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Animal Spirit, Financial Shock and Business Cycle

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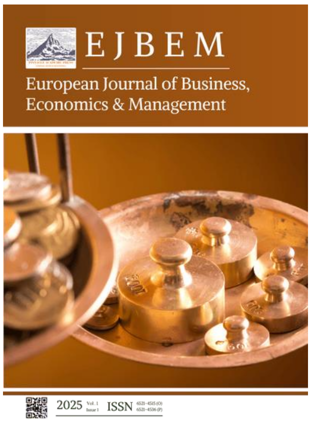

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Abstract: The study explores integrating psychological factors into business cycle theory through behavioral economics. It introduces animal spirits within a financial accelerator based DSGE model involving seven sectors. Results reveal that these animal spirits impact the macro economy by affecting corporate net worth, where positive news stimulates growth in net worth, employment, and output. Additionally, people's initial reaction to news weakens the effects of anticipated shocks. Simulated models with news shocks highlight distinct impacts of monetary and fiscal policies. In scenarios with news shocks, not only monetary policy drives noticeable economic adjustments, but also fiscal policy significantly moderates the economy. Recommendations stress the importance of considering expected factors in policy formulation, advocating proactive fiscal approaches alongside cautious monetary policies to foster growth while curbing potential financial crises due to bubble expansion. This research provides a fresh theoretical framework for governmental policy decisions.

