Variation of Multiplier Effects of Consumption Vouchers Distributed in Different Ways

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Abstract. Consumption voucher policy can stimulate aggregate demand. Some countries’ governments have responded to the recent world-wide recession with equal distribution consumption voucher policy. In this paper, consumption vouchers were distributed to two groups of people in two ways. Multiplier effects in two distribution ways were calculated, which shows that the marginal propensity to consume (MPC) of two groups and the proportion of each group’s disposable income are the main factors to influence the multiplier effect. By comparing the multiplier effects in two distribution ways, an equation was obtained as an optimization criterion of consumption voucher distribution. Government can choose the optimized way of consumption voucher distribution through this criterion on the basis of national conditions.

1. Introduction

In the standard Keynesian framework, government spending on useless public works has a larger multiplier effect than spending on government transfer payments does [1]. However, Yoshiyasu Ono analyzed the multiplier effect of spending on useless public works and government transfer and argued that government transfers are economically equivalent to spending on useless public works even though the effect of their two types of expenditure on national income differs [2]. Also, Chang found the importance of consumption to increase domestic demand in China. Consumption voucher can be regarded as a special kind of government transfer payment [3]. The difference between consumption vouchers and normal government transfer payment such as cash subsidies is that some of cash subsidies can be deposited as saving and just a little of them will be used to consume while all of consumption vouchers can be used to consume and have larger effect on stimulating aggregate demand.

Some governments have responded to the recent world-wide recession with fiscal expansion [4]. Following the 2008 financial crisis, many governments implemented the consumption vouchers policy so that they can offset the shocks from the crisis. For example, Taiwan implemented a consumption spending policy that involves distributing the consumption vouchers using a fund of US$2.808 billion from 2009 to 2013[4]. The intellectual basis for this is that government spending on government transfer stimulates aggregate demand.

A study based on the data of distributing consumption vouchers in Taiwan showed that although the multiplier of investment expenditures was higher than that of consumption spending, the consumption spending created the more jobs per US$1 billion [5]. Wang used the conventional model to analyze the multiplier effect of consumption vouchers in China [5]. All of the previous studies were all based on distributing the same value of consumption vouchers to every people. This may have misled some into thinking that equally distributing consumption vouchers is the best way among all ways of the consumption voucher distribution. Nevertheless, because the fiscal policy will have the significant effect on MPC, different ways of distribution will have different multiplier effect [6]. In this sense, the actual multiplier effect of equally distributing consumption vouchers...
might not to be the highest. Different group of people have different MPC. In the following, multiplier effects of consumption vouchers through two different distribution ways are innovatively analyzed and compared based on the macroeconomic model. Furthermore, suggestions that how to distribute consumption vouchers are put forward to the government.

2. The Multiplier Effects Under Two Types of Consumption Voucher Distribution Ways

In the logic, the national disposable income $Y_d$ equals consumption $C$ plus saving $S$,

$$Y_d = C + S$$

For simplicity, let us assume that consumption function is linear function and ignore the change of saving $S$ of people. In this case, consumption $C$ satisfies

$$C = C_0 + cY_d$$

where $C_0$ represents the fixed consumption of people and $c$ represents the MPC of people. From equations (1) and (2), we can obtain

$$Y_d = C_0 + cY_d + S$$

The multiplier effect is important especially when people have different MPC. In this model, provided that people are divided into two groups, i.e. group A and group B, equation (2) are modified to deal with the case where there are two groups of people and their MPC differ. So consumption, $C$, given by equation (2) revised as

$$C = C_0 + c_1Y_{dA} + c_2Y_{dB}$$

where $Y_d = Y_{dA} + Y_{dB}$ and $c_1$ represents the MPC for group A, $c_2$ represents the MPC for group B, $Y_{dA}$ represents the total disposable income of group A and $Y_{dB}$ represents the total disposable income of group B.

From equations (1) and (4), we can know that before distributing consumption vouchers, the national disposable income $Y_{d0}$ satisfies

$$Y_{d0} = C_0 + c_1Y_{dA} + c_2Y_{dB} + S$$

In the following, two consumption voucher distribution ways are considered. One is that each person in group A and group B obtains the same value of consumption vouchers (First condition), the other is that each person in group A obtains the different value of consumption vouchers as each person in group B (Second condition). Noticeably, under different consumption voucher distribution ways, the total consumption voucher value is the same.

