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Rules or Forward Guidance versus Discretion in Monetary Policy, Evidence from two Behavioral Experiments

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Abstract

This paper examines the impact of rules or forward guidance versus unpredictable discretion in monetary policy on economic performance with two behavioral experiments. It simulates two distinct environments for investment decision-makers: one characterized by a fixed interest rate and another with variable interest rates. When the central bank deviates from clear and transparent rules, its monetary policy becomes unpredictable for economic decision-makers, which hinders the efficient functioning of the economy. In the discretionary experimental scenario, fluctuations in interest rates resulted in monetary business cycles. Consequently, the Wicksell hypothesis was confirmed by the experiment: errors made by the central bank in controlling interest rates can trigger economic fluctuations. If central banks do not communicate their policies clearly or do not apply transparent rules, this will cost jobs and growth.

Keywords: monetary policy, rules, forward guidance, discretion, monetary business cycles, Wicksell hypothesis, behavioral modeling

1. Introduction

Several researchers have documented a shift in monetary policy away from rule-based approaches, such as the Taylor rule. Historically, there are two key concerns regarding the rules governing monetary policy: first, a distrust of politicians who may inflate the currency to meet fiscal needs, and second, a fear that discretionary measures could induce economic disruption. Forward guidance enables central banks to communicate their future monetary policy decisions in a manner that can be accurately anticipated by economic actors. This paper analyzes the impact of rules and forward guidance versus unpredictable discretion on economic performance through simulations of two different environments for investment decision-makers: one with a constant interest rate and another characterized by unpredictable interest rate fluctuations.

The paper begins with a comprehensive review of the current literature in Section 2. Section 3 explains the experimental design employed in this research, followed by the presentation of results in Section 4 and conclusions drawn from the data in Section 5.

2. Related Literature

There is an ongoing discussion about whether the central bank should adopt rules regarding inflation, real or nominal GDP, money supply, or interest rates (Taylor, 2017). Many prominent economists advocate for binding rules for central banks. Smith (1776) argued in Book IV, Chapter 1 for a "well-regulated paper money." Hetzel (1987) summarizes the central ideas of Thornton's works from 1802 and 1810, emphasizing that "the central bank's responsibility should be made explicit, and that the mechanics for ensuring price level stability should be governed by rules, not discretion." Ricardo (1824, pp. 10-11) warned that "it is said that government could not be safely entrusted with the power of issuing paper money; that it would most certainly abuse it…." . Wicksell (1907, p. 219) proposed a price-oriented rule for the central bank, advocating for increased interest rates in response to rising prices and decreased rates when prices fall. He explored the relationship between the central bank's interest rate management and economic fluctuations, arguing that policymakers are accountable for economic boom and bust cycles due to their mismanagement of interest rate controls. During economic booms, interest rates are kept artificially low, resulting in widespread overinvestment driven by collective misjudgment. When the central bank eventually reacts, its response tends to be both delayed and severe, exacerbating the boom and instigating the subsequent bust. This phenomenon is known as the Wicksell hypothesis (Wicksell, 1922; Wicksell, 1998; Grosskettler, 1989).

According to Simons, a rule-based system is especially crucial in the realm of monetary policy. He argued that the

economy cannot operate efficiently if entrepreneurs are constantly forced to guess the central bank's policy actions. Simons emphasized the need to "avoid a situation where every business venture becomes largely a speculation on the future of monetary policy" (Simons, 1936, p. 3). Friedman proposed a “stable framework of fiscal and monetary action that largely eliminates the uncertainty and undesirable political implications of discretionary action by governmental authorities” (Friedman, 1948, p. 12). Friedman (1960, p. 85) argued that discretionary monetary policy, marked by continuous shifts due to political pressures on the central bank or changes in personal beliefs and opinions, leads to negative economic consequences. He advocated for a constant growth rate of the money supply and a target of price stability for the central bank. The time-inconsistency problem described by Kydland and Prescott (1977), Calvo (1978), and Barro and Gordon (1983) suggests that central banks and policymakers may refrain from pursuing an optimal long-term plan if they can gain short-term advantages, such as reducing unemployment through inflation. However, this approach may result in decreased growth and employment in the long term (Mishkin, 2018; Moe, 2013). The opposing Keynesian argument posits that there is, indeed, a long-term trade-off between inflation and unemployment, as articulated by the Phillips curve.

