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The paper considers the prospects of constructing theoretical postulates on the family that is consistent with some of the main features of economic growth. Theoretical abstraction of the parameters involved based on the intergenerational dynastic model is analyzed and compared to evidence. Descriptive and analytical technique were employed in analyzing the model. Nonmarket productivity levels and their effect on initial human capital endowment of households were also considered.

Keywords: per capita income, human capital endowments, intergenerational transfer, eudaemonic effect

There are so many issues and dimensions regarding economic growth and development that need insightful consideration. One of these is the contribution of the family as an economic and optimizing unit in the economy. This is because households or families own the factor inputs and assets of the economy, including ownership rights in firms, and hence choose the fractions of their incomes to consume and save. Moreso, an altruistic parent hand over to his descendants patrimony or bequest. Households and families also determine how many children to have, when and whether to join the labour force as well as how much to work in earning income. Hence, households or families form the basic decision-making unit in the economy, *ceteris paribus*. Constructing a theoretical formulation of the family and economic growth is not an easy task. Sociological institutions especially the family plays a vital role in the process of economic growth and development. Moreso is the fact that one of the fundamental issues in economics is the problem of value, that is, the problem of allocating resources to the production of different goods and sharing of these goods among owners of resources. This problem exists in any kind of economic system, for instance an economy where specialization and exchange prevailed among families without the intervention of firms who gave money incomes in exchange for productive services and goods in exchange for money revenue. For the sake of this analysis as is the convention in all economic literature, families and households are the same and used interchangeably. One of the shortcomings of the neoclassical Solow-Swan growth model is that the saving rate and by extension the consumption-income ratio is exogenous and constant. The reason for this according to Barro and Sala-i-martin (2004) is because the overall amount of investment in the economy was given by the savings of families. Using the Ramsey growth model, they noted that infinitely lived families choose consumption and saving to maximize their dynastic or intergenerational utility, subject to an intertemporal budget constraint. While economic problems and choices face individuals, firms and governments, the first and primary aggregation of individuals is through families. Hence, when instances are cited as households, firms and government, the remarkable and eminent position of households is assured in economic analysis. Both the Solow-Swan as well as the Ramsey growth models had considered the household as a basic economic unit in their framework of analysis (Barro and Sala-i-martin, 2004; Agenor, 2004). While firms seek to maximize their profits, government sought to provide

and meet basic social needs of people in the community or state. However, families or households as the first aggregative economic unit seek to maximize their intergenerational, dynastic utility. The issue of intergenerational transfer or flow is indeed interesting considering the significance which such dynastic human capital transfer plays in ensuring an enduring legacy in certain field of human activity or knowledge.[1] Having noted that, it is imperative to stress that a firm in need of labour or workforce looks to competitive households for its supply. Likewise before government embarks upon any social project in a community, the preference of such a community are first mapped in to an aggregative form from households that made up the community. The reason is more often than not closely linked to the fact that the ultimate objective of economic science is not curiosity, but the necessity to act and such rational action must be based on some principles. One of these principles is that dealing with family issues and considerations. Economic science must continuously evolve in its examination of fundamental problems dealing with social institutions and behaviour. Otherwise, is would become a *dinosaurian* discipline. To this end, we hoped that this study would not only provide some contributions to the economics of household optimization and decision making but also elicit more studies on the issues raised or addressed in the paper[2]. The paper is organized in to five sections. Following this introduction is Section II which presents a review of some household models in economic literature. Section III provides the framework of analysis while Section IV focuses on the theoretical parameterization. Section V contains the concluding remarks.

II.   Household Models: Review

There are quite a number of household models in economic literature. One remarkable one among them is the one attributed to Gary S. Becker and Harvey Leibenstein as examined by Easterlin (1977)[3]. According to Easterlin, these two economists pioneered the concept of a decision-making approach to fertility behaviour in conformity to the household theory of consumer choice and that their formulation is of a form describes as follows. Assuming that households or families viewed children as a type of consumption good, yielding utility like economic goods in general household desires for children can therefore be conceived in terms of an indifference map with number of children on one axis and commodities on the other. Any given point on the map expresses the degree of satisfaction attached to that specific combination of children and commodities[4]. One can then think also of a price tag attached to children. This

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[1] Instances can be cited including the famous Bernoulli family of Basel, Switzerland that produced successive generations of distinguished sons who are eminent mathematicians and scientists. They include Jacob Bernoulli, who is well known for his work in physics and mathematics. Others are Johann Bernoulli who is a pioneer in exponential calculus and Nicholas Bernoulli. Other notable examples include the Kennedy family in field of politics especially with the likes of the charismatic President John Fitzgerald Kennedy of the United States who was assassinated in 1963 and his brother Senator Robert Kennedy also assassinated in 1966 though others survive including Senator Edward Kennedy etc.

