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Salam sejahtera,

Terima kasih kepada pembaca yang masih setia menanti edisi Jurnal Pengembangan Wiraswasta.

Dalam edisi kali ini, redaksi menampilkan tulisan-tulisan mengenai keuangan, sumberdaya manusia, dan reformasi birokrasi. Diantaranya Pengaruh kinerja terhadap nilai perusahaan dengan pengungkapan CSR dan Good Corporate Covernance sebagai variabel pemoderasi, Pengaruh service quality terhadap satisfaction, trust, and commitment, On saving behaviour (The oretical perspective) dsb.

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Selamat membaca.

ARTI LOGO

Tiga orang bergandengan melangkah bersama melambangkan Kebersamaan, dan Kesinambungan. Garis yang mengelilingi ketiga orang seperti buku yang terbuka melambangkan Keterbukaan.

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Redaksi menerima sumbangan tulisan/artikel yang ada hubungannya dengan ekonomi bisnis dan manajemen dari para pembaca. Tulisan harap diketik 2 spasi pada kertas ukuran A4 maksimal 30 halaman. Setiap tulisan disertai abstraksi dan referensi. Redaksi berhak merubah/menyempurnakan isi tulisan. Pendapat yang dinyatakan dalam majalah ini adalah pendapat pribadi penulis, meskipun redaksi bertanggung jawab atas pemilihan tulisan yang hendak dimuat.

ON SAVING BEHAVIOUR

Oleh:
Dra. Sri Lestari Prasilowati, MA
Drs. Ec. Ibnu Widiyanto, MA PhD

Saving is a future consumption. The motives why people save are different. This study aims to theoretically discuss saving in aggregate level. The study develops static and dynamic models of aggregate saving. The study finally aims to show whether saving affects growth or growth affects saving. Both models seem to be relevant in approaching a saving model. The results show that aggregate savings in household level are influenced by demographic structure, risks, liquidity constraints, varying levels and growth rate of national income.

Keyword: *saving, growth, household .*

INTRODUCTION

Many years before the publication of the General Theory of Employment, Interest and Money by John Maynard Keynes (1936), some economists had argued that consumption and income were functionally related. However, Keynes was the first economist to stress the importance of the relationship between consumption and income and to make it a central part of macroeconomics today. In his theory of propensity to consume, Keynes argued that the absolute level of current income was the principal determinant of current consumption spending. Over short periods of time, the time horizon emphasized in his analysis, Keynes concluded that consumption could be described by a simple relation between consumption spending and disposable income. Saving and consumption are interrelated. Given the level of disposable income, saving can be obtained as the amount of income remaining after income has been allocated to consumer expenditures. In other words, saving is simply the residual between income and current consumption. To some extent, Browning and Lusardi (1996) note that although most of the empirical work

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presents sophisticated and flexible theory of saving, it is indeed a theory of consumption. In fact, the works on saving itself are descriptive and relatively atheoretical. Henceforth an analysis about saving can be developed by adopting a theory of consumption. Indeed, it is coherent and interwoven.

Saving is future consumption. It is literally obvious. The income we put aside today, after some adjustments, can be utilized for making capital/ investment, leaving bequests or even purchasing durable or non durable goods next time. Indeed, the decision of how much to consume is a decision about spending money now as opposed to retaining it to finance future consumption (read: spending), for specific purpose or for some general unspecified contingency in the future (Deaton, 1992). Thus, the appropriate basis theory is the theory of intertemporal choice which formalizes trade offs between the present and the future.

Not only on the micro approach but also on the aggregate level, savings can be obtained by subtracting disposable incomes and consumption. The difference between the two approaches is only on the way to measure disposable income and consumption. However, Sachs and Larrain (1993) remark that aggregate saving, no matter what, is actually the sum of household, business and government savings. In other words, total private saving plus government saving represent aggregate savings in the economy. Therefore, a discussion about aggregate saving should convey the idea of private and government saving.

The primary focus on this paper is to discuss the aggregate saving. This indeed becomes one central issue in macroeconomics. Undoubtedly, saving will play an important role in the revaluation of national assets. In this sense, Goldsmith (1983) indicates that there is a negative correlation between the share of saving in aggregate level and national assets. To some extent, the share of saving at current prices may be expected to be lower in inflationary situations than under stable prices. Thus, the discussion of aggregate saving hopefully presents the reformation thought of a national economy.

