مجلة تنمية الرافدين

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5- Our results also indicate that fiscal policy may be used to mobilize saving: a tax cut can also be used to increase private savings. This supports the view that tax rate that postpone consumption and the shifting tax base from income to consumption will encourage domestic savings..
6- A large body of empirical evidence suggests that the presence of more children in a household raises consumption in relation to income (see Fry, 1994; Edwards, 1996). The results of this study also show that a drop in the dependency burden is associated with an increase in private savings rates, supporting the life-cycle hypothesis. Currently, the retirement age for the working population in Asia is 60 years. From a policy perspective, a move towards increasing the retirement age to 65 years may reduce the dependency ratio and increase the private savings.

Table 1
Short and Long Run Results of Life-Cycle Hypothesis : Dynamic GLS

Variables	**Short- run 1970-2009**	**Long-run 1970-2009**
Growth rate of GDP	0.165 (0.014)**	0.144(0.007)**
Dependency ratio	-0.416(0.162)*	-0.232(0.012)**
Log per capita Income in US$	0.587 (0.062)**	0.404(0.000)**
Real interest rate	---------	0.263(0.075)*
Constant	1.419 (0.022)**	8.07(0.013)**
ECM_{t-1}	-0.392 (0.002)**	---------
	R^2= 0.62	R^2= 0.75
	Countries = 6	Countries = 6
	Sample size=236	Sample size=236
	Log LR=446.51	Log LR=645.33

Note: The value in parentheses is the p-value.

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Table 2
Granger Causality Test Results Based

Dep. Var	**SP**	**GRO**	**PC**	**DEP**	**INT**
		χ2-statistics			
SP	-	0.29 (0.099)**	0.88 (0.005)**	0.11 (0.002)**	0.56 (0.45)
GRO	0.17 (0.68)	-	0.178 (0.19)	1.67 (0.21)	0.52 (0.47)
PC	1.42 (0.24)	1.566 (0.22)	-	0.76 (0.0089)**	0.042 (0.84)
DEP	0.0421 (0.84)	3.19 (0.082)**	0.22 (0.15)	-	0.002 (0.97)
INT	0.69 (0.41)	1.94 (0.17)	0.114 (0.29)	0.11 (0.32)	-

Notes: Asterisks (**) and (*) denote statistically significant at 5 percent and 10 percent significance level respectively.

Granger causality

We proceeded with the Granger causality test and the results of the Asian respectively. Results of the causality test reveal some interesting points: **First**, the evidence supports a causal relationship running from economic growth, per capita income to private savings (GRO, PC→ PS/GDP) .

second, there is feedback relationship between dependency ratio and private savings rate(DEP ↔PS/GDP) , hence supporting the life-cycle consumption model that states that a higher dependency ratio is associated with a lower savings rate;

Conclusions

The world's savings rate has decline for the last two decades but, Asian's private savings have risen remarkable over the same period. The empirical analysis showed that private savings is positively related to income level and economic growth, but negatively associated with interest rate, and dependency ratio. We note that dependency ratio has major impact in short and long run. An analysis of the short run mechanism reveals that private savings adjust to correct disequilibrium among the studied variables. Additionally, the causality tests show a unidirectional causal relationship exists in the savings-growth nexus and a feedback causal relationship exists between economic growth. By and large, the evidence is supportive of the life-cycle hypotheses.

In this study, our results also confirmed that economic growth contributes positively to private savings but the relationship holds only in the short run. Additionally, we showed found that private savings Granger causes economic growth and not the other way round as suggested in Carroll and Weil (1994).

Policy implication

Empirical testing of the models presented in the previous section is difficult because the crisis is still under way, Keeping this in mind, the saving policy in the post crisis period should consider the following:

1- it is vital to take various policy actions to encourage private saving in Asian countries.
2- the econometric evidence reported in this paper point to the growth and per capita income as statistically significant positive influences on private saving in short as well as in long time.
3- the dependency ratio, hence supporting the life-cycle consumption model that states that a higher dependency ratio is associated with a lower savings rate.
4- Thus, the most obvious policy implication in this study is that policies that promote savings will have a positive effect on capital accumulation which in turn lead to economic growth.

associated with a 0.26 percentage point increase in private saving rate. This finding is consistent with Mckinnon – Shaw proposition.

