Waqf Financing Expenditure and its Impact on Government Debt

Azniza Hartini bt Azrai Azaimi Ambrose[1], Mohamed Aslam[2], Hanira Hanafi[3]

[1] Kulliyyah of Economics and Management Sciences, International Islamic University Malaysia, azniza_azrai@iium.edu.my

[2] Faculty of Economics and Administration, University of Malaya, maslam@um.edu.my

[3] Faculty of Economics and Administration, University of Malaya, hanira_hanafi@um.edu.my

Abstract – **The Malaysian debt has been under scrutiny since the 1Malaysia Development Berhad (1MDB) scandal; placing pressure on the research for sustainable debt. The purpose of this article is to forecast the impact of *waqf* (Islamic pious foundation) financing expenditure on federal government debt in Malaysia. It is to ascertain whether *waqf* can be an alternative solution to government debt reduction. To perform this, the Neoclassical Dynamic Stochastic General Equilibrium (DSGE) model is adopted. The theoretical framework is developed by considering the history, tradition, culture, and political influence of *waqf* primarily in Muslim majority countries. It was also inspired by the European third sector framework. The result shows that federal government debt can be reduced when *waqf* finances federal government expenditure. This has several implications. For one, this study revives the cohesive government-*waqf* role in providing pure and mixed public goods without depending solely on government expenditure. It highlights the fact that these shared role has an impact of reducing government debt. The result also inadvertently provides evidence of a significant third sector role on public finance dynamics. As a matter of fact, this study is one of very few quantitative attempts in illustrating how *waqf* interacts with the economy and its impact on government debt.**

Keywords – Waqf, Islamic Economics, public finance

I. INTRODUCTION

In conventional economic theory, there are multiple strategies to attain government debt sustainability. The New Keynesian economics proposes that economic growth rate should supersede interest rate of debt (Marattin et al., 2011; Mabugu et al., 2013) [1, 2] while the New Classical Economics calls for an increase in tax rates or expenditure cuts (Qin et al., 2006; Sakuragawa and Hosono, 2011; Hansen and İmrohoroğlu; 2016) [3, 4, 5]. Internalizing both of the schools' recommendation, the balanced budget and multi period strategy came about. The former involves simultaneous manipulation of variables in the government budget constraint (Cogan et al., 2012) [6] while the latter in different fiscal periods (Reith, 2014) [7]. Copious studies had verified these strategies by developing a macroeconomic model and generated a forecast of debt to gross domestic product (GDP) ratio. Their modelled economy consists of a representative from households, a representative from firms, and the conduct of monetary and fiscal policy by the government. These studies however, never considered the inclusion of the third sector in their economy leaving a wide literature gap on the possible third sector impact on economic variables. The third sector or voluntary sector includes "all such individual and social activities, which are not by intent or design, undertaken to attain any economic or material benefit for the doer or doers, but generate wide ranging economic repercussions" (Faridi, 1983, p.35) [8].

On the other hand, literature in Islamic economics has long considered this. *Waqf*, which is considered as a component of the third sector (Faridi, 1983; Kahf, 2014; Arshad and Haneef, 2016) [8, 9, 10], had acquired a pivotal role in the economic landscape of past Muslim economies. The literature named *waqf* as one of several sources of revenue in past Muslim governments; used to finance pure public goods, mixed public goods, as well as other social goods and services (Faridi, 1983; Siddiqi, 1995; Gil, 1998; Babacan, 2011; Biancone and Radwan, 2019) [8, 11, 12, 13, 14]. These items essentially make up the components of modern public expenditure. In addition, Sultan Salahuddin al Aiyyubi of the Ayyubid dynasty introduced *waqf* as a supplementary fiscal policy in the Nile Valley with its application lasting through the Ottoman rule (Frenkel, 1999) [15]. In fact, Ambrose et al. (2018a) [16] had concluded that *waqf* financing modern expenditure is also doable with its model thought out by Ambrose et al. (2018b) [17]. Çizakça (1998) [18] had long envisioned that debt can be ultimately

reduced should *waqf* be assigned to finance certain components of government expenditure. A simulation was specifically done for Malaysia by Marzuki et al. (2012) [18] which found that *waqf* can help government save more thus enabling the savings to finance debt.

However, all these studies had only focused on the historic economic application of *waqf* or theoretically argued its uses and impact on modern economies. Few studies had actually employed macroeconomic models using real data to show *waqf*'s evident impact on modern economy. Hence, the purpose of this article is to examine the impact of *waqf* financing government public expenditure on debt using Dynamic Stochastic General Equilibrium (DSGE) model. The Malaysian federal government is the country of choice for this study.

This article is organised as follows. The second section discusses the construction of a *waqf* framework in light of modern economy. Based on the framework, a theoretical model is built in the third section. The theoretical model then gave rise to the model equilibrium in Section 4. The fifth and sixth sections present the calculation for parameter values and steady state values. Simulation is then done in the eighth section and a conclusion is presented in the final section.