In this paper, we organize the discussion into five sections. Following this introduction section, Section Two deals with a brief review of theories regarding the aggregate saving. Section Three presents a discussion whether Saving affects Growth or Growth affects Saving. To this end, we attempt to discuss the data sets and variables used in the studies as well as to provide a related conclusion and a discussion of the open issues. At the end, Section Four provides some concluding remarks.

THEORIES OF AGGREGATE SAVING

Static Models of the Aggregate Saving

In this discussion, we begin with a review of income determination and multiplier analysis in an open economy. In this economy, aggregate expenditure, E, consists of consumption, C, planned or intended investment, I, and government purchases of goods and services, G. We also assume that for macroeconomic equilibrium, aggregate expenditure must equal national income, Y. It is also important to denote autonomous imports (M) as an addition to the supply of domestically produced goods and autonomous exports (X) as an addition to aggregate expenditure. Therefore the aggregate income can be defined as follows

$$M + Y = C + I + G + X \qquad (1)$$

The curve C measures aggregate consumption expenditure and its upward slope reflects the Keynesian Hypothesis that consumption is an increasing function of income such that

$$C = \alpha + \beta Y_d \quad (2)$$

where α is the autonomous consumption and $0 < \beta < 1$ represents marginal propensity to consume (MPC) and Y_d is personal disposable income that is total income minus taxes net of government transfer payment (or simply income after taxes).

For the shake of simplicity, we assume that all taxes are income taxes and that the yield from taxes is proportional to income. Thus, the tax function can be written as follows

$$T = t Y \quad (3)$$

where $0 < t < 1$ is marginal tax rate and Y-T equals to Y_d. By employing equations (1), (2) and (3) and after some manipulation, we get the equilibrium of income as follows:

$$Y = \frac{1}{1-\beta(1-t)} (\alpha + I + G + X - M) \quad (4)$$

Because income can be spent on consumption or saved in the private sector, S_p, or used to pay taxes, then we substitute into equation (1) to obtain

$$I + G + X = S_p + T + M \quad (5a)$$

or simply

$$I = S + (M-X) \quad (5b)$$

where I + G are nonconsumption expenditures often known as injections; while S_p + T are unspent income which is their sum is called leakages; and X is an additional injection and M is additional leakage as well as M-X is the trade deficit/ surplus of the foreign sector. After some manipulation, we end up with the aggregate saving function in a open economy with assumption of no deficit or surplus of foreign trade as follows:

$$S = [1-\beta (1-t)] Y - \alpha - G \quad (6)$$

so the slope of the aggregate saving is $[1-\beta (1-t)]$. Henceforth, we denote this parameter by $s = 1-\beta (1-t)$ measuring the increase in national saving that accompanies a $ 1 rise in national income. Because β and t are positive values less than unity, s must be a positive fraction.

Finally, a rise in the government expenditures induces the aggregate saving to decline and therefore raises national income. Meanwhile, a rise in the tax rate rotates the national saving function in a counterclockwise manner, raising its slope and therefore lowering national as well as the multiplier.

We now relax the assumption that there is no deficit or surplus. Because $M \neq X$ or $M-X \neq 0$, net imports should be added to the aggregate saving schedules to obtain the total leakage schedule. Therefore our new equilibrium becomes

$$Y = \frac{1}{s+m} (\alpha + I + G + X-M) \quad (7)$$

where s+m is the national marginal propensity to save plus marginal propensity to import. This actually the slope of total leakage schedule. By employing equations (4) and (7) we obtain the new multiplier as

$$\frac{\Delta Y}{\Delta G} = \frac{\Delta Y}{\Delta I} = \frac{1}{s+m} \quad (8)$$

It is clear that the multiplier becomes the reciprocal of national marginal propensity to save (s) plus the marginal propensity to import (m). Therefore, imports play an important role in reducing the multipliers. But, it is evident that the multiplier rises with a decline marginal propensity to save. This occurs because a lower marginal propensity to save implies a larger marginal propensity to consume so that a larger fraction of any income is spent on consumption.