Keywords: business cycle; animal spirit; financial shock; news shock

1. Introduction

There is a growing interest in the role of human psychological factors in the functioning of macroeconomics. The integration of psychology and economics, as well as the development of behavioral economics, provides promising avenues and methodologies for studying the role of human behavior in macroeconomic phenomena. The purpose of this paper is to further investigate business cycle theory, particularly focusing on the economic booms and recessions resulting from human predictions about economic prospects. The study of economic cycles has a long history; it has been one of the primary concerns in economics since its inception. Kydland and Prescott introduced technological shocks into economic cycle models, leading to the development of the Real Business Cycles (RBC) model [1]. The RBC model posits that productivity shocks have a significant impact on economic operations and are the primary causes of economic fluctuations. However, one of the frequent criticisms leveled against the RBC theory is its failure to provide comprehensive explanations for economic downturns. For instance, the 2007 U.S. financial crisis originated from a housing credit crisis within the financial market, resulting in the recession of the real economy and rapidly spreading worldwide, impacting not only the U.S. economy but also causing substantial disruptions to other countries globally, including China. This recession, sparked by a financial crisis, clearly cannot be explained solely from the perspective of technological productivity shocks. A suitable perspective for understanding economic cycles is that prosperity and recession arise from fluctuations in investment, which, in turn, depend on the perceptions of economic conditions by economic agents — termed "animal spirits". Recent literature has examined the role of animal spirits in economic operations. Akerlof and Shiller assert that animal spirits can describe the ambiguity of human behavior [2]. This ambiguity in human behavior can also be viewed as the uncertainty of human behavior, often understood in the discourse of economic research as psychological factors causing economic turmoil. In financial markets, fluctuations in public emotions from excitement to fear may significantly impact asset prices and economic activities outside the financial sector. During good times, people trust the economy, make spontaneous decisions, and instinctively believe in their success, causing asset values to rise and potentially continue to increase. Conversely, if everyone holds a pessimistic view of the economy, this can lead to a decline in asset values, subsequently resulting in an economic recession. This understanding is often discussed within the framework of Endogenous Business Cycles (EBC). EBC models can be traced back to Azariadis, Cass and Shell, Farmer and Woodford, Benhabib, and Farmer [3-6]. These studies examined uncertainty's impact within economic models, indicating that uncertainty can cause economic cycles. However, despite the feasibility of models with uncertainty or "sunspot" shocks theoretically, initial studies by Farmer and Woodford were conducted in a static model with only two periods [5]. To dynamize and extend the model, Benhabib and Farmer highlighted uncertainty's potential similar to Real Business Cycle (RBC) models [6]. Farmer and Guo provided a theoretical framework within endogenous economic cycle models, indicating the impact of sunspot shocks in a dynamic, long-term environment [7]. Currently, research in macroeconomics is dedicated to integrating financial factors into theoretical discussions. This is because a primary function of financial markets is to provide credit to the real economy. Consequently, financial shocks often significantly impact economic fluctuations. Gertler and Kiyotaki introduced financial shocks from a credit supply perspective into economic cycle models, suggesting that negative shocks in the economy initially impact the balance sheets of financial institutions like banks, leading to a contraction in credit extension and subsequently affecting the real economy [8]. Bernanke and Gertler explored the causes of economic cycles from the perspective of credit demand [9]. Kiyotaki and Moore proposed the collateral constraint mechanism [10]. Bernanke, Gertler, and Gilchrist incorporated the credit market into DSGE models, considering nominal rigidities and asymmetric information in the credit market [9]. Brzoza-Brzezina et al. separately integrated these mechanisms into DSGE models, conducting comparative analyses through impulse response analysis and moment matching, concluding that the BGG financial accelerator mechanism aligns more closely with actual economic operations [11]. Several domestic scholars have delved into related research regarding incorporating financial shocks into economic cycles. Brunnermeier established a structured VAR model, showing a positive correlation between credit issuance and output growth. Financial pressure, i.e., interest rate hikes resulting from monetary policy shocks, tightens credit, subsequently causing output decline [12]. Presently, research on the role of animal spirits in macroeconomics has not adequately considered financial factors. There still exists a gap in studying how animal spirits influence the macroeconomy through financial markets. In terms of price adjustment mechanisms, this paper adheres to the settings of Christiano, Eichenbaum, and Evans, Smets and Wouters, introducing nominal rigidity into the economic cycle model [13,14]. It explores the impact of news shocks on economic fluctuations within the context of the New Keynesian economic environment with price stickiness. Unlike the study by Bernanke and Gertler under the New Classical Model, Sims investigates the financial accelerator mechanism within a New Keynesian model with price stickiness [9,15]. Hence, this paper adopts Sims' analytical framework in introducing the financial accelerator mechanism, thereby studying the role of animal spirits in an economic environment containing financial markets within the economic cycle [15]. Similar studies to this research include Matteo Iacoviello [16]. Compared to Matteo Iacoviello's study, this paper introduces the DSGE model using the BGG mechanism, following different settings for the introduction of enterprises and commercial banks, thereby enhancing the model's explanatory power [16]. However, our study differs as we introduce financial shocks from the perspective of enterprises as credit demanders through the BGG framework, while using informational shocks to introduce animal spirits into the economic cycle model. This paper is divided into four sections. The first section is the introduction, which provides a retrospective review of previous research findings, offering theoretical support for subsequent research. The second section involves model construction. Based on the analysis of animal spirits, financial markets, and economic cycles, we establish a DSGE (Dynamic Stochastic General Equilibrium) model. In this model, the household sector comprises representative households, the production sector includes intermediate and final goods firms, the policy sector involves central banks and governments, and the financial sector consists of commercial banks and enterprises. Additionally, within the framework of the BGG financial accelerator theory, we introduce price stickiness and animal spirits to examine the impact of animal spirits on the macroeconomy. The third section is numerical simulation. The final section consists of conclusions and policy recommendations.

2. Model

2.1. Representative Household

Let C_t represent household consumption, where greater consumption yields higher utility. Labor supply is denoted by H_t. Labor is regarded as a loss of efficiency, and M_t represents the amount of currency held. The greater the currency held, the higher the household utility. Therefore, when households make choices, they consider these factors to maximize their lifetime utility. Here, $\beta \in (0,1)$ represents the objective discount factor, and η represents the Frisch labor supply elasticity.

$$max\, E_0 \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{1-\sigma}}{1-\sigma} - \frac{{H_t}^{1+\eta}}{1+\eta} + ln(\frac{M_t}{P_t})\right) \tag{1}$$

Households face budget constraints, which can be represented as:

$$P_t C_t + B_t + M_t \leq W_t N_t + M_{t-1} + (1 + r_{t-1}) B_{t-1} + \Pi_T + TR_t - T_t \tag{2}$$

