

HOUSEHOLD CONSUMPTION AND OLD-AGE POPULATION: EMPIRICAL STUDY FOR THAILAND AND JAPAN

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ABSTRACT

This study aims to investigate the relationship between household consumption and old-age population in Thailand and Japan during the period 1988-2009. The co-integration method and regression analysis were used to investigate the influence of proportion of old-age population (65 years old and older) on household final consumption expenditure per capita. The findings reveal that both Thailand and Japan, the two variables are co-integrated, implying that the proportion of old-age population and the household final consumption expenditure per capita have relationship in the long-term. We also find that the proportion of old-age population may influence the household final consumption expenditure per capita, by using a regression analysis.

Field of Research: Household Consumption, Old-age Population

INTRODUCTION

Household consumption made the largest contribution to gross domestic product (GDP) for both Thailand and Japan. The proportions of the GDP in the household consumption stood at 54.3 and 59.6 percent of the GDP of Thailand and Japan, respectively, in 2009 (World Bank, 2011), implying that it is the major determinants of the GDP of these countries. For the sources of household consumption growth, a possible influence is demographic trend. At this time, Japan has the oldest population in the world (PRB, 2010) and already completed its aged population over five years, while Thailand has just reached its aging population at last year. Hence, the lower fertility and mortality rates have increased the proportion of the old-age population both Thailand and Japan. Other things being equal, such a demographic phenomenon may be beneficial or detrimental to a country's prospects for aggregate household consumption.

With regard to the importance of the old-age population about the future household consumption, several studies have focused on the influence of the aging of the population on household consumption. For instance, Horioka (2006) studied the causes of the prolonged slowdown of the Japanese economy in the 1990s and found that a main factor holding up the GDP growth was household consumption. Furthermore, the study pointed out that a major cause of the stagnation of household consumption was due to an increase in uncertainty about old age in general and the insufficiency of pensions and insurance. In addition, Kennickell and Lusardi (2004) found that older household consumption dropped at the time of retirement, due to the household has more time and alternative choices which could be used to substitute home production for purchased goods. In contrast, Mason et al. (2006) indicated that the rapid aging of the population may have maintained aggregate household consumption because the elderly finance its own consumption from previous asset accumulation. Moreover, Smith (2004) pointed out that no decrease in food expenditures for UK's retired households. Thus, the available evidences suggested that old-age in general is important for the aggregate household consumption, but it is still unclear whether the old-age population and household consumption have the relationship in the long-term.

Consequently, this study aimed to investigate the relationship between household consumption and old-age population in Thailand and Japan during the period 1988-2009 by employing the co-integration technique. It also investigates the influence of proportion of old-age population (65 years old and older) on the household final consumption expenditure per capita. The information obtained from this study should be helpful for both Thailand and Japan in finding appropriate ways to prepare for the eventual expansion of the proportion of old-age population.

LITERATURE REVIEW

In economics, household consumption is considered as one of the most important components of aggregate expenditures of the country, especially the theory of consumption developed by Keynes (1936). Household consumption may be influenced by many factors particularly; an important factor in this moment time as demographic trends. The sharp decline in the fertility and mortality rates have been increased the proportion of old age in the total population of many countries, such as Japan and Thailand, and this in turn will gradually change the demand for goods and services in both magnitude and their patterns. However, the old-age expenditures will be high depending on the fund available and old-age consumption behavior.

Normally, the consumption of the old-age population could be financed by three ways: (a) public transfers, (b) familial support, and (c) savings and asset accumulation in the working-age period. Some previous studies (Phananiramai, 2007; Ogawa et al., 2008) had shown that Thailand's old-age population was financed by their familial support by around 20 percent of the total consumption, whereas in Japan less than 5 percent. Furthermore, having received the social welfare, the proportion of Japan's old people is higher than the Thai's old people, especially the national pension system.

For the consumption of the old-age behavior, it is uncertainty about old age in general (for example, health risk, unforeseen emergencies, more leisure time, etc.), leading unclear to the patterns of old-age consumption, magnitude and the direction related to aggregate expenditure of the country as a whole. Early studies (Horioka, 2006; Kennickell and Lusardi, 2004) suggested that increased uncertainty may have contribute to the stagnation of household consumption in the developed country. Meanwhile, some study (Mason et al., 2006) pointed out that an increase in aging population may have increased aggregate household consumption.

