

Toward a Theory of Aggregate Output, Income, and Economic Inequalities Determination in an Islamic Economy

Sayyid Tahir

An Islamic economy is a community wherein economic agents acknowledge the sovereignty of Allah (*s.w.t.*) and their mutual interactions are governed by the principles laid down in the Qur'an and Sunnah. Such an economy differs from both capitalistic and socialistic economies in two important respects. First, there is a manifest concern for equity and justice along with economic efficiency both at the micro and macro levels. Second, the principle of no interest is strictly adhered to when cashing of time element is involved in intertemporal transactions. How does such an economy function and perform at the macro level? This question has gained a new significance in view of growing worldwide interest in Islam in general and in Islamization of economic life in particular. Serious efforts are therefore required in search of an Islamic economic paradigm. The present exercise represents a modest attempt in this regard.

All theoretical exercises are abstractions subject to appropriate assumptions. The level of abstraction is usually determined by the goals of analysis and by manageability criteria. A desire to isolate some of the fundamental processes at work in an Islamic economy provides the necessary motivation for this study. Accordingly, we restrict the analysis to a closed economy and focus on the determination of the levels of aggregate output and income associated with the current production process and the degree of economic inequalities in an Islamic economy. Necessary assumptions supporting our argument are provided as they become relevant. We invoke first principles to build our Islamic macroeconomic framework. Economic logic is allowed to guide the argument within the prescribed Islamic limits. Despite some semblance of "reinventing the wheel" this approach is desirable for an objective reconstruction of true Islamic economic ideals in the present state of the art.

Theorizing, to begin with, involves simplification and classification. Of course, theoretical sketches reflect by and large upon both the values upheld by a society and upon its institutions. On the basis of the ends of decision making, we adopt a four-way classification of economic agents with respect to aggregate output, namely, PRODUCERS, CONSUMERS, INVESTORS, and GOVERNMENT. We also introduce a subclassification of POOR and RICH along economic lines in the category of CONSUMERS. This enables us to study economic inequalities in the economy endogenously. At the institutional level, we incorporate *zakah* into our framework. In the process of modelling, we also introduce some novelties that have not received adequate attention from theorists so far. One of these concerns the treatment of wealth in macroeconomic models of an Islamic economy. Our approach is one of equilibrium analysis. The main finding is that equilibrium levels of aggregate output, income, and economic inequalities in an Islamic economy would depend upon, among other things, three factors: the level of autonomous expenditures, the distribution of income among the poor and the rich, and output- and wealth-related *zakah* flows. Comparative static results based on our analytical framework provide an

economic rationale for Islamization of a non-Islamic economy. Our argument is presented in the following order. In the first section, the classification scheme adopted for this study is considered. Next, the analytical framework for a hypothetical Islamic economy is laid down together with simple behavioral postulates. In the third section, equilibrium levels of aggregate output, income, and economic inequalities in the economy are studied. The fourth section explores some policy implications of our argument. The argument closes with a note on some issues for further work.

CLASSIFICATION OF ECONOMIC AGENTS

Theories are simplified attempts at understanding and explaining realities, whether actual or perceived. Classification constitutes the essential first step in this regard. It provides the necessary edifice for establishing meaningful generalizations relevant to the problem at hand in a cause-and-effect sense. From an economic point of view, all output owes its existence to production and supply, and nothing is produced unless there is demand as well. For purposes of our analysis, we postulate a homogeneous class of PRODUCERS on the supply side. Demand for output, on the other hand, is perceived as forthcoming for fundamentally different reasons. With this in mind we adopt the following well-known classification of economic agents on the demand side for our Islamic economy: CONSUMERS, INVESTORS, and GOVERNMENT.

The category of CONSUMERS includes all economic agents who purchase output in order to satisfy their personal (non-income-earning) needs. This class encompasses every individual in the economy. The INVESTORS class enlists those economic agents who acquire output for the sake of strengthening their income-earning capacity. The GOVERNMENT category consists of non-private institutional members of the economy, whose decisions to acquire output are not guided by personal consumption or income-earning considerations. The following three points may be noted about this classification.

First, the INVESTORS category is the demand-side analogue of the PRODUCERS class on the supply-of-output side. Investment and production are quite often interlinked, especially at the aggregate level. However, the assignment of a dual role to the same group of individuals may be justified for the following reasons. At the micro level, production decisions in a significant number of instances are determined independently of investment considerations, particularly after projects enter their gestation phase. Moreover, investment needs to be separately highlighted in order to put into proper perspective the user or demand aspect associated with aggregate output. This point, in turn, provides useful clues to an understanding of the dynamics supporting macroeconomic models, noted below.

Second, GOVERNMENT is considered an essential part of the Islamic economic scene. This category includes all local, state, or provincial and central governments. Giving prime import to GOVERNMENT may be justified on two economic grounds. Basically, Islam does not accord an unqualified endorsement to the outcome of the market process, which largely depends on initial endowments of economic agents. This point is supported by the fact that Allah has decreed an ownership right for the less privileged in the outcome of the production process despite their non-participation in it. *Ushr* might be cited as an example in the case of agricultural activities. In this connection GOVERNMENT's role will be adjudicative. Moreover, the institution of GOVERNMENT is indispensable to discharging the collective obligations of every Islamic community, such as taking care of the destitute and other matters of public interest. Of course, the all-too-familiar case of market failures and the provision of public goods may be yet another reason.