In this dynamic programming problem, the variables are defined as follows: P_t represents the price level, B_t stands for the quantity of bonds held in period t, w_t denotes the nominal wage, Π_t signifies dividend income, TR_t represents government transfer payments, and T_t denotes taxes. We have first-order conditions with respect to each variable and by rearranging, the optimal conditions for households can be obtained:

$$N_t^{\eta} C_t^{\sigma} = \frac{W_t}{P_t} \tag{3}$$

$$C_t^{-\sigma} = \beta E_t \left[C_{t+1}^{-\sigma} \left(\frac{P_t}{p_{t+1}}\right) (1 + r_t)\right] \tag{4}$$

$$\left(\frac{M_t}{P_t}\right)^{-1} = C_t^{-\sigma} \left(\frac{r_t}{1+r_t}\right) \tag{5}$$

The three first-order conditions above delineate fundamental aspects: the first condition establishes the labor supply equation, portraying the trade-off between labor and leisure for households; the second condition employs the consumption Euler equation, outlining the optimal consumption trajectory for households; the third equation characterizes individuals' demand for money, where increased holdings of money result in a diminished quantity available for consumption.

2.2. Final Goods Producers

The final goods producers operate in perfect competition, procuring intermediate goods from intermediate producers at no cost and then reselling them to households. The packaging method involves a CES aggregation of intermediate products, where Y_t denotes the quantity of final output, $Y_t(i)$ signifies the quantity of intermediate product i, and $\varepsilon > 1$ represents the substitution elasticity between intermediate products.

$$Y_t = \left[\int_0^1 Y_t(i)^{\frac{\varepsilon-1}{\varepsilon}} di\right]^{\frac{\varepsilon}{\varepsilon-1}} \tag{6}$$

The maximization of profits for intermediate products can be formulated:

$$max\, P_t\, Y_t - \int_0^1 P_t(i)Y(i)_t\, di = P_t \left[\int_0^1 Y_t(i)^{\frac{\varepsilon-1}{\varepsilon}} di\right]^{\frac{\varepsilon}{\varepsilon-1}} - \int_0^1 P_t(i)Y_t(i)\, di \quad (7)$$

Solving the optimal conditions yields the demand function and price index for intermediate products:

$$Y_t(i) = \left[\frac{P_t(i)}{P_t}\right]^{-\varepsilon} Y_t \quad (8)$$

$$P_t = \left[\int_0^1 P_t(i)^{1-\varepsilon} di\right]^{\frac{1}{1-\varepsilon}} \quad (9)$$

2.3. Intermediate Goods Producers

The intermediate product producers operate under monopolistic competition, and the production function is:

$$Y_t(i) = A_t K_t(i)^{\alpha} H_t(i)^{1-\alpha} \quad (10)$$

Where A_t represents the technological level following an AR (1) process.

$$ln\, A_t = \rho_a\, ln\, A_{t-1} + \varepsilon_t^a + \sum_{j=0}^{H-1} \varepsilon^a{}_{t-j} \quad (11)$$

The minimization of costs for intermediate producer i can be formulated as:

$$min\, W_t\, H_t(i) + R_t K_t(i) \quad (12)$$

$$s.t. \quad A_t K_t(i)^{\alpha} H(i)^{1-\alpha} \geq \left(\frac{P_t(i)}{P_t}\right)^{-\varepsilon} Y_t \quad (13)$$

