



AN ANALYSIS OF *ZAKĀT* EXPENDITURE AND REAL OUTPUT: THEORY AND EVIDENCE

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ABSTRACT

This study advocates *zakāt* as the major and potent fiscal policy instrument in an Islamic state. *Zakāt* plays its role in macroeconomic stabilization through nondiscretionary and discretionary fiscal policy. The built-in stabilizer mechanism occurs when *zakāt* collection is automatically reduced during recession, giving more money to the people to spend—which tends to stimulate the economy—while during the boom period more *zakāt* is collected, reducing the ability of people to spend—which tends to dampen economic activities. These reduce macroeconomic fluctuations. As a discretionary fiscal policy, the government varies the disbursement of *zakāt* to the recipients whenever necessary during the phases of the business cycle. During the expansion phase, the government decreases *zakāt* disbursement to reduce aggregate spending. Likewise, *zakāt* disbursement is increased when the economy is in the downswing to increase aggregate spending. Empirical evidence using Malaysian data supports the hypothesis that *zakāt* spending is a potent fiscal instrument to improve economic performance. The results of panel data regression analysis indicate that *zakāt* expenditure can significantly explain the variation in real output. This suggests that Muslim countries should make serious effort to improve the efficiency of *zakāt* collection and spending to generate growth and development of the *ummah*.

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1. INTRODUCTION

In recent years, there has been relatively rapid progress in the development of the theory and practices of Islamic banking and finance. Indeed, we are quite successful in introducing the field of Islamic banking and finance into practice in both Muslim and non-Muslim countries. Although some Muslim scholars have reservations on the purity of the operations of Islamic banking, Islamic bond market, and Islamic stock market, the fact is very clear: we are moving forward and may Allah guide us into the right path.

The same is not true in other fields of Islamic economics in general. Specifically, there has not been much progress in the development of a concrete Islamic macroeconomic framework, at the conceptual and operational levels. It is hoped that cooperation among Muslim scholars in the relevant disciplines will generate serious interdisciplinary efforts to bring about the relevant ideas for the development of the field of Islamic macroeconomics or macroeconomics from an Islamic perspective. We must make an effort, struggle, and be willing to face the difficult challenges and obstacles along the way. Our main goal now is to have an in-depth formal analysis of Islamic economics framework.

By formal analysis we mean an economic analysis that uses more mathematics or at least diagrams to arrive to the conclusions so that we could minimize ambiguity. Indeed, we need sustained research efforts, innovations, constructive criticisms, and thoughtful and provocative discussions to pave the way for the development and progress of Islamic economic thoughts.

Although it has been recognized that the principal instrument of fiscal policy for an Islamic state is *zakāt*, yet there is not much literature on macroeconomic model in an Islamic framework which incorporates *zakāt* as one of the fiscal policy instruments to analyze the efficacy of fiscal policy to stabilize economic performance. Some argue that *zakāt* is not an effective fiscal instrument to stabilize macroeconomic fluctuations since its channel of transmission to the real sector is only through nondiscretionary policy. Thus, Muslim economists have differing views as to whether *zakāt* could be used as a fiscal instrument for stabilization policy.

Faridi (1983) advocates *zakāt* to be a fiscal policy tool. He argues that *zakāt* occupies a central place in Islamic fiscal policy and operations. As the *zakāt* rate is fixed, it provides stability to public revenues and budget stability. But as the rate of *zakāt* is fixed, the *zakāt* collections will change in accordance to the rise and fall in individual incomes. He thus argues that *zakāt* collection and disbursement may have a stabilizing effect on an Islamic economy through the built-in stabilizer and as a discretionary stabilizer through *zakāt* disbursement. With regard to the countercyclical use of *zakāt*, he further argues that as economic prosperity increases, *zakāt* expenditure declines thereby causing an accumulation of budget surplus. The accumulated budget surplus on the account of *zakāt* may be held over during those years and used when recession or depression sets in causing hardship to people. This opinion is based upon the fact that there is no compulsive direction in the *Qur'ān* or the *Sunnah* to disburse *zakāt* collections immediately. If *zakāt* is intended for poor recipients, it may require both its immediate transfer, and/or its retention depending what serves their interest better.