[2] The place of continous search for answers to the fundamental problems of theoretical economics is laudable and inevitable. Fundamental problems in the physical sciences such as the *Fermat's Last theorem* baffle mathematicians for centuries before it was finally solved in 1955.

[3] Except otherwise stated this study by Easterlin is the major source of the review and perspectives in this section.

[4] The absurd and bizarre commoditization of children in recent times for instance can be seen in the establishment of 'baby factories' by some people in certain states in Nigeria where young men were paid to impregnate young girls mostly in their teens who then bear the pregnancies with the resulting children been sold off to interested buyers who offer the highest price. This indeed is morally reprehensible because unlike common household commodities children are human beings themselves possessing life and entitled to all rights and privileges. No one should therefore become a merchant or make a merchandise of life as he or she cannot create one by himself or herself.

price tag would consist of the discounted cost of various expense items required to have and raise children, including the opportunity cost of the time devoted to child care, due allowance being made for a child's prospective contribution, if any, to family income. Together with product prices and household income, these costs establish a budget line constraint. The interaction of this externally determined constraint with the subjectively determined indifference map determines the combination of children and goods which will yield most satisfaction under given conditions of tastes, prices and incomes. If the relative price of children were higher (because the price of child-care items rose more than the average price of goods generally, for instance), the optimal combination would shift toward more goods and fewer children. On the other hand if subjectively, the attractiveness of commodities rose relative to that of children, a similar shift would occur. However, if the level of household income were higher, the optimal combination would include both more children and more goods, though the increase would not necessarily be proportionate. Hence, in equilibrium, the number of children people have would vary directly with household income and with the price of goods relative to children, and inversely with the strength of desires for goods relative to children. Easterlin noted that it seems unrealistic to view household decisions about having children as such a highly rational process, though several combinations suggest a certain plausibility of the approach. In the first instance, if one takes commodity purchases proper, to which the theory of consumer choice is ordinarily applied, economic theory, does not claim that households actually go through precise calculation. Rather, the argument is that purchasing decisions involve a rough weighing of preferences against constraints of the type spelled out rigorously in the formal theory. More importantly, if the constraints or preferences change, behaviour would change in a way predicted by the theory. Therefore, confronted with higher prices for certain goods, a typical household would tend to substitute other goods. Again, if the household's income rises, it will feel freer to expand its purchases generally. While typically, there are no actual calculations- indeed, reactions may be in a sense automatic rather than produced by conscious deliberation, which means behaviour often change in a way implying the type of subjective balancing of preferences against constraints envisaged by the theory. Similarly, with regard to fertility decisions, children, like commodities, are a source of satisfaction. To this end, he observed that just as one notes that one family differs from another with regard to the intensity of its desire for a given good (a vacation trip abroad for instance), so, too, we detect differences in the strength of desires or tastes for children. Furthermore, children, like commodities generally, are not without costs and the surveys of the topic showed, most parents are well aware of this. From prenatal medical expenses through university education, a child involves a long succession of expenditures, of which the typical household is painfully cognizant. Finally, just as different commodities compete with one another for the household's resources so also do children compete with goods or commodities. Having another child this year may mean sacrificing a new car or a long-awaited month or vacation. Desires, costs, income –all of these do enter people's thinking about having children. Now if this is so, then there is some plausibility to assume that decisions about having children involve a rough balancing of preferences and constraints, perhaps largely subconsciously, of the type described in the economic theory of household commodity purchases. In conclusion, the application of the theory of consumer choice to family building decisions, that is, the subject of human fertility has been bought for the first time within the reach of the main body of economic theory. In any case, there are other perspectives to these issues.

