

Recession, Government Decision, and Consumers' Behavior

A Cognitive Game Approach – Theoretical Analysis

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DOI: 10.6007/IJARBS/v4-i5/874 URL: <http://dx.doi.org/10.6007/IJARBS/v4-i5/874>

Abstract:

This manuscript presents a theoretical cognitive game approach to analyze the potential behavior of consumers as a reaction to a government bailout plan at times of big recessions.

Keywords: Cognitive game theory, Recession, Economic Crisis, Consumers' Behavior, Consumers' Spending, Governments' Bailout Plans, Expansionary Fiscal Policy, Government Decision Making, Government Policy Analysis, Public Policy Analysis.

Introduction

This manuscript presents a theoretical cognitive game approach to analyze the potential behavior of consumers as a reaction to a government bailout plan at times of big recessions. This manuscript does not aim to review related literature or not to present any empirics. It utilizes only a cognitive game approach within a theoretical exposition to address the potential success or failure of a policy making decision at times of big economic recessions.

This manuscript contributes to policy and government decision making analysis and consumers' behavior literature in general in terms of its multidisciplinary simple approach.

The manuscript presents a cognitive game approach to address the question of the success or the failure of a government decision at times of big recessions under a specific adopted scenario.

The manuscript will be completed later to address its contribution to the existing literature and to try to apply empirically its theoretical logic on different countries at the time of the financial crisis started in the last quarter of 2007 in USA.

Government decision making and consumers' behavior – A cognitive game

Considering the following scenario; consumers can decide to cooperate or not to cooperate with the government policy makers depending on different rational criteria. Unsystematic and

irrational behavior may also affect decisions of consumers here. Mainly; consumers will follow only their cognition at times of crises that depends on historical experiences with governments' policies and also on unexplained feelings toward the future and how precautious they are at times of crises. People are more worried about their future at times of crises that can make them evaluate the current saving more than any other regular time which can counteract the government strategy of stimulating the economy. Increasing consumers' confidence and spending is a crucial factor for the government policy to succeed. Having proposed the above scenario; a cognitive game may explain consumers' behavior toward an expansionary government policy the government decides to adopt at times of big recessions. Figure 1 explains the potential cognitive reaction of consumers to a bailout spending plan assuming the above scenario. This game assumes a neutral risk-taker-agent.