Ahmed *et al.* (1983) point out that there are a group of economists who are in favor of using *zakāt* as a countercyclical policy as it is not obligatory to disburse all the *zakāt* collection within a specific period, which implies that some *zakāt* proceeds can be withheld during an inflationary period and to be used during a recessionary period to improve the economy's performance; while another group argue otherwise. Metwally (1983) finds that *zakāt* disbursement has the ability to increase aggregate consumption since the marginal propensity to consume of *zakāt* payers is lower than that of *zakāt* recipients. This implies that *zakāt* disbursement has a role in national income determination; the higher the *zakāt* expenditures the higher the increase in equilibrium output.

Tahir (1989) develops and introduces *zakāt* in an Islamic macroeconomic model focusing on the determination of aggregate output associated with the degree of inequalities in an Islamic economy. In this model, the equilibrium levels of output, income, and inequalities in an Islamic economy depend on the level of autonomous expenditure, income distribution between the poor

and the rich, and output and wealth-related *zakāt* flows. Specifically, he formulates five behavioral equations, namely: the degree of economic inequality, the incomes of the poor and rich, and the consumptions of the poor and rich. The rest is the national income identity while investment, *zakāt*, and taxes are assumed to be exogenous. Using this model framework, he arrives to the conclusion that the equilibrium level of aggregate output depends on autonomous expenditures, income distribution, and *zakāt* flows.

This paper here will advocate *zakāt* as the major fiscal policy instrument in an Islamic state that can be used to stabilize macroeconomic fluctuations. This paper is indeed my humble contribution to the area of Islamic macroeconomics, to analyze the impact of *zakāt* in the determination of national income, which is an extension of Yusoff (2006). Toward this end, we divide the household sector into two groups: those who pay *zakāt* and those who receive *zakāt*, similar to the approach taken by other Muslim economists, such as Ahmad Ausaf (1987) and Sayyid Tahir (1989). We then formulate the equations of aggregate consumption and *zakāt* from which the reduced form consumption equation is derived. The direction of the impact of exogenous *zakāt* disbursement on national income is determined through the *zakāt* multipliers.

In this paper, it is assumed that the amount of *zakāt* disbursed to the recipients may be less or equal to the *zakāt* fund depending on the economic situations as suggested by Faridi (1983). During the expansion phase of a business cycle, *zakāt* collection may be more than *zakāt* disbursement as more people are employed and there would be less eligible *zakāt* recipients, and therefore we should have *zakāt* surplus. During recession, we would expect a fall in *zakāt* collection and a rise in *zakāt* disbursement as more people are eligible to receive *zakāt*, which leads to *zakāt* deficit and this deficit should be covered by the *zakāt* surplus accumulated in the previous years.

However, *zakāt* disbursement should be at most equal to the *zakāt* fund available, termed as a balanced *zakāt*. Although the government can discretely change the amount of *zakāt* to be disbursed, the total disbursement of *zakāt* by the *zakāt* authority in a particular year should be at most equal to the *zakāt* fund available in that year. *Zakāt* deficit should be discouraged in Islam as it

reflects extravagance but *zakāt* surplus is encouraged as it reflects thriftiness. On this issue, Faridi (1983:127) suggests the investment of *zakāt* surplus for the benefit of the poor. He accords that the easiest way to disburse *zakāt* is to expend the *zakāt* fund to the poor via transfer payments, but then argues that in the light of the objectives of *zakāt* and modern economic analysis it is possible to utilize *zakāt* in order to produce a cumulative effect on poverty and as an instrument of active fiscal policy. A part of *zakāt* fund or *zakāt* surplus may be utilized for productive investment.

There are a number of verses in the *Qur'ān* giving broad guidelines to spending behavior of Muslims. For example, *Qur'ān*, 25:67 says “Those who, when they spend, are not extravagant and not niggardly, but hold a just (balance) between those (extremes).” This verse does not specifically state the sources of the fund and who is spending it and therefore could be applied to many situations as permitted by *Shari'ah*. For example, based on this verse, Haque et al. (2009,115) argue that one of the aims of Islam is to balance between materialism and spiritualism; between individualism and socialism; between theory and practice; and between extravagance and niggardliness. They argue further that on the basis of the principle of moderation, Islam strongly condemns all extremes or negligence in both religious and worldly matters.