2.1 The Multiplier Effects of Consumer Vouchers Distribution under the First Condition

When each person in group A and group B obtains the same value of consumption vouchers, according to equation (5), the national disposable income $Y_{d1}$ satisfies

$$Y_{d1} = C_0 + TR + c_1aY_{dA} + c_1bY_{dB} + S$$
where $TR$ represents the total value of the consumption vouchers, $C_{1a}$ represents MPC of group A after obtaining the consumption vouchers, $C_{1b}$ represents MPC of group B after obtaining the consumption vouchers, $Y_{d1A}$ represents the total disposable income of group A after obtaining the consumption vouchers and $Y_{d1B}$ represents the total disposable income of group B after obtaining the consumption vouchers.

Provided that disposable income share for group A $a_{1A} = Y_{d1A} / Y_{d1}$ and disposable income share for group B $a_{1B} = Y_{d1B} / Y_{d1}$, then $0 < a_{1A} < 1, 0 < a_{1B} < 1$ and $a_{1A} + a_{1B} = 1$. From equation (6), multiplier effect of consumption vouchers under the first condition $A_1$ can be described as

$$A_1 = \frac{dY_{d1}}{dTR} = \frac{1}{1 - (c_{1a}a_{1A} + c_{1b}a_{1B})} \tag{7}$$

Without loss of generality, $0 < c_{1a} < 1$ and $0 < c_{1b} < 1$, so $0 < c_{1a}a_{1A} + c_{1b}a_{1B} < 1$. Therefore, $A_1 > 1$, which means that the value of consumption vouchers is increased by one dollar, the total disposable income of all the people will be increased by more than one dollar.

### 2.2 The Multiplier Effects of Consumer Vouchers Distribution under the Second Condition

When the total value of consumption vouchers $TR$ in the second condition is the same as that in the first condition, by assuming that each person in group A obtain the consumption voucher value $TR_1$ and each person in group B obtain the consumption voucher value $TR_2 (TR_1 \neq TR_2)$, the national disposable income $Y_{d2}$ satisfies

$$Y_{d2} = C_0 + TR + c_{2a}Y_{d2A} + c_{2b}Y_{d2B} + S \tag{8}$$

where $C_{2a}$ represents MPC of group A after obtaining the consumption vouchers, $C_{2b}$ represents MPC of group B after obtaining the consumption vouchers, $Y_{d2A}$ represents the total disposable income of group A after obtaining the consumption vouchers and $Y_{d2B}$ represents the total disposable income of group B after obtaining the consumption vouchers.

Provided that disposable income share for group A $a_{2A} = Y_{d2A} / Y_{d2}$ and disposable income share for group B $a_{2B} = Y_{d2B} / Y_{d2}$, then $0 < a_{2A} < 1, 0 < a_{2B} < 1$ and $a_{2A} + a_{2B} = 1$. From equation (8), when people in group A and group B gain the different value of consumption vouchers, the multiplier effect of consumer vouchers can be obtained as

$$A_2 = \frac{dY_{d2}}{dTR} = \frac{1}{1 - (c_{2a}a_{2A} + c_{2b}a_{2B})} \tag{9}$$

Without loss of generality, $0 < c_{2a} < 1, 0 < c_{2b} < 1$. As $a_{2A} + a_{2B} = 1, 0 < c_{2a}a_{2A} + c_{2b}a_{2B} < 1$. Therefore, $A_2 > 1$, which means that if the value of consumption vouchers is increased by one dollar, the total disposable income of all the people in the nation will be increased by more than one dollar.
2.3 Comparison of Multiplier Effects under Two Distribution Conditions