Further, because exports add to aggregate expenditure, it causes a trade surplus. But this is not as much as the rise in exports because income will increase and this automatically raises the level of imports. The extent to which induced imports offset the impact of the exogenous rise in exports depends on the values of the national marginal propensity to save. A higher marginal propensity to save implies a lower multiplier and therefore a lower level of induced imports. In other words, when the economy can decline its imports and raise its exports, this will affect the aggregate saving to rise.

In general, the aggregate saving function when there is deficit or surplus of foreign trade, after some manipulation from equations (6) and (7), can be defined as follows

$$S = [1-\beta (1-t)] Y - \alpha - G + M-X \quad (9)$$

The presence of imports and exports actually represents the demand situation related to individuals' utility within a country. Because imports and exports are exogenous to saving, it is essential to know how individuals behave to satisfy their utilities. Equation (9) actually has deviations because it cannot tell us precisely about consumers' choice, that is, why people choose to allocate their income to saving.

The preceding discussion is merely based on the Keynes' theory which develops a static model. This theory has been challenged because it utilized the absolute income in measuring aggregate level, see for example Kuznets (1942 and 1946) and Duesenberry (1949). Indeed, before Friedman (1957) presented his permanent income model, researchers were generally using current income as the variable in the regression analysis and were finding a marginal propensity to consume that was less than 1, along with an intercept coefficient that was positive so finally the saving rates would tend to rise. But economists, for example Kuznets (1946), argued that when income increased over the period of century, the US saving rate had not risen. This seemed to contradict the idea of MPC<1 which was proposed by the Keynesian economics. Even, Modigliani (1986) notes that it is interesting and somewhat paradoxical that present day interest and extensive research activity about saving behaviour owes its beginning to the central role assigned by Keynesian economics to the consumption as a determinant of aggregate demand and to the concern with oversaving as a source of both cyclical fluctuations and long run stagnation. As it is apparent, the earlier approach seems to be characterized as crudely empirical; little attention is given to why rational consumers would choose to allocate their income to saving. Thus, the legitimacy of the Keynesian economics fails to be kept so we should develop more general model to avoid the restriction.

Dynamic Models of Aggregate Saving

Rather than rationalize the consumption- saving hypothesis in terms of ad hoc behavioural assertion, the modern approach explains consumption-saving in terms of the choices made by an optimizing consumer facing an intertemporal consumption- saving allocation problem. The basic idea of intertemporal consumption- saving allocation is that optimal consumption-saving in each time period is not intended to maximize utility in each period given income for that period, but rather is intended to maximize utility over a longer time horizon given the consumer's stream of (expected) future income. In this sense, we can view the consumption- saving decision from the representative agent framework's perspectives. So we could treat social planner as if he was an individual in maximizing his utility subject to budget constraints. In this respect, we assume that although preference of individuals will, of course, be different but they rationally are alike.

Kirman (1992), however, criticizes that whatever the objective of the modeler, there is no plausible formal justification for the assumptions that the aggregate of individuals acts itself like an individual maximizer. Also, the reaction of an individual to some change in a parameter of the model may not be the aggregate reaction of the individuals he represents. However, this weak generalization should not impede researchers to investigate aggregate consumption- saving. Rather, it should enrich researchers to be aware in concluding their surveys.

Regardless Kirman's critique, we then may develop a new model to convey an idea of utility maximization over time. Therefore, the social planner's problem, which is considered to be individual's problem since individuals' preferences are treated alike, can be constructed as follows:

$$U = U(C_1, C_2, \ldots, C_t) \tag{10a}$$

such that the social planner maximize

$$E_t\left\{\sum_{j=0}^{\infty} \beta^{t+j}\, u(c_{t+j})\right\} \tag{10b}$$

subject to

$$\sum_{j=0}^{\infty} \frac{C_{t+j}}{(1+r)^j} = \sum_{j=0}^{\infty} \frac{Y_{t+j}}{(1+r)^j} \tag{10c}$$