The Prophet (pbuh) has explained further the meaning of the concept of moderation in Islam. He says, “This religion is easy. No one becomes harsh and strict in the religion without it overwhelming him. So fulfill your duties as best you can and rejoice. Rely upon the efforts of the morning and the evening and a little at night and you will reach your goal.” (*Ṣaḥīḥ al-Bukhārī*).

According to Sheikh Salman al-Oadah (2008), this *ḥadīth* establishes the essential principle that the religion (Islam) is one of ease and facilitation. Muslims today are in great need of understanding this properly. Moderation and facilitation do not imply that a person can follow his own predilections without regard for the dictates of the sacred texts. By contrast, moderation is intrinsic to those texts. It is embodied in the Islamic teachings which are drawn from the *Qur'ān* and the *Sunnah*. He explains further that moderation is not a single, rigid idea. Nor it is a mere slogan to be invoked at various times. Rather, it is a methodology, a

principled approach based upon the *Qur'ān* and the *Sunnah* with regard to the general objectives of Islamic Law and an attitude of assuming the best about others and seeking the best way to facilitate their needs.

In the subsequent discussion, we shall advocate the case where *zakāt* spending is the major instrument of fiscal policy in an Islamic economy; the Islamic state employs the *zakāt* policy to fine tune and develop the economy. We then discuss the effect of *zakāt* policy on equilibrium national income using a much simplified Keynesian model where *zakāt* is formally introduced. The analysis and discussion are more formal in the sense that basic mathematics or calculus is used. By doing so we would hope that the argument will be less ambiguous.

2. THE MODEL FRAMEWORK

In an effort to make the analysis as simple as possible, we shall focus the discussion in the case where *zakāt* is the only fiscal policy instrument. The model is a three-sector Islamic economy consisting of household, firm, and government sectors. The household sector is divided into two sub-categories: one category supplies the factor of production to the business and government sectors, receives income in return, and then spends this on goods and services; while the other sub-group receives *zakāt* from the government. The household is the major sector in terms of spending. Business firms employ labor and other factors of production to produce goods and services and then sell them to the household and government sectors. The government sector collects *zakāt* from the household and business sectors and disburses it to the eight categories of *zakāt* recipients, namely: the poor, one who has neither material assets nor means of livelihood; the needy, one with insufficient means of livelihood to meet basic needs; the *zakāt* administrator, one who is appointed to collect and administer *zakāt*; the new convert, one who has converted to Islam; the slave, one who wants to free himself from bondage; the debtor, an individual who is in debt when he/she borrows money to buy *ḥalāl* basic needs such as foods, clothing, education, and healthcare; for the path of Allah, one who carries out activities for the cause of Allah; and finally, a wayfarer, one who is stranded in a journey.

2.1 NATIONAL INCOME IDENTITY

We write the national income identity for a closed economy as:

$$(1) \quad Y = C_1 + C_z + I;$$

where Y is the national income, C_1 is the consumption of *zakāt* payers, C_z is the consumption of *zakāt* recipients, and I is the gross private domestic investment.

We shall not explain the concept of national income accounting in an Islamic economy since it has been discussed adequately in Yusoff (2006).¹ The basic differences between these two papers are as follows. The previous paper assumes that the *zakāt* recipients have no income; they totally depend on *zakāt* and *sadaqah* for consumption purposes. The present paper considers two groups of *zakāt* recipients: those who do not have income and those who have income but insufficient to cover their basic needs.²

Now, we define:

$$(2) \quad Y = Y_1 + Y_2;$$

where Y_1 and Y_2 are the incomes accrued to *zakāt* payers and recipients respectively.

Dividing (2) by Y , we obtain:

$$(3) \quad 1 = Y_1/Y + Y_2/Y \\ = \alpha + \beta;$$

where α and β are the proportions of Y_1 and Y_2 in national income or simply the income distribution between the two groups. Solving for Y_1 and Y_2 in terms of Y , we have:

$$(4) \quad Y_1 = \alpha Y, \\ Y_2 = \beta Y.$$

We would expect α to be relatively higher than β . Equations (4) are important, which will become more obvious later.

