Choice of Macroeconomic Policy Model in Conditions of Global Instability

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Abstract: The article addresses models of macro-economic policy based on key theoretical foundations of modern macroeconomy, their analysis is provided in the context of global instability of world economy. Methodology of the study covers basic notions and methods of modern game theory applicable to modeling of macroeconomic processes. The author proposes theoretical game model which proves the advantages of discretionary policy based on post-Keynesian concepts in comparison with “policy of the rules” commonly implemented before the crisis and built on theoretical postulates of neo-classic approach. The result of the study showed the necessity of keeping uncertainty element while implementing macro-economic policy to increase this policy’s effect on the behaviour of private sector entities.

Key words: Macroeconomy · Neo-classical macroeconomy · Neo-Keynesianism · Post-Keynesianism · Discretionary policy

INTRODUCTION

Macroeconomy, as independent scientific discipline, is focused on theoretical aspects of interaction between state and private sector of market economy. Macroeconomic approach suggests collision of centralized regulation impact performed by state structures with spontaneous reaction of market environment as a result of a huge number of decentralized decisions. In this context the degree of homogeneity of economic environment of private sector is of utter importance.

Homogeneity suggests that all or most subject of private sector use the same model for making decisions. The belief about full heterogeneity of economic environment of private sector is characteristic feature of neo-classical macro-economy in all its modern forms: monetarism, rational expectations concept, real economic cycle theory etc. This homogeneity is based on universal principle of rationally maximizing behaviour and is embodied in the models of “representative agents” which while being different in their functions (households, companies etc.) use the same model of economic behaviour described as rational maximization of objective function. All economic subjects maximize their objective functions (choice criteria) responding only to the real long-term changes in economic situation. Here their targets are conflicting with the objectives of macro-economic regulation intended for short-term maximization of national production and employment.

State intervention prevents from intertemporal maximization of the parameters of objective functions of private sector subjects. But in conditions of homogeneity economic environment the actions of all subjects, including the state are fully predictable. This is the base for hypothesis of “rational expectations” which has become basic concept of modern neo-classical and neo-Keynesian macroeconomy. If expectations of economic subjects are rational then the state which is striving to maximize public wealth must demonstrate devotion to some rules. This idea was formulated by M. Woodford in regard to monetary policy: “…effectiveness of monetary policy depends as much on the public’s expectations about future policy as upon the bank’s actual actions. Hence a bank must not only manage to make the right decision as often as possible; it is also important that its actions be predictable.” [1; p. 15].

Strict compliance with the rules make quite predictable actions of the state be included as arguments into objective functions of private subjects which will
enable them to perform rational optimization. D. Taylor-the author of known rule of monetary policy-argues that "...the private sector and other public sector institutions developed rules of thumb that depended on the rule-like behavior of the monetary authorities. These rules of thumb improved the operation of the economy." [2; p. 8].

Last decade of XX century and in the early 2000s saw macro-economic policy of the most developed countries based on officially declared rules of monetary and fiscal regulation. This signalized the victory of neo-classical macroeconomy not only in the sphere of theory but practical policy as well. However, crisis in 2008 and followed by it period of global instability cast discredit on the theoretical postulates and practical conclusions of neo-classical theory and stimulated search for alternative decisions.

Alternative approach to the problem of macroeconomic policy was developed in the framework of “post-Keynesian” or “post-Walrasian” macroeconomy [3-5]. In spite of many differences in theory and methods existing in these approaches they share one common concept: the idea of heterogeneity of economic environment. This suggests multiplicity of decision-making models which inevitably results in uncertainty because economic subjects can not predict the reaction of other subjects just thinking about how they would behave themselves in such situation. As wrote J. Jespersen: “Expectations-formation is associated with considerable uncertainty on the actor level and there will also be considerable difference in expectations-formation from actor to actor when the future is unknown.” [6; p. 123].

MATERIALS AND METHODS

In conditions of uncertainty the heterogeneity of behavioral models of economic subjects is manifested by their different attitude to risk. They manifest either neutrality or risk aversion. The first group chooses variants of behaviour directed to maximization of potential gain, the second-minimization of possible losses. In game theory such situation is described in the following way: "Each player has the choice between a safe strategy that yields a fixed payoff x and a risky strategy the payoff of which depends on the total number of players that choose the same strategy... Hence, there is a conflict between risk dominance and payoff dominance" [7; p. 1013].

