Study on the Inflation in the Economic System in Online Games

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***Abstract*-- Online games do not have intervention measures such as central banks, currency over-supply, and interest rates. The game designer can plan production relations and productivity, and set the production cost, but they cannot intervene and control the working hours of the individual player, and hence cannot directly intervene the total amount of the game currency. There are differences between the economic operation in the online game and that in realistic society, so, the operating rules and mathematical models of the economics need to be re-evaluated in the virtual world.**

I. INTRODUCTION

The degree of excellence of the economic system of a game is in direct proportion to the life cycle of the game, and the speed of inflation of a game is in direct proportion to the rate of the player loss. The paper conducted a systematic analysis of the reasons for the inflation in the online games from the perspective of economic system, and found that the inflation occurred in the online game due to reasons such as players own an excessive amount of fund, the channel of the consumption fund of the game is blocked, and the developer and operator do not control the transaction activities[1]-[3].

II. THREE TYPES OF INFLATION IN ONLINE GAMES

A. Income-driven inflation

The speed at which currency accumulates in the game surpasses the material output and system recycle, leading to an increased price of equipment and props. Namely, the designer precisely designs zero economic profit or negative economic profit and makes sure that the game currency achieves negative growth through recycling system (skills learning/equipment maintenance/equipment forging, among others)[5]. To a certain degree, the income-driven inflation can be controlled from the source[6]. However, three external interferences in the game will directly affect the economic system and impose its effect through income-driven inflation mechanism: plugin, account hacking, and replication.

B. Structural inflation

Structural inflation is an inflation phenomenon caused by imbalanced supply and demand of product design in all fields of a game. Game designers often take efforts to design an enormous production system and provide rich trading modes, considering the playability for different types of players and the richness of the gameplay. When players play the game, they will find some production methods that, due to the input/efficiency threshold, can cause the imbalance between supply and demand of different types of products. Fortunately, in the economic system of the online game, as long as the general relationship between supply and demand keeps relatively stable as a whole, the structural inflation will not result in overall growth in price. Players also have considerable affordability so long as the inflation does not happen on life necessities or become too extreme.

C. Demand-pull inflation

The online game design will not plan two elements — overdrafts and deficit, triggering the only mechanism where game currency chases after too few commodities. However, if the gameplay is too simple, the props are too scarce, and the design of the production skills are incredibly deficient, the online game will be unlikely to survive. The volume of the game's economic system is relatively small, and it is challenging for a single player to mobilize the transaction market of a server. The market change requires the interaction of a significant number of players. Although players who do not participate in it will suffer indirect losses, they will not feel apparent frustration. On the other hand, the transaction behavior itself among players will not improve the total currency amount but the currency transfer.

III. THE PARADOX OF THRIFT IN THE GAME

We derived the paradox of thrift in the economy of online games through the below formula. Suppose the user's gold coin surplus (S) = user income amount (Y) - user consumption amount (C), and user real time income amount (Y_0)> user real time consumption amount (C_0). As in Fig. 1,Set the consumption as a linear function, then consumption (C) = spontaneous consumption (C_0) + induced consumption (cY_d)

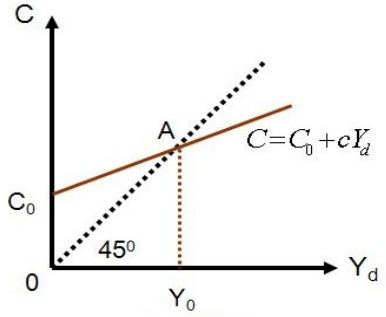

Fig. 1 Linear graph of player's consumption

Average surplus (C/Y_d) + Average consumption ratio (S/Y_d)=1

As in Fig. 2,Marginal surplus ratio ($\triangle C/\triangle Y_d$)+ Marginal consumption ratio ($\triangle S/\triangle Y_d$)=1, Then $S=(1-C)Y_d-C_0$

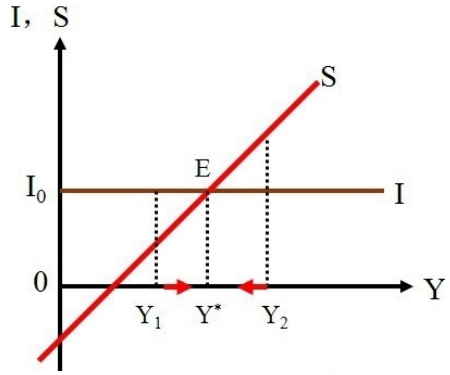

Fig. 2 Linear graph of the relationship between player's surplus and income

E: the consumption and surplus reach the balance, Y is the balanced income. When consumption increases, user's income climbs. When consumption reduces, user's income decreases.

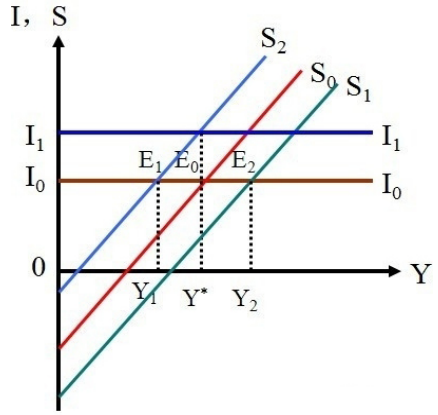

Fig. 3 Analysis of the player's consumption comparison

In the deduction formula, C is smaller than 1 as the marginal propensity to consume. When C becomes larger, the value of 1/(1-C) becomes larger, and the user income increases; when C becomes smaller, the value of 1/(1-C) becomes smaller, and the user income decreases.

As in Fig. 3,We reckon from the above that when the number of gold coins that do not enter the circulation market increases, S moves left (S_2)and Y decreases; when the amount of gold coins that do not enter the market circulation reduces, S moves right(S_1) and Y increases.

When the player consumption accounts for a higher proportion of the income, the overall player income increases, and the economic system of the game prospers. By contrast, if the design of the trading system is verbose and messy or with a harsh threshold, or its proportion of the binding fund is too high, and the free fund is insufficient, the player transaction will be restrained by various reasons such as above, and the overall player income decreases. This is the paradox of thrift in the game: the more lavishly the player spends, the market becomes more prosperous, otherwise more sluggish.

IV. CONCLUSION

The speed of inflation in the game is determined by the design mechanism, and whether time or props are charged are not the decisive factor. In the event of inflation, the leverage method of charging the player for time is monotonous and will directly damage player's interest, while charging players for props provides richer controlling methods without ruining player's experience. So, the combined leverage through charging the player for both time and props can better solve the inflation in the game.

The paper is based on the macroeconomic system and projects the simplified version of the system to the economic system in online games. We found that player's production is constrained by consumption instead of the opposite. If consumers do not spend or reduce their spending amount, the operation of the economic system will suffer a stagnation, followed by stagnant production passion of the players. The acquisition system, production skills system, and living skills system will become self-sufficient like a standalone game, leading to substantial loss of game users.

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