Third, the CONSUMERS and INVESTORS classes are not mutually exclusive. For example, all those who belong to the category of INVESTORS also belong to the set of CONSUMERS, though not vice

versa. This classification would be justified on grounds that at any point in time considerations underlying consumption and investment decisions are different. Of course, one can always cite many instances in which this hypothesis is not likely to hold. However, in an aggregative analysis such cases can be ignored, provided that quantitatively these are not likely to affect the general conclusions. We presume this to be the case.

So far we have looked at classification of economic agents according to the production or use roles played by them. Now we look at avenues for making distribution issues a part of macroeconomic models for an Islamic economy. This is essential because equity considerations in general and concern for the poor in particular rank at par with economic efficiency in an Islamic milieu.

Let us recall that every individual in our hypothetical economy is a member of the set of CONSUMERS. This set is, therefore, a natural candidate for incorporating distributional notions in our model. The next logical thing is to consider three empirical regularities featuring the human scene, Islamic or otherwise. Income elasticities for various classes of commodities, such as necessities or luxuries, are usually different. Budget shares of these commodities for various income groups are normally not the same. Moreover, saving rates of various income groups often diverge. These realizations underlie the conventional wisdom that marginal propensity to consume declines as (disposable) income rises.¹ Such differences in marginal, not average, propensities to consume are of definite consequence in determining the level of aggregate consumer expenditure and therefore aggregate demand, output, and income in any economy.² This implies that disaggregation of the set of CONSUMERS in the context of macroeconomic models is justified on technical grounds. It is called for, moreover, because of its significance for endogenizing distribution issues.

Therefore, with an eye on manageability considerations, we disaggregate the set of CONSUMERS in the following two components: POOR and RICH. Of course, the important associated restriction is that marginal propensity to consume of the RICH is smaller than that of the POOR. The basis of our subclassification is the Shari'ah-ordained economic threshold known as *nisab* for *zakah* rather than earned income. *Zakah*-receiving CONSUMERS are being classified as POOR and the rest as RICH.

In passing, we may also note that economics literature is not entirely silent on this kind of disaggregation. The all-too-familiar Kaldorian classification of workers vs. capitalists in the distribution theory literature is along functional, rather than personal, lines. In the Islamic economics literature, Metwally³ and Ahmad⁴ consider this idea in the context of aggregate consumer expenditure in an Islamic economy without addressing its potential for studying distribution issues endogenously. With these remarks, we now turn to our macro model of an Islamic economy built around the proposed classification schemes.

THE MODEL

The theory in this paper is perceived for a closed economy, with a timeframe for analysis of one year. Matters are simplified by assuming that economic agents' interactions in the financial and assets markets have no bearings on their interactions in the goods market where current output is traded. This assumption allows us to defer a discussion of the no-interest aspect of an Islamic economy until a later study, without violating the requirements of logical consistency. Complexities of the supply-side formulation are also sidestepped for now by assuming that the price level is fixed at unity. This is equivalent to saying that PRODUCERS are willing to supply all the output that would be demanded at the going price level. Moreover, the entire analysis in this paper may be considered as though cast in real terms. Members of the economy are grouped into

the classes of POOR and RICH in exogenously given proportions. Likewise, total income associated with the production process is assumed to be the sum of the shares accruing to the POOR and the RICH in exogenously determined proportions. Both these assumptions are needed to isolate the primary forces and processes underlying the determination of aggregate output, income, and economic inequalities in our hypothetical economy. Another crucial assumption is that all non-human wealth in the economy belongs to the RICH, while the POOR do not own such wealth. Strictly speaking, such an assumption would be invalid in a dynamic setting without additional postulates. However, an alternative working hypothesis about the distribution of wealth was found not to alter our main conclusions. Therefore, this assumption is retained and appropriate parametric restrictions are relied upon to guard against inadmissible results. Finally, to simplify the analysis, it is also assumed that all necessary conditions are fulfilled so that net output equals gross output and the value of output equals income generated in the production process. With this background, we first analyze the determination of aggregate output and income associated with the production process in our hypothetical Islamic economy.

The parties associated with any claims on aggregate output are PRODUCERS on the supply side, and POOR CONSUMERS, RICH CONSUMERS, INVESTORS, and GOVERNMENT on the demand side. Each party pursues its own objectives. Of course, in the production process resource transfers and output exchanges take place, and corresponding income flows are generated in the direction of economic agents. These points yield the following clues to the determination of aggregate output and income in an Islamic economy.

- The state of contractual arrangements regarding output will determine the ultimate level of output *and*, by implication, income associated with the production process.
- Income accounting might provide the necessary links in the chain leading up to aggregate output and income determination in the economy.