Moreover, it is expedient to note that even right from the early twentieth century; family considerations have been a significant aspect of investigations in economic literature. Pigou

(1932) extensively explored some of these issues in his treatise *The Economics of Welfare*. He noted ". . . *Up to this point we have tacitly assumed that the old-established practice of disregarding conjugal and family estate in fixing wages will be maintained. Of recent years, however, considerable attention has been paid to proposals for regulating wages on a family basis*". He observed that these proposals involve a departure from the ideal of fair wages because they require that different men of equal quality are paid wages that vary in accordance with the number of children that they have. Moreover, he noted further that in several countries such as Germany and France, there was a marked movement towards what was then known as the *Family Wage System*. In these countries, 'compensation funds' were established, to which the separate employers contribute in proportion to their wages bill, from which the whole of the family allowances were paid. By this device, he however stressed that, an employer makes the same total payment in respect of each worker employed by him whatever the size of his family, and there is, therefore, no inducement to anyone to engage single men in preference to married men. Pigou nevertheless raised objections to the introduction of the *Family Wage System* then. Some of his objections include firstly that such scheme "*necessarily implied the taxing of bachelors in order to provide a bounty for men with large families – a sort of bounty on parenthood*". Secondly, he opined that if taxation is to be raised for the purpose of giving bounties to the heads of large families, it is better to raise it through the instrumentality of taxation rather than in hidden and uneven manner which the *Family Wage System* entails (see Pigou, 1932, pp. 603-606).

The issues of marriage and economic prosperity also engaged the attention of Pigou. He quoting Brentano in an earlier work noted that ". . . . *As prosperity increases, so do the pleasures which compete with marriage, while the feeling towards children takes on a new character of refinement, and both these facts tend to diminish the desire to beget and bear children*". He conjectured that those people, who for instance have something to leave to their children are more affected by the fact that, if their family is large, what is left at their death must be divided in to a number of small parts, than those who have nothing to leave and act aside economic motives. On correlation between wealth and family size in the light of prevailing birth and mortality rates then, he observed that ". . . . *Wives in districts of least prosperity and culture (. . . these poor wives were married to poor husbands) have the largest families*". Lastly, Pigou also explored the training and nurturing of children especially those in poor families. He noted that ". . . . *It is just when their children are young, and, therefore, in many ways afford the most fruitful soil for investment, that poor families and themselves in the greatest straits, and, therefore, least able to provide adequately for them. The proportion of children who pass their earliest years in great poverty is much larger than the proportion of families who are in this condition at any time*". He however observed that ". . . . *Properly arranged help for these children may do much towards building up, in the most plastic period of life, strong bodies and minds trained, at least in general intelligence, and perhaps, also in some form of technical skill . . . . . Again, it is useless, and may be even harmful; to spend money on educating children so ill-nourished that they cannot learn and merely exhaust their nervous system in trying to do so. Underfed children must be provided with meals as well as education, and, it need hardly be added, these meals must be regular and not spasmodically offered to different children twice or three times in a week*". Meanwhile Levenson and Solon (1971) while exploring the theoretical foundations of the supply of labour and functional distribution of income observed that the size of the population is a function of the motive that causes families to have children. Children can be regarded in two ways according to them: they are a potential source of satisfaction or utility to their parents (that

is, consumer goods); however, in addition they have the characteristics of producer goods in that they are a potential source of family income and means of support for their parents in their parents' old age. In determining the size of the family, the potential cost of having and raising children in excess of the potential returns from the children as producer goods must be weighed against the marginal utility from the children as consumer goods. They moreover noted that the potential costs and returns are not independent, because investment in children would have an effect on their future earning capacity. One reason to this end they affirmed for why parents may choose not to invest to a socially optimum degree in their children's education is that they are not assured that the investment would result in a sufficient return to them. The Levenson-Solon model is useful in explaining to a great extent the long run population changes that have occurred in the United States. For instance, they noted that as the United States became more urbanized, the cost of raising children increased while their value as producers' goods – which was substantial in a rural economy declined. The result they observed was a decline in average family size. Nowadays, as it was true then, rural family size exceeds urban family size. Other studies have examined fertility choice and how it affects income and economic growth over time. Micevska (2001) considered a general equilibrium growth model with physical and human capital formation as well as endogenous fertility to explain the positive relationship between fertility and income and its implication on economic development.

