is organized as follows. In addition to the introduction, the second part will provide a brief literature review on the macroeconomic impact of interest rate liberalisation reform. The third part constructs a dynamic stochastic general equilibrium model with cash prior trading constraints. The fourth part is adopted. The model parameters are obtained by calibration and the model is numerically simulated. Finally, based on the steady state and numerical simulation results of the model, a conclusive review is made[7].

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2. Literature Review

Interest rate intervention is one of the most important policy propositions that traditional Keynesianism irons out economic fluctuations and promotes growth. However, long-term low interest rates are not conducive to the control of the amount of money. The interest rate policy under the traditional Keynesianism has been strongly criticized by monetarism (Friedman, 1968).

As countries became trapped in stagflation in the 1970s, neoclassicalism, which advocated economic freedom, completely replaced Keynesianism's mainstream position in macroeconomics. Developed countries have carried out interest rate liberalisation reforms, with inflation as the main goal. One (and implicitly) according to certain rules (such as "Taylor Rules"; Taylor, 1993), has achieved wide success, entered the "great easing" of economic growth and low inflation for more than 20 years. (Great Moderation) Age (Bernanke, 2004). Similar to developed countries, many developing countries adopted the catch-up financial policy characterized by artificially low interest rates, credit rationing and foreign exchange control after World War II, but they caused the consequences of insufficient savings, lack of capital, and inefficient allocation of resources. . To this end, McKinnon (1973) and Shaw (1973) proposed the theory of financial repression and financial deepening, pointing out that artificial distortion and financial repression caused the regulatory interest rate to be too low or the real interest rate to be negative, which is the main reason for the low efficiency of the financial system and economy.

However, some scholars have pointed out that interest rates themselves have a diametrically opposite substitution effect and income effect on savings. The impact of different income and risk levels on savings rate and output is uncertain (Jappelli & Pagano, 1991). Hellmann et al. (1997) The financial constraint theory proposed from the perspective of incomplete information, under the macroeconomic stability, low inflation rate and measurable assumptions, got the conclusion that the government controlled the real interest rate to benefit economic growth. Due to differences in theoretical understanding, empirical research is very important. Since interest rate liberalisation in many cases means that interest rates rise and real interest rates turn from negative to positive, the relationship between real interest rates and savings, investment, and economic growth naturally becomes a focus of attention. A large number of studies, represented by Fry (1978, 1980, 1997) and directed at developing countries, show that real interest rates have a significant impact on economic growth. Increasing real interest rates contributes to the formation of savings and the growth of investment. However, early empirical studies often performed time series analysis for representative developing countries. Due to differences in sample and variable selection, some people also reached opposite conclusions (eg Galbis, 1979; Khatkhate, 1988).

Obviously, the selection of samples and data has a very important impact on the test results. Galbis (1979) argues that the conclusion that Latin American studies cannot explain that inflation is harmful to actual investment and economic growth is likely due to problems with data quality.

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3. Theoretical Model of the Monetary Economic Cycle

Consider a Stockman (1981) cash-first model structure consisting of three representative individuals: residents, businesses, and the central bank. Residents can achieve the goal of optimizing the expected utility function by simultaneously selecting the consumption, leisure time, period-end capital stock and ending currency balance while facing the constraints of life-span intertemporal constraints and commodity market transactions. The firm faces the Cobb-Douglas production function, which maximizes profits by choosing the final commodity, labor, and ending capital stock. The central bank is responsible for formulating and implementing monetary policy. The monetary policy instruments and monetary policy transmission channels are nominal currency growth rate and nominal deposit interest rate. Although the model of this paper does not include the new Keynesian monetary policy transmission mechanism: price or wage stickiness. However, through Stockman's (1981) cash advance trading constraints, this model also ensures that monetary policy has an impact on real economic fluctuations. Therefore, the currency in this model is not neutral. At the same time, in the New Keynesian monetary economic cycle model, monetary policy generally has short-term non-neutral and long-term neutral characteristics. However, according to Lucas (1987, 1988, 1996), in both cases, money is non-neutral, both in the short-term and in the long-term. First, when residents need money as a trading medium in commodity market transactions (such as Lucas, 1987), the transaction budget constraints that residents need to face will cause the currency to influence the marginal utility of household consumption and the labor margin through price (nominal interest rate level). The alternative relationship of utility in turn affects the economic cycle and its steady state; second, in the model of endogenous economic growth (eg Lucas, 1988), even if residents do not need to face transaction budget constraints, money can also affect the marginal utility of the labor force. To influence the economic cycle and long-term economic growth rate. The model in this paper is in line with the first case, and residents need to face transaction budget constraints when they exchange in the commodity market. Therefore, in the model of this paper, the central bank can adjust the monetary policy tools (nominal currency growth rate or nominal interest rate level) to affect the economic cycle fluctuations and the steady economic level changes[8].