Taking a lead from the first point, for now, we may define the equilibrium level of output to be one corresponding to which contractual arrangements are acceptable to all economic agents in their respective producer or user capacities. In the state of equilibrium there will thus be no call from any quarter for a change in any existing contract as long as the parametric aspects of the situation remain unchanged. At this stage a question may be raised: Why do we need to operationalize our theory around the notion of equilibrium? The reason is simple. There is normally a lag in decision making and actions taken on the one hand and realized outcome on the other. Thus, for example, PRODUCERS always produce in anticipation of sales. If realized sales differ from the planned output, there will be either unsold output or unfilled orders. In both cases PRODUCERS will have an incentive to revise their production plans and produce a different level of output in the next accounting period. As a result output level achieved in the first accounting period will not be a meaningful basis for any comparative purposes, either across time or across different economic regimes. Thus there is a genuine case for adopting an equilibrium approach to aggregate output determination. In conclusion, if Y is output planned by PRODUCERS (equal in value to income) and C_1, C_2, I , and G are planned demands by POOR CONSUMERS, RICH CONSUMERS, INVESTORS, and GOVERNMENT respectively, then the basic condition for aggregate output and income determination would be

$$Y = C_1 + C_2 + I + G. \quad (1)$$

We turn next to a novel aspect of the disaggregated framework developed in this study: determination of economic inequalities in the economy.

We propose to associate economic inequalities with inequalities in the distribution of purchasing power defined in terms of disposable income. Let Y_{d1} and Y_{d2} be total disposable

incomes of the POOR and RICH classes respectively and $\eta_1 \equiv [Y_{d1}/(Y_{d1} + Y_{d2})]$ be the proportion of the economy's aggregate disposable income accruing to the POOR. As mentioned earlier, members of the economy are divided into the POOR and RICH categories in exogenously given proportions, say, α_1 and α_2 , where $\alpha_1 + \alpha_2 = 1$. As shown in the appendix, abstracting from intragroup inequalities, these data imply that the degree of economic inequality D in the economy would be

$$D = (\alpha_1 - \eta_1) / \sqrt{\alpha_1 \alpha_2}. \quad (2)$$

The value of D will vary between zero (perfect equality) and $\sqrt{\alpha_1/\alpha_2}$ (perfect inequality). Y_{d1} , Y_{d2} , and hence η_1 are endogenous variables in this study. Therefore, notwithstanding the exogeneity of the distribution of income associated with the production process, D will have the status of an endogenous variable in our model of Islamic economy. This point will become clearer with the specification of the complete structure of our model built around equations (1) and (2). We shall first give the remaining equations for our model and thereafter dwell upon their underlying considerations.

Accounting relations

$$Y_{d1} \equiv q_1 Y + \lambda Y + \delta W + R, \quad (3)$$

$$Y_{d2} \equiv q_2 Y - \lambda Y - \delta W + R. \quad (4)$$

Macro functional relations

Consumption functions:

$$C_1 = A + aY_{d1} \quad A > 0, 0 < a < 1, \quad (5)$$

$$C_2 = B + bY_{d2} \quad B > 0, 0 < b < a. \quad (6)$$

Investment function:

$$I = \bar{I}. \quad (7)$$

Government expenditure.

$$G = \bar{G}. \quad (8)$$

Government non-zakah transfer payments:

$$R = \bar{R}. \quad (9)$$

Government tax revenue:

$$T = \bar{T}. \quad (10)$$

Some newly introduced symbols are:

θ_1, θ_2 = fractions of total income (associated with the production process) accruing to the POOR and the RICH respectively, with $\theta_1 + \theta_2 = 1$;

- λ = ratio of total output paid in the form of *ushr* (on agricultural produce), *khums* (on mineral output), *zakah* (on current output treated as stocks in trade or inventories), etc.;
- W = total non-human wealth of the RICH carried over from the previous accounting period; and
- δ = average *zakah* rate on W in the economy.

Identities (3) and (4) reflect upon the backup role of income accounting in the process of determination of aggregate output and income, as mentioned earlier, and economic inequalities. Y has both income and output dimensions. On the income side, Y accrues to the POOR and the RICH in proportions of θ_1 and θ_2 , assumed to be exogenously given. In consonance with the physical dimension of Y , there exist *zakah* flows embodied in λY which are paid by the RICH and received by the POOR in the same accounting period. The value of λ , which is an average rate, depends upon the composition of output and various divinely-ordained *zakah* rates. Equality of λ (and also δ) in relations (3) and (4) corresponds to our maintained hypotheses that the institution of *zakah* is managed by the GOVERNMENT from its general budget and that all *zakah* is spent on the POOR. A non-zero λ implies that a divinely-ordained redistribution mechanism, concurrent with the process of distribution embodied in θ_1 and θ_2 , is a distinguishing feature of an Islamic economy. The treatment of wealth constitutes another intriguing dimension of our argument.

W , non-human wealth of the RICH, may consist of all tangible assets in the form of plant and equipment, inventories carried over from the past, stocks of existing houses, equities, savings, bullion, and the like. Most of these assets directly contribute to the flow of goods and services in the current accounting period. The role of plant and equipment in this regard is clear. Let us select it as an example to explain our point.

The reward to the owners of plant and equipment is in the form of rent or profit. Let us call it gross return. This gross return is included in the value of Y (as a cost item) in the aggregate income accounting for the economy and is therefore reflected in $\theta_2 Y$ accruing to the RICH. A closer look at Islamic injunctions on *zakah* discloses that an owner of plant and equipment is not entitled to gross return, as above, but to net return in the form of gross return minus *zakah* on plant and equipment. This *zakah* on plant and equipment is the divinely-given right of the POOR in the assets of the RICH. With the gross return on plant and equipment already included in $\theta_2 Y$, there is a need to subtract just the associated *zakah* subsumed under δW to arrive at purchasing power of the RICH, Y_{d2} .