4. Per capita income is an important variable and reflects the capacity to save (Loayza *et al*, 2000)*. A positive correlation between the two variables is in support of LCH. Further, it is consistent with the permanent-income hypothesis, which predicts that higher growth (i.e., higher future income) reduces current savings. Again, our results tend to support the view that savings behavior of the fast growing Asian economies

The coefficient being large and significant at the 5 percent level. Income increases, more considerations will be given to the purchase of durables and housing, education of children, spending after retirement, and other life-cycle purposes.

The life cycle hypothesis is base on the age of individual, predicating that saving follows an inverted-U shaped path. As expected, its estimated coefficient is negative and significant on private saving. In the other words, the private saving rate moves in the same direction as the share of working-age people in the total population, implying that Asian countries in a demographic transition could experience significant movement in their saving rates over time.

Short-run analysis

we found the model to fit the data fairly well and the error-correction term (ECT) to be statistically significant at the 1 % level. The coefficient of the ECT was negative, and hence satisfied the necessary condition for model stability. The magnitude of the ECT measures the speed of adjustment to the long-run equilibrium path. As shown in Table 3, the size of the ECT coefficient in the Asian-5 is –0.39, implying that more than 39% of the previous year's domestic savings from its long-run equilibrium value is corrected each year

A short-run movement in growth rate of GDP, dependency ratio and per capita income appear to matter for private savings in the Asian countries. As expected, our result shows that changes in the rate of economic growth raise the rates of private savings while the dependency ratio is negatively correlated with savings. The results suggest that an increase in income growth by 10 % leads to an increase in private savings rate of 5.8 %.

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* Muradoglu and Taskin (1996) investigated the difference in household savings behavior of the developed and industrial countries. Their empirical findings reveal that as income growth and household savings are positively correlated in industrial countries but not in the developing countries.

been highly correlated over long time horizons as well as for many regions and stages of development. Second, private savings is directly associated with output through investment, so that to the extent that it increases domestic investment, higher domestic private savings will generally result in higher growth. The main theoretical foundation for the link between growth and private saving comes from Modigliani's life-cycle hypothesis, according to which growth increases savings because it increases the income of the young relative to that of the elderly. Higher savings are likely to cause faster capital accumulation and increased growth. It should be noted that our findings also suggest that growth Granger cause savings. The one-way causal relationship suggests that the possibility of a virtuous circle, under which growth leads to more savings. This results is confirmed by Attanasio *et al.* (2000), Loayza *et al* (2000), Carroll *et al*. (2000), Hussein and Thirlwall (1999) and Edwards (1996).

2. The effect of demographic changes on savings can also be derived from the life-cycle model. The dependency ratio was found to have a negative influence on the savings ratio: the higher the dependency ratio, the lower the savings rate. Demographics, however, are likely to help explain the long-run trends in savings and short-term fluctuations. this result documented in the literature (Edwards, 1996; Masson *et al*., 1998, Kim and Kim, 2006) [*].
3. The effect of a change in interest rate on savings is well-know to be ambiguous. The LCH postulates that the effect interest rate on savings can either be positive or negative. If the substitution effect outweighs the income effect, then the savings ratio rises with an increase in the interest rate. On the other hand, if the income effect dominates the substitution effect, then the coefficient is negative. A rise in real interest rates makes current consumption more expensive relative to future consumption, leading to a fall in current consumption and a rise in savings. Also, the prudence motive against future income shocks dominates the interest-rate effect in the precautionary model. Most studies generally found a weak and often insignificant effect of interest rate (real) on savings (Fry, 1995). In this study, we found that real interest rate has small and positive effect on savings in long run. A 1% increase in interest rate is

[*] Kim and Kim (2006) found that there is a long-run equilibrium relationship between an aging population (above 65), medical expenditure and national savings in the case of South Korea. Their empirical results also indicate that there is no short-run causal relationship between aging and national savings. They went on to conclude that Korea needs policies to maintain high savings rates as the country was facing a fast aging population.

$$PS_{ijt} = \pi_{ij} + \lambda_{ij} X'_{ijt} + \sum_{j=1}^{P_1} \delta_{ij} \Delta X_i, L_{t-j} + \sum_{j=1}^{P_1} \gamma_{ij} \Delta X_i, L_{t+j} + e_{ijt}, \quad \textbf{(1)}$$

Hence X_{ijt} are the regressors of the savings model in the level form L, and $L_{t\pm j}$ here denotes to the lag and lead operator* of the first different parameters, e_{ijt} is the error term to capture the unobserved effects and is assumed to have zero mean and constant variance. (see for more discussion Hussein and de Mello Jr, 2001).