The cash advance model requires residents to have real money as a trading medium when purchasing consumption and investment products in the commodity market. Therefore, in the model of this paper, residents should face the intertemporal survival budget constraint and cash advance transaction constraints at the same time. Next, the goal of maximizing the expected utility function is achieved by the choice of consumption, leisure time, actual currency balance at the end of the period, actual government bonds, and capital stock. The equations (1)–(4) respectively represent the expected utility function of residents, the identities of gross national product under closed conditions, the distribution of labor and leisure time of residents, and the process of forming total capital.

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$$U = E0\sum_{i=0}^{\infty}\beta_i(\ln c_i + \psi \ln x_i) \tag{1}$$

$$y_i = c_i + i_i \tag{2}$$

$$x_i + h_i = 1 \tag{3}$$

$$k_i = i_i + (1 - \delta)k_i \tag{4}$$

Among them, c_i, x_i, m_i, y_i, i_i, h_i, k_i, δ respectively represent household consumption demand, leisure time, actual currency balance at the end of the period, total output, investment (ie, savings), labor time, period-end capital stock and capital. Depreciation rate; model parameters β, Ψ respectively represent the residential discount rate (future utility function and current utility function substitution relationship) and the substitution relationship between consumption and leisure time in the resident utility function. The resident life expectancy constraints and cash advance conditions are represented by equations (5) and (6), respectively. Equation (5) is the budget constraint for intertemporal resident survival, which includes resident cash income, financial assets, final commodity expenditures, and financial liabilities. Residents' cash income includes labor wage income wt (1-xt) and capital rental income rit k_{t-1} ; financial assets include the initial real money balance mt -1 /πt and the beginning of the actual government bond balance Rst bt -1 /πt; Commodity expenditures include expenditures on consumer goods and investment products; financial liabilities include the actual currency balance mt at the end of the period and the ending government bond balance bt. Equation (6) is a Stockman (1981) cash advance transaction constraint that requires residents to have real money as the sole trading medium when purchasing final goods in the commodity market.

$$\begin{aligned} &r_i^k k_{k-1} + w_i(1-x_i) + \frac{m_{i-1}}{\pi_i} \\ &= c_i + k_i - (1-\delta)k_{i-1} + m + b_i \end{aligned} \tag{5}$$

$$M_{i-1} + T_i = P_i y_i \tag{6}$$

Model Parameter Calibration, Numerical Simulation and Steady State Analysis

3.1 Model parameter calibration

In this paper, we first use the calibration method to obtain the model parameter values, and then through the model steady state equation, impulse response and numerical simulation results to explain, analyze and predict the interest rate marketisation reform, the nominal deposit interest rate rise may be generated for China's macroeconomic and macroeconomic structure. Impact. Compared with traditional micrometric research methods, the dynamic stochastic general equilibrium model parameter values obtained by calibration can avoid the Lucas criticism caused by structural changes. Therefore, the model parameter values in this

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paper will not change due to the structural reform of interest rate marketisation. Consistent with most dynamic stochastic general equilibrium model analysis, this paper uses the macro-microeconomic data published by the National Bureau of Statistics and the model steady-state equation to obtain model parameter values by calibration. The model calibration process is mainly based on the average of macroscopic and microeconomic data that can be observed in reality, and the method of calculating the model parameter values by the steady-state equation of the nonlinear model. The sample period of macro-microscopic main observable data is 1996Q1-2011Q4, and the data source is Wind database[9].

3.2 Steady state analysis of the model

The model calibration process shows that in the long run, China's inflation rate is basically equal to the growth rate of China's base money supply. Since the interest rate marketisation reform will not change the growth rate of China's base money supply, after the interest rate marketisation reform, we can assume that the inflation rate remains stable. The interest rate marketisation reform will lead to intensified competition among commercial banks and increase the nominal deposit interest rate. According to the dynamic behavior equation of the model, the change of nominal deposit interest rate will affect China's macro economy and its economic structure through nominal interest rate and real interest rate.