In our literature review, we did not find any previous study which investigated the relationship between household consumption and old-age population in developing country as Thailand. Additionally, because of uncertainty about old age in general, it is still unclear about the direction of the two variables in the long-term relationship in both Thailand and Japan. It is for these reasons that this two-country study was conducted and employed the co-integration technique in our analysis.

RESEARCH METHODOLOGY

Analytical Method

The analytical method for this study can be divided into three steps. Firstly, Augmented Dickey Fuller unit root test (ADF test) is used to analyze whether the variables are stationary. Secondly, if the unit root test indicates that the variables are non-stationary, the Engle and Granger (1987) co-integration test will be used to examine whether there exists a meaningful long-term relationship among these non-stationary variables.

Finally, if the non-stationary variables are co-integrated, the Ordinary Least Square (OLS) will be employed to analyze the long-term influence of the proportion of old-age population (65 years old and older) on the household final consumption expenditure per capita (separately for each country). The regression equation is expressed as follows:

$$\text{CONSUM}_t = \beta_0 + \beta_1 \text{OLD_POP}_t + \varepsilon_t$$

where **CONSUM** = the household final consumption expenditure per capita (U.S. dollars),

OLD_POP = the proportion of old-age population (percent),

β_1 = the regression coefficient of OLD_POP, indicating a change in household final consumption expenditure per capita when the proportion of old-age population changes by 1 percent.

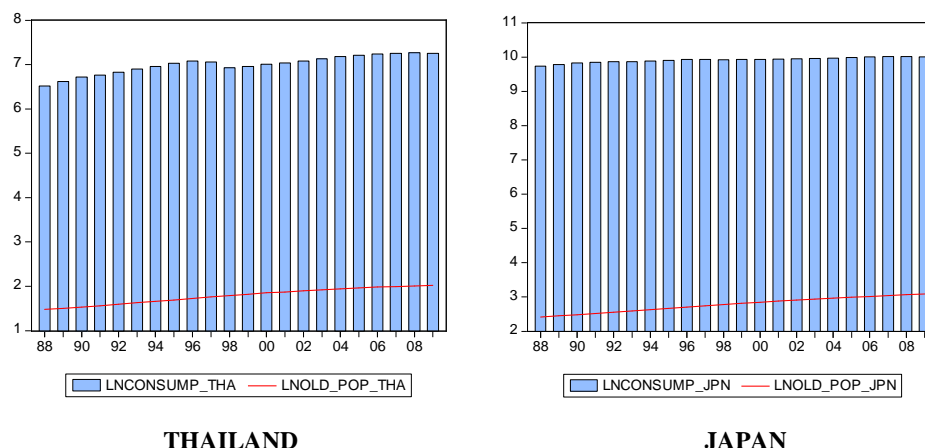
Data and Source of Data

Secondary time series data in annual format of Thailand and Japan are obtained from the World Bank (2011) over the period 1988 – 2009. Data analyzed in this study is composed of (1) household final consumption expenditure per capita in constant 2000 prices and (2) proportion of old-age population (65 years old and older).

EMPIRICAL RESULTS AND DISCUSSION

Starting with the overall of household consumption and old-age population during the period 1988-2009, as seen in the Figure 1, the expansion of the household final consumption expenditure per capita both Thailand and Japan were relatively constant with the old-age population. However, as Figure 1 indicates, compared to Japan, the consumption expenditure per capita growth in Thailand tended to be less stable, particularly in the period of Asian financial crisis, the consumption expenditure per capita registered a decline of 3.98 percent over the period 1997-2001.

Figure 1: Natural Logs of Household final consumption expenditure per capita and Old-age population in Thailand and Japan during 1988-2009



To examine the influence of old-age population on household final consumption expenditure per capita, a regression analysis was performed separately for each country. First of all, the augmented Dickey-Fuller (ADF) unit root test was employed to test the existence of unit roots in the individual time series. The results obtained from the ADF test are shown in Table 1.

Table 1: ADF Unit Root Test

Variables	Level		Second Difference	
	Constant without trend	Constant with trend	None	None
Thailand:				
LnCONSUMP	-1.876(1)	-2.61(1)	1.18(1)	-4.396(1)**
LnOLD_POP	-3.656(1)*	1.557(1)	-0.314(2)	-4.733(1)**
Japan:				
LnCONSUMP	-2.201(1)	-3.211(1)	1.10(1)	-3.282(1)**
LnOLD_POP	-5.183(1)**	-7.134(1)**	-1.363(1)	-2.522(6)*

Note: Figures in parentheses indicate number of lag structures.