2.2 AGGREGATE CONSUMPTION

The desired aggregate consumption of the *zakāt* payers is given as:

(5)

where C_{01} is the autonomous consumption of *zakāt* payers, where they will dispose their assets to purchase goods and services when their income is zero, c_1 is the marginal propensity to consume (MPC₁), and Y_1 is their income. Thus, $(Y_1 - Z)$ is the disposable income after deducting *zakāt* payments. We would expect c_1 to be relatively low.

The desired consumption of the *zakāt* recipients is

$$(6) \quad C_Z = C_{0Z} + c_Z G_Z + c_2 Y_2, \quad 0 < c_Z < 1, \quad 0 < c_2 < 1;$$

where C_{0Z} is the autonomous consumption where the *zakāt* recipients consume goods and services, for example from *sadaqah*, if they have no income and do not receive *zakāt*, c_Z is the marginal propensity to consume of *zakāt* recipients with respect to *zakāt* (MPC_Z), G_Z is the amount of *zakāt* spending, c_2 is the marginal propensity to consume of *zakāt* recipients with respect to income Y_2 (MPC₂). We would expect c_Z and c_2 to be higher than c_1 . If c_Z equals to c_2 then equation (6) reduces to:

$$(6a) \quad C_Z = C_{0Z} + c_Z (G_Z + Y_2), \quad 0 < c_Z < 1.$$

The desired aggregate consumption, C , is:

$$(7) \quad C = C_1 + C_Z.$$

Substituting (5) and (6) into (7), we obtain:

$$(7a) \quad C = C_{01} + c_1(Y_1 - Z) + C_{0Z} + c_Z G_Z + c_2 Y_2.$$

Simplifying and rearranging (7a), we have:

$$(7b) \quad C = C_{01} + C_{0Z} + c_1(Y_1 - Z) + c_Z G_Z + c_2 Y_2.$$

We would expect C_{01} to be higher than C_{0Z} since the *zakāt* payers can consume more at zero income in aggregate by disposing their wealth.

2.3 THE *ZAKĀT* COLLECTION

The *zakāt* collection from the *zakāt* payers is:

$$(8) \quad Z = z(Y_1 - C_{TE}) + zA_0;$$

where Z is the *zakāt* collection, z is the *zakāt* rate, C_{TE} is the total *zakāt* exemptions, and A_0 is the initial amount of asset holdings.³ This is a simplified *zakāt* collection equation to represent what is being practiced in Malaysia.

2.4 THE REDUCED FORM CONSUMPTION EQUATION

Substituting the *zakāt* equation (8) into the consumption equation (7b), we obtain:

$$(9) \quad C = C_{01} + C_{0Z} + c_1 z C_{TE} + c_1 Y_1 - c_1 z Y_1 \\ + c_Z G_Z + c_2 Y_2 - c_1 z A_0.$$

Equation (9) suggests that the reduced form aggregate consumption depends directly on the income of *zakāt* payers and *zakāt* recipients, *zakāt* disbursement, and asset holdings or wealth.

3. AGGREGATE INCOME-EXPENDITURE ANALYSIS

We shall employ a simplified Keynesian aggregate income and aggregate expenditure approach to determine the equilibrium national income. As in Tahir (1989), gross investment expenditure is assumed to be exogenous. The equilibrium income is determined when the aggregate income equals aggregate expenditure.

Substituting the aggregate private consumption (9) into the national income identity (1), we obtain:

$$(10) \quad Y = C_{01} + C_{0z} + c_1 z C_{TE} + (c_1 - c_1 z) Y_1 \\ + c_z G_z + c_2 Y_2 + I_0 - c_1 z A_0.$$

Substituting $Y_1 = \alpha Y$ and $Y_2 = \beta Y$ into (10), rearranging, and solving for Y , we have:

$$(11) \quad Y = \frac{[C_{01} + C_{0z} + c_{1z} C_{TE} + c_z G_z - c_1 z A_0 + I_0]}{[1 - \alpha(c_1 - c_1 z) - c_2 \beta]}$$

Equation (11) suggests that national income is determined by the amount of *zakāt* spending, G_z asset holdings, and investment. Given the values of the parameters and the exogenous variables in the RHS, we can then calculate the equilibrium national income.