3.3 Model numerical simulation and impulse response

The model numerical simulation summarizes the fluctuations in total output, nominal deposit interest rates, and inflation rates when the model faces the same technical and monetary policy shocks at different nominal deposit interest rates. According to the numerical simulation results of the model, as the nominal deposit interest rate level increases, the fluctuations in total output, inflation rate and nominal interest rate in the face of external shocks gradually decrease. It can be seen that the rise in nominal deposit interest rates is conducive to reducing the volatility of China's macro economy in the face of external shocks.

Impulse Response Analysis The following chart depicts the steady-state nominal deposit interest rate changes after interest rate liberalisation, model total output, consumption, investment, and nominal deposit interest rates for one percent technical impact (TFP) and monetary policy shocks. Impulse response. The main conclusions are: With the completion of the interest rate marketisation reform, China's macroeconomic steady-state (long-term) nominal deposit interest rate will further enhance the effectiveness of monetary policy. The chart below first describes the impulse response of the model's total output, consumption, investment, and nominal deposit interest rate to a one percent technical impact (TFP) when the steady-state nominal deposit interest rate level changes. It can be seen from the figure that as the steady-state nominal deposit interest rate rises, the initial response of the consumption, investment and nominal deposit interest rates to the technical shock gradually increases, but the sustainability gradually weakens; while the initial

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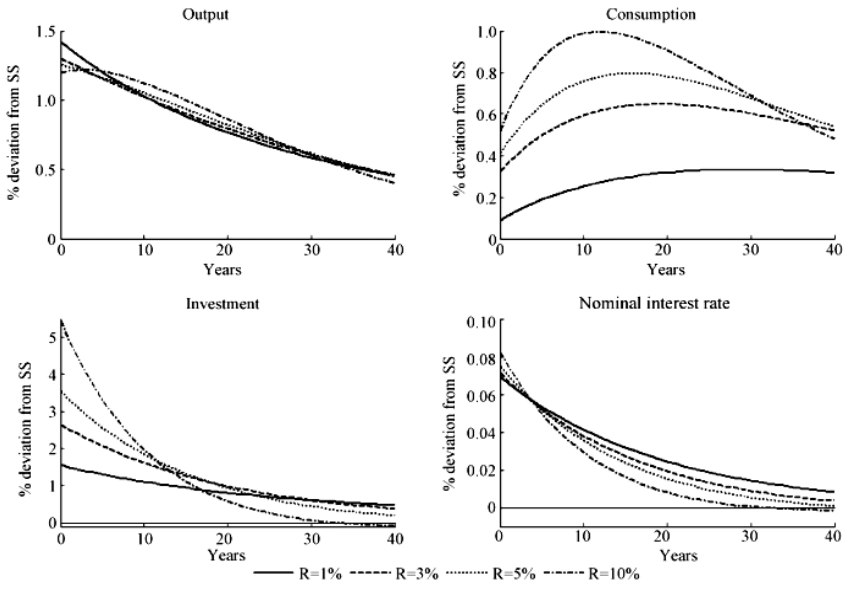
response of the total output to the technical shock gradually weakens, but Sustainability is gradually increasing. It should be emphasized that the following chart shows that as the nominal deposit rate increases, the initial response to the technical shock of total output weakens, while the initial response of consumption and investment to technology shocks increases[10].

This is mainly due to the logarithmic linearisation of equation (2) in the model. The change in output exogenous shock depends not only on the changes in investment and consumption, but also on the steady state of total output, investment and consumption. As the steady-state (long-term) rise in nominal deposit interest rates will simultaneously lead to a decline in steady-state investment as a percentage of total output, and consumption as a share of total output, the initial response to the technical impact of total output in the chart below is due to steady-state The increase in the proportion of consumption in total output and the decrease in the proportion of investment in total output is precisely the embodiment of the steady-state (long-term) nominal deposit interest rate rise after the interest rate marketisation reform is conducive to the promotion of macroeconomic restructuring.



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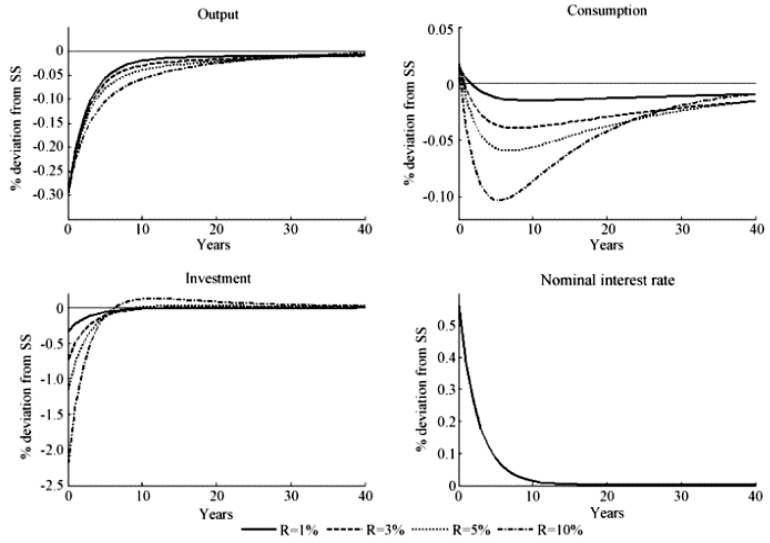