** Statistically significant at 1 percent level.

* Statistically significant at 5 percent level.

Despite some differences in the findings, both LnCONSUMP and LnOLD_POP are obviously non-stationary in the analysis of either country. On the other hand, the ADF tests have shown that these variables have the same order of integration, with an I(2) process in model without constant and trend.

As a next step of the analysis, the Engle and Granger co-integration test was used to examine the long-term movement of the variables. Results of the co-integration test based on the residuals from the regression were verified whether the series of residuals are stationary. As seen in the Table 2, we state that LnCONSUMP and LnOLD_POP are cointegrated in the analysis of either country. The findings indicate that the estimated residuals

are stationary with an I(0) process. Hence, there existed a co-integrating relationship between the two variables, namely household final consumption expenditure per capita and old-age population (LnCONSUMP and LnOLD_POP), meaning that these variables of both countries have the relationship in the long-term.

Table 2: Statistical results from the regression analyses and co-integration tests

Variables	Coefficient	Std. Error	Adj. R-square	F-stat.	ADF Stat. of Regression Residuals
Thailand: (D.W.= 0.43)					
Constant	5.034 **	0.219	0.872	144.06**	-2.723**
LnOLD_POP	1.105**	0.115			
Japan: (D.W.= 0.45)					
Constant	8.986**	0.100	0.922	250.10**	-2.758**
LnOLD_POP	0.337**	0.035			

Note: The dependent variable is natural log of the household final consumption expenditure per capita (LnCONSUMP); the explanatory variable is natural log of the proportion of old-age population (LnOLD_POP).

HAC consistent covariance (Newey-West) was used in the equation estimator.

** Statistically significant at 1 percent level.

Finally, the Ordinary Least Square (OLS) was employed to analyze the long-term influence of the old-age population on the household final consumption expenditure per capita in Thailand and Japan. According to the findings in Table 2, each estimated regression equation was shown that the proportion of old-age population and the household final consumption expenditure per capita are positively related in the long-term.

The statistical results for Thailand revealed that the proportion of old-age population could explain the variation in the household final consumption expenditure per capita by 87.2 percent and the regression model is statistically significant at the 1 percent level. Moreover, the regression coefficient of the proportion of old-age population (LnOLD_POP) is also statistically significant at the 1 percent level with the value of 1.105, implying that the household final consumption expenditure per capita was determined by the proportion of old-age population factor in the long-term relationship.

Based on another regression analysis presented in Table 2, Japan had an adjusted R-square of 0.922, indicating that 92.2 percent of the variation in the household final consumption expenditure per capita could be explained by the equation's explanatory variables. In addition, the findings revealed that the proportion of old-age population had statistically significant influence at the 1 percent level with regard to the household final consumption expenditure per capita, with regression coefficient being 0.337. As was the case for Thailand, it implied that the household final consumption expenditure per capita was determined by the proportion of old-age population factor in the long-term relationship.

Consequently, the results obtained in this study provide additional empirical evidence to the ongoing debate on the relationship between household consumption and old-age population. Although several previous studies have shown an increase in uncertainty about old age in general might be stagnated the household consumption during the overall period studied, it seems clear that old-age population factor is important and has positive influenced the level of household consumption for both Thailand (the country with aging population) and Japan (the country with aged population) in the long-term.

CONCLUSION AND RECOMMENDATION

The findings of this study revealed the importance of the changing of old-age population to the level of household consumption in the long-term. Our findings suggested that an increase in the share of the aged in the total population would lead to increase the magnitude of the household final consumption expenditure per capita in Thailand and Japan as a whole.

However, to our knowledge, it seems clear that whether or not the consumption of the old-age population would be high would depend on the funds available to them to finance their consumption. Moreover, the demographic trend might have influence the patterns of household consumption; for example, about demand for health-related expenditures, etc.

Accordingly, the business in the countries should focus on the movement of old-age population if they wish to compete against others in a race. Turing to the policy recommendation, the government should reduce uncertainty about the future old-age population, especially about the adequacy of permanent income for the elderly; for example, about public old-age pension system, insurance, etc.

Finally, the further study should focus on the patterns of old-age consumption in order to find the way to improve the business strategies.

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