Finally, the short-run Dynamic Generalized Least Squares (DGLS) for the saving equation is:

$$\Delta PS_{ijt} = \eta_{ij} + \eta_{ijt} ECM_{ijt-1} + \eta_{ijt} \sum_{j=1}^{P_1} \eta_{ij} \Delta X_i, \left(L_{t+j}\right) + \upsilon_{ijt} \quad \textbf{(2)}$$

The terms ECM_{ijt-1} is the one period lagged error correction term from the long run savings function (assuming one vectors) and (L_{t+j}) are the parameters in the lead from only.

The full panel consists of annual data from 6 countries - Malaysia, Philippines, Singapore, Thailand, Korea and China. These countries were selected base on the availability of data for all the variables. The data consist of private savings rates, economic growth, income level in US$ value. The bulk of the data comes from *Key Indicators of Developing Asian and Pacific Countries*, 2010, Vol. XXXI, Oxford University Press, New York. The sample period is from 1970 to 2009 and most variables are in ratio forms. In this study, we opt for annual data rather than quarterly data because some data (e.g., income) are not readily available on quarterly basis

Estimation Results- Long-run analysis

This empirical study was intended to shed additional light on factors that could explain the relatively high private savings rates in the Asian countries. The results suggest that the macroeconomic policy framework is important and that governments can indeed usefully undertake policies to foster private savings ratio. Keeping this in mind, the policy in the post-crisis period should consider the followings:

1. The rate of growth is an obvious candidate for explaining the rate of private savings for two reasons. First, private savings and growth have

* Notice that the actual number of observations used in the analysis depends on the number of lag and lead variables used in the estimation. The integer k, the number of lags (or leads) is chosen as follows. Starting with a reasonable upper bound k, on estimation, if the variable (with the highest lag) is significant, then k is chosen as the optimal number of lags (or lead). If the variable is insignificant, the number of lags (leads) is reduced by one until the last lag (lead) is significant in the estimation.

level has a positive impact on private saving, while the life expectancy rate and borrowing constraints has a negative effect .

Khan , T, Gill, A and Haneef, S, (2013), apply co-integration analysis to estimate the private saving in Pakistan and they conclude that the increase in per-capita income, expected age, increase in year of education are positively associated with private saving , while dependency ratio has a negative effect on it. Ahmad , K, and Mahmood, H, (2013) has argue that the per capita income, inflation and exchange rate have a negative effect on private savings in Pakistan for period 1974-2010 using ARDL method.

To sum up, despite extensive literature on private savings, several empirical facts have not been resolved conclusively, particularly for the developing countries. Many puzzles still remain in the empirical studies, including the effects of demographic factors, economic growth, interest rates .

The empirical model

Although, we find so many empirical studies analyzing this important issue, most of these studies have certain limitations such as ad hoc use of econometric techniques. Moreover, the studies on the Asian region were mainly based on data that ends in the 1980s. In the 1990s most of the sample countries pursue rapid financial development programs and the opening-up of the economies. It is, therefore, important to re-examine the private savings behaviour in these fast growing economies using more recent data and new methodology.

The estimation technique we use is the general to specific modeling procedure , which aims to minimizing the possibility of estimation spurious relations while retaining long-run information. The essence of this technique is to embed the relationship being investigated within a sufficiently complex dynamic specification, including lagged dependent and independent variables so that a parsimonious specification of the model can be uncovered. A major advantage of this method is that it yields an equation with first differenced – and hence stationary- dependent variable, which, unlike a simple first differenced equation, also appropriately retains long-run information embodied in the data (Hendry, 1996)

Next, we proceeded with the Dynamic Generalized Least Squares (DGLS) methodology of Stock and Watson (1993) as described in Campbell and Perron (1991). This methodology corrects for (i) serial correlation the sample residuals exhibit AR (1) using Generalized Least Square (GLS); and (ii) endogeneity of the regressors by including lags and leads of changes in the explanatory variables.

The long-run Dynamic Generalized Least Squares (DGLS) procedure involves running the following private saving function (PS) regression:

Furthermore, one would expect older individuals and households with older heads to be drawing down on their savings to finance postretirement consumption. This would generate a negative relationship between the elderly dependency ratio and average household saving rates. For instance, Kim and Lee (2007) find an evidence for East Asian economies that higher old-age dependency ratios lead to lower saving rates.