where U denotes total utility over period planning horizon; $\{C_j\}_{j=1, \ldots, n}$ is consumption per capita in each of the present and future periods; so $u(c_{t+j})$ is the felicity utility functions at time t for individual j. The planner's choice of consumption- saving path is constrained by the stream of income receipts expected over the period, and lending- borrowing opportunities (summarized by the real interest rate, r) available to the consumer; where r is risk free interest rate and it is constant as a generalization of intertemporal budget constraint and we treat it as a single asset. Equation (10c) is the intertemporal budget constraints where $\{Y_j\}_{j=1, \ldots, n}$ is the consumer's expected income stream. In this model, we assume that there is no uncertainty. In case of uncertainty, we should consider the presence of the risks in our model; to this end, Aiyagari (1994) and Blanchard and Fischer (1989) provide good examples in discussing the consumption- saving choice under uncertainty.

The optimization problem faced by social planner is to maximize life time utility, equation (10b) subject to income

resources, equation (10c). The budget constraint itself defines the set of consumption- saving possibilities available by the planner in the present time period. In this respect, when a planner is able to borrow against future income, present consumption can exceed present income. Alternatively, the planner may choose a reduced level of present consumption in favour of higher future consumption. The maximum number of dollars that can be transferred forward through saving and lending is achieved when the entirety of present income is saved (current consumption is zero) so that net present value of income can be added to the planner's buying power in the next period.

Further, the effects of an increase in present income induces higher present and future consumption. As more future consumption is possible only if a portion of the increase in first period income is added to saving, the optimal adjustment of present consumption, must be less than the increase in income. The intertemporal model therefore predicts that the marginal propensity to consume is less than unity, and that the effect on consumption of a change in current income is spread over time. But, Hall (1978) argues that there is a statistically marginal and numerically small relation between consumption and very recent levels of disposable income. Even, Modigliani (1979) concludes that the saving rate of a country is entirely independent of its per capita income. Thus, it is worth noting that predicting consumption- saving from the fluctuation of income will not be quite easily understood.

As for any change in relative price, the response by utility maximizing planner may be separated into a substitution effect and an income effect. According to substitution effect, the higher rate of interest increases opportunity cost of present consumption in terms of future consumption, and motivates planner to cut back on current consumption and increase saving. The opposite applies for the income effect. Because of the higher rate earned by saving (lending), a dollar saved today yields a greater addition to future income than it did previously, so the income resources available to the planner in the future are greater. As long as consumption is normal, the positive income effect stimulates present consumption and reduces present saving. The two effects thus counteract each other, and whether or not a rise in interest rates encourages total saving becomes an empirical question. The evidence indicates that the net effect may be positive or negative, and it is typically negligible (Browning and Lusardi, 1996; Friedman, 1957; Hall, 1978; Hall, Taylor and Rudin, 1990; Modigliani, 1986; Sachs and Larrain, 1993; Scarth, 1996).

From this perspective, two major theories of consumption- saving followed the Keynes theory. These two theories are developed by the Nobel Prize winning economists, Milton Friedman in the 1950s and Franco Modigliani in 1985 whom develop the Permanent Income Hypothesis (PIH) and the Life Cycle Hypothesis (LCH), respectively. In this respect, although the emphasis of the PIH and LCH is different, they share a common foundation based on intertemporal optimization and thus yield similar implications. One of some interesting conclusions of the theories is that between countries with identical individual behaviour, the aggregate saving rate will be higher the higher long run growth rate of the economy; it will be zero saving rate for zero growth. Thus it is essential to remark that saving finally affects growth.

But, does saving affect growth or does growth affect saving? This becomes another issue within this paper. It is evident that the growth models imply that high saving economies will grow faster but the Modigliani's classic life cycle model predicts a correlation between savings and growth but with the direction of causality reversed. Further, models of consumption with habit formation also provide another explanation through which growth may affect saving rates (Deaton, 1992; Carroll and Weil, 1993).

WHICH COMES FIRST: SAVING OR GROWTH

Saving Affects Growth

In this saving and growth issue, we begin a review of some growth theories. Many growth models indicate that high saving economies will grow faster, either in the short run as one move towards a steady state or in the long run as in many endogenous growth models. Without loss of generality, we summarize the growth models in two major approaches-traditional growth theory (the Keynes-Ramsey rule and Solow model) and the new growth theory.