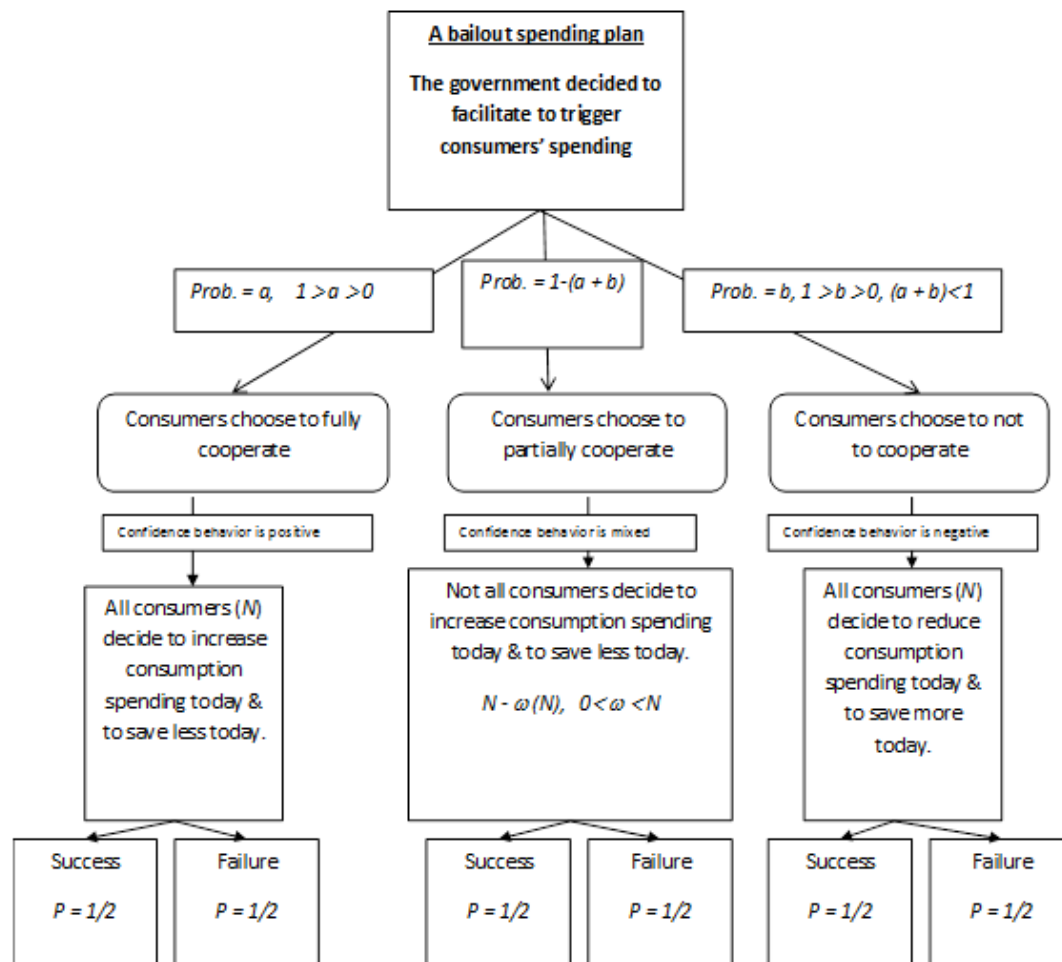


Figure 1: Consumers' potential reaction toward a potential government expansionary policy a government imposes at the time of the recession.

The initial move in the above game starts by the government that decides to bailout the economy via imposing a type of an expansionary fiscal policy such that increasing the government spending ΔG and hence facilitating life for consumers to spend more; yet, there are three possibilities policy makers may face:

1. All consumers N may decide to cooperate because they recognize the benefit of such policy on the economy and they trust such action the government has taken and hence their behavior I goes toward the direction of the government policy;

$$I \forall N \rightarrow \Delta G, \quad \text{with Prob.} = a, \quad 1 > a > 0.$$

The behavior of all consumers goes toward the direction of the government policy with a probability of a , where a , is a real number between zero and 1.

2. All consumers N may decide to not to cooperate because they perceived, remembered, learned and thought about the entire crisis differently; and hence their behavior can be described as follows;

$$I \forall N \not\rightarrow \Delta G, \quad \text{with Prob.} = b, \quad 1 > b > 0, \quad (a + b) < 1.$$

3. Not all consumers decide to cooperate because they perceived, remembered, learned and thought about the entire crisis in opposite directions; and hence their behavior can be described as follows:

$$I \forall (N - \omega N) \rightarrow \Delta G, \quad \omega N \not\rightarrow \Delta G, \quad \text{with Prob.} = 1 - (a + b).$$

Where, ωN is the number of people who follow collectively the opposite direction; who decided to not to cooperate.

Consumers simultaneously recognize and take decisions regarding two options:

1. They decide to cooperate so they increase consumption today and save less today in exchange for unforeseen future out of confidence toward the government's action, or,
2. They decide to be cautious so they choose to decrease consumption today and to save more today for unforeseen future because they distrust the government or because of unexplained feeling.

If they decide to cooperate so they can face two possibilities for their future consumption and hence welfare:

1. The government policy is successful and hence the bailout plan will work effectively and the dynamic sectoral multiplication will also work over time and hence the standard of living in general will increase over time and hence their future consumption increases, so both their current and future consumptions increase. This scenario can happen with a probability of $\frac{1}{2}$. The payoff for $n, n \in N$ would be (α, α) , $\alpha > 0$, by giving the first value of α for the gain of the current consumption and the second value of α for the gain of the future consumption and hence the total welfare for N ; assuming consumption smoothing behavior over time; increases and the total impact on the economy is purely positive; $\partial W_t / \partial C_j > 0$, $\partial W_t / \partial C_t > 0$, where W is the total welfare, C is consumption, and j is consumption period in question and $t, t < j$, is time and with rationality; $\partial^2 W_t / \partial C_j^2 < 0$.

2. The government policy fails and that the bailout plan will not work out effectively whether because of possible distortions exist in the markets, rent seekers, or for any other economic or non-economic reasons; and hence, the standard of living doesn't increase over time and hence, future consumptions decrease. This scenario can happen with a probability of $\frac{1}{2}$. The payoff for $n, n \in N$ would be $(\alpha, 0)$ by giving the first value of α for the gain of the current consumption and the second value of zero for the loss of the future consumption. Accordingly and as described in the above discussion; the net welfare for N will be neutral assuming consumption smoothing behavior over time, $\partial W_t / \partial C_t = 0$.

