The Reviews of the Relationships between Consumption, Income and Interest Rate
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Abstract. Theories about consumption are very important parts in the macroeconomics research. The former studies found that the hypothesis consumption did not follow a random walk and consumption is excess sensitivity to income. In recent years, the traditional investment-based economic growth began to be questioned as China’s economic growth began to decline. The adjustment of the entire economic structure is the main direction to solve the current problem. The most important thing is to pay attention to consumption and stimulate consumption. This paper reviews the previous studies of foreign economists of the relationships between consumption, income and interest rate. It should be able to make some contribution to China's economic restructuring.

Introduction

Consumption by households on goods and services is the largest part of aggregate demand. In the UK, it has accounted for more than 60 percent in total aggregate demand since 1980. In addition, the other developed countries would be expected to get the similar figures. Consequently, the household decision of consumption plays an important role on the performance of economical operation. Then, theories which can predict the change of consumption are very significant for money policy authorities. Since the meaningful result from Keynes argued that the current income has decided the amount of the consumption, much research has attempt to identify the determinant of a consumer's consumption. The Keynesian consumption function, the permanent income hypothesis and the life cycle hypothesis are all the influential theories for the consumption topic.

Friedman debated that households have a much long terms view of income. Therefore, consumption choices made by households will be forward-looking. It depends not only on current income but also on expectations of future income. The permanent income hypothesis had been tested by many research to check whether the response of consumption to income is in accordance with the description of the theory [1]. Hall asserted that the permanent income hypothesis under the rational expectation assumption means the consumption follows a random walk [2]. However, Mankiw and Shapiro stated that the standard testing procedure the Flavin used is biased toward finding excess sensitivity [3].

This article aims to claim the relationship between consumption, disposable income and the real interest rate. It could be supposed the results that the consumption is positively related with income but not obviously related with real interest rate which is concluded by recent researches. In the next section of this paper, the recent famous efforts about consumption
would be reviewed. In the past half century, many economists pay their attention to the consumption of theory. To begin from the absolute income hypothesis, then the permanent income hypothesis was raised by Friedman followed with many different opinions in the action to test the PIH. The literature review section would synthesize and critically review the large number of the research efforts to identify the development process of the consumption theory.

The Reviews of the Theories about Consumption

In the past decades, many economists have offered many theories that can be chosen to explain consumer behaviours. Two of them which are called absolute income hypothesis and the permanent income hypothesis are the most prominent theories for the economic circus. The absolute income hypothesis (AIP), which is known as the Keynesian consumption function, asserted that the current income of household is the main determinant for its consumption [4]. Keynes explained that consumers are likely to expect the future income base on their current income, then the expectation of future income may not be important for the consumption. Following the theory, aggregate consumption has a simple positive relationship with current income. The traditional AIP theory was soon attacked after a relatively short successful term. The model is an incomplete theory to explain consumer behaviour even it is to fit the data. The main theoretical criticism against the Keynesian AIP theory is that the assumption of the consumer choice is too simplistic. The factors to decide the household to consume or save are more than current disposal income. A major one of them are that expectations about the future. The mistake of the Keynesian consumption function with some extreme examples such as s professional sports man which has a short lived career and one author who get royalties once a year. These examples support the strong foundation to break the link between consumption and current income. In general, rational consumers would attempt to smooth consumption when they faced fluctuating income in a series of periods.

Hence, some new theories are following to answer the criticisms for the AIP theory which are called permanent income hypothesis (PIH) and life cycle hypothesis (LCH). The PIH theory is developed by Friedman and the LCH theory is proposed by Modigliani. Both they share similar assumption which argue that consumption decisions will be based on long terms income. It leads to the result that the consumers are to try to maximize their lifetime welfare from their consumption. In addition, consumers would no longer do their expenditures in the base of current income. Income could be transferred across different periods due to households can borrow and save money freely with an interest rate.

The LCH split lifetime into three different periods which are young age with little or no income, a long period of working life and elderly period. He asserted that that a household could save and borrow for consumption smoothing to maximize its welfare. For instance, someone who have taken out student loans will invest in pension plans during the working period as reserve for retirement. The life cycle hypothesis predict declares that consumption smoothing will happen all over the life cycle. Friedman argued that income could be split into two parts, which are permanent income part and transitory income part respectively. The first part could be defined as average or long-run income and the second part could be viewed as temporary fluctuations around the average income level. The permanent income hypothesis predicted that consumption of household will be based on permanent income since the household would apply borrowing and saving to smooth transitory income fluctuations. The permanent income hypothesis links the AIP theory and the optimal consumption model. The
consumption decisions which based on the PIH theory indicates that the marginal propensity to consume (MPC) out of short-term transitory shocks will be low to reflect the consumption smoothing implied by the optimal consumption model. In addition, the PIH theory also implied a long-term positive relationship between consumption and income which is similar to the absolute income hypothesis.

Romer states that interest rate is also an important factor to decide the consumption in the intertemporal consumption model. Because it represents the returns of saving and the costs of borrowing. Moreover, it could be regarded as the price of shifting income or resources into different periods. The increased interest rate would reduce the present discounted value of future income or make borrowing more expensive that leads to the reduced maximum amount which can be consumed in the current period [5]. Nevertheless, increased interest rates could also generate higher returns from saving which is to raise the maximum consumption of next period. The impact of interest rate on consumption by separate it into the substitution and the income effect. The substitution means that the increased interest rate would lead consumers to substitute current for future consumption since the returns of saving and the savings of borrowing are both raised. The income effects of change in interest rates depends on whether the household is a net saver that will be better by an increased interest rate or a net borrower that will be worse following an increased interest rate. Hall showed that the elasticity of intertemporal substitution is one of the prominent determinants of the change of consumption and saving for real interest rate. Furthermore, an increased expected real interest rate would induce consumers to postpone consumption when everything else hold the same level [6].