Deaton and Paxson (2000) show that the age-saving profile has the traditional hump shape in Taipei, China. Park and Rhee (2005) also find for Korea that there is a positive relationship between the age of household head and the household saving rate, once the household head's age crosses the mid-40s. There is a decline in saving rates after retirement relative to the peak saving rates that are attained in the late 50s, but the average post-retirement saving rate is still quite high. Using household survey data, Attanasio and Szekely (2000) show that households in Taipei, China and Thailand have higher saving capacity because of higher income growth allowing for accumulation of resources. Alternatively, low income level has been blamed for the low saving rate of Philippine households.

In related study, Faruqee and Husain (1998) confirmed the importance of demographic factors in explaining the trend in the private savings rates in the Asian countries. They argued that to a lesser extent rising per capita incomes and forced savings in the form of compulsory pension plans could have contributed to the high savings rates in the rapidly growing ASEAN countries. Meanwhile, authors like Hondroyiannis (2006) and Attanasio et al. (2000) have questioned the robustness of demographic effect on private savings. Indeed, they challenged the conventional view and argued that bequests and unpredictable expenses may alter the savings pattern of the elderly. This means that elderly people may not dis-save to the extent that the traditional LCH predicts.

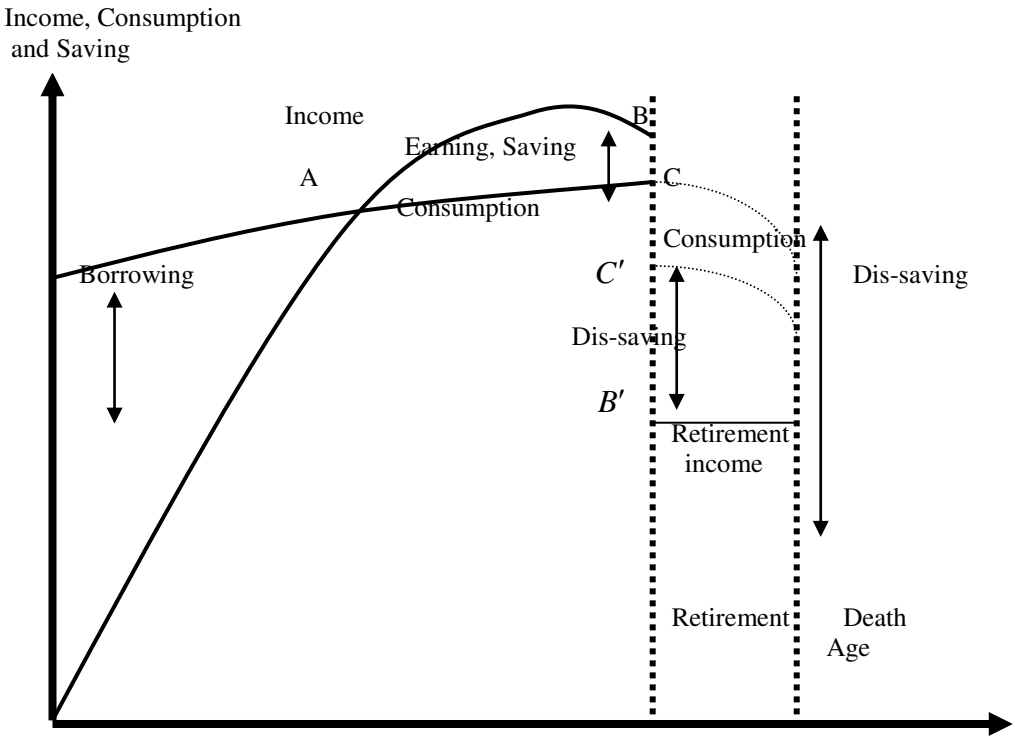
Nwachukwu, t and Egwaikhide, F, (2007), using error correction method of the determinants of private saving in Nigeria, and they found saving rate rises with the level of disposable income but falls with the rate of growth, the real interest rate has a significant negative impact . Furthermore, Bhandari, R , Dhakal, D and Pradhan , K, (2007), estimate the determinants of private saving in South Asia, and they found that the per capita income have a positive effect. The degree of urbanization**,** interest rate and the dependency ratio have no noticeable impact on private savings

Amponsah, C, (2012) estimated the determinants of Private saving in the EU countries using the GMM method and found, that GDP growth and dependency ratio has a positive effect on private saving. Ozcan and other, (2010), study the determinants of Private savings behavior in Turkey for the period 1968-1994, and the finding support the evidence that the income