II. CONSTRUCTING THE FRAMEWORK OF *WAQF* IN MODERN ECONOMY

Waqf or its plural *awqaf* means retaining and preserving certain asset strictly for specific philanthropy purposes (Kahf, 2014) [9]. Just like *sadaqah* (donation), *waqf* endowments are mainly driven by the altruistic behaviour of humans. In Islamic history, it had played a pivotal role in supplying pure and mixed public goods in a decentralized fashion. Pure public goods are "goods that are non-excludable (not easily denied to unauthorized consumers) as well as non-rival (capable of being enjoyed by many consumers at once)" (Kuran, 2001, p.841) [20] while mixed public goods possess the characteristics of both private and public goods. However, mixed public goods are also categorized as public goods in the Islamic context (Akhthar, 1995) [21]. At its height, *awqaf* were endowed by the state and society for the purposes of defence, water supply, education, training, healthcare, animal care, transportation, and others (Peri, 1992; Çizakça,1998; Gil, 1998; Kahf, 2014) [22, 18, 12, 9]. *Waqf* for these purposes are often termed as public *waqf.*

One of the earliest *waqf* was initiated by Prophet Muhammad peace be upon him (pbuh) in which the Prophet had converted a property left by Mukhayriq into *waqf* for defence (Gil, 1998; Kahf, 2014) [12, 9]. As the territories of Islam expanded, Caliph Umar al-Khattab converted many conquered villages and Egyptian lands into *waqf* for military benefit and the Muslim public (Gil, 1998) [12]. Later on, Caliph Al-Ma'mun from the Abbasid Caliphate, provided healthcare through similar means and ensured continuous streams of income through a *waqf* investment fund (Kahf, 2014) [9]. The fund had invested in business, residential buildings, and agricultural lands (Kahf, 2014) [9]. Later on, Sultan Salāh al-Dīn of the Ayyubid Dynasty formally introduced *waqf* as a public policy that augmented his fiscal reforms which lasted through the Ottoman era (Frenkel, 1999) [15]. These are a few examples of how *waqf* had interacted with state rulers or governments.

On the other hand, past upper class societies were also motivated to endow *waqf* (Bonine, 1987; Kuran, 2001) [23, 20]; indicating an interaction of *waqf* with past communities. One of the ways undertaken by them to sustain *waqf* was by using profits from their own businesses for *waqf* support. Bonine (1987) [23] discussed at length the evolution of Yazaad Bazaar in Iran which began through *awqaf* endowed by viziers and local patrons. It serves as proof that *waqf* had been the epicentre for economic expansion. Scores of businesses were developed and then converted into *waqf* back then; operated to fund religious schools, mosques, water cisterns, and other purposes. It further shows that *waqf* had also interacted with the market. Similarly, the *waqf* investment fund set up by Caliph Al-Ma'mun mentioned earlier may also serve as another example. Hence, it can be seen that *waqf* had integrated with the community, market, and state in the past. This is reminiscent of the modern third sector championed by Europe.

Pestoff (1992) [24] had developed a specific framework of third sector to which Evers and Laville (2004) [25] as well as Defourny and Pestoff (2008) [26] claimed the best representation for Europe by far. The framework, the third sector in the welfare triangle, is depicted in Fig. 1. The outer shape namely the welfare triangle indicates two things (Evers and Laville, 2004) [25]. First, each vertex denotes the sources of welfare contribution namely state, market, and community. Second, to show that the third sector is not juxtaposed with public sector (state) and private sector (community and market) but is in fact an intermediary sector. This is only rational because the third sector complements and interrelates with the other two sectors (Defourny and Pestoff, 2008) [26]. Meanwhile, the inner circle comprises of third sector organisations (TSOs). These TSOs are "simultaneously influenced by state policies and legislation, the values and practices of private business, the culture of civil society and by needs and contributions that come from informal family and community life" (Evers and Laville, 2004, p.15) [25]. The limits of these influences are defined using three types of dotted lines outlining the behaviours of state, market and community while simultaneously forming overlapping areas.

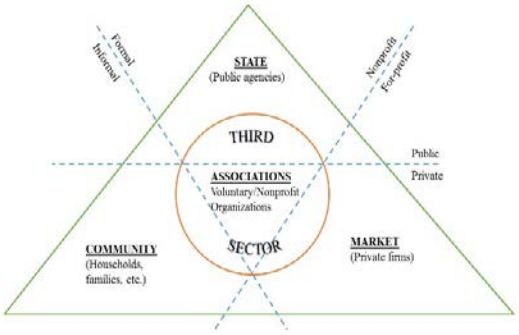

Figure 1. The Third Sector in the Welfare Triangle
Source: Pestoff (1992, p.25) [24]

Assuming that *waqf* can be termed as a type of TSO, the overlapping area between the state and the third sector indicates the role that *waqf* has on implementing public policy which are public, non-profit, and formal in nature. This is similar to past Muslim rulers that had converted conquered lands, villagers, and treasury revenues into *waqf*. Modern government *waqf* organizations such as the Department of *Awqaf, Zakat* and *Hajj* in Malaysia, Kuwait *Awqaf* Public Foundation in Kuwait (KAPF), and *Majlis Ugama Islam Singapura* or the Islamic Religious Council of Singapore fit in here too. Meanwhile, the overlapping area between the market and the third sector involves third sector enterprises like cooperatives which are private, for profit, and formal in nature. This is where businesses that support *waqf* in the historic Yazaad Bazaar fit in. Johor Corporation in Malaysia is an excellent modern example whereby part of the company's shares are endowed as *waqf* (*Waqaf An-Nur* Corporation Berhad, 2015) [27]. The final overlapping area points to self-help or mutual-aid groups that often exist in community which are informal, private, and non-profit in nature. This area marks the action of past wealthy individuals whom had supplied goods through *waqf* for societies' benefit. The Vehbi Koç Foundation based in Turkey is a good contemporary example (Çizakça,1998) [18].

However, the framework can be further modified to discuss the case of *waqf* exclusively as a specific type of third sector instrument (TSI). The first consideration is the fact that it is imprecise for *waqf* to be a "pure" TSI depicted as the centre triangle in the circle of Fig. 1. This is because *waqf* shares responsibilities with the government in providing for pure and mixed public goods as was alluded earlier in this section. Perhaps only *ṣadaqah* may be qualified as a "pure" TSI. This makes the centre triangle of Fig. 1 extraneous in a *waqf* framework. The second consideration is that the community, market, and state were not mere sources of *waqf* contribution. The well to do (community) supply pure and mixed public goods and guaranteed continuity of these supplies using their investments and business profits (market). This initiative by the well to do reduced the need for the state to provide such goods in the past. Another role of the state is to include *waqf* as a public policy. Hence, the community, market, and state actually agents of an economy that was born out of *waqf*; just like the economy in Yazaad Bazaar. Assertion that *waqf* can contribute to economic development made by Biancone and Radwan (2018) [27] indeed has its basis.

Taking these considerations into account, Fig. 2 was developed. As can be seen, the three inner triangles depict the state, community, and market which expectedly form an outer triangle. This outer triangle represents the economy thus elucidating the role of state, community, and market as economic agents which are similarly defined in most modern macroeconomic models. *Waqf* is placed in a circle that touches the sides of this outer triangle and juxtaposes with the three agents' triangles. These actually delineates the intermediary role of *waqf* and links the three agents together. Thus in essence, the *waqf* circle located in the middle of the outer triangle is to emphasise *waqf*'s role as the crux of this economy. Meanwhile, areas of the inner triangles that do not intersect with the *waqf* circle are the typical role of agents that do not concern *waqf*.

Figure 2. The Public Waqf Framework

However, this economic framework became dormant after the collapse of the Ottoman Empire. *Waqf* was deemed unable to integrate into an economy that was rapidly industrialising (Kuran, 2001) [20]. As a result, the views of *waqf* became restricted and were deemed only suitable for religious purposes. Its former role as the supplier of pure and mixed publics goods together with the state were transferred completely to the latter.

Regardless, *waqf* possesses evolutionary characteristics that make it a practical instrument for any era (Setia, 2014) [29]. Kuran (2001) [20] claims that two scenarios have to occur in order for *waqf* to integrate in modern economies. One, all *awqaf* should be coordinated and two, formed into a *waqf* municipal of corporate status. The former is self-explanatory while the latter entails the creation of corporate *waqf* defined by Mohsin (2014) [30] as "the confinement of an amount of liquid money, shares, profit, dividends by founder(s) such as individuals, companies, corporations, organizations or institutions, and the dedication of its usufruct in perpetuity to the welfare of society" (p.16). Kuran (2001) [20] also believes that corporate *waqf* should acquire a legal entity and thus overseen by a board of

managers. If these two scenarios occur, then by extension, the public *waqf* framework represented in Fig. 2 will be applicable again in modern economy.

The first scenario is already taking root in most Islamic countries. The Federal Constitution of Malaysia appoints the State Islamic Religious Councils (SIRCs) as the sole trustees of *waqf* which require all *awqaf* be registered with the respective SIRCs. Singapore is however much advance than Malaysia in terms of trustee flexibility and transparency. Majlis Ugama Islam Singapura (2016) [31] contains records of all registered *waqf* deeds in the country which can be accessed by the public. Trustees of these *waqf* are by no means confined to Majlis Ugama Islam Singapura or the Islamic Religious Council of