This line of reasoning readily extends to non-productive assets, such as bullion, as well. In principle, their owners can liquidate them to meet the ancillary *zakah* obligations. But then the excess or shortfall of sale price over owner's purchase price will be treated as value added or negative value added and counted in Y and $\theta_2 Y$, and the *zakah* payment falling under $-\delta W$ will convert the gross return into net return (or else further accentuate the loss) on holding the idle asset. On the other hand, if owners do not liquidate idle assets, the associated *zakah* needs to be subtracted from $\theta_2 Y$ (under δW) to emphasize its nature as a negative rate of return on idle assets, in terms of current output and income. In short, subtraction of δW converts gross income $\theta_2 Y$ of the RICH into net income over which they can lay claim, pending any taxation by GOVERNMENT.

Because of the nature of the institution of *zakah* presumed in this study, λY and δW have to be added to $\theta_1 Y$ to define disposable income Y_{d1} of the POOR.

Finally, income accounting relations (3) and (4) show the presence of a tax-transfer mechanism in our model. However, GOVERNMENT is assumed to tax the RICH and make transfer payments only to the POOR. These instruments enable GOVERNMENT to meet any of the economy's needs that cannot be fulfilled through the institution of *zakah*.

C_1 and C_2 are those parts of aggregate output intended to satisfy consumption needs of POOR and RICH CONSUMERS respectively. This interpretation may be termed a PRODUCER's perception of C_1 and C_2 . From a buyer's perspective they represent planned expenditures of the two groups of CONSUMERS on currently produced goods and services. In our model, consumption decisions of both the groups are directly related to the levels of their respective purchasing powers, defined in terms of disposable incomes. Equations (5) and (6) are highly simplified working hypotheses. Positivity of A and B is consistent with indispensability of the act of consumption for survival. The key restriction imposed on (5) and (6) is $0 < b < a < 1$, where a and b are marginal propensities to consume the disposable incomes of POOR and RICH CONSUMERS respectively. This proposition is in line with our *a priori* reasoning on partitioning the set of CONSUMERS.

Now we look at our hypotheses regarding investment I . This variable embodies the demand of INVESTORS (OR PRODUCERS) for current output to add to productive capacity. In principle, this also includes output intended to achieve the desired level of inventories. The determinants of I can therefore be traced to the determinants of productive capacity and desired level of inventories. Productive capacity is likely to depend upon expected demand for output and relevant costs (or expected return) to PRODUCERS. The costs may include, among other things, the gains that PRODUCERS might have to share with other partners in the production process. Similar factors might underlie the desired level of inventories. Besides these factors, there may exist other reasons for PRODUCERS to guard against any depletion of productive capacity or desired inventories, even in the absence of depreciation in the usual sense. *Zakah* is one such factor that comes to mind in an Islamic economy. *Zakah* on inventories, for example, when paid in kind will induce PRODUCERS to expand production so as to maintain the desired level of inventories. *Zakah* on idle assets is yet another source for increasing investment demand for currently produced goods and services. In an aggregative framework, this last factor might manifest itself through lower costs of funds to PRODUCERS due to an enhanced supply of investable funds.

The foregoing argument suggests that, ideally, one may wish to make I a function of the following factors: expected output, relevant costs, expected return, and *zakah*. The first of these will make the model dynamic. The second and third call for substantial extension in the scope of the analysis, especially to take into account operational details of financial markets in an Islamic economy. In the present state of theorizing for an Islamic economy, both these ventures are premature. *Zakah* on inventories and agricultural output, however, can easily be acknowledged as a determinant of aggregate investment within the framework of this study. But the ensuing analytical complexities are likely to make this exercise less insightful. Therefore, we prefer to work with a simplified version of the investment function, namely $I = \bar{I}$, as part of our formal model and leave it for the reader to determine the impact of *zakah* as a direct determinant of investment demand.

G represents that part of currently produced goods and services that would be desired by GOVERNMENT to discharge its obligations. T and R are basically financial flows which together influence the demand for goods and services in the form of G (via the GOVERNMENT's budget), C_1 and C_2 (via disposable incomes), and I (as a residual category). Taken together, G , T , and R are proxies for adjudicative and economic roles of the state in the economy.

G is thought to be determined by many considerations outside the purview of the present model. Accordingly, it is enlisted as an exogenously determined variable. The quantum of transfer payments channeled through the GOVERNMENT to fulfill social obligations of the economy on account of minimum needs of the POOR not met through *zakah* proceeds is represented by $R = \bar{R}$. Of course, R may be suppressed from the model when *zakah* funds alone are

sufficient for their designated aim. The justification for taxation, on the revenue side, stems from the need for public expenditures in the economy. To the extent that ability to pay may be relevant, T can be made a function of Y in our framework. Wealth W will not matter, since it is treated here as given and fixed. This and other considerations may be embedded in an exogenous component of GOVERNMENT'S revenue function defined vis-à-vis Y , the principal endogenous variable in our model. For example, $T = \bar{T} + tY$, where $\bar{T} > 0$ and $0 < t < 1$. Such a fine specification is most likely to reflect itself in the size of the multipliers and not in the main conclusions. Accordingly, we choose to work with the simple hypothesis $T = \bar{T}$ to capture GOVERNMENT'S revenue side. *Zakah* accounts are separate from the GOVERNMENT'S fiscal budget which, for simplicity, is supposed to include administrative expenses of the institution of *zakah*. Finally, the reader may note that the restriction $T = G + R$ is missing from our model. Its presence is not considered essential for an Islamic economy. In principle, its absence should be matched by endogenizing the financing of the GOVERNMENT'S budget, but, as mentioned earlier, all financial matters are deferred until a later study for the sake of getting some fundamental matters clear now. Next we turn to the determination of aggregate output, income, and economic inequalities in our hypothetical Islamic economy.