3.1 THE SAVING-INVESTMENT APPROACH

National income can also be decomposed according to how it is used, given as:

$$(12) \quad Y = C_1 + S + Z;$$

where S is aggregate saving. That is, national income or output is used for consumption, paying *zakāt* due, and saving. Therefore, this equation is always true:

$$(12a) \quad C_1 + S + Z = Y = C_1 + C_z + I.$$

Subtracting C_1 , we have:

$$S + Z = Y - C_1 = C_z + I.$$

Thus, the national income equilibrium is determined when:

$$(12b) \quad S + Z = C_z + I.$$

Equation (12b) says that the national income equilibrium is determined when leakage ($S + Z$) is equal to injection ($C_Z + I$). Substituting for C_Z , we have:

$$(12c) \quad S + Z = C_{0Z} + c_Z G_Z + \beta c_2 Y + I.$$

3.2 EQUILIBRATING MECHANISM

Investment, I , in equation (12a) is the actual investment realized by the producers. It consists of planned investment, I_p and unplanned investment or a change in inventory, I_{up} , which can be written as:

$$(13) \quad I = I_p + I_{up}.$$

Substituting (13) into (12b), we have:

$$(13a) \quad S + Z = C_Z + I_p + I_{up}.$$

Unplanned investment, I_{up} could be positive or negative or zero, which occurs due to the unexpected changes in the supply and demand conditions. When unplanned investment is zero, it means that the economy is producing exactly as consumers demand and therefore the economy is at equilibrium. The equilibrium income is determined when unplanned investment is zero or when planned investment equals actual investment.

When unplanned investment is positive it means that the economy is producing more than the consumers demand; sellers stop making orders from producers, signaling to producers that they should reduce production and get rid of the inventory to zero to achieve equilibrium output.

When unplanned investment is negative it means that the economy is producing less than the consumers demand; sellers increase orders signaling to the producers that they should increase production to move toward equilibrium output.

In this model, inventory acts as an important mechanism to equilibrate supply and demand in the economy. Thus, unplanned investment is the equilibrating mechanism of this simple model.

3.3 THE MULTIPLIERS

Since this study focuses on the impact of *zakāt* on equilibrium income, we shall now derive the multipliers for investment and *zakāt* disbursement.

The total differential of (11) is:

$$(14) \quad dY = \frac{[dC_{01} + dC_{0Z} + c_{1Z}dC_{TE} + c_z dG_z - c_1 z dA_0 + dI_0]}{[1 - \alpha(c_1 - c_1 z) - \beta c_2]}.$$

Equation (14) shows the effects of the changes in each of the exogenous variables on the endogenous variable, Y . The multiplier for Z_E is obtained by taking partial derivative of (14) with respect to Z_E . The multiplier for *zakāt*, G_z , is:

$$(15) \quad \partial Y / \partial G_z = c_z / [1 - \alpha(c_1 - c_1 z) - \beta c_2] > 0.$$

The *zakāt* multiplier depends on the marginal propensity to consume of *zakāt* recipients, c_z . Since $c_z > 0$, the *zakāt* multiplier is positive, implying that an increase in *zakāt* expenditure will increase economic activities. The government or *zakāt* authority will decide on the amount of *zakāt* to be disbursed, G_z . In the special case where $c_z = 1$, the *zakāt* multiplier (15) becomes:

$$(16) \quad \partial Y / \partial G_z = 1 / [1 - \alpha(c_1 - c_1 z) - \beta c_2];$$

showing that, in this special case, when all the *zakāt* received by the *zakāt* recipients is spent for consumption, then the *zakāt* multiplier is the same as the multipliers of C_{01} , C_{0Z} , and I_0 , but its impact on equilibrium income is higher than the case when $c_z < 1$.

4. THE BALANCED ZAKĀT

Some economists argue that all the *zakāt* collected in a particular year should be disbursed in that year. The effects of this strategy in an economy can be analyzed by imposing a restriction that *zakāt*

collection equals to *zakāt* disbursement, that is $G_Z = Z$, and we shall call this as a balanced *zakāt*.