III. Framework of Analysis

Let us now consider the methodological framework of our analysis, particularly the model framework. Let us assume that there are $n_1, n_2,....N$ families in a hypothetical economy. These are different households. Given that:

$$Y_H = f(n)$$ [1]

is a single household production function where Y_H is the family output level or *per capita* income level which is a function of both physical and human capital endowments by members of such household, in this case n_1. However,

$$Y = F(N)$$ [2],

where Y is the national output level of the whole economy since N is the sum total of all families or households in the country. It represents the product of all the single households' production functions. Thus:

$$Y = Y_H(n_1).Y_H(n_2).Y_H(n_3)... = F(N) = Y(N)$$ [3]

The framework conforms to the neoclassical model in nature:

$$\lim_{n \to 0} f'(n) = \infty; \lim_{n \to \infty} f'(n) = 0$$

It is known from national income accounting that there are many domestic chores and activities by households that are value-added to national income but which are not added or counted as part of the GDP. The Ramsey growth model which is probably the most viable workhorse framework used in dynamic macroeconomics presents a plausible approach on household optimization. It is extensively reviewed and examined by Barro and Sala-i-martin (2004). We would consider this model as part of our framework beginning with its basic assumptions. These include: Firstly, households provide labour services in exchange for wages, receive interest incomes on assets, purchase goods for consumption and save by accumulating assets. Secondly,

households are identical, that is, each has the same preference parameters, faces the same wage rate (because all workers are equally productive), begins with the same assets per person and has the same rate of population growth. The third premise is that each household contains one or more adult, working members of the current generation. In making plans, these adults take account of the welfare and resources of their prospective descendants. Lastly, the current adults expect the size of their extended family to grow at the rate μ because of the net influences of fertility and mortality. It is imperative to stress that from assumption [4] above, the adults in such competitive households as rational agents choose their fertility by weighing the costs and benefits of rearing children. Hence, normalizing the number of adults at the initial level, 0, to unity, the family size at time t which corresponds to the adult population:

$$L(t) = e^{\mu t} \tag{4}$$

Incorporating the assumptions of the Ramsey model in to our framework of analysis, the single family production function therefore becomes:

$$Y_H = F(e^{\mu t}, h, k, a, \rho) \tag{5}$$

where $e^{\mu t}$ is the family size, h is the level of human capital endowments by individuals in the household, k is the physical capital stock owned by individuals in the household; a is the amount of assets accumulated by them and ρ is the time preference parameter which is positive and constant. From empirical evidence, there is obviously an inverse relationship between the per capita income level (Y_H) and fertility which is influenced by the family size, $e^{\mu t}$. We attempt to examine the typical behaviour of families or households and how their activities and productivity which are determined outside the price mechanism affect output growth in the economy. While the Ramsey framework is one of the earliest known and veritable frameworks for an appraisal or analysis of such issues or considerations, its explicit theoretical aloofness renders it less useful for the sake of this analysis and therefore necessitates the incorporation of new methodologies and approaches in dealing with these problems. One of the major advantages however of the Ramsey model is its adoption of infinite-lived households which implied the altruistic linkage from parents to children and their successive generations. The rate of time preference, $\rho>0$ in the Ramsey formulation, according to Barro and Sala-i-martin (2004) corresponds to the degree of intergenerational altruism in the overlapping generation model.

IV. Theoretical Parameterization

We would now consider some of the basic parameters of this theoretical analysis. Given the background that there is an inverse relation between per capita income level and fertility which influenced family size, we now turn our attention to consider whether there is a linear relationship between a household's size and its initial physical and human capital endowment. The initial physical and human capital endowment, K(0), is significant in the intergenerational transfer or altruism of the overlapping generation model (OGM). This variable differs across families in any economy as not all households are equally endowed. A well-endowed family would tend to have smaller family size compared to a less endowed household. Is there a linear relationship between a household's size and its initial physical and human capital endowment? In the proposition above, there seems to be a relationship: an inverse relation. Now if there is only one adult person in the family at the initial level of take-off of such a household, then $e^{\mu t}=1$, Therefore, $\mu t =0$. If $e^{\mu t}=0$, K(0) =b. The intercept, b, is the autonomous income levels available to the family which is independent of the family size, $e^{\mu t}$. This is what a household earns or