RESULTS

Our model consists of ten equations in ten endogenous variables. Equations (7), (8), (9), and (10) contain enough information to determine four of the unknowns: I , G , T , and R . With this information and other maintained hypotheses, the remaining six equations can be solved for six unknowns: Y , D , C_1 , C_2 , Y_{d1} , and Y_{d2} . We are interested merely in the solution values Y^* (the equilibrium level of aggregate output and income) and D^* (the equilibrium degree of economic inequalities).

Substituting equations/relations (3) through (10) in equation (1) and carrying out necessary simplifications, we get

$$Y^* = \varphi_1 E + \varphi_2 W, \quad (11)$$

where $E = A + B + \bar{I} + \bar{G} + a\bar{R} - b\bar{T}$ is total autonomous expenditure (autonomous-cum-induced in the cases of \bar{R} and \bar{T}),

$\varphi_1 = 1/[1 - (\theta_1 a + \theta_2 b) - \lambda(a - b)]$ is expenditure multiplier, and

$\varphi_2 = \delta(a - b)/[1 - (\theta_1 a + \theta_2 b) - \lambda(a - b)]$ is wealth multiplier.

We can use result (11) in combination with relations (3) and (4) to define η_1^* , the ratio of disposable income of POOR CONSUMERS to aggregate disposable income in equilibrium. Substituting it in (2), we get

$$D^* = (\alpha_1 - \eta_1^*) / \sqrt{\alpha_1 \alpha_2}. \quad (12)$$

Given α_1 , α_2 , θ_1 , θ_2 , and other parameters of the system, it is quite obvious that the equilibrium degree of economic inequalities in our hypothetical Islamic economy is conditional upon Y^* . Moreover, whereas the degree of income inequality embedded in θ_1 and θ_2 affects the level of Y via disposable incomes and consumption functions of the POOR and the RICH, the degree of economic inequality embodied in D has no feedback effect on Y . Consequently, the forces driving the economy toward an equilibrium aggregate output and income would alone ensure

that the economy also converges to an equilibrium degree of economic inequality. In other words, we need to focus only on the processes leading to the determination of Y^* in order to understand the dynamics of our hypothesized Islamic economy. Of course, when needed, D may serve as an economic inequality gage.

According to result (11), equilibrium Y embodies an expenditure effect and a wealth effect. Moreover, the level of equilibrium output and income depends, among other things, upon the distribution of income among the POOR and the RICH and *zakah* considerations. A critical condition for the existence of a positive Y^* is

$$(\theta_1 a + \theta_2 b) + \lambda(a - b) < 1. \tag{13}$$

The left-hand side in this relation is $d(C_1 + C_2)/dY$, i.e., overall marginal propensity to consume Y in the economy. The weighted average of the two groups' marginal propensities to consume their respective disposable incomes is $\theta_1 a + \theta_2 b$, where relative income shares act as weights. The $\lambda(a - b)$ term captures the implications of the differential in the two groups' marginal propensities to consume for the overall marginal propensity to consume Y due to the existence of *zakah* flows concurrent with the production process. Thus $\lambda(a - b)$ represents a correction factor needed to define marginal propensity to consume Y consistent with the economy's institutional set-up. Since $a > b$, overall marginal propensity to consume Y will necessarily be positive. But will it also be less than unity as required by (13)? To determine this, let us transform inequality (13) into the following comparable restrictions:

$$\lambda < [1 - (\theta_1 a + \theta_2 b)] / (a - b)$$

or

$$\lambda < \theta_2 + [(1 - a) / (a - b)]. \tag{13'}$$

Let us recall the interpretations of λ and θ_2 and note that $\{(1 - a) / (a - b)\} > 0$. It is then reasonable to infer that (13') and therefore (13) will always hold. Incidentally, $(\theta_1 a + \theta_2 b) + \lambda(a - b)$ is also the slope of the aggregate demand function in the output-expenditure (or, equivalently, income-expenditure) plane. It is a stability requirement in our model that this aggregate demand function have a slope of less than unity. This condition is also satisfied by implication. At this stage it should also be recorded that meaningful results require the total consumer expenditure of the POOR to be less than or equal to their total disposable income in equilibrium. Condition (13) alone is not sufficient to guarantee this. We presume that values of parameters of the model ensure meaningful results. In this background, Y^* represents both a positive and a stable equilibrium value of output and income associated with the production process in the Islamic economy characterized by equations/relations (1) through (10). Next we look at the adjustment mechanism that would lead the economy to this equilibrium state.