Research on the impact of forward guidance is critical. Del Negro, Giannoni, and Patterson (2012) demonstrate that the effects of forward guidance vary widely based on the specific context of the statements made. After accounting for these additional factors, they show that forward guidance generally yields positive and significant effects on output and inflation expectations. With this baseline established, they illustrate that conventional medium-scale DSGE models often significantly overstate the influence of forward guidance on the macroeconomy, a discrepancy they refer to as the "forward guidance puzzle." McKay, Nakamura, and Steinsson (2016) introduce a model demonstrating that the effectiveness of forward guidance is greatly influenced by the assumption of complete markets. In scenarios where agents face uninsurable income risk and borrowing constraints, a precautionary savings effect reduces their responses to changes in future interest rates. As a result, forward guidance exhibits significantly less ability to stimulate economic activity.

The Keynesian Demand Management School supports discretionary monetary policy (Lamfalussy, 1981). For instance, Sauer (2007) utilized a Keynesian model to illustrate the short-term negative effects of rule orientation. He argues that rigid prices, impatient households, policymakers' preference for output stabilization, and deviations from the steady state can all undermine the effectiveness of the timeless perspective rule, making it inferior to discretionary decision-making. Mishkin (2018) summarizes the arguments against monetary rule orientation as follows: 1. The need for a reliable model of the macroeconomy to guide decision-making. 2. The assumption that the structure of the economy remains stable over time. 3. The inability of rules to anticipate and adapt to unexpected events or uncertainties. 4. The lack of flexibility and discretion in decision-making. 5. The fact that central bankers, who are entrusted with making decisions, are not inherently less trustworthy than rules.

What is the status quo? There is a consensus among many scholars that central banks moved away from general rule orientation before the financial crisis, particularly as interest rates were too low relative to the prevailing rules at that time. Taylor (2012) identifies a shift to discretionary monetary policy from 2003 to the present, during which economic performance has been poor compared to the prior rule-based approach. Kahn (2010) and Ahrend (2010) provide evidence of a shift in monetary policy away from rule-like strategies, such as the Taylor rule. Kohn (2012) raised concerns about the reliability of straightforward policy guidelines for evaluating this shift. The IMF staff (2015, p. 32) found that, in many countries leading up to the 2007–09 global financial crisis, the economy was operating above potential, leading to inflationary pressures, while financial vulnerabilities were also accumulating. Both factors indicated a need for tighter monetary policy, meaning interest rates were too low. Hofmann and Bogdanova (2012) refer to this global departure from the Taylor rule as the "Great Global Deviation." One reason for this deviation is that central banks tend to follow each other (Taylor, 2017). According to the models and data presented by Gray (2013), when the U.S. lowers its policy rate—either as an independent decision or as part of a monetary policy rule—it often triggers a global response, prompting other central banks to cut their rates and intervene in currency markets, even after controlling for broader macroeconomic trends.

Taylor (1983) and Canzoneri (1985) argue that if monetary authorities lack private information about the state of the economy, the debate becomes straightforward: no discretion is necessary, and optimal outcomes can be achieved through rules that dictate actions based on observable factors. Athey, Atkeson, and Kehoe (2003) pose the question of what happens if the monetary authority has private information. They propose establishing an inflation ceiling to set the maximum allowable inflation rate, thereby providing the central bank with socially accepted discretion. However, even in this scenario, discretionary monetary policy can have significant economic consequences due to unexpected changes in decision-making parameters. This aspect will be analyzed in this paper through two behavioral experiments.