which accrue to it prior to the proper establishment or formation of such a household[5]. However, it is imperative to stress that the initial physical and human capital endowment especially the incomes are more or less linked to monetary considerations. It is money which enables the economic system (especially a modern monetary economy) to keep track of every productive engagements or rather what each man produces and what he or his family uses up, so that in broader terms the two processes are kept in equilibrium and distribution of what is produced goes on in an orderly manner. Also important is the fact that there is always a sort of interphase between one household and another in successive generations for example from father to son. That inter-period income endowment, b, is not an intergenerational transfer as it cannot be traced to one's parents or dynastic wealth that a typical household can possibly be endowed with at the state or level of its take-off. It is imperative to note that the family size $e^{\mu t}$ represents the labour supply function since households are not only consumers but also producers who make optimizing choices and decisions in the course of time. We now consider the relationship between K(0) and $e^{\mu t}$ graphically.

In Fig.1, the curve, K(0) starts from the origin 0 and move upward in a steady manner. It represents the time path of the initial physical and human capital endowment of the household with no autonomous income *ab initio*. In other words, it is the state where a household has no initial physical and human capital stock, K(0) at its point of take-off.[6] However, when a family has some physical and human capital endowment, starting or beginning with the level b, on the K(0) axis, this depicted by the curve, K(0)* in Fig.1. It represents the steady state path for a household having initial physical and human capital endowment. What this means is that such a household starts with an autonomous income level, b, unlike the former that possess no such income level (starting off at the origin), that is K(0). The curve, K(0)* moves at a higher level in the ($e^{\mu t}$, K(0)) plane. It implied the movement to the steady state.

Given initial physical and human capital endowments by households in a competitive market model, let us consider a scenario where there are two adults in the household, say, a man and his wife[7]. Thus: $e^{\mu t}$ = 2. Taking logs of both sides gave us the result, μt =0.693. Since we assumed that this is the beginning of the household proper, then t =1. In circumstances for instance where three or five children which are born to such a family that result in to μt =1.609 and μt = 1.945 respectively. The child rearing parameter of raising a family of 5, that is, father and mother and three children is 2.32 while that of raising a family of 7 is 2.81.
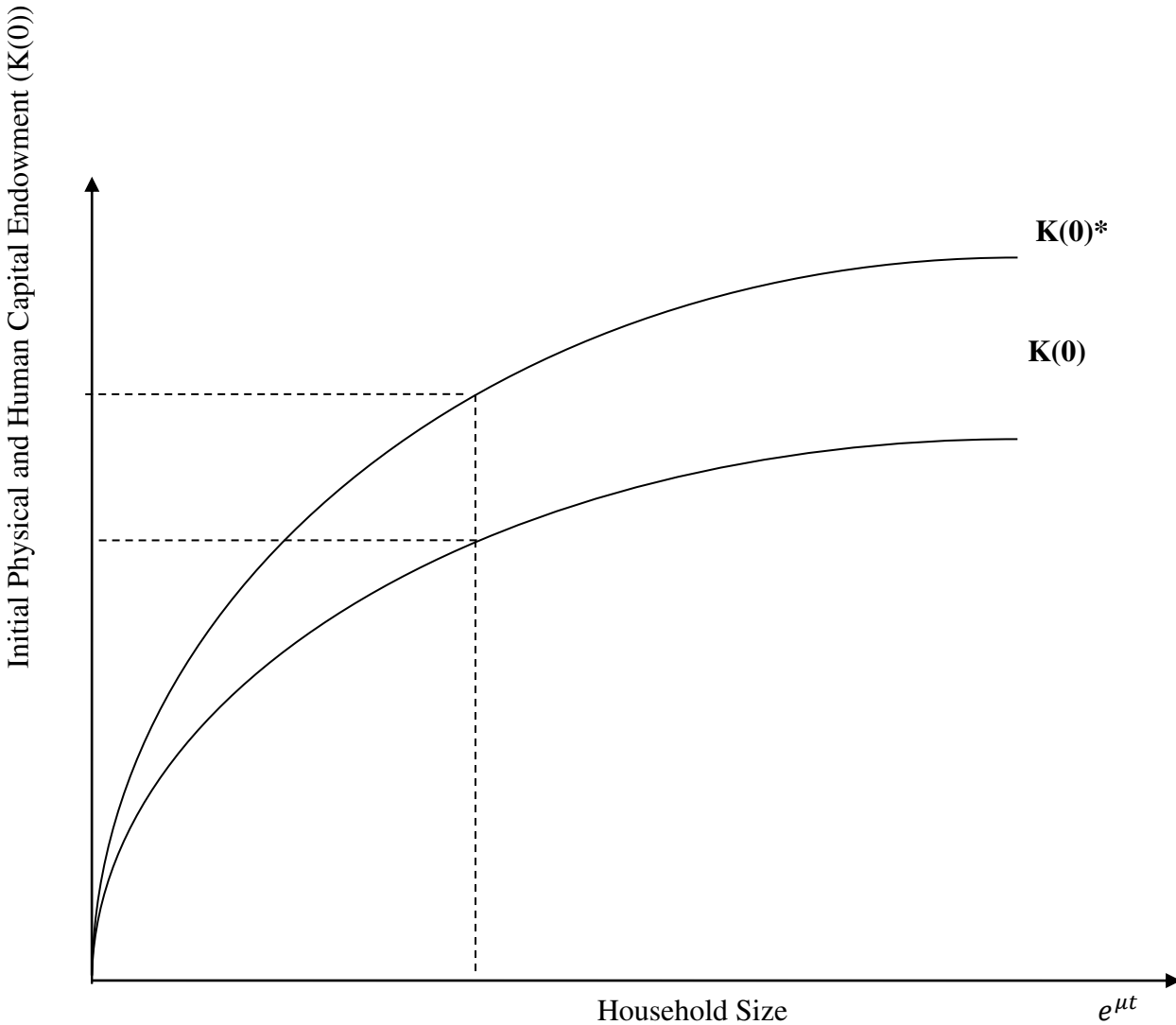