PRODUCERS are owners of output unless and until it is sold to POOR CONSUMERS, RICH CONSUMERS, or GOVERNMENT. At a micro level it may be true that one producer's investment needs are fulfilled by purchases from other producers. Such transactions among producers involve a transfer of ownership. When aggregated, however, this transfer-of-ownership aspect becomes obscured. In the aggregate, therefore, sales on account of investment demand may be treated as sales to PRODUCERS themselves in their capacity as INVESTORS. With this point in mind, let us next reinterpret equation (1) as the accounting relation

$$Y^r = C_1^r + C_2^r + I + G^r, \tag{1'}$$

where superscript r indicates 'realized'.

Now, a comparison of (1') with (1) should make the adjustment process clear. From the PRODUCERS' angle, distinctions between C_1 and C_1' , C_2 and C_2' , and G and G' are unimportant. In view of the nature of sales on account of investment and the ownership factor, I can be treated as a residual alignment category in Y' . Accordingly, PRODUCERS' evaluation of Y' vis-à-vis Y and their ensuing reactions will be guided by how I' compares with I . If, after meeting orders on account of C_1' , C_2' , and G' , I' exceeds planned or desired I , it will point to the existence of unwanted output in the system. On the other hand, the excess of desired I over I' will represent 'unfilled orders' on the PRODUCERS' stock registers. Let us assume that PRODUCERS cut production whenever there is unwanted output in the system and expand it in the event of unfilled orders. Therefore, in our model, where demand considerations are overriding, PRODUCERS' evaluation of realized investment versus desired investment and their ensuing reactions to excess supply and excess demand will lead the economy toward equilibrium. The demand responses in our model are largely constrained by the income associated with the PRODUCERS' production decisions. Moreover, slope of the aggregate demand function is less than unity. These two factors will ensure that the gap between demand and supply considerations will narrow in each successive iteration until the system converges to Y^* and associated D^* . With these closing remarks on the determination of aggregate output, income, and economic inequalities in a highly simplified Islamic economy, we now focus on the policy implications of our exercise.

POLICY IMPLICATIONS

Traditionally, this subject is approached from the point of view of stabilization of an economy around some target level of aggregate output and income. The same could be done for the Islamic economy expounded in this study. In addition, our framework could be gainfully employed to study the status of economic inequalities in an Islamic economy and to work out a policy mix that could be used to suitably affect both the level of economic activity and the degree of economic inequalities. This will be akin to combining the usual stabilization policy with a distribution policy.

In present times, however, it is desirable to focus on another question: Is it worthwhile, on economic grounds, to subscribe to the notion of an Islamic economy? Or, is it desirable to Islamize an economy for economic considerations alone? We propose to approach this issue from two angles; the level of aggregate output and income and the degree of economic inequality. The framework of the second section could be adapted to derive equilibrium outcome for the economy in these two respects if it were not Islamized in the first place. The results of the third section would then constitute comparable results for the Islamic economy. Appropriate conclusions might be based on the two sets of result, subject to any necessary qualifications.

As per the terms of reference of this study, presence or absence of the institution of *zakah* is the determinant of whether or not an economy is Islamized. Without any loss of generality, the principles underlying decision making at various levels and other parametric aspects of the economy are constrained to be the same both before and after Islamization. In these circumstances, the equilibrium outcome for the economy before Islamization can be worked out simply by solving the equation system (1) through (10) with both λ and δ set equal to zero. Taking this lead, we first derive equilibrium aggregate output and income in the economy before Islamization (Y^{**}) as

$$Y^{**} = \mu_1 E, \quad (14)$$

where $\mu_1 = 1/[1 - (\theta_1 a + \theta_2 b)]$ is the expenditure multiplier and

$E = A + B + \bar{I} + a\bar{R} - b\bar{T}$ is total autonomous expenditure (autonomous-cum-induced for \bar{R} and \bar{T}) in the economy.

A comparable result for the Islamized economy is given by the solution equation

$$Y^* = \phi_1 E + \phi_2 W. \tag{11}$$

We note that the level of autonomous (and autonomous-cum-induced) expenditure is constrained to be the same both before and after Islamization. However, Islamization results in an increase in the expenditure multiplier of the economy from $\mu_1 = 1/[1 - (\theta_1 a + \theta_2 b)]$ to $\phi_1 = 1/[1 - (\theta_1 a + \theta_2 b) - \lambda(a - b)]$. The noticeable difference between the two multipliers is due to the *zakah* parameter λ . This implies that the *zakah*-induced expenditure effects alone would increase the equilibrium levels of output and income after Islamization of the economy. We further notice that, as per the definition of aggregate output and income associated with the production process, both Y^* and Y^{**} include some wealth effects emanating from the productive-asset component of non-human wealth. Islamization of the economy would generate additional wealth effects embodied in $\phi_2 W$, which would further boost equilibrium output and income in the economy. Significantly, these wealth effects also owe their existence to the institution of *zakah* via the parameter δ .