On the other hand, if agents N , decide to not to cooperate; they may also face two scenarios:

1. The government policy succeeds and by the clear mechanism of the economy their future consumption increases. This may happen with a probability of $\frac{1}{2}$. Thus, there's a possibility with a probability of $\frac{1}{2}$ that their current consumption decreases because they decided to not to cooperate while their future consumption increases because of the success of the policy has been taken by the government and because also they decided to have savings for their future consumptions so they will live in relative prosperity in the future. The payoff for n then, $n \in N$ would be $(0, \beta)$ in this case, $\beta > \alpha$; considering the order but magnitudes of differences don't matter; by giving the first value of 0 for the loss of the consumption and the second value of β for the excessive gain of the future consumption. Accordingly; the net welfare for N will be at least positive; $\partial W_t / \partial C_t \geq 0$.
2. The government policy fails and recalling that the future consumption decreases. This scenario can happen with a probability of $\frac{1}{2}$. Thus, there's a possibility with a probability $\frac{1}{2}$ that their current consumption decreases because they decided to not to cooperate while their future consumption may not decrease because of their cautious behavior and savings.¹ Yet, there's a probability of $\frac{1}{2}$ that the future will not be that prosper as in the previous case. Accordingly; the payoff for $n, n \in N$ could be $(0, \alpha)$ by giving the value of 0 for the current consumption loss and the value of α for at least the non-decreasing consumption in the future.

Table 1 summarizes the potential reaction of $n, n \in N$; N is collectively taken the same decision to the expansionary policy that is decided to be taken by the government to bailout the economy:

Table 1: the potential reaction of $n, n \in N$, N has collectively taken the same decision to the expansionary policy that is decided to be taken by the government to bailout the economy: (Assuming taste is homogenous for all N).

| Agents' Potential Reaction | Government's Policy Potential Status | N' payoff for (Current consumption, Future consumption) | The net impact on welfare for all N |
|----------------------------|--------------------------------------|---|---------------------------------------|
| <i>To cooperate</i> | Success (Prob. = $\frac{1}{2}$) | (α, α) | > 0 |
| | Failure (Prob. = $\frac{1}{2}$) | $(\alpha, 0)$ | 0 |
| <i>Not to cooperate</i> | Success (Prob. = $\frac{1}{2}$) | $(0, \beta)$ | ≥ 0 |
| | Failure (Prob. = $\frac{1}{2}$) | $(0, \alpha)$ | 0 |

According to figure 1 then, when $I \forall N \rightarrow \Delta G$, the highest gain will happen if and only if the government's policy succeeds; taken this into consideration; then the best option for the agent is to cooperate; a Nash equilibrium. While, when $I \forall N \rightarrow \Delta G$, the highest gain will also happen if the government's policy succeeds; a Nash equilibrium as well. Thus, with a constant first move of the government that chose to facilitate by imposing an expansionary policy; and with taken into consideration the two possibilities of policy success and policy failure; the agent's best benefit is to choose to cooperate because if he/she changes such choice; his/her net payoff assuming a consumption smoothing behavior; will not make him/her better off. However; the best strategy ever in terms of that game is for agents to cooperate and for the government to succeed because it's the only strategy that does not lead to deprivation in both the present days and the future and it is also Pareto optimum because any deviation will lead to a worse off situation for the consumers assuming neutral time preference behavior.

Figure 2 considers however the third possible scenario and the most realistic one that is; $I \forall (N$

$$- \omega.N) \rightarrow \Delta G, \quad \omega.N \not\rightarrow \Delta G, \quad \omega.N \subseteq N, (1-\omega.N) \subseteq N, \omega.N \text{ could be:}$$

- (i) $= (1- \omega.N)$, or,
- (ii) $> (1- \omega.N)$, or,
- (iii) $< (1- \omega.N)$.