We aim to analyze the influence of rules and discretion in monetary policy on economic performance by simulating various interest rate environments for investment decision-makers. The impact of interest rates on the economy has long

been a critical topic for economists. Building on early contributions by Harrod (1936), Kaldor (1940) introduced a mechanism to explain shifts in economic activity through the imbalance between ex-ante savings and investment. Kaldor's model suggests that investment depends on profit levels, which are themselves determined by the level of economic activity. The interaction of nonlinear investment and savings functions, along with their temporal shifts, leads to business cycles. Kalecki expanded on this concept by considering time lags in capital accumulation (Krawiec & Szydlowski, 1999; Szydłowski & Krawiec, 2001; Szydłowski & Krawiec, 2005). Hicks (1950) further clarified fluctuations in the utilization of expanding production capacity by examining both induced and autonomous investments. Subsequent developments based on Hicks' model include Chenery's (1952) investment function, which considers both demand and capacity utilization, as well as the effects of prior investments. Phillips (1961) addressed the need to endogenize the money market. We have integrated these elements into a behavioral business cycle model in which investment functions as an endogenous trigger for the business cycle.

Behavioral modeling seeks to develop a framework that captures the underlying economic dynamics governing behavior in various contexts (De Grauwe & Ji, 2019; Conrad, 2019). However, it does not claim to provide a perfect representation of reality. Unlike traditional economic modeling, which relies on mathematical assumptions, this approach emphasizes experimental methods to more accurately reflect human behavior. These behavioral models are designed to isolate the key factors influencing decision-making and to examine the social interactions among multiple actors. Within these models, hypotheses are formulated and tested using human subjects, with a detailed experimental design enabling replication by other researchers. Consistent with Popper's philosophical perspective (1958), these hypotheses remain valid until contradicted by experiments yielding conflicting results. The behavioral patterns identified through this process can serve as a foundation for the development of new theories and strategies in economic policy.

3. Experimental Design

To summarize, although the orientation toward monetary rules has been increasingly abandoned in recent times, most researchers still advocate for it. Thus, we propose the following hypothesis:

“Monetary rule orientation or forward guidance leads to better economic performance compared to unpredictable discretionary policies due to the adjustment problems faced by economic agents.”

This leads to the Wicksell hypothesis: “Errors by the central bank in controlling interest rates can trigger economic fluctuations.”

Our economic model is designed to test these hypotheses using behavioral science and aims to enhance the Hicks-oriented model by incorporating capacity effects and price changes. Economic policy implications are derived from this model. In Game A, we tested investment decisions and their economic performance within a rule-based monetary system featuring a constant interest rate of 3%. In Game B, we employed a discretionary, variable interest rate policy. The interest rates were adjusted by the game master, who simulated the role of the central bank, with the total interest rates in both games summing to 30%.

Experiments A and B were conducted during the winter semesters of 2021/22 and 2023/24, as well as the summer semesters of 2022 and 2023, using MS Teams and Excel. The study included 137 participants divided into ten groups, comprising students from various Business Bachelor programs, such as Macroeconomics and Political Economy, at the University of Applied Sciences HTW in Saarbrücken, Germany. A simplified company model was employed for the experiment, allowing students to manage capital investments as if they were company managers. The rules were explained to the students before starting the experiments. The students were then tasked with maximizing profit by investing capital, just the way a manager of a company would. The experiment was conducted with business administration students who possessed basic business knowledge. Business administration students will be managers in the business world in the future. The most successful maximization of profits through investments was rewarded with €10 in variable remuneration. So, salience was given, as the reward corresponded to a clear output function. Furthermore, the reward increments were much more important than components of the students' utility (dominance).

In Game A, students were informed that interest rates would remain constant. Managers (students) were tasked with varying investments to maximize profits, with the interest rates impacting the profit and loss (P&L) statements as investments were made using borrowed capital. Interest payments reduced the company's equity, while profits increased it. Investment decisions by all participants affected demand by 50%. Product prices were influenced by both demand and production capacities, with the price for the current period (P_t) calculated by multiplying the demand-to-capacity ratio by the price from the previous period ($P_t = D/PC\ P_{t-1}$). The game commenced with demand equal to supply, and capacities were reduced by 40% per round due to depreciation.