The Traditional Growth Theory

The Keynes- Ramsey Rule

We see that consumption- saving decision can be discussed by using Keynes, Friedman or Modigliani approaches albeit their flaws. Now, we attempt to interweave the Keynesian approach with one fundamental growth model, namely the Ramsey model. Like Keynes, in the Ramsey model we assume no uncertainty condition. But unlike Keynes, we assume that individuals have infinite horizons and maximize their preferences.

We start the discussion by developing the Ramsey (1928) analysis of optimal growth under certainty by deriving the intertemporal conditions that are satisfied on the optimal path that would be chosen by a central planner. Unlike Keynes, we deal the issue of aggregate saving with establishing representative agent framework. In this respect, Frank Ramsey posed the question of how much a nation should save and solved it using a model that is now the prototype for studying the optimal intertemporal allocation of resources (Blanchard and Fischer, 1989).

Initially, suppose that a central planner wants to maximize family welfare. The only choice that has to be made at each moment of time is how much the representative family should consume (or save) and how much it should add to the capital stock to provide consumption in the future. Thus the planner has to find the following problem:

$$\max U_o = \int_0^{\infty} u(c_t) \exp(-\theta t)\, dt \tag{11a}$$

subject to

$$f(k_t) = c_t + \frac{dk_t}{dt} + nk_t \tag{11b}$$

$$k_o \text{ given}; \; k_t, c_t \geq 0 \tag{11c}$$

After some manipulations, we obtain the optimal solution by setting up the present value Hamiltonian function as follows:

$$H_t = u(c_t) \exp(-\theta t) + \mu_t[f(k_t) - nk_t - c_t] \tag{12}$$

where n is population growth and k is capital per labour. Replacing μ_t by λ_t in equation (14) such that $\lambda_t \equiv \mu_t \exp(\theta_t)$ yields

$$H_t = [u(c_t) + \lambda_t \{f(k_t) - nk_t - c_t\}] \exp(-\theta t) \quad (13)$$

Finally, after arranging terms, we obtain

$$\frac{d\lambda_t}{dt} = \lambda_t[\theta + n - f'(k_t)] \quad (14)$$

Equation (14) is the Euler's equation describing a necessary condition that has to be satisfied on any optimal path. This specific condition is known as the Keynes Ramsey rule such that $c_t \frac{v''(c_t)}{v'(c_t)} = \sigma$ where σ is the elasticity of intertemporal substitution. In this respect, the Keynes Ramsey rule, in discrete or continuous time, implies that consumption increase, remains constant or decrease depending on whether the marginal product of capital (net of population growth) exceeds, is equal to, or less than the rate of time preference. To this end, if initially the marginal product of capital is high, consumption will be increasing over time on the optimal path thus, finally saving tends to decrease (Blanchard and Fischer, 1989). Evidently, the Keynes-Ramsey rule gives us idea how economy behaves along in a steady state or off steady state. Thus, it seems that we can successfully interrelate more recent discussion of saving and growth by using the theory of Keynes and Ramsey.

The Keynes Ramsey rule is basically the condition when the marginal rate of substitution between consumption at two points in time equals the marginal rate of transformation. This condition is useful to choose the highest level of consumption therefore will be indicating the level of saving. This condition finally induces the economy as a whole.

The Solow Model

Another approach to modeling economic growth is the Solow (1956) model which is defined as follows:

$$I = S \quad (15a)$$

$$I = + \delta K \quad (15b)$$

$$S = s Y \quad (15c)$$

$$Y = F(N, K) \quad (15d)$$

where N is labour measured in efficiency units and grows at the n rate; K is capital employed to produce output Y. The notation is standard. As the closed economy model, equation (15a) stipulates goods market clearing (investment equal saving). Equations (15b) and (15c) are the descriptive savings function which can be derived from intertemporal utility maximization framework.