In the context of uncertainty the efficiency of state macroeconomic policy is viewed at quite different angle. State intervention will create two-aspect uncertainty for economic subjects of private sector. Firstly, uncertainty is associated with possible direction and the scale (size) of impact of macro-economic regulation performed by the state. Secondly, for every economic subject in private sector there exists additional uncertainty associated with possible response of other subjects to the regulatory impact of the state. As a result stimulation of aggregate demand by methods of fiscal or monetary expansion in the same time creates uncertainty in regard to the size of such expansion and in regard to response of companies to increase in demand. Every company must decide what to do in changed situation: increase price for their products/services or increase their supply.

This situation can be presented in the form of simple game 2x2 in which individual company plays against “representative company” decisions of which are aggregated summary of the decisions made by other companies. Since “...groups of people display patterns and structures of behavior that are not present in the behaviour of the individual members” [8; p. 127] actions of every individual company will be inevitably different from behaviour model described by “representative company”.

Analysis of the Model: Individual company chooses the rate of price increment ([pi]) for their goods from the range (0, [pi]max), where [pi] = its estimate of maximally possible rate of price increment to satisfy additional demand which originates as a result of stimulating policy of the government. Here the company must take into consideration possible variants of the choice of representative company which determines expected inflation rate-[pi]'.

In conditions of constant returns to scale the maximization of expected profit is with [\text{[pi]} = [\text{pi}^\text{max}], i.e. when the company chooses such rate of price increment which will completely balance the increment in demand, expected after implementation of state stimulation policy. Planned rate of increment in production volumes of the company is equal to zero.

The choice of individual and “representative companies” can be described as unlimited set of strategies but in order to represent potential heterogeneity of the decision making model this choice can be limited to two types of strategies for both players-[alpha] and [beta].
Strategies of [beta] type are invariant and suggest clear choice of maximally possible rate of increment in price with given size of state regulation of demand. For individual company the choice of such strategy suggests that \([\pi] = [\pi]^{max}\) and for “representative company” that \([\pi]^{*} = [\pi]^{max}\). Therefore if all companies in economy would choose [beta]-strategies then the only result of state regulation measures will be increase in prices. Choice of beta-strategies means neutral attitude of economic subjects to risk. Choosing such strategy the company ignores the possibility of overestimation of \([\pi]^{max}\) value and associated with it risk of losses caused by decrease in sales volume and want to maximize ours profits by increase in prices.

[Alpha]-strategies are variable-they suggest that \([\pi]\) value can vary in the range \(0 \leq [\pi] < [\pi]^{max}\) (for “representative company”: \(0 \leq [\pi]^{*} < [\pi]^{max}\)). These strategies admit possibility of different results because reaction of companies to stimulating policy is combined-i.e. it suggests simultaneous growth of production volumes and prices. Choice of [alpha]-strategy shows risk aversion which by economic subjects. If chosen \([\pi]\) value is below \([\pi]^{max}\) the company will reduce risk of possible losses because of overestimation of \([\pi]^{max}\) value but in the same time it gives away a part of possible gain and refusing from maximization of profit.

Let us assume that the object of maximization is net gain. Beta-strategies consider net profit as difference between maximal possible price increment rate and that price increment rate which the company would choose if its attitude to risk was not neutral. Strategies of [alpha]-type define net gain as difference between chosen by the company price increment rate and average increment in price presented as increment rate chosen by “representative company”. This difference reflects change in relative price for company product. If the price increment rate is above average the company gets additional gain from increase of relative price for its product.

Summarizing these assumptions we can build a pay-off matrix of the game (Table 1):

In conditions of homogeneity of economic environment the outcome of the game will be definite. If all companies are neutral to risks they choose maximal values of price increment rate and the solution will be combination of strategies [beta], [beta]. The level of prices grows proportionally to expected increment in aggregate demand and production volumes are constant. The same result is achieved if expectations of the companies are “rational”: companies have perfect vision of future actions of the state and other companies. In this case “…the players know that the other players are rational and they know that the others know that they are rational” [9, p. 142]. That is why all companies will choose beta-strategy. But in this case it will be senseless to talk about neutrality to risk because there is no risk.

But such solution is possible only if the economic environment of private sector is homogeneity-i.e. economic subjects are characterized by the same degree of neutrality to risk. If the degree of neutrality/risk aversion is unequal for different subjects, the outcome of the game is unknown.