Each company aimed to maximize profits through investment decisions (I), with investments expected to depend on profits, as suggested by Kaldor (1940). Delays in expanding production capacities were considered, following Kalecki's model (1935). Managers were responsible for acquiring production equipment and integrating it into the manufacturing

process. In the simulation, investments totaling €2.5 million over two game rounds led to a 50,000-unit increase in production capacity over two years. This increase translated to an additional €1 million in sales revenue at a price of €20 per unit, representing a 40% increase, or €50 in additional revenue for each unit of production capacity ($PC_{t+2} = PC_t + I_t/50$). Once installed, production facilities became permanent, making the capacity increase irreversible. Participants started with a turnover of €10 million (sales) and equity (EQ) of €10 million. With a product price of €20 (P) and production costs of €15 (PC), they sold their production capacity of 500,000 units (PCap), resulting in a profit (PR) of €1.9 million (PR = S - PC - CC) after deducting €600,000 in borrowing costs at an interest rate of 3% (Capital Costs, CC).

4. Results

Fig. 1 shows the constant interest rates of the rule-based Game A, while Fig. 2 illustrates the fluctuating interest rates resulting from the discretionary monetary policy of Game B. The changes in interest rates were random and did not adhere to any specific rules; in both games, the total interest rates paid summed to 30%. In Game A, the interest rate remained constant at 3% (Fig. 1a). The central bank did not respond to inflation by raising interest rates, maintaining a low-interest-rate policy and engaging in quantitative easing (QE). The Investments were positive from the outset, driven by a favorable demand trend that led to price increases (Fig. 2a). These price increases resulted in higher unit profits (Fig. 4a), which, in turn, led to increased investments (Fig. 5a). Due to the accelerator effects present in the Hicks model, this increase in demand stimulated further investments (Fig. 6a), generating economic growth (Fig. 9a). Initially, as production capacities did not increase, prices and profits continued to rise. Managers focused solely on their profit and loss (P&L) statements. The rising demand resulted in price increases, while production capacities remained constant until round six. Consequently, company profits increased, prompting managers to boost investments (see Fig. 5a).

From a microeconomic perspective, managers consistently decided to expand capacity to increase sales and, therefore, profits. Investments and therefore demand continued to increase. The investment gestation period—the time required from securing capital to implementing new equipment—meant that capacity only expanded two rounds later, adjusting supply to meet demand. This lag initially resulted in rising prices and profits, leading managers to invest even more. After two rounds, the increased capacity finally came onto the market as additional supply. However, the delayed capacity expansions (see Fig. 7a) created an oversupply starting in round six, resulting in a price collapse (see Fig. 2a), which rendered investments unprofitable due to falling unit profits (see Fig. 4a). Consequently, investments plummeted (see Fig. 5a), leading to a downturn. Starting from round seven, prices began to fall (Fig. 2a), which also caused unit profits to decline (Fig. 4a). Companies reduced their investments, resulting in an economic downturn (Fig. 9a) and ultimately leading to bankruptcies, as reflected in negative equity (see Fig. 8a). This sequence of events contributed to restoring market equilibrium through reduced supply as firms exited the market.

Conversely, the interest rate fluctuations in Game B resulted in changes in the cost of capital per unit (Fig. 3b), which subsequently affected unit profits and led to shifts in investment. Falling interest rates encouraged increased investments (Fig. 5b) and demand (Fig. 6b), resulting in economic expansion characterized by rising prices (Fig. 2b) and increasing unit profits (Fig. 4b). Conversely, rising interest rates (and therefore the cost of capital) (Fig. 3b) led to reduced investments (Fig. 5b) and demand (Fig. 6b), contributing to a downturn in prices. The result was a monetary business cycle.

In Game A, there were fewer fluctuations in the cost of capital per unit (Fig. 3a) and unit profits (Fig. 4a) due to the constant interest rates, which resulted in fewer changes in investment (Fig. 5a) and demand (Fig. 6a). Company managers operated in a more stable economic environment and reacted less impulsively; the reduced monetary discretion led to fewer unexpected situations in which managers had to correct their investment decisions. There was planning security. This stability resulted in fewer losses and bankruptcies. The negative equity for the predictable, rule-based monetary policy was approximately minus €11 billion, compared to around minus €14 billion for the unpredictable discretionary monetary policy (Fig. 8a and b). Consequently, market players were able to plan better under constant and predictable interest rates associated with rule-based monetary policy than with the changing and unpredictable interest rates of discretionary monetary policy.