Fig.1: The Relationship between K(0) and $e^{\mu t}$

The child rearing parameter here is the ratio of raising a family of n-2 children given the initial physical and human capital endowments of the adults in the family –a man and his wife. The child rearing parameter is computed as the ratio of raising a family of size n to that comprising only a man and his wife. Mathematically, we express this as: $\mu t_{(n)}/\mu t_{(2)}$. Hence the child rearing parameter of a family of five is calculated as $\mu t_{(5)}$ divided by $\mu t_{(2)} = 1.609/0.693 = 2.32$. Likewise, that of raising a family of 7 is computed as $\mu t_{(7)}/\mu t_{(2)} = 1.945/0.693 = 2.81$. The average number of children that many families would prefer is four, because the child rearing factor $\mu t_{(4)}/\mu t_{(2)} = 2$; implied the 'ceiling limit' for the couple or both parents, i.e., the man and his wife. The difference in raising two additional children (between raising a family of five and that of seven), that is, the marginal or average utility of raising two additional children is 0.5.

There is virtually no difference in the child rearing parameter in raising a family of 10 given all the initial physical and human capital endowment of such parents. An issue closely connected to the child rearing parameter just considered is the concept of living income or wage. An interesting perspective was raised by Pigou (1932, pp. 599-600). A living wage, according to him for a man is a wage that will enable the person who receives it, if he has an average family to maintain and if he has average good fortune in the matter of sickness to earn an income sufficient for a good life. He however observed that a rate of wages that will achieve this end in these conditions will not achieve it for a man with a family in excess of the average or subjected to an unusual amount of sickness. Moreover, the living wage did not take account of the fact that some workers need to support their parents who have become dependents as well as their own children and of the further fact that the wives of some workers contribute nothing towards the family income while those of others contribute significantly for instance, a wage for the breadwinner which would provide a "living" for his family at one stage of its growth would be quite inadequate at another stage. Pigou quoting a study by Bowley on the condition of the poor at Reading in 1912 estimated that the minimum expenditure necessary for the attainment of a reasonable standard of living at marriage would be 16 shillings per week which would rise gradually to about 25 shillings in five years and 28 shillings in ten years, provided that there were four children all surviving. It would remain at 28 shillings for another five years and then fall back to 16 shillings as the children became self-supporting. For women workers the connection between living wage and living income is even more remote in view of the great differences between the positions of women mainly supported by their husbands, self-supporting single women and women who are themselves the principal breadwinners of a family. Indeed, a good living income and a certain number of children that can adequately be nurtured and catered for would have a *eudaemonic effect* in any family or household concerned. An interesting dimension to this end is the observation that food items constitute the major component of what consume most people incomes in developing economies. However consumption of balanced diets or meals by households can or would only be possible in an egalitarian economy where the income distribution mechanism is not only effective and efficient, but which have evolved ways and means to mitigate the social and economic woes of its populace. Now even at that, there might not be a wholesome uniformity in consumption regarding what constitute a balanced diet but on a general note, each household would at least be assured of better and well-nourishing meals or diets. In most societies or economies, due to huge and widening income inequalities, those in the lower income group tends to consume a particular strand of meal on a continous, consistent basis mostly carbohydrates or cereals because of limited and inadequate sources of income. On the other hand, those in the upper income group, while having access to all the good things and luxuries of life tends to consume expensive synthetic food items most of which are junks. They apparently are impatient in developing balanced diet recipes for their households. The middle income group tends to be the exception as a result of the fact that most of the individuals in this income stratum are highly educated and tend to be more concerned about their lifestyles and dietary constitution.