As can be seen in equations (7) and (9), the numerators of both equations are 1. Thus, to compare the magnitude of \( A_1 \) and \( A_2 \), just compare the denominator magnitude of \( A_1 \) and \( A_2 \). Assume that \( \lambda_1 \) and \( \lambda_2 \) represent the denominators of \( A_1 \) and \( A_2 \) respectively, and \( \lambda \) represents the difference of \( \lambda_1 \) and \( \lambda_2 \), then

\[
\lambda_1 = 1 - (c_{1a}a_{1A} + c_{1b}a_{1B}) \quad (10)
\]

\[
\lambda_2 = 1 - (c_{2a}a_{2A} + c_{2b}a_{2B}) \quad (11)
\]

\[
\lambda = \lambda_1 - \lambda_2 = (c_{1a}a_{1A} + c_{1b}a_{1B}) - (c_{i2}a_{2A} + c_{i2}a_{2B}) \quad (12)
\]

In equation (10), note that the average of \( C_{1A} \) and \( C_{1B} \) weighted by the disposable income of each group share \( a_{1i} \) (for \( i = A, B \)) replaces the standard MPC. In the same way, in equation (11), note that the average of \( C_{2A} \) and \( C_{2B} \) weighted by the disposable income of group A and B share \( a_{2i} \) (i=A, B) replaces the standard MPC. Therefore, not only can MPC of group A and group B under two kinds of consumption vouchers distribution ways influence the value of \( \lambda \), but also the disposable income share of each group is another important factor.

If \( \lambda > 0 \), then \( A_1 < A_2 \), which shows that the multiplier effect under the second condition where different consumption vouchers are distributed to each person in group A and group B is larger than that under the first condition of equally distributing consumption vouchers to each person. On the contrary, if \( \lambda < 0 \), then \( A_1 > A_2 \), which shows that the multiplier effect under the first condition is larger than that under the second condition.

3. Strategies to Distribute Consumption Vouchers for Government

When government decides to implement the consumption voucher policy to stimulate the aggregate demand, there always exist two important problems to solve. One is how much the government will spend and the other is that how to distribute the consumption vouchers. For the former, government spending depends on the willing of government. For the later, the way of distribution depends on how to classify the people.

According to Li [6], Feng [7], Chu [8] and Fang [9], the fiscal policy has the different influences on the MPC for the urban households and rural households in China. This evidence indicates that fiscal policy has different influences on MPC for people who have different income. Therefore, it is better to classify the people according to their disposable income. Equation (7) and equation (9) illustrate the influential factors of multiplier effect of the consumption voucher distribution which are respectively the MPC and each group’s disposable income share. Furthermore, to some extent, equation (12) can be regarded as an optimization criterion of multiplier effect, which shows that different types of distribution ways can lead to different multiplier effects, so government can gain the optimized distribution plan through equation (12).

For the case in this paper, there are two groups, and there will be two steps that government need to do. The first step is to make sure the total value of consumption vouchers, the total population and the total disposable income. The second step is to make the decision of distribution proportion of two groups. Once the distribution plan is determined, government can gain the data of predicted MPC after obtaining the consumption vouchers of two groups and the predicted disposable income.
share of each group according to the historical data. Then government can obtain the optimized plan among all the distribution plans by comparing according to the optimization criterion.

4. Conclusion

No matter how government distributes the consumption vouchers, the disposable income of people will be increased and the multiplier effect is more than one.

If there are two types of distribution ways of consumption voucher and the people are divided into two groups according to their disposable incomes, by comparing the multiplier of two types of consumption vouchers distribution, the equation

\[
\lambda = \left( c_{2a}a_{2A} + c_{2b}a_{2B} \right) - \left( c_{1a}a_{1d} + c_{1b}a_{1B} \right),
\]

can be regarded as an optimization criterion of multiplier effect. And if \( \lambda < 0 \), then the multiplier effect under the first condition where different consumption vouchers are distributed to each person in group A and group B is smaller than that under the second condition of equally distributing consumption vouchers. If \( \lambda > 0 \), then the multiplier effect under the first condition is larger than that under the second condition.

As for the multiplier effect itself, the multiplier effect is influenced by MPC of each group and each group’s disposable income share after obtaining the consumption vouchers. And the governments can gain the better plan of consumption voucher distribution by changing each group’s disposable income share in the line with their domestic conditions.

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