By assuming that the production process involves constant returns to scale and denoting per worker basis, we can reformulate the model in a single differential equation as follows:

$$\dot{k} = sf(k) - (n + \delta)k \quad (16)$$

Furthermore, Scarth (1996) summarizes that since convergence to $\dot{y} = \dot{k} = 0$ is assured, in full equilibrium, output must grow at the same percentage rate as does labour. But as the growth rate is assumed to be exogenous, it cannot be affected by policy (which in this compact structure must be interpreted as variations in the saving rate, s). A tax policy which permanently raises the propensity to save does increase growth in a transitional way.

The final effect of this policy, however, is an increase in the capital/ labour ratio (and therefore in per capita output), not in the growth rate. Nevertheless, this can still represent a very significant increase in material welfare.

The Solow model implies that the countries with same n, , and s must have the same levels of per capita income, no matter what the size of their initial capital/ labour ratio. Initially, poor countries will grow faster than rich countries and they must converge to the same standard of living. Growth rates should correlate inversely with the initial level of per capita income. In other words, it can be concluded in the Solow model, the higher saving affects the higher growth.

The New Growth Theory

In this new theory, we remove the assumption of diminishing returns with respect to reproducible factors of production. By employing the Cobb/ Douglas production function and supposing that the labour efficiency index is proportional to aggregate physical capital/ labour ratio and assuming b = aK/N, the fundamental differential equation of the model becomes

$$\frac{\dot{k}}{k} = sA - (n + \delta) \qquad (17)$$

where A = $a^{1-\alpha}$. Unless sA just happens to equal (n+δ) there is no convergence to any steady state value for k. Indeed, if sA > (n+δ) capital intensity grows without bound, and a higher savings rate permanently raises the growth rate. Furthermore, Jappelli and Pagano (1994) also conclude that under endogenous growth, the steady state growth is an increasing function of the saving rate such that factors that simulate saving promote growth, ceteris paribus.

The interesting things about the new growth are that if policy can affect the growth rate, the implication for welfare can be very great. In this respect, the new Classical and New Keynesian can be on the same conclusion. Another interesting feature is that income inequality can lower growth. This is because growth depends positively on education in human capital, see for example Galor and Zeira (1993).

But, despite the fact that a new growth model is not needed to rationalize the cross sectional evidence, many economists are dissatisfied with the fact that the Solow model does not attempt to endogenize and therefore explain the steady state growth rate and "s" for that matter.

Growth Affects Saving

Unlike the growth theory, Modigliani's classic life cycle model predicts a correlation between savings and growth, but with the direction of causality reversed. Further, the life cycle model, like the permanent income model, builds on the theory that consumption in a particular period depends on expectations about life time income and not on the income of the current period. The distinctive contribution between the two theories (PIH and LCH) is its observation that income tends to fluctuate systematically over the course of a person's life and that personal saving behaviour is therefore crucially determined one stage's in the life cycle. For example, when people are young, their incomes are low, and they often dissave because they know that they will be earning more incomes later in their lives. During their working years, income rises to reach a peak at around middle age, and they repay the debt incurred earlier

and save for their retirement years. When retirement arrives, income from work goes to zero and people consume their accumulated resources. Henceforth, we can conclude that individuals face several periods of time.

The simplest version of the LCH model, with complete certainty, assumes that consumption is a constant equal to the annuity value of life time wealth. In this respect, consumers save during working time and dissave during retirement. In his seminal paper, Modigliani (1979) denotes several number of implications which are at that time quite novel and surprising. At first, the saving rate of a country is entirely independent of its per capita income. This result actually refuses that MPC must be less than 1. Secondly, differing national saving rates are consistent with an identical individual life cycle behaviour. Thirdly, between countries with identical individual behaviour, the aggregate saving rate will be higher the higher the long run growth rate of economy; it will be zero for zero growth. In this case, the behaviour of the saving rates can be inferred from that of aggregate private wealth, W, through the relation $S = \Delta W$, implying

$$s \equiv S/Y = (\Delta W/W)\ (W/Y) = \rho \qquad (18a)$$

$$ds/d\rho = w + \rho\ (dw/\ d\rho) \qquad (18b)$$

where w is the wealth income ratio and □ is the rate of growth of the economy which in steady state equals the rate of growth of wealth, □ W/W. Since w is positive and is based on a level life cycle consumption and earnings, which insures that it is independent of the level of income, we have established conclusion 1 and 2 above. In addition, if the age profile of the wealth income ratio could be taken as independent of growth then the saving rate would be proportional to growth with a proportionality factor equal to M/2, where M is the length of retirement. This actually reveals that Modigliani's life cycle theory supports "growth drives saving".