The issue of economic ethics is also worthy of due consideration in an analysis on the family with its implication on output growth. While we would not discuss the issue of eugenics here, though central to economic ethics our preoccupation would be specifically with regard to the issue of commercial surrogacy in recent times. In many parts of the world especially in Asian countries such as India, Thailand etc, many women have resort to being surrogate mothers to many couples from other parts of the world most especially the advanced industrial economies

which undisputedly are also the most wealthiest for economic reasons. In as much as economic considerations informed such trends lately, these developments have far reaching implications on development and how income distribution is perceived across the global economy[8]. When a couple have obtained the optimal number of children they believed is appropriate for them, raising additional number of children for economic reasons or rather pecuniary basis ultimately warrant due consideration. Such developments overstretched the limits of the child-rearing parameter earlier examined in the preceding section. We now turn our attention to nonmarket productivity and its minimal effect on the initial human capital endowment of a household. As we are all well aware, there are quite a number of domestic chores and activities in households which though are productive engagements are not adequately priced or properly allocated and rewarded by market forces, that is, the price mechanism[9]. Inevitably, they are not counted as part of the gross domestic product, the standard measure of an economy's productivity or income level. The choice between labour supply and leisure represents the departure point of where household decide on how to allocate their time in an optimizing manner over time. Easterlin (1977) reviewed and considered the Becker (1965) study which examined this approach extensively. One of his basic assumptions is that time not spent on market activity is used for domestic family production. The remarkable or striking characteristic of this approach is that the productivity of home or domestic chores is affected by capital accumulation and technological progress. The allocation work and leisure was considered by Pigou (1932) for he noted that women who besides industrial work also have the burden or task of looking after their homes cannot afford to withstand long hours like adult men. More leisure for them yields a higher return in form of the children having opportunities for healthy sleep and play as well as opportunities for the women in taking better care of their homes.[10] While examining the defects inherent in the gross national product (GNP), Morgenstern (1976) noted that many services are rendered and many goods produces that never enter a market thereby escaping their inclusion in the GNP. He posited the well-known fact that should housewives be paid by their husbands GNP would rise and added that consequently there would not be one iota of differences in production or services. The allocation of time between market and domestic work then depends on relative productivity trends and on the evolution of relative demands for market and domestically-

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[8] The recent abandonment of a child born with Down syndrome by a Thai woman to an Australian couple raises ethical questions on the premium placed on human life across the world. While the Australian couple took the child's twin sister, leaving the helpless child behind, the moral and contractual issues involved in such episodes obviously comes to the fore. The rapidity with which changing trends in fertility and demographic issues are evolving across the globe in recent times is not only staggering but also thought-provoking. The monstrosity of capital flight in emerging economies to say, surrogacy and fertility choices when compared to the output growth and per capita income level in developing countries is quite immense. The case where many Chinese couples are going to the United States to have children through surrogate mothers with at least $150,000 per child while amusing also provokes thought on new vistas of the raison d'être for this emerging trend. The growing wealth among many Chinese who have been raised to the middle class in terms of income per capita bracket coupled with the harsh fertility and demographic policy there might perhaps account largely for this wave of development.