Individual company while making decision can not be sure that its decision coincides with the decision of “representative company”, i.e. with the decision of the majority. That is why in order to make rational decision it must not only evaluate possible gains with different combinations of strategies but the probability of coincidence/non-coincidence of its decisions with decisions of the majority and possible effects of it. Individual company has no precise information about which values \([\pi]^{max}\) will take. However evaluating the degree of heterogeneity of the environment in which it operates the company can evaluate expected gains from alternative strategies:

\[
U^\varepsilon = p(\pi - \pi^\varepsilon) + (1 - p)(\pi - \pi^{max})
\]

\[
U^\varepsilon (\beta_i) = \pi^{max} - \pi
\]

where \(p\)-probability that the “representative company” (majority of companies) will choose [alpha]-strategy.

Having equalized these expressions we can determine the increment price rate of individual company when expected gain from the both types of strategies is equal:

\[
\pi^* = \frac{p}{2} \pi^\varepsilon + \left(1 - \frac{p}{2}\right) \pi^{max}
\]
where \([\pi^*]\)-strategy of individual company which in conditions of heterogeneity of economic environment will bring expected gain, which is equal to expected gain obtained from \([\beta]\)-strategy but associated with less risk. Therefore the companies which are neutral to risk, if they act rationally, must prefer this strategy to \([\beta]\)-strategy because it promises the same gain with less risk. As a result in conditions of behavioral heterogeneity of private sector and associated with it uncertainty even neutral to risk subjects will choose less risky and less inflationary price strategies than in conditions of homogeneity and certainty. All strategies will be \([\alpha]\)-type and therefore, \(p=1\). Then \([\pi]\) value can be described more simply:

\[
\pi^* = \frac{1}{2}(\pi^e + \pi^{\max})
\]

In this case the solution of the game will be combination of strategies \([\alpha]\),\([\alpha]\), and \([\pi]\) is the strategy of “price leaders” which is higher that inflation rate with due regard to possibility of unpredictable changes in inflation but is lower than maximum possible increase in price with expected size of demand stimulation. But it is obvious that \([\pi]\) value will be less than \([\pi]\) only if \([\pi]\) also will be less than \([\pi]\) and this is possible only if there is high uncertainty in regard to state policy influencing factual value \([\pi]\).

**CONCLUSION**

Such result shows that discretionary policy is better than policy of “playing by the rules”. Discretionary policy creates uncertainty in evaluation of expected values of its parameters. Possibility of big mistake while evaluating expected parameters of state policy makes companies choose less risky-less inflationary strategies and react to the growth of aggregate demand by changes in production volumes rather than by increment in prices.

On the contrary, if government and Central Bank will play by strict rules the expectations of economic subjects of private sector becomes quasi-rational. In fact, these expectations are adaptive, but the state with its ordered actions eliminates the error of expectations and creates illusion of “perfect prevision”. In such conditions even those subjects which do not accept risk would choose inflationary strategies and respond to increase in aggregate demand by increase in prices, not by increase in production volumes. Finally such policy becomes “neutral” but this is not the result of “rational expectations” which are allegedly intrinsic of economic subjects, it the results of complete predictability of the policy.

**Inference:** While implementing the policy of some kind the state determines the response of private sector. If it is regularly implemented policy of “playing by strict rules” it will form economic environment corresponding to the ideas of “new neo-classical macroeconomy” with long-term neutrality of state regulation policy. If discretionary policy is kept and the state deliberately acts unpredictably it results in appearance of post-Keynesian world where most part of economic subjects demonstrate risk aversion, choosing less inflationary strategies which bring more positive reaction of private sector to stimulation policy of the state. It is obvious, that in long term discretionary policy will be dominating strategy of the state because it allows to keep and strengthen efficiency of state macro-economic regulation especially important in crisis situation. Policy of strict rules, on the contrary, decreases the efficiency of state regulation and this restricts ability of the state to eliminate negative shocks generated by world markets or private sector of national economy.

Choice of discretionary policy is a tool to reduce risks for the state itself as a guarantor of macro-economic stability. That is why last crisis of 2008-2009 made many modern macro-economists to revise their attitude to discretionary policy after long period of devotion to the policy of playing by the rules. The crisis made them agree that “discretionary policy is vitally needed because when the “rules” dominate it will be very difficult to avoid serious crisis” [10; p. 151]. Risk of possible crisis is key reason that the state should keep the freedom of choice in the sphere of macro-economic policy not only during crisis but during “prosperity” periods as well.

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