Solving the first order conditions yields

$$H_t(i) = \mu_t(1-\alpha)\frac{Y_t(i)}{W_t} \quad (14)$$

$$K_t(i) = \mu_t \alpha \frac{Y_t(i)}{R_t} \quad (15)$$

Here we introduce price stickiness. We assume the pricing method adopted by firms follows the Calvo model, where in each period, each firm has a probability of $(1-\theta)$ to freely adjust its product price, and a probability θ to maintain the price unchanged [17]. The problem for intermediate producers can thus be expressed as:

$$\max_{P_t(i)} E_t \sum_{t=0}^{\infty} (\theta\beta)^i \left(\frac{C_t}{C_{t+i}}\right)^{-\sigma} \left[\frac{P_{t+i}(i)}{P_{t+i}}\left(\frac{P_{t+i}(i)}{P_{t+i}}\right)^{-\varepsilon} Y_{t+i} - mc_{t+i}\left(\frac{P_{t+i}(i)}{P_{t+i}}\right)^{-\varepsilon} Y_{t+i}\right] \quad (16)$$

$$P_t(i) = \frac{\varepsilon}{\varepsilon-1} \frac{E_t \sum_{i=0}^{\infty} (\theta\beta)^i mc_{t+i} P_{t+i}^{\varepsilon} Y_{t+i} C_{t+i}^{-\sigma}}{E_t \sum_{i=0}^{\infty} (\theta\beta)^i P_{t+i}^{\varepsilon-1} Y_{t+i} C_{t+i}^{-\sigma}} \quad (17)$$

We observe that the right-hand side of the equations does not contain the subscript i, indicating that all intermediate product producers choose the same optimal price, denoted as P_t^*:

$$P_t^* = \frac{\varepsilon}{\varepsilon-1} \frac{E_t \sum_{i=0}^{\infty} (\theta\beta)^i mc_{t+i} P_{t+i}^{\varepsilon} Y_{t+i} C_{t+i}^{-\sigma}}{E_t \sum_{i=0}^{\infty} (\theta\beta)^i P_{t+i}^{\varepsilon-1} Y_{t+i} C_{t+i}^{-\sigma}} \quad (18)$$

2.4. Firms

Based on Bernanke, Gertler, Gilchrist, we model the following two sectors [9]. To incorporate credit factors into the model through corporate lending, let's initially establish a standard debt contract between firms and commercial banks. Firms acquire credit from commercial banks based on their net worth. With this credit, firms invest in new capital. Here, N_{t+1} denotes the firm's net worth, $Q_t K_{t+1}$ represents the capital purchased by the firm at the end of period t. Due to insufficient net worth, firms borrow from commercial banks represented by $Q_t K_{t+1} - N_t$. Z_{t+1} denotes the loan interest rate, ω_{t+1} signifies heterogeneous shocks to capital returns in the economy, and R_{t+1}^k represents the capital return rate. The left side of the equation indicates the total interest payment by firms to commercial banks, while the right side denotes the overall return rate on new invested capital by firms.

$$Z_{t+1}(Q_t K_{t+1} - N_t) = \overline{\omega}_{t+1} R_{t+1}^k Q_t K_{t+1} \quad (19)$$

Let the cumulative distribution function (CDF) of heterogeneous shocks $\overline{\omega}_{t+1}$ be denoted as $\Phi(\omega_{t+1})$, and the probability density function as $\phi(\omega_{t+1})$. Here, the first integral part of the equation represents the expected value of capital returns. Due to the impact of heterogeneous and uncertain shocks $\omega_{t+1}$and $\omega_{t+1} > \overline{\omega}_{t+1}$, firms obtain capital returns on the purchased capital, enabling them to cover loan interest payments without defaulting. The second part represents the interest payment made by firms to commercial banks. The difference between these two parts signifies the firm's expected returns [18,19].

$$\int_{\overline{\omega}_{t+1}}^{\infty} \omega_{t+1} \phi(\omega_{t+1})\, d\omega_{t+1} R_{t+1}^k Q_t K_{t+1} - \left(1 - \Phi(\overline{\omega}_{t+1})\right) Z_{t+1}(Q_t K_{t+1} - N_t) \quad (20)$$

As the firm's net worth is pledged as collateral, it should be considered as an opportunity cost for the returns obtained by the firm. Therefore, the ultimate return for the firm should be:

$$\frac{f(\overline{\omega}_{t+1}) R_{t+1}^k Q_t K_{t+1}}{N_t} \quad (21)$$

2.5. Commercial Banks

The integral part of the equation signifies that due to the impact of heterogeneous and uncertain shocks ω_{t+1} where $\omega_{t+1} < \overline{\omega}_{t+1}$, the firm faces bankruptcy and defaults on loan interest payments. In case of default, the bank seizes all the firm's assets as per the contract, where μ represents the commercial bank's liquidation cost [20]. The second part represents the loan interest payments that the firm should make to the commercial bank if no default occurs. The sum of these two parts indicates the bank's expected returns.