In passing, it may be mentioned that the greater expenditure effects would not necessarily result in smaller aggregate savings after Islamization. In fact, the economy's performance in this regard would be as good as that before Islamization or even better. To verify this point, let us recall that the primary decision relevant to disposable incomes is whether to consume or to not consume (i.e., save). Thus we have

$$Y_{d1} = C_1 + S_1 \tag{15}$$

and

$$Y_{d2} = C_2 + S_2. \tag{16}$$

Here S_1 and S_2 are planned savings of the poor and the rich respectively. In these two relations we can make appropriate substitutions for C_1 , C_2 , Y_{d1} , Y_{d2} , and, in the process, Y . Necessary simplifications will yield

$$S_1 + S_2 = I + (G + T - R). \tag{17}$$

Under our working hypotheses for both the pre- and post-Islamization instances, we have

$$S_1 + S_2 = \bar{I} + (\bar{G} + \bar{T} - \bar{R}). \tag{18}$$

This implies that the economy's equilibrium volume of private savings after Islamization would be the same as that before Islamization. This would happen despite the aforementioned differentials in the volume of aggregate expenditures in the two instances. It can be easily verified that if investment were an increasing function of income, aggregate savings would in fact increase (along with the level of output and income) in the economy as a result of Islamization.

Now we study the implication of Islamization for the degree of economic inequality in the economy. In our analytical framework, such effects are channeled through an increase in Y following Islamization. In principle, therefore, we have

$$dD = (dD/dY)dY, \tag{19}$$

where dD/dY is evaluated at $\lambda = \delta = 0$. Appropriate substitutions in (19) yield

$$dD = \{(\theta_2 - \alpha_2)/[(Y - \bar{T} + \bar{R}) \sqrt{\alpha_1 \alpha_2}]\} dY. \quad (20)$$

Given $dY > 0$ after Islamization, as noted above, $\theta_2 > \alpha_2$ and $[(Y - \bar{T} + \bar{R}) \sqrt{\alpha_1 \alpha_2}] > 0$, it follows that $dD > 0$. That is, Islamization of the economy in our chosen example would lead to an increase in economic inequalities. It is a logical consequence of our analytical assumptions regarding the fixity of θ_1 , θ_2 , α_1 , and α_2 . We anticipate a reversal of this result in a general model allowing for changes in these parameters after Islamization, along with a built-in demarcation of members of economy into POOR and RICH categories. Even without such an exercise, Islamization would be attractive for two reasons. First, it would lead to a decline in absolute poverty because $(dY_{poor}/dY) = (\theta_1 + \lambda) > 0$. Second, it would give the economy a built-in redistribution mechanism in the form of the institution of *zakah*, which also tackles economic inequalities at their main source, namely, non-human wealth.

The case for Islamization thus far is restricted to the terms of reference of this study, in particular our hypothesis that PRODUCERS are willing to supply all output that might be demanded at the going price level. One might question our conclusions on grounds that, if supply constraints were binding, the Islamization policy would simply fuel inflation and thereby have negative consequences. To allay any apprehensions in this regard, we record just one observation. *Zakah* in its capacity as a negative rate of return on idle resources is likely to spur investment. This, in turn, would expand productive capacity of the economy and relax supply constraints as well. Thus Islamization of economy may be advocated on supply grounds also. Although our study does not focus on this aspect, the case for Islamization might become even stronger if one were to further take into account the implications of a profit-and-loss sharing mode of financial intermediation instead of an interest-based mechanism. On the whole, therefore, we contend that pure economic considerations support the case for Islamization of an economy.

CONCLUDING REMARKS

This study has attempted to delineate the basic framework for macroeconomic analysis of an Islamic economy. The central message is very simple: it is possible to work toward a reconstruction of Islamic economics by systematically following the course of logic within the prescribed Islamic limits. The reader can refresh his memory about the main features of this study by quickly glancing over the introductory section. We take this opportunity to remind ourselves about the main finding. The equilibrium levels of aggregate output, income, and economic inequalities in an Islamic economy depend upon at least three factors: the level of autonomous expenditures, the distribution of income among the POOR and the RICH, and output- and wealth-related *zakah* flows. There might be other factors that would become relevant once various simplifying assumptions in this study were relaxed. Our analysis also supports Islamization of economy as a viable economic policy in a non-Islamic setting.

Interestingly, if an Islamic economy were such as the one perceived in this study, fundamental revisions in the existing practices of statistical accounting of aggregate output, income, and expenditures might not be required. Of course, the *halal* aspect would have to be observed. It would be necessary to expand the scope of existing data compilation practices to develop output accounts along the lines of sectorial composition and income and expenditure accounts for the POOR and RICH categories. Moreover, a regular appraisal of an economy's stock of wealth and its distribution would also be necessary. Of course, development of proper aggregate *zakah* accounts would be essential in order to realize Islamic ideals. Finally, in matters of further

research, rigorous efforts would be needed to develop macroeconomic models of an Islamic economy incorporating financial intermediation, supply-side factors, and foreign trade. The analytical framework developed in this study might serve as a useful point of departure for such a purpose.

In the end, all praises are for Allah, Lord of the universe, who knows what is good for us. We seek his guidance to be on the right path and forgiveness for our conscious and unconscious mistakes. He is too loving and caring for anybody not to seek his pleasure.