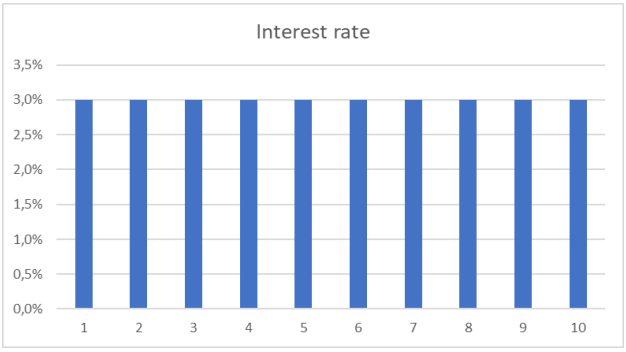

Figure 1a. Interest rates (rules)

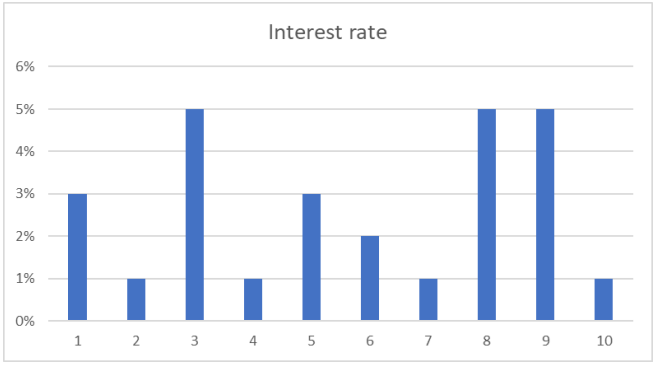

Figure 1b. Interest rates (discretion)

Figure 2a. Price (rules)

Figure 2b. Price (discretion)

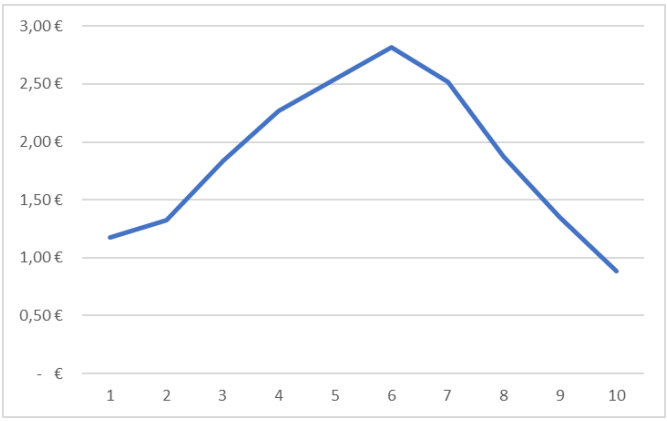

Figure 3a. Capital costs per unit (rules)

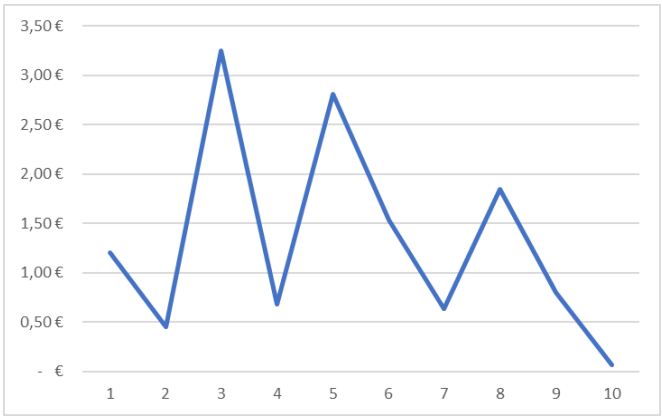

Figure 3b. Capital costs per unit (discretion)