Following the appearance of the permanent income hypothesis, many economists have done the researches to test whether the outcome of consumption against income change is consistent with the PIH theory. Robert Lucas stated some criticism of econometric method evaluation involved consumption. He argued that traditional consumption functions could not be able to evaluate the impacts of alternative policies despite how well they fit the data. Hall proposed a random walk model of consumption which are incorporated with rational expectation to state that consumption should follow a random walk and changes of consumption would be no relationship with lagged values of other variables which included income. He used Euler equations to model the consumption random walk which has advantages over traditional models and was immune to the problems that pointed out by Lucas. The new research style, which is called “Euler equation approach”, has become the dominant method to model consumption in the following consumption research. Because Euler equations is simpler than conventional approaches. In addition, it avoids the demand to solve the household's optimization problem.

However, there are also some different opinions for Hall's model. Carrol (2001) argued that the model is unable to uncover household preference variables which leads to the trouble that the Euler equation is hard to explain empirical data [7]. In contrast with random walk hypothesis, Flavin (1981) asserted that consumption is excess sensitive to income. In his opinion, the test of the permanent income hypothesis that based in rational expectation should be thought of as a test with the reduced form of the structural model. The method was to analyse the implication of the PIH for the consumption with conditional expectation [8]. The conclusion from Flavin has been widely used as evidence of liquidity constraints which are significant for realizing household spending. However, Flavin's model for testing the permanent income hypothesis can be severely biased toward rejecting the conclusion of excess sensitivity due to income has approximately a unit root that are common in economic
time series, and traditional test statistics are inappropriate in the appearance of unit roots. The implication of detrending will be the false appearance of excess sensitivity even though the theory is in reality correct. Therefore, it is not clear from the Flavin’s test that consumption is excess sensitive to income changes.

There are also some other researches from different viewpoints to examine the PIH theory. The permanent income hypothesis indicates that households save since they rationally expect that their labor income will be decreased. It shows that saving could be at least as good a predictor of reduced labour income as any other forecast which can be formed from public information. Hence, he considered the implication of the PIH theory for saving action. It has been accepted by major researchers that consumption is smooth since permanent income is smoother than measured income. Actually, the consumption smoothing is a main reason for existence for the PIH theory, as almost all textbooks of macroeconomics carefully explains. However, Campbell and Deaton stated that the evidence for the opposite position, which permanent income is indeed less smooth than measured income. As a result, the consumption smoothing cannot be directly explained by permanent income hypothesis [9]. Moreover, the research showed while some potential qualitative requirements of the model are fulfilled, consumption is too smooth and there is little proof that saving shifts too little to be in accordance with the theory.

Campbell proposed a new method to appraise consumption, income and interest rates with the data are generated by two kinds of consumers. The first kind of consumers are forward-looking households, who consume their permanent income, occupied half proportion in the sample. And the other kind is “rule of thumb” consumers that consumed their current income. They listed three empirical regularities to explain their model. Firstly, expected income changes are related to expected consumption changes which is opposite to the simplest version of the permanent income hypothesis that consumption does not follow a random walk. The relationship between current consumption and income indicates that the rule of thumb behaviour would be appearance on the part of consumers. The second regularity is that expected real interest rates changes are not related with expected consumption changes. Which means that the forward-looking consumers would not move their consumption growth in response to interest rates changes, hence, the elasticity of intertemporal substitution in consumption would be close to zero. The third empirical regularity is that terms in which consumption is high relative to permanent income would be followed by rapid growth of income. It suggests that at least some consumers should be forward-looking because their realization of future growth of income is reflected in current consumption.

Zeldes (1989) concluded three empirical puzzles have found in the recent researches. The first puzzle is the sensitivity of consumption to current income [10]. Hall found an innovation that the response in consumption is different from the annuity value of the wealth increasing which can be defined as excess sensitivity. It should be noticed that the definition of excess sensitivity is not the same with Flavin’s. The second puzzle relates the relationship between expected growth of consumption and interest rate over time. The growth of consumption should be negative if the interest rate is less than the rate of time preferred under any certainty model of consumption. Friedman pointed out that average aggregate consumption growth in some empirical research has been positive and real interest rates were very close to zero even though rates of time preference were assumed to be positive [11]. The third puzzle concerns the elderly savings behavior. There have been some debates in the problem that whether the aged make a living by savings at all after retirement by some economists. Mirer argued that
the elderly did not dissave during retirement [12]. However, Hurd opposed that view with the proof that the wealth in elderly families decreases over time with the panel data [13].

**Conclusion**

Consumption theory is one important part in the macroeconomics system. From the recent research, the AIP hypothesis from Keynes is too simplistic for the practical situation. Hence, most of this paper focuses to test whether the permanent income hypothesis is rational with the new data. Moreover, the article contributes to the understanding and analysis of relationships between household consumption, disposable income and real interest rate. The permanent income hypothesis described by most economists says the individuals’ consumption should be based on the sum of their disposable income and the expected discounted value of households' future income. On the rational expectation, the consumption is expected to be constant over their lifetimes due to "smoothing consumption". This statement is accepted by many macroeconomics textbooks, however, from the result of the test, the consumption is obviously influenced by the income but not the interest rate. In other words, the expected discounted value might be not the direct and primary element to decide the consumption. The result of the paper indicates that the disposable income is the main cause of the changes in consumption. And the interest could not change the consumption directly. The results could offer a beneficial help for the consumption research.

**References**