Their saving rates then may start to fall with the increasing share of the dissaving elderly population. Interestingly, the share of the working-age population is actually projected to *increase* slightly over the next three decades in Bangladesh, Cambodia, India, Pakistan, and Philippines. This could have opposite effects on savings behavior, other things being equal. The effects of a rising old-age dependency ratio on average household savings are, however, not entirely obvious. Based on the traditional version of the LCPY hypothesis, one would expect older individuals and households with older heads to be drawing down on their savings to finance postretirement consumption. This would generate a negative relationship between the elderly dependency ratio and average household saving rates. For instance, Kim and Lee (2007) find an evidence for East Asian economies that higher old-age dependency ratios lead to lower saving rates. Can this be squared with rising saving rates across all age groups and the high saving rates of the elderly that have been documented using the household-level data? One difference between microeconomic and macroeconomic data is that the concept of savings tends to be different because of measurement as well as conceptual issues. For instance, the flow of services from owner occupied housing is treated differently in the national income accounts than in household surveys. Household surveys also tend to under sample households near the top of the income distribution, which normally have high saving rates. This would then result in a lower household saving rate compared with the macroeconomic data.

A Brief Literature Review

According to the LCH, income growth will have a positive and significant effect on savings. In a growing economy, savings from the productive worker will increase relative to inactive (old and retiree) workers' dis-savings and thus, aggregate savings will increase. Indeed, the rising savings (private) in Asia is linked to income growth. Unfortunately, the results from empirical investigation on the impact of this variable has yielded conflicting results (see Bosworth, 1993; Carroll and Weil, 1994; Edwards, 1996; Masson et al., 1998; Loayza et al., 2000; Sarantis and Stewart, 2001, among others). For example, Bosworth (1993) has argued that the effect could be negative since in a growing economy, workers anticipate future income increases, and as a result will increase consumption and reduce savings. On the other hand, Loayza et al. (2000) pointed out that growth is the most robust significant variable explaining national savings in both OECD and LCD samples. Therefore, the empirical evidence is mixed and sign on the coefficient of economic growth is an empirical matter warrants further investigation (see also Park and Rhee, 2005).



الشكل ١
الاستهلاك والادخار خلال دورة الحياة

المصدر: الرسم من اعداد الباحث بالاستناد الى نظرية دورة الحياة:
Richard T, Froyen and Linda, Low, 2001, Macroeconomics- An Asian Perspective, Prentice Hall, Singapore.

b. Demographic Factors

Demographic factors, in conjunction with the LCPY hypothesis, can generate shifts in saving patterns. An aging population means that the dependency ratio—the ratio of the dependent population to the working-age population—is expected to rise, which could drive up saving rates. This could be particularly important for a country like the PRC where the one-child policy is projected to generate a substantial demographic shift. East Asian countries have had a noteworthy demographic transition—aging with a declining fertility rate. Figure 6 shows demographic projections for the countries in selected Asian economies. In virtually every country, the share of the elderly in the population is projected to increase, with particularly sharp increases in store by 2040 for PRC; Hong Kong, China; and Korea. This could increase household saving rates in these countries in anticipation of rising dependency ratios and greater strains on public pension systems.

Theory of the Life-Cycle Hypothesis

The life-cycle hypothesis makes use of the interaction between income, consumption, saving, wealth and age. Early articles are proposed by Modigliani and Brumberg (1954) and Ando and Modigliani (1963,1986), postulate that individuals smooth consumption over time by taking into account anticipated changes in their resources, induced by education and age as well as movements in the expected rate of return on savings. Figure 1 illustrates the stylized pattern of income, consumption and savings predicted by the standard life cycle model for a representative individual. During the first part of his or her life, a typical individual earns relatively little and consumes a relatively large amount of goods; who consumption therefore exceeds his expenses, and he therefore borrows. Because income increase with education and age, the individual reaches a point where he no longer needs to borrow (point A); beyond that point, saving becomes positive. Income, however, begins to decline beyond a certain age; with consumption growing at a slower rate, saving continues to increase for a while but eventually also begins to fall. Once retirement is reached, income drops (by the distance BB') to a level below consumption. If the reduction in income is unanticipated, consumption falls abruptly upon retirement, from C to C'. If, on the contrary, the fall in resources is perfectly anticipated, consumption begins to decline smoothly before retirement age is reached with no discrete change at that point. In either case, the individual must dis-save in order to maintain his consumption close to his needs, until his death.