4. Conclusion

Similar to reforms in other areas, China's interest rate liberalisation reform has also adopted a gradual model. Although the basic idea of interest rate liberalisation has been clearly stated 20 years ago and there is consensus on the significance and necessity of reform, we still have an important way to go. In particular, the current downward trend in economic growth, rising inflationary pressures, the accumulation of real estate bubble risks, and the harsh international economic environment are not the ideal time to promote interest rate liberalisation. However, if we look at the experience of interest rate liberalisation in developed countries, we can find that many countries are under the unfavorable environment of weak internal economic growth, external oil crisis and the disintegration of the Bretton Woods system, and the stagflation of individual countries. Complete the interest rate marketisation reform. However, the exact effect of interest rate liberalisation on macroeconomic and economic structures still lacks the necessary theoretical and quantitative analysis. To this end, this paper is based on the actual economic cycle model, through Stockman (1981) cash advance (CIA) trading constraints, under the framework of dynamic stochastic general equilibrium, the interest rate marketisation on China's macroeconomic and economic structure. The impact was studied. Through rigorous theoretical derivation, calibration and simulation analysis, this paper can get the following main conclusions: First, after the interest rate marketisation reform, the rise of nominal deposit interest rate will increase the real interest rate of deposits and the marginal cost of corporate capital, and the growth of investment and capital stock will Effectively suppressed, the proportion of investment in GDP will decline, and the proportion of consumption in GDP will rise, which will help improve the economic structure and sustainable economic development. Second, in the case of

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constant labor market conditions, investment and capital stock. The decline in growth rate will help enterprises to improve productivity and output stability, and increase the consumption level of the residential sector. Third, in the face of external shocks (whether technical shocks or monetary policy shocks), the rise in interest rates can also By adjusting the economic structure to reduce macroeconomic fluctuations, it is conducive to the long-term stable growth of the macro economy. Fourth, after the interest rate is marketized, the response of the real economy to the impact of monetary policy will be greatly strengthened, which means that the channel of interest rate transmission of monetary policy will be more unobstructed. After the interest rate liberalisation reform, concerns about the rise in nominal deposit interest rates will impact economic development and negatively impact investment and macroeconomic growth, and are not supported by our model.

It can be seen that the interest rate marketisation reform has a very obvious role in promoting China's macroeconomic growth. It is of great significance for adjusting the economic structure, promoting the transformation of development mode, and enhancing the ability of the economy to resist external shocks. As a core variable of financial factors, the interest rate marketisation reform is not only related to the changes in the macroeconomic development path and the improvement of monetary policy control measures, but also an important part of deepening the reform of financial and economic marketisation. The recent development of the financial industry and Reforming the "Twelfth Five-Year Plan" will be regarded as the key work of reform. It must be acknowledged that the interest rate marketisation reform is related to the major adjustment of the economic entity's interest pattern, which will have a broad and far-reaching impact on economic restructuring and economic growth. At present, the lower limit of the loan interest rate has been able to float 70% below the benchmark level, and the marketisation of the loan interest rate has actually been completed. In recent years, financial innovation and bank wealth management business have developed rapidly, and the balance of bank wealth management products has accounted for about 5% of all deposits. The marketisation of debt business has gained valuable experience; Recently, the People's Bank of China has increased its open market operations and market capital price guidance, indicating that policy makers have also actively prepared for full interest rate marketisation. Financial institutions, corporate and monetary policy decision-making departments are beginning to learn to adapt to the market-determined interest rate environment, and the basic conditions for the full liberalisation of China's interest rates are gradually maturing. We must steadily and steadily push forward the process of interest rate marketisation reform, effectively transform the traditional economic development concept that investment depends on, and promote the capital efficiency and productivity of enterprises through interest rate marketisation, and enhance the role of household consumption and consumption in economic growth. Promote the steady growth of the macro economy and strengthen the role of monetary policy price leverage to truly realize the sustainable and healthy development of the Chinese economy.

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