$$\int_0^{\overline{\omega}_{t+1}} \omega_{t+1}(1-\mu)\, R_{t+1}^k Q_t K_{t+1} \phi(\omega_{t+1}) d\omega_{t+1} + \left(1 - \Phi(\overline{\omega}_{t+1})\right) Z_{t+1}(Q_t K_{t+1} - N_t) \quad (22)$$

Next, we construct the evolution path of firm net worth. Assuming a survival rate of γ for firms in the economy each period, $(1-\gamma)$ portion of firms face bankruptcy. In the following equation, V_t represents the firm's equity, and R_t denotes the risk-free deposit rate. Hence, the first part of the equation represents the net returns from firm investments, while the second part signifies the loss incurred by the firm due to loan interest payments and the liquidation cost paid to the bank upon bankruptcy:

$$V_t = R_t^k Q_{t-1} K_t - \left(R_t + \frac{\mu \int_0^{\overline{\omega}_t} R_t^k Q_{t-1} K_t \phi(\omega_t) d\omega_t}{Q_{t-1} K_t - N_{t-1}}\right)(Q_{t-1} K_t - N_{t-1}) \quad (23)$$

The net worth of a firm can be represented as:

$$N_t = \gamma V_t + W_t^e \quad (24)$$

Where W_t^e represents the wages paid by the firm, namely the portion of equity obtained by providing labor. However, due to the relatively small magnitude of W_t^e, it is often negligible in the model. Therefore, the evolution path of the business's net worth is:

$$N_{t+1} = \gamma \left[V_t = R_t^k Q_{t-1} K_t - \left(R_t + \frac{\mu \int_0^{\overline{\omega}_t} R_t^k Q_{t-1} K_t \phi(\omega_t) d\omega_t}{Q_{t-1} K_t - N_{t-1}}\right)(Q_{t-1} K_t - N_{t-1}) \right] \quad (25)$$

2.6. Monetary Policy

In monetary policy, the central bank follows the Taylor rule, within which we introduce information shocks (News Shock), where r^* and π^* represent the equilibrium levels of interest rates and inflation, respectively.

$$r_t = (1-\rho_r) r^* + \rho_r r_{t-1} + (1-\rho_r)\theta_\pi(\pi_t - \pi^*) + e_r + \sum_{j=0}^{H-1} e_{r,t-j} \quad (26)$$

2.7. Fiscal Policy

Resource constraint is:

$$Y_t = C_t + I_t + G_t + C^e \quad (27)$$

Where C_t is total consumption, G_t is government purchases, I_t is total government investment, C^e is corporate consumption, and government purchase shocks follow the following AR (1) process:

$$ln\,G_t = \rho_g\,ln\,G_{t-1} + \varepsilon_t^g + \sum_{j=0}^{H-1} \varepsilon^g{}_{t-j} \quad (28)$$

3. Numerical Simulation

3.1. Technological Shocks

Figure 1 introduces news shocks into the economy, anticipating a positive technological shock in the 10th period. The findings reveal that the anticipated positive technological shock does not significantly impact output and enterprise net worth [21]. Before the 10th period, prior to the shock's realization, labor and household consumption start to increase prematurely, while investments and enterprise net worth decrease before the 10th period. Inflation rates and real interest rates tend to decline [22]. Before the realization of the technological shock, the expected impact of the technological shock on total output is not evident. Simultaneously, news shocks, manifested in the form of technological shocks, result in an increase in real interest rates but lead to a reduction in employment and inflation rates. After the 10th period, the expected rise in technological productivity is realized, enhancing production efficiency and consequently increasing capital returns. This decline in employment within the economy is accompanied by rising investments, increased enterprise net worth, and expanded business scale, leading to a notable enhancement in total output following the realized positive technological shock

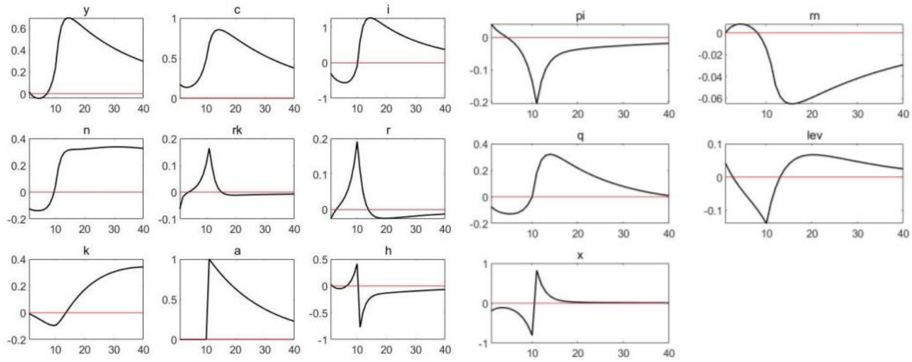

Figure 1. TFP with News Shocks.

3.2. Monetary Policy Shocks

Figure 2 depicts an economic environment including news shocks. In the expected economy, a positive monetary policy shock is anticipated in the 10th period. The results reveal that, with the news shock of the central bank raising nominal interest rates occurring after the expected 10th period, economic agents adjust their behavior in advance, reducing consumption and investment, decreasing labor, and causing an early decline in inflation rates. Capital inputs in the economy decrease, leading to a decline in enterprise net worth and subsequently a decrease in total output. However, when the expected shock materializes in the 10th period, it does not cause greater fluctuations compared to the unexpected shock. This implies that public anticipation of monetary policy prompts earlier adjustments in economic behavior, limiting the ability of monetary policy to induce significant fluctuations in various macroeconomic variables [23]. Hence, in an economic model incorporating public expectations, the regulatory effect of monetary policy weakens. Consequently, if the public can accurately anticipate future economic shocks based on available information, proactive measures taken by economic agents beforehand would to some extent mitigate the amplification effect of the financial accelerator mechanism on economic crises.

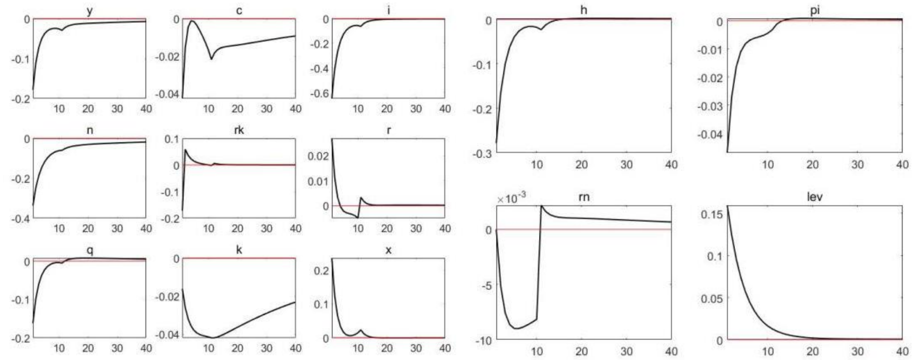

Figure 2. Monetary Policy with News Shocks.

Figure 3 introduces news shocks into the economy. Similarly, a positive fiscal shock is introduced in the 10th period, where economic agents anticipate a proactive fiscal policy by the government in that period. The positive fiscal policy shock indicates the anticipated expansion of government spending scale in the 10th period, leading to an increase in the money supply circulating within the economy. Consequently, positive expectations regarding fiscal policy result in an increase in nominal interest rates and inflation rates, along with an increase in employment and expanded investments in the economy. When, in the 10th period, the actual effects of increased government spending occur, compared to an economy without considering expectations, the impact of fiscal expenditure on economic variables diminishes. Public anticipation of fiscal policy similarly reduces the regulatory effects of fiscal policy. However, compared to monetary policy, within an economic environment containing news shocks, fiscal policy exhibits more effective regulatory effects. This is contrary to conclusions drawn from economic models that do not account for expectations.

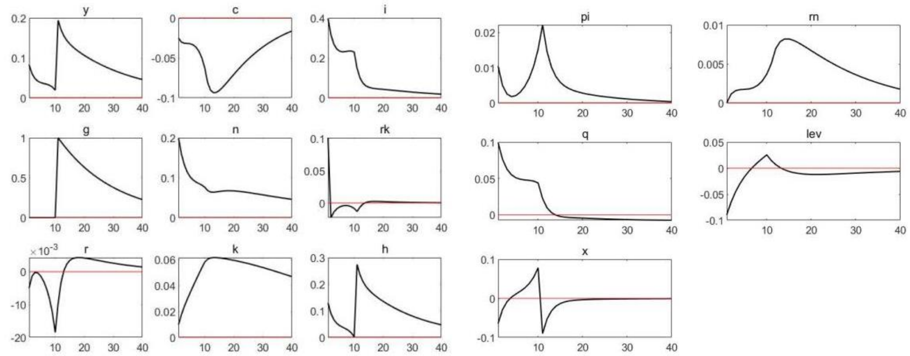

Figure 3. Fiscal Policy with News Shocks.

Figure 4 depicts the impact of fluctuations in corporate net worth on the macroeconomy in the presence of news shocks, where agents react to economic information regarding future economic conditions. It is assumed that in period 10, there is information suggesting a positive change in corporate net worth, implying that agents anticipate an increase in firm value in the future. Consequently, households reduce consumption and increase investments before period 10, anticipating higher dividends from stock investments in firms. Positive expectations lead to an increase in corporate net worth during the period. Simultaneously, following the BGG financial accelerator mechanism, the rising net worth prompts increased credit demand by firms, leading to expanded investments, increased output, and higher employment. A marginal increase in inflation is observed alongside the rise in corporate net worth, indicating moderate inflation in the economy, resulting in a short-term growth trend. Anticipating the increase in corporate net worth, the public's proactive response diminishes the impact on total output.

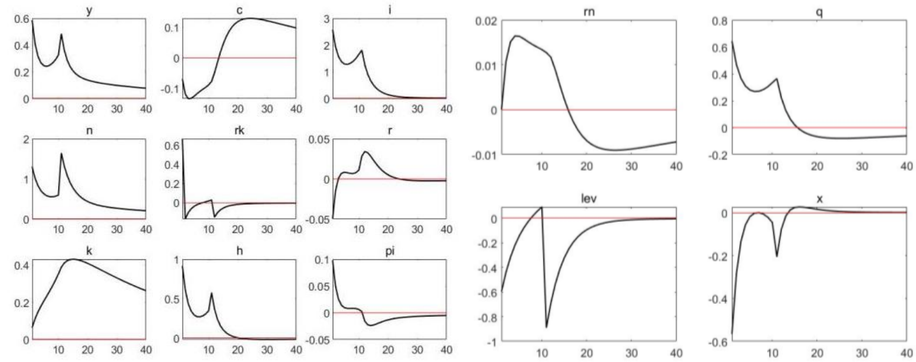

Figure 4. Net Worth with News Shocks.

4. Conclusion and Policy Recommendations

4.1. Conclusion

This paper establishes a dynamic stochastic general equilibrium model encompassing seven sectors including households, intermediate goods producers, final goods producers, firms, financial intermediaries, central banks, and governments. It primarily investigates how animal spirits affect the macroeconomy in an economic environment that includes price stickiness and financial markets. Based on theoretical analysis, the main conclusions of this paper are as follows: Firstly, in an economy with financial frictions, animal spirits influence the macroeconomy through corporate net worth. Positive information received by economic agents regarding corporate net worth leads to an increase in corporate net worth. This triggers credit expansion, prompts firms to expand in scale, increase investment, employment, output, and induces mild inflation, generating procyclical economic effects. Secondly, due to public expectations and their preemptive adjustments to future economic shocks, expected impacts are significantly weakened when they materialize. This phenomenon mitigates the actual effects of expected shocks compared to the models that do not account for expectations, aligning with Lucas's notion that rational expectations nullify policy effectiveness. Thirdly, the analysis of behavioral responses to fiscal and monetary policies in models without and with expectation shocks reveals differential reactions of economic agents under different conditions. In models without expectation shocks, monetary policy has a more pronounced impact and regulatory effect on the economy compared to fiscal policy. However, once expectation shocks are incorporated into the economic model, agents' expectations of fiscal policy exhibit a more noticeable "shock-response" effect. Thus, policy selection should rely more on expectation management, choosing appropriate economic policies based on distinct economic environments. Building on the aforementioned research, the exploration of confidence raises a pertinent question: Do animal spirits conflict with rational behavior? Or should animal spirits encompass human rational economic conduct? If animal spirits are solely considered irrational behavior, then this issue does not require extensive exploration. One approach is attributing people's economic confidence to expectations of future economics, dividing expectations into rational and noise components, designating noise as animal spirits, thereby classifying animal spirits purely as irrational entities. However, if animal spirits encapsulate both human rational and irrational economic behaviors, and since animal spirits describe uncertainties in human behavior, rational behavior should also be part of human behavior. Thus, human behavior is sometimes rational, yet under certain conditions, it may not be rational. The problem lies in how to distinguish rationality and uncertainty within human behavior in these scenarios and subsequently explore how different behaviors affect the choices of economic agents. It is evident that different interpretations of animal spirits lead to distinct conclusions. Further research is required regarding the nature and implications of animal spirits in different forms and their impacts on economic decisions.

4.2. Policy Recommendations

Firstly, implement proactive fiscal policy alongside cautious monetary policy. Based on theoretical analysis, it is observed that in models both without and with expectation shocks, proactive fiscal policies stimulate the economy, while contractionary monetary policies noticeably reduce economic output. Hence, to sustain economic growth, proactive fiscal policies are necessary. They enhance economic agents' expectations, thereby boosting output, increasing employment, and fostering economic growth. Additionally, a moderately accommodative monetary policy, by reducing interest rates to a certain extent, enhances consumption and investment, thereby increasing output. However, it's crucial to note that excessive accommodation in monetary policy can lead to credit over-supply, causing asset prices to deviate from their actual values, potentially inflating asset price bubbles. Irregularities in credit markets might sow the seeds of an economic crisis. Hence, a cautious monetary policy coupled with prudent regulation of financial institutions providing credit in the market is essential. This ensures orderly credit growth within a lawful framework, facilitating effective policy adjustments and incentives for the economy. Secondly, incorporate expectation management into the macroeconomic policy framework. As evident from the analysis above, unlike previous macroeconomic policies that inadequately considered the "shock-response" effect of economic agents to news, leading to distortions and often failing to achieve the desired effects, macroeconomic policies should incorporate more expectation management. By integrating economic agents' expectation factors into policy analysis frameworks, the efficiency of policy implementation can be enhanced. Analysis of monetary and fiscal policies in models both without and with expectation shocks reveals that in an environment without expectation considerations, monetary policy demonstrates more pronounced economic regulatory effects compared to fiscal policy. However, upon introducing expectation shocks from economic agents, fiscal policy exhibits more significant regulatory effects than monetary policy. This phenomenon occurs because financial markets sensitize agents' responses to monetary policies, weakening the actual impact of monetary policies through anticipatory adjustments in economic behavior. Lastly, macroeconomic policies should accurately identify various sources of shocks. Theoretical analysis suggests that in a model with expectation shocks, policies regarding different shocks — such as technological, policy-driven, or financial shocks — cannot be generalized. These diverse sources of shocks operate through different mechanisms and have varying impacts on the macroeconomy. Thus, it is imperative to accurately identify the sources and nature of economic shocks. Tailoring appropriate policies according to the nature of different shocks is essential. Strengthening policy precautions in advance to prevent adverse effects of various types of shocks on the economy is crucial.

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