Like Modigliani, Deaton (1992) also provides support that growth drives saving but with a different approach. Deaton (1992) and Carroll and Weil (1993) establish models of consumption with habit formation to explain their hypothesis. They state that a positive relationship between productivity growth and the ratio of savings to income in the aggregate economy is an early and justly celebrated prediction of the LCH. Under these models, they argue that habits cause consumption to respond slowly to unanticipated growth in earnings, and the result is higher saving, at least in the short run.

Further, if we modify the assumptions, the Modigliani's life cycle model can no longer hold up. Paxson (1996) remarks that it is not common that individuals desire consumption to be constant over their lifetime. Consumption needs to vary systematically over the lifetime due to the changes, for example, in health status and in the rate of interest. Deaton (1992) even argues that uncertainty about incomes, life spans or future consumption needs combined with precautionary motives may result in upward-sloping age-consumption profiles. If these profiles can take on any shape, then so can age-saving profiles, and in this case the relationship between growth and saving implied by life cycle theory is not necessarily positive. However, as long as the average age at consumption exceeds the average age at earning, higher growth will result in a higher aggregate saving rate.

Paxson (1996) then attempts to link the issue of saving and growth observed in the macro data by the life cycle theory and habit formations models. The starting point of the life cycle model with no uncertainty can be specified by Paxson (1996) as:

$$c_{iab} = f_i(a)\, W_{ib} \tag{19}$$

where c_{iab} is consumption for a consumer i aged a and born in year b; W_{ib} is a function of life time wealth and preferences f_i (a). Consumption needs would depend on life cycle variation in the ages and number of household members, variables which display systematic changes over the life cycle and which could be included in the preferences function as additional variables.

The advantage of specifying consumption as the product of life time wealth and preferences is that the logarithm of consumption can be expressed as the sum of an age specific component and a "fixed" life time wealth component:

$$\ln(c_{iab}) = \ln f_i(a) + \ln(W_{ib}) \tag{20}$$

Unfortunately, Paxson (1996) reasons that suitable panel data are practically non existent. So, we cannot estimate precisely the regression of consumption on a set of dummy variables for each age, and an individual-specific fixed effect to account for each person's life time wealth. Then, without loss of generality, Paxson estimates equation (20) using available information on the consumption of birth-years cohorts. Thus specifically, we can take averages across all individuals in of age a born in year b to obtain

$$\overline{\ln(c_{ab})} = \overline{\ln f(a)} + \overline{\ln(W_b)} \tag{21}$$

The life cycle hypothesis actually contends that consumption choices made in each period are part of a long term utility maximizing strategy, under which intertemporal consumption allocation is strongly influenced by the demographic characteristics of consumers, individuals attempt to achieve a standard of consumption that is proportional to their life time wealth, and dislike deviating from this standard. The optimal consumption standard can be maintained when current income is low or high relative to lifetime average by borrowing (dissaving) or lending (saving) at various stages of the life cycle. Interestingly, Paxson (1996) succeeds to prove that higher growth increases saving rates either by employing the life cycle theory or models of consumption with habit formation.

CONCLUDING REMARKS

Saving becomes the most interesting issue in macroeconomic within the last decades. It was started by Keynes, saving came to be seen as the variables inducing the economy and social welfare. Friedman and Modigliani, followed by others such as Hall, Barro, Aiyagari, Deaton, Jappelli and Pagano, Paxson and others developed a consumption- saving models that made it important in the aggregate demand.

As in household level, an individual is treated as a social planner although there is a critique for this assumption. The planner has to maximize utility subject to budget constraints. This planner is then required to consider demographic structure, risks, liquidity

constraints and varying levels and growth rates of national income to gain maximum utility.