The LCPY hypothesis implies that young workers should borrow against their future income; workers should have the highest savings rates when their income are highest in the latter stages of their careers; and retirees should start drawing down their savings upon retirement . this implies a hump- shaped age- savings profile. The figure shows a lifetime profile of earning and consumption. The hump in consumption reflects the changing demographic composition of the household as children are born, grow expensive, and leave, and the hump in earnings reflects the standard age-earning profile. Consumption drops at retirement as work related expenses such as transportation are no longer needed. Household members would borrow at the beginning of their career, save in the middle, and run down the accumulated asset after retirement .Nonetheless, there are a handful of findings in favor of the hypothesis in developing Asia.

Introduction

Countries in Asia that have been achieved high growth rates are also characterized by higher savings rates . Asian economies that have been constantly registering a more than 30% saving rates since the mid- 1990s are noteworthy. These include China, Indonesia, Republic of Korea, Malaysia, Singapore, Thailand, and are known to be takeoff countries, characterized as those that have achieved high and sustained savings and growth rates since the 1980s-. This observation is often described as the " virtuous cycles of saving and prosperity" as opposed to the "poverty trap" of inadequate savings and stagnation.

In recent years, there has been an outpouring of empirical work on the determinants of saving both in developed and developing countries. This has been prompted by the widespread concern over falling economic performance and financial system collapse in major Asian countries since 1997 and divergence in saving and investment rates between countries of the developing world. There is, however, a growing concern about the lopsided nature of the existing empirical evidence on the main determinants of private saving, particularly for developing countries.

This paper sets out to investigate the private savings behaviours of the Asian countries. The framework for our analysis is derived from the life-cycle model that has been the standard theory for the explanation of changes in private savings over time and across countries. It complements earlier empirical works in two aspects. First, we present empirical evidence on the life-cycle based on a new data set that ended in 2009 for six Asian countries that were severely affected by the previous and recent financial crisis. Second, existing literature tends to be limited to either cross-sectional or time series analysis, this study utilized the panel approach dynamic generalized least square (DGLS) method to deal with the problem of simultaneous equation bias. the DGLS method estimators are designed to be free of endogeneity bias[*]. Unlike most of the previous studies, this study also looked to private savings rates in terms of their impact on the long-run equilibrium savings rates and on their short-term effect on private savings.

[*] Earlier studies have addressed this problem by using instrumental variables. The article by Loayza et al.(2000), among others, used panel instrumental-variable technique to deal with endogeneity and heterogenity problems. In this paper, I addressed the problem by using the DGLS method to show the impacts of these variables on savings. We also note that the DGLS does not always produce residual free from autocorrelation. As such the DGLS estimator that includes leads, lags and autoregressive process was used to determine the parameters of the model.

Abstract

This paper examines the Life Cycle Hypothesis in the light of the Asian experience during the period 1970-2009 using the dynamic panel analysis. Over this period, rates of private sector in these economies have risen steadily and are presently among the highest in the world. Several conclusions emerge clearly from the estimation results: private saving rates rises with the rate of growth of GDP and disposable income. Demographic factor (dependency ratio) is an important determinant of private saving rates, an increase in dependency ratio, will be offset by a decline in the proportion of those under the age of 15-65. Therefore, the net effect could be negative.

Key Words*: Saving during life, Panel Method for long and short term, Granger Causality .*

المستخلص

يتناول هذا البحث فرضية دورة الحياة في ضوء التجربة الاسيوية للفترة ١٩٧٠-٢٠٠٩ وذلك باستخدام التحليل الحركي للبيانات المزدوجة. وخلال تلك الحقبة ، فان معدلات نمو القطاع الخاص تنامت بشكل ملحوظ وباتت واحدة من بين أعلى المعدلات في العالم. اظهرت نتائج التقديرات جماة من النتائج المهمة: ترافقت الزيادة في معدل الادخار الخاص مع معدلات النمو الاقتصادي، بينما مارس العامل الديمغرافي دوراً مهما في تحديد معدلات الادخار الخاص، حيث ادى تزايد نسبة الاعتمادية او الاعالة للسكان الذين تتراوح اعمارهم ما بين اقل من ١٥ سنه واكثر من ٦٥ سنة الى تدهور واضمحلال معدلات الادخار الخاص.

الكلمات المفتاحية*: الادخار الخاص، البيانات المزدوجة، في المدى القصير والطويل، العلاقة السببية*

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Life-Cycle Hypothesis in Asia:What Went Right

مدى أنطباق فرضية دورة الحياة في آسيا

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