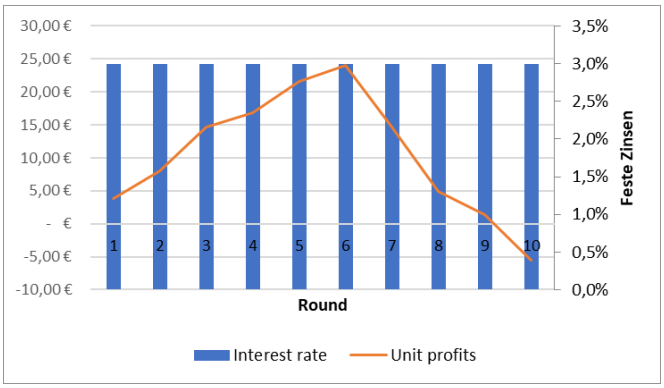

Figure 4a. Unit profits (rules)

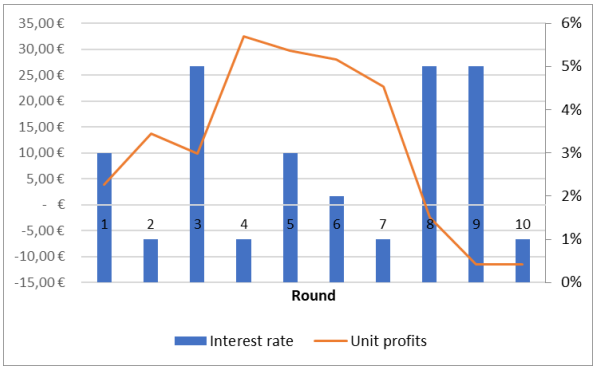

Figure 4b. Unit profits (discretion)

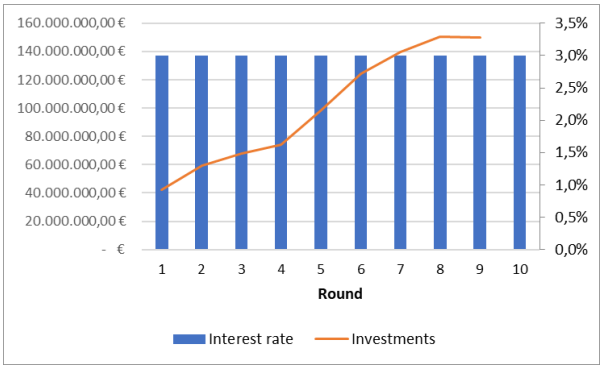

Figure 5a. Investments without round 10 (rules)

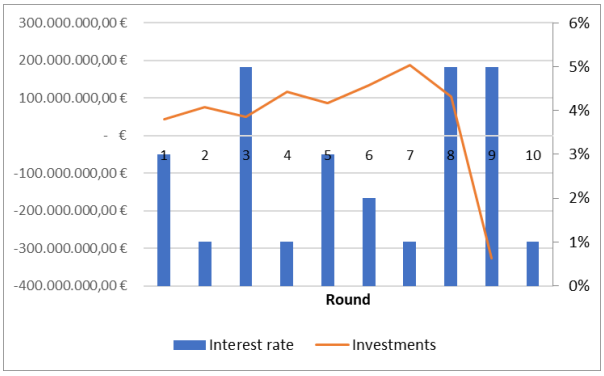

Figure 5b. Investments without round 10 (discretion)

Figure 6a. Change of demand (rules)

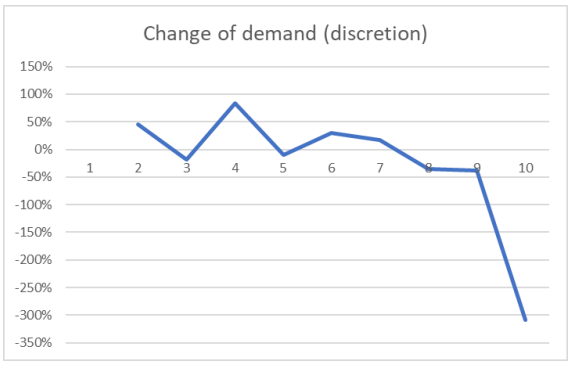

Figure 6b. Change of demand (discretion)