4.1 AGGREGATE CONSUMPTION

Recall equation (7b), which is the aggregate consumption function when *zakāt* collection is not equal to *zakāt* disbursement given as:

$$(7b) \quad C = C_{01} + C_{0Z} + c_1(Y_1 - Z) + c_Z G_Z + c_2 Y_2.$$

If all the *zakāt* fund is spent then $Z = G_Z$, therefore (7b) becomes:

$$C = C_{01} + C_{0Z} + c_1(Y_1 - G_Z) + c_Z G_Z + c_2 Y_2.$$

Simplifying, we obtain:

$$(17) \quad C = C_{01} + C_{0Z} + c_1 Y_1 + (c_Z - c_1) G_Z + c_2 Y_2.$$

4.2 THE MULTIPLIERS

Substituting for C of (17) in national income identity (1) and taking the total differential, we obtain:

$$Y = C_{01} + C_{0Z} + c_1 Y_1 + (c_Z - c_1) G_Z + c_2 \beta Y + I_0.$$

Simplifying and rearranging, we have:

$$Y = [1/(1 - c_1 \alpha - c_2 \beta)][C_{01} + C_{0Z} + (c_Z - c_1) G_Z + I_0].$$

Taking total differential:

$$(18) \quad dY = [1/(1 - c_1 \alpha - c_2 \beta)][dC_{01} + dC_{0Z} + (c_Z - c_1) dG_Z + dI_0].$$

The balanced *zakāt* multiplier is obtained as:

$$(19) \quad \partial Y / \partial Z_E = (c_Z - c_1) / (1 - c_1 \alpha - c_2 \beta) > 0.$$

If $c_z > c_1$ then $(c_z - c_1) > 0$, therefore the *zakāt* multiplier is positive, implying that an increase in *zakāt* collection and the subsequent disbursement by the *zakāt* authority and spending by *zakāt* recipients will increase economic activities. In this case, the effect of an increase in *zakāt* depends crucially on the differential between the marginal propensity to consume by *zakāt* payers, c_1 , and *zakāt* recipients, c_z ; the higher the value of c_z and the lower the value of c_1 , the higher the value of multiplier and therefore the greater is the effect of *zakāt* on economic activities.

4.2.1 SPECIAL CASES

In a special case where $c_z = 1$, the *zakāt* multiplier is:

$$(20) \quad \partial Y / \partial G_z = (1 - c_1) / (1 - c_1 \alpha - c_z \beta) > 0.$$

Since $0 < c_1 < 1$, the *zakāt* multiplier in this special case is positive; an increase in *zakāt* spending will be unambiguously raising the economic activities. The multiplier is larger than in the case of $c_z < 1$.

When $c_z = 1$, $\beta = 0$, $\alpha = 1$, then:

$$(21) \quad \partial Y / \partial G_z = (1 - c_1) / (1 - c_1) = 1.$$

Under these conditions a dollar of *zakāt* disbursed by the government would generate a dollar of income. This occurs only when all *zakāt* recipients have no income and spend all the *zakāt* received.

4.3 THE IMPACT OF INCOME DISTRIBUTION PARAMETERS ON THE SIZE OF ZAKĀT MULTIPLIER

The impact of *zakāt* spending on national output depends on the magnitude of its multiplier, and two of the parameters in the multiplier are the income distribution parameters, α and $\beta = (1 - \alpha)$. Therefore, it is logical to ask whether we could change the income distribution parameters to increase the size of the multiplier. To see this, let us use the *zakāt* multiplier equation (17). Holding the

zakāt rate constant, we then vary α , which will automatically vary $\beta = (1-\alpha)$ in the opposite direction. As a result, the answer is not obvious because as more wealth is redistributed in favor of the poor, the rich then become relatively poorer which results in their marginal propensity to consume to increase while the marginal propensity to consume of the poor falls. Since both MPCs determine the size of the multiplier, therefore changing the income redistribution in favor of the poor may not have much effect on the size of *zakāt* multiplier and national income.