[9] Pigou (1932, p. 15) quoting Mukerjee in his treatise *The Foundations of Indian Economics* notes ". . . The collaboration of the family members not only economises expenses, but sweetens labour. Culture and refinement come easily to the artisan through his work amidst his kith and kin".

[10] Many housewives obviously did little in adding to the gross national product (GNP) for there is an observed pattern or trend in which the time they should have used towards the optimal and efficient utilization of the scarce and limited resources at the disposal of their families, they spend on idle chatters and discussions which have no impact or effect on the output level in the economy. Constructive and productive talks on better culinary and nutritional or dietary recipes for their families would obviously add significantly to GDP on terms of good health and quality of life for the citizenry.

produced goods. We specify utility following Barro and Sala-i-martin (2004) as u(c, *l*k) where c is consumption per person or worker in the household, *l* is the person's intensity of work at time t and k is human capital per person. Hence, u(·) is homogenous of some positive degree and the term *l*k is conjectured as forgone leisure time, adjusted for a person's quality. The inclusion of a labour/leisure choice by Barro and Sala-i-martin (2004) in the Ramsey framework raises the speed of convergence to the steady state though only to a moderate extent.

As noted earlier, there is a market activity component that members of a household engaged in which is computed as part of GDP and a nonmarket component that involve domestic chores or work is unaccounted for in the GDP or by the price mechanism. We now consider a model where there are two phases or kind of output given the foregoing background and premises, that is, a market component – per capita output computed from the economy's GDP for a person in the household and domestic output which is unaccounted for by the market mechanism as in the former. We define per capita output which is accounted for by the price mechanism as y and the family's domestic output by y´. Total productivity, irrespective of market mechanism or consideration is therefore:

$$y^* = y + y´ \qquad\qquad [6]$$
such that the rate of change of y^* is the total differential:

$$dy^* = (\partial y^*/\partial y)dy + (\partial y^*/\partial y´)dy´ \qquad\qquad [7]$$
In the event where there is an infinitesimal change in the market component, y while the nonmarket component, y´ remains constant, that is, dy´ = 0 and the total differential reduces to a partial differential:

$$dy^* = (\partial y^*/\partial y)dy \qquad\qquad [8]$$
thus:

$$\partial y^*/\partial y = (\partial y^*/\partial y)_{y´ \text{ constant}} \qquad\qquad [9]$$
Having considered a simple mathematical overview of nonmarket economic engagements by household or families in the output growth process which often go unaccounted for or more precisely not accounted for by the price mechanism, it is expedient to stress that this component needs to be given much attention not only by economists and policymakers, but also governments around the world. Competitively priced market models would certainly contain the descriptions and explorations hereby expounded in the paper. The price mechanism however is such that fertility growth and considerations more or less influenced the eventual outcomes of such competitive pricing, ceteris paribus. Non-presence of the characteristics described hitherto represents only a purely altruistic model which might either not be viable or theoretically plausible.

V. Concluding Remarks

We have so far considered and some parameters and considerations on the family and their implications on economic growth from a theoretical viewpoint or perspective which have not hitherto been explored or examined in the field. We found that the family size and its physical and human capital endowment at the time of its take-off are very critical in ensuring good and proper intergenerational transfer of wealth and prospects for sustainable living. The policy implications include among others that the government should strive to provide families and

households with basic amenities such as good education and social infrastructures that can yield better physical and human capital endowments for such households in the long run which ultimately impact positively on economic growth. Eutrophic projects and programmes should be embark upon and also encourage as part of measures aimed at or rather targeted at families and households. However, issues and considerations such as eugenic practices should not be encouraged through public policy as was done in bygone decades for instance in Nazi Germany. Public policy should be geared towards promoting mechanisms that would better the lot of families and households in the economy.

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