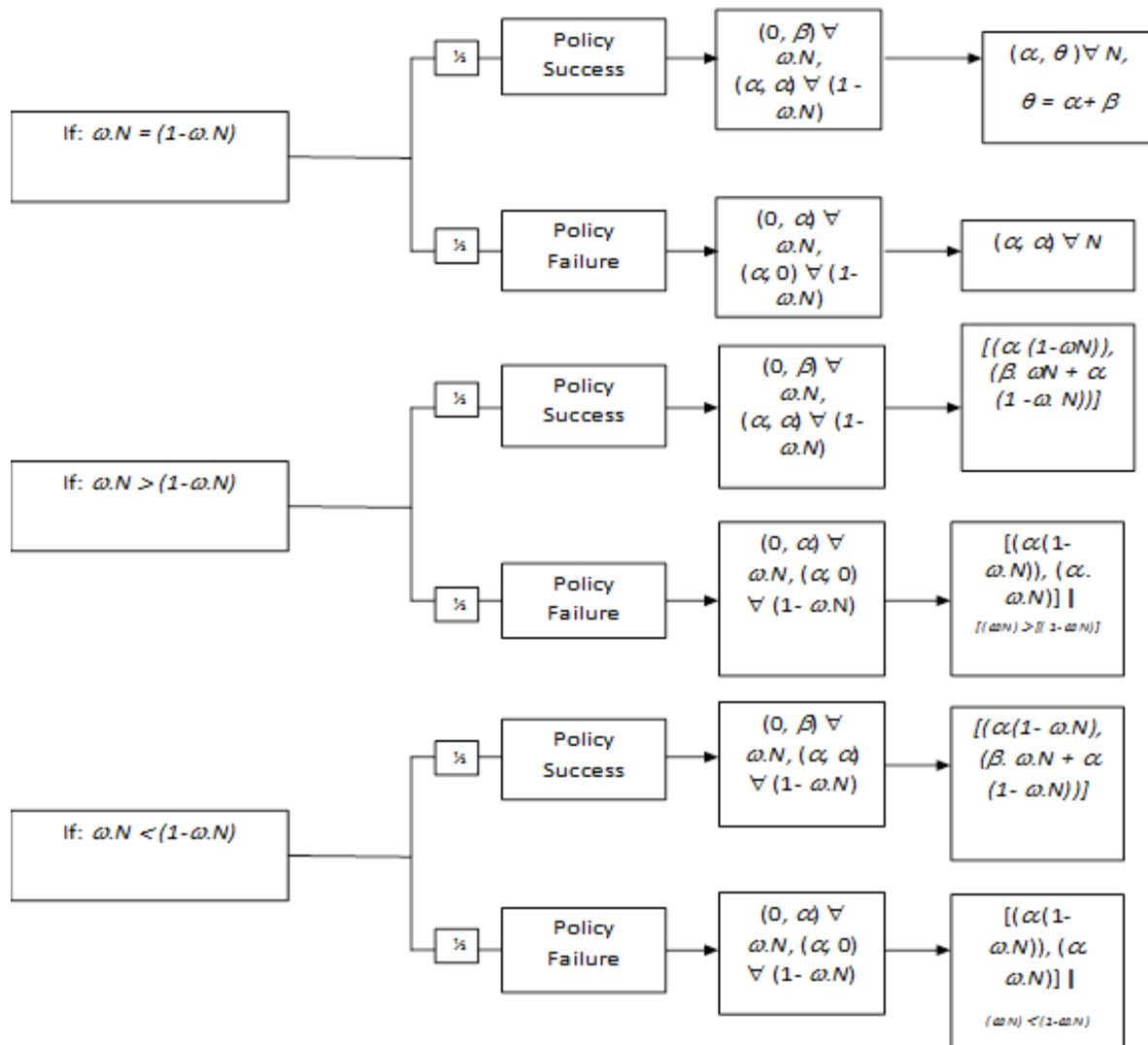


Figure 2: The payoff and probabilities of the third scenario of dividing agents to two subsets of N ; a non-cooperative subset $\omega.N$ and a cooperative subset $(1-\omega.N)$ under three possibilities: $\omega.N = (1-\omega.N)$, $\omega.N > (1-\omega.N)$, or $\omega.N < (1-\omega.N)$: (By giving the least gain the value of 2 and the highest gain the value of 4; considering logical orders: magnitudes of differences don't matter). Assuming taste homogeneity of all N in all cases:

From figure 2, it is obvious that when both subsets of N equal each other; the payoff for N is (α, θ) , $\theta = \alpha + \beta$, $\beta > \alpha$ with a probability of $\frac{1}{2}$ of the possibility of a successful policy, and the payoff for N is (α, α) with a probability of $\frac{1}{2}$ of the possibility of the failure policy. Thus, the total welfare for the entire society is not decreasing in both cases but; future consumption with a successful policy is higher than future consumption with a failure policy. However; when $\omega.N \neq (1-\omega.N)$, the payoff for N is $[(\alpha(1-\omega.N)), (\beta\omega.N + \alpha(1-\omega.N))]$ with a probability of $\frac{1}{2}$ of the possibility of the successful policy and the payoff is $[(\alpha(1-\omega.N)), (\alpha\omega.N)]$; with a probability of $\frac{1}{2}$ of the possibility of the failure policy and the tradeoff between the current consumption and the future consumption will depend on the magnitude of each subset $\in N$ but it is very

obvious that whatever the magnitude of each subset of N is; the future consumption is the highest if the policy is successful but current consumption is always higher if more people have decided to cooperate with the government's policy, yet the distribution between the current and the future consumption will be maximized assuming taking all behavior of N into consideration if and only if more people have decided to cooperate with the government policy and the policy is successful. This is the only strategy that can achieve both the Nash equilibrium and Pareto optimum. Any other re-distribution; would reduce the net welfare over time for the entire society; considering all scenarios have been discussed. Thus, in order for the government to maximize the net welfare over time; it needs to mobilize its resources toward success. It's the role of policy makers then to encourage consumers to cooperate in order for the policy to meet its goal. The government should use all tools and resources to achieve that strategy. The manipulation of domestic media and relevant marketing strategies could help as complementary elements to enhance consumers' confidence so to spend more at the time of the recession.

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ⁱ Assuming no pension plans are incorporated in the entire analysis.