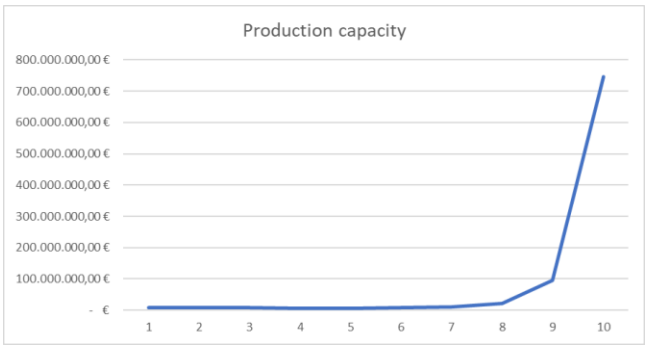

Figure 7a. Production capacity (rules)

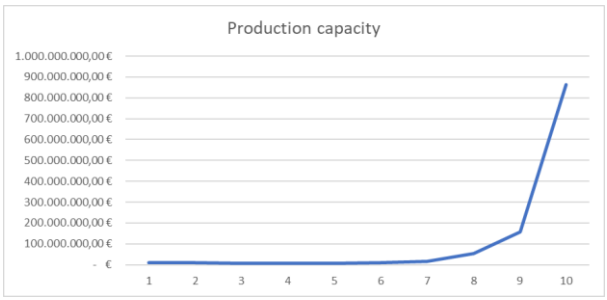

Figure 7b. Production capacity (discretion)

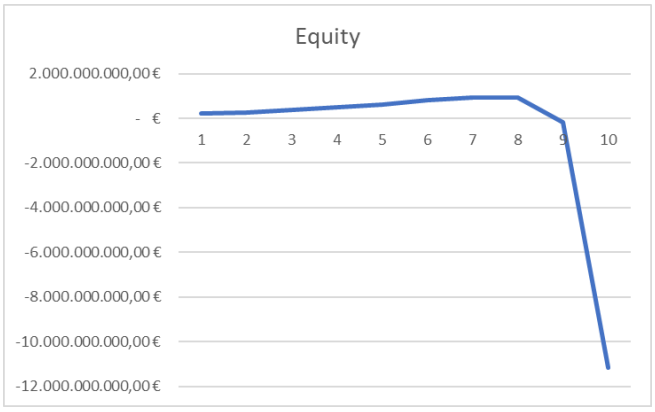

Figure 8a. Equity (rules)

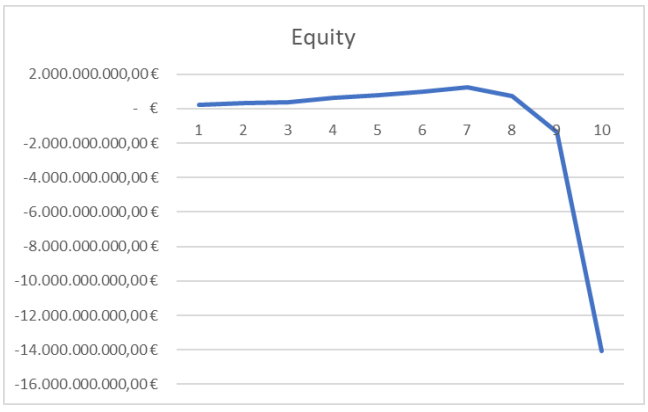

Figure 8b. Equity (discretion)