5. EMPIRICAL MODEL AND ESTIMATION TECHNIQUES

Equation (11) is our basic empirical model which, generally, can be written as:

$$(22) \quad Y_t = \theta_0 + \theta_1 GZ_t + \theta_2 X_t + u_t;$$

where Y is the real output, represented by real GDP, GZ is the *zakāt* expenditure, X are other variables that influence real output, θ_0 , θ_1 , θ_2 are the parameters to be estimated, and u is the disturbance term. All the variables are in logs. We expect the *zakāt* expenditure to be positively related to GDP; an increase in *zakāt* spending would raise income. This study uses panel data analysis⁴ to analyze the effect of *zakāt* spending on real output.

Panel data analysis has the ability to exploit the rich information inherent in cross-section and time series analyses. It also takes into account the heterogeneity of individual cross-sectional units by allowing for individual-specific effects and gives more variability and degrees of freedom. We shall employ a panel data analysis with fixed effect model, and therefore equation (22) is rewritten as:

$$(23) \quad Y_{it} = \theta_0 + \theta_1 GZ_{it} + \theta_2 X_{it} + \delta_i + u_{it};$$

where i denotes the cross-section units represented by the fourteen states of Malaysia, θ_0 is the overall intercept, and δ is the fixed effect.

The fixed effects model (FEM) assumes that the slope coefficients θ_1 and θ_2 are constant for all cross-section units while

the intercept varies over individual cross-section units but does not vary over time. The intercept, δ_i , takes into account of the heterogeneity influence from unobserved variables which may differ across the cross-section units.

Prior to the estimation of equation (23), we first test the stationarity of the series. There are several methods which can be used for testing the presence of a unit root of panel data. In this study, we use the Hadri z-statistic, where the null hypothesis is no unit root.

5.1 SOURCES OF DATA

The study uses Malaysian data from 2003 to 2006, as the published data on *zakāt* expenditure are only available for the most recent years with a few states having missing values. We therefore decided to use panel data analysis, where the cross-section units are the fourteen states in Malaysia. Moreover, *zakāt* is collected and spent by separately each state. The annual data on *zakāt* expenditure and GDP were obtained from the Pusat Pungutan Zakat, Majlis Agama Islam Wilayah Persekutuan (*Zakāt* Collection Centre, Federal Territory Islamic Religious Council) and the Economic Planning Unit (EPU) respectively.

5.2 ESTIMATION METHODS

In the empirical estimation, we ignore the other variables, X , in equation (26) and focus only on *zakāt* expenditure since data on the other variables at state level are not available at the moment. Since we are using panel data analysis, ordinary least squares (OLS) estimation may be inappropriate as the errors are likely to be contemporaneously correlated across time and across cross-section units, although we still report OLS estimates for comparison purposes. The most appropriate technique of estimation is the Generalized Least Squares (GLS) method.

To avoid bias in the estimates due to possible endogeneity of the regressor, GZ , we then use generalized method of moments (GMM) technique estimation on the GLS transformed data using lagged dependent and independent variables as instruments. Before the GMM technique is applied, we test for the existence of unit root in the series (not reported here).

The Hadri *z*-statistic, where the null hypothesis is no unit root, indicates that both GDP and *zakāt* spending have unit roots on levels but the hypotheses of no unit roots on the first differences are accepted. These suggest that we should estimate the model using GMM technique on the first differences to avoid spurious regression results.

5.3 RESULTS AND DISCUSSION

The least squares estimates in Table 1 suggest that *zakāt* has the ability to influence real GDP.

TABLE 1
Results of Panel Least Squares on Level

$LGDP_t = -0.1706 + 0.5874LGZ_t$
(2.0545) (0.1213)
Adjusted- $R^2 = 0.3711$, D-W statistic = 0.2495,
 F -statistic = 23.4278 (prob = 0.0000)

Fixed Effects

States	δ_i
Kedah	-0.300583
Kelantan	-0.879179
Melaka	-0.581911
Negeri Sembilan	-0.560769
Pahang	-0.292747
Perlis	-1.815069
Pulau Pinang	0.331543
Perak	0.303364
Sabah	0.546414
Selangor	0.803892
Sarawak	0.685836
Terengganu	-0.110010
Federal Territory	0.137601

Note: Values in parentheses below each coefficient are the standard errors.
 $\Delta LX = LX - LX(-1)$ where $LX = \{LGDP, LGZE\}$

However, the D-W statistic is highly significant, suggesting that the error terms are correlated across time. When the model is estimated with AR(1), then *zakāt* is no longer significant but the AR(1) coefficient is highly significant.