APPENDIX: DERIVATION OF THE DISTRIBUTION MEASURE

Suppose that the economy consists of N members, with N_1 in the POOR class and $N_2 = (N - N_1)$ in the RICH class. According to definitions employed in the text, total disposable incomes of POOR and RICH CONSUMERS are Y_{d1} and Y_{d2} , respectively. Let us assume that these disposable incomes are distributed equally within their respective socioeconomic classes. In other words, disposable income of each POOR CONSUMER is $y_{d1} = (Y_{d1}/N_1)$ and that of every RICH CONSUMER is $y_{d2} = (Y_{d2}/N_2)$. Population mean disposable income would be

$$\bar{Y}_d = (Y_{d1} + Y_{d2})/N. \tag{i}$$

The economy-wide variance in disposable incomes may be defined as

$$\sigma^2 = [N_1(y_{d1} - \bar{Y}_d)^2 + N_2(y_{d2} - \bar{Y}_d)^2]/N. \tag{ii}$$

Substitutions for y_{d1} , y_{d2} , and \bar{Y}_d yield

$$\sigma^2 = \left[N_1 \left(\frac{Y_{d1}}{N_1} - \frac{Y_{d1} + Y_{d2}}{N} \right)^2 + N_2 \left(\frac{Y_{d2}}{N_2} - \frac{Y_{d1} + Y_{d2}}{N} \right)^2 \right] / N.$$

Taking note of $N = N_1 + N_2$, necessary simplifications and substitution of $\alpha_1 = [N_1/(N_1 + N_2)]$ and $\alpha_2 = [N_2/(N_1 + N_2)]$ imply

$$\sigma^2 = \{[(\alpha_2 Y_{d1} - \alpha_1 Y_{d2})^2/N_1] + [(\alpha_1 Y_{d2} - \alpha_2 Y_{d1})^2/N_2]\} / N.$$

At this stage, one may note that

$$(\alpha_2 Y_{d1} - \alpha_1 Y_{d2})^2 = (\alpha_1 Y_{d2} - \alpha_2 Y_{d1})^2$$

and

$$(1/NN_1) + (1/NN_2) = 1/N_1N_2 = N^2/\alpha_1\alpha_2.$$

Therefore, economy-wide variance in disposable incomes may be defined as

$$\sigma^2 = [N/(\alpha_1\alpha_2)] [\alpha_2 Y_{d1} - \alpha_1 Y_{d2}]^2 = [N/(\alpha_1\alpha_2)] [\alpha_1 Y_{d2} - \alpha_2 Y_{d1}]^2. \tag{iii}$$

Accordingly, the economy-wide dispersion in disposable incomes in terms of standard deviation would be

$$\sigma = [N/\sqrt{\alpha_1\alpha_2}] [\alpha_2 Y_{d1} - \alpha_1 Y_{d2}] = [N/\sqrt{\alpha_1\alpha_2}] [\alpha_1 Y_{d2} - \alpha_2 Y_{d1}]. \tag{iv}$$

Together, \bar{Y}_d and σ capture all aspects of distribution in our two-class economy, namely, average income and dispersion of the two group incomes around the average. Skewness is not relevant. For purposes of comparative analysis from an inequality point of view, however, we need a pure inequality measure free from any scale effects. Such a measure, along the lines of the usual coefficient of variation, is

$$D = \sigma / \bar{Y}_d, \quad (\text{v})$$

Substitution of (i) and (iv) into (v) and taking note of $\eta_1 \equiv [Y_{d1}/(Y_{d1} + Y_{d2})]$ and $\eta_2 \equiv [Y_{d2}/(Y_{d1} + Y_{d2})]$ yield the following two equivalent definitions of D :

$$D = (\alpha_1 - \eta_1) / \sqrt{\alpha_1 \alpha_2}, \quad (\text{vi.a})$$

$$D = (\eta_2 - \alpha_2) / \sqrt{\alpha_1 \alpha_2}. \quad (\text{vi.b})$$

In either case, the value of D will vary in the interval $[0, \sqrt{\alpha_1/\alpha_2}]$. The lower bound corresponds to $\eta_1 = \alpha_1$ and $\eta_2 = \alpha_2$ (i.e., perfect equality). The upper bound represents perfect inequality when $\eta_1 = 0$ and $\eta_2 = 1$. In between these two extremes, a higher value of D will signify a greater degree of inequality, and vice versa. Of course, in any event the two measures will give the degree of intergroup economic inequality defined in terms of disposable incomes. We prefer to use (vi.a), instead of (vi.b), in the text in order to highlight the state of economic inequalities from the POOR CONSUMER'S point of view.

Finally, the assumption of perfect intragroup equality is the bedrock of D . This is indeed a strong proposition. Proper remedy in this regard can take the form of further disaggregation. However, any such option, far from being fully satisfactory, will give rise to complex inequality measurement issues. On the other hand, manageability considerations within the framework of macroeconomic models strongly favor the use of D .

NOTES

Sayyid Tahir is a professor of economics at International Islamic University, Islamabad, and International Islamic University, Malaysia.

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1. Empirical support for this contention is provided, using consistent procedures, in the author's "Testing for the Existence of Distribution Effects in the Aggregate Consumption Function" (Ph.D. diss., McMaster University, 1981), ch. 4.
2. A formal proof of this is given in *ibid.*, 15-18; this matter will also become evident in subsequent sections of the present study.
3. M. Muhammad Metwally, "Al-Tawazan al-Aam al-Siyasat al-Iqtisadiyyah al-Kulliyah fe Iqtisad al-Islami" [General equilibrium and macroeconomic policies in an Islamic economy] *Journal for Research in Islamic Economics* 1, no. 1 (1983): 1-33, Arabic section.
4. A. Ahmad, *Income Determination in an Islamic Economy*, Research series in English, no. 25 (Jeddah: Centre for Research in Islamic Economics [King Abdul Aziz University], 1987).