Regarding which came first - the growth or the saving, we come into conclusion that the presence of liquidity constraints raises the saving rate, strengthens the effect of growth on saving and foster productivity growth in models in which growth is endogenous. But, in other models such as the life cycle theory and habit model of consumption, the relationship between saving and growth is reversed. That is to say, growth should be treated as an exogenous variable. The other exogenous factors may be demographic factors, income variation and so on. These become the next issue.

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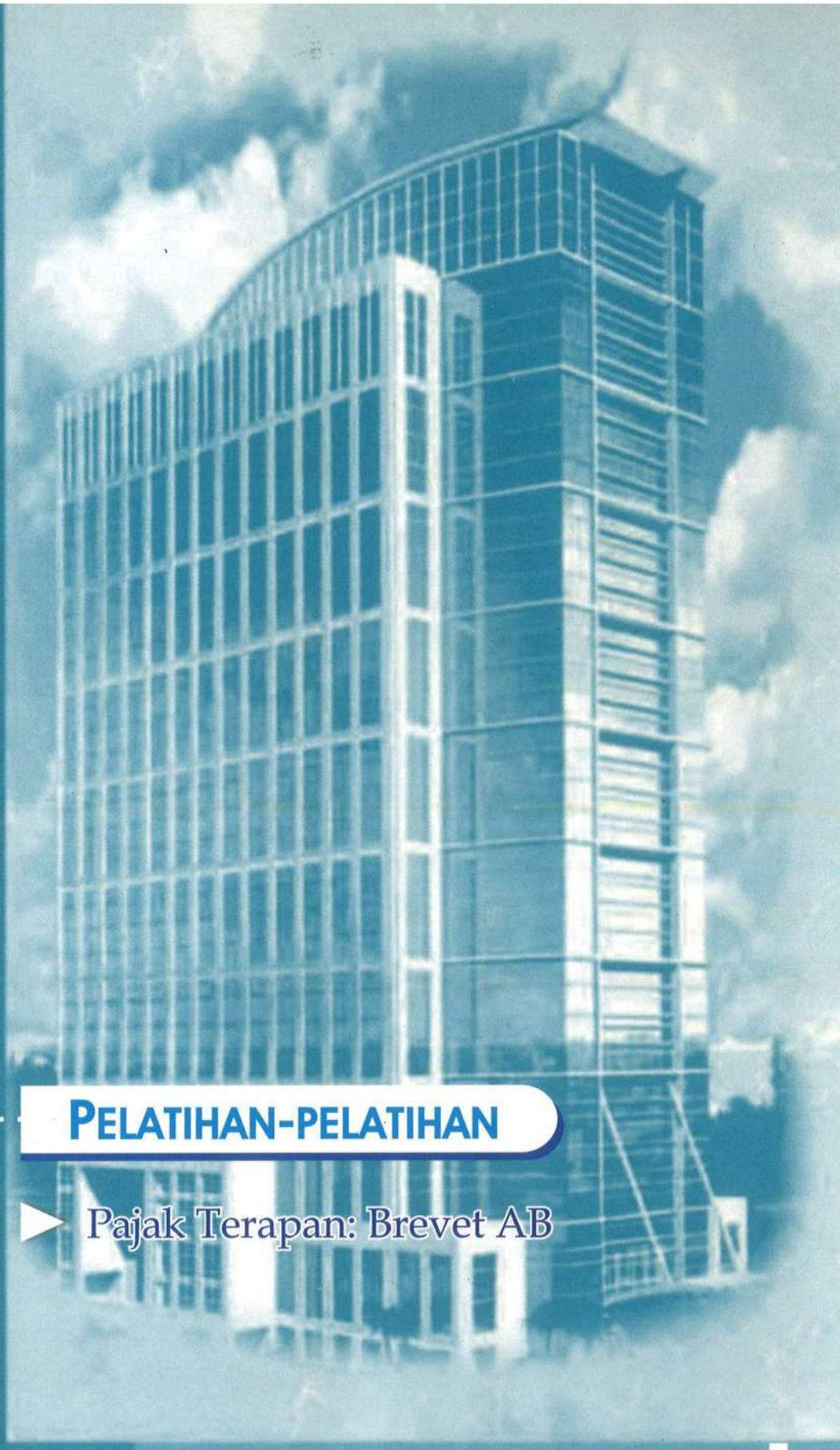

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