We then re-estimate the model at first difference using the GLS method using the seemingly unrelated (SUR) model, where both autocorrelation and correlation among the cross-section units are corrected. The results in Table 2 indicate that the coefficient of *zakāt* is highly significant. The goodness of fit is high at about 95 percent. The *F*-statistic is also high, rejecting the null that the effect of *zakāt* on real GDP is zero, but the D-W statistic is still significant suggesting that autocorrelation is not fully eliminated.

TABLE 2
Results of Panel Generalized Least Squares on First Differences

$$\Delta LGDP_i = 0.0477 + 0.0024 \Delta LGZ_i$$

(0.0013) (0.0009)

Adjusted-*R*² = 0.9478, D-W statistic = 1.2698,
F-statistic = 619.33 (prob = 0.0000)

Fixed Effects	
States	δ_i
Johor	0.003609
Kedah	“0.003022
Kelantan	“0.010582
Melaka	“0.002144
Negeri Sembilan	“0.006322
Pulau Pinang	0.002701
Perak	“0.003745
Sabah	“0.002985
Selangor	0.005080
Sarawak	“0.001279
Terengganu	“0.006637
Federal Territory	0.009124

Note: Values in parentheses below each coefficient are the standard errors.

$\Delta LX = LX - LX(-1)$ where $LX = \{LGDP, LGZE\}$

We further re-estimate the model at first difference using GMM, still with SUR model to correct both the contemporaneous correlation across time and equations. The results shown in Table 3 suggest that the goodness of fit is still high at 92 percent, suggesting that 92 percent of the variations in the output growth are explained by the *zakāt* growth and cross-section units (states) intercepts. The *zakāt* coefficient is highly significant, and the D-W statistic is insignificant. The impact of *zakāt* growth on GDP growth is small but significant. Specifically, a 10 percent increase in *zakāt* expenditure results in a 0.6 percent growth in real GDP.

TABLE 3
Results of Panel Generalized Method of Moments
– Generalized Least Squares on First Differences

$$\Delta LGDP_t = 0.0414 + 0.0651 \Delta LGZ_t$$

(0.0048) (0.0293)

Adjusted- $R^2 = 0.9204$, D-W statistic = 2.0973,
 F -statistic = 641.05 (prob = 0.0000)

Fixed Effects

States	δ_i
Johor	0.005101
Kedah	"0.002095
Kelantan	"0.009744
Melaka	"0.001291
Negeri Sembilan	"0.002772
Pulau Pinang	0.002488
Perak	"0.004028
Sabah	0.007828
Selangor	0.005320
Sarawak	0.003024
Terengganu	"0.011259
Federal Territory	0.007418

Note: Values in parentheses below each coefficient are the standard errors.

$\Delta LX = LX - LX(-1)$ where $LX = \{LGDP, LGZE\}$

6. CONCLUSION

This study attempts to analyze the potential of *zakĒt* as a fiscal policy instrument in an Islamic state using a simple Keynesian model. We formulate the consumption equations for both *zakĒt* payers and recipients, and *zakĒt* collection to derive an equilibrium equation in the goods market showing the relationship between *zakĒt* spending and real output. Empirical evidence using Malaysian panel data supports the hypothesis that *zakĒt* spending is a potent fiscal instrument to generate economic growth.

It is suggested here that Muslim countries must make all effort to establish *zakĒt* as the major tool to spur economic growth. In order to make this a success, we must organize *zakĒt* collection and *zakĒt* spending in the most effective and efficient manner. As long as *zakĒt* collection and spending are disorganized, we can never achieve the potential of *zakĒt* as an effective fiscal instrument.

ENDNOTES

1. This is a revised version of the same article, presented at the *National Seminar on Macroeconomics in an Islamic Perspective*, Kuala Lumpur, 2004, where government spending and taxes are included in the model.
2. This point was raised by Dr. Mabid Ali Al-Jarhi at the National Seminar on Macroeconomics in an Islamic Perspective, 2004.
3. A more detailed discussion on the derivation of *zakĒt* equation is given in Yusoff (2006).
4. For a more detailed discussion on panel data, refer to Greene (2003).

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