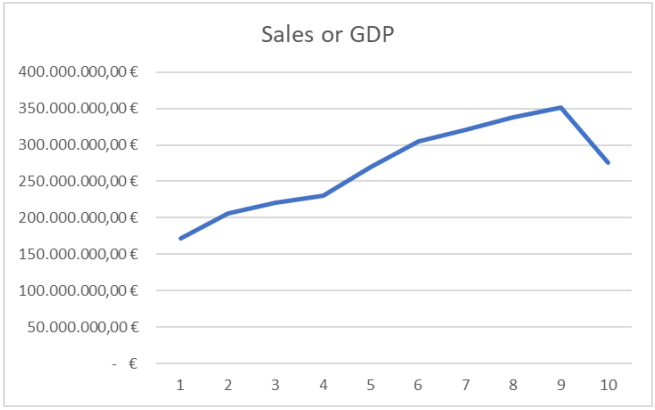

Figure 9a. Sales or GDP (rules)

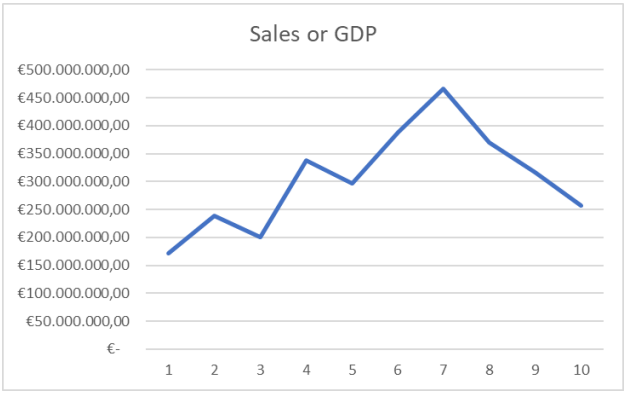

Figure 9b. Sales or GDP (discretion)

5. Conclusion

In this paper, we analyzed the impact of rules or forward guidance versus discretion on economic performance by simulating two different environments for investment decision-makers: one with a constant interest rate and another with varying interest rates. Our hypothesis—that "monetary rule orientation or forward guidance leads to better economic performance than unpredictable discretionary policies due to adjustment problems faced by economic agents"—was confirmed by comparing the two scenarios. If the central bank does not adhere to clear and transparent rules, its monetary policy can become unpredictable for economic decision-makers. The economy is unable to operate efficiently if entrepreneurs are constantly forced to guess the central bank's actions. The results of the experiments also highlight the significance of the forward guidance instrument. Central banks are well-advised to communicate their monetary policy decisions in a manner that allows economic players to anticipate these decisions accurately. Athey, Atkeson, and Kehoe (2003) explored a scenario in which the monetary authority possesses private information and suggested implementing an inflation ceiling as a socially accepted form of central bank discretion. However, even this approach to discretionary policy can have significant economic consequences due to unexpected changes in decision parameters. Our findings demonstrate that market participants can plan more effectively with constant and predictable interest rates (i.e., rule-based monetary policy or forward guidance) than with fluctuating and unpredictable rates (i.e., discretionary monetary policy).

Furthermore, in the scenario with changing interest rates (Game B), fluctuations resulted in variations in the cost of capital per unit and, consequently, in unit profits, which impacted investment levels. Falling interest rates stimulated increased investment and therefore demand, leading to an upswing characterized by rising prices and unit profits. Conversely, rising interest rates elevated the cost of capital, resulting in reduced investments and demand, and ultimately causing a downturn. Thus, a monetary business cycle was the result.

In the scenario with constant interest rates (Game A), there were fewer fluctuations in the cost of capital per unit and unit profits, resulting in more stable investment and demand. Company managers operated in a more stable economic environment and reacted less impulsively, leading to fewer losses and bankruptcies. Thus, we also confirmed the Wicksell hypothesis: "Errors by the central bank in controlling interest rates can trigger economic fluctuations." If the central bank does not adhere to clear and transparent rules or fails to explain its future policy through forward guidance, its monetary policy will become unpredictable for economic decision-makers. This unpredictability hampers the efficient functioning of the economy, as entrepreneurs would be left constantly guessing the central bank's actions. Investments are not only

relevant for demand. The right investments generate growth and employment, while bad investments are a waste of economic capital. In the experiment, the bad investments also led to bankruptcies, i.e., a loss of production and jobs. To summarize: if central banks do not communicate their policies clearly or do not apply transparent rules, this will cost jobs and growth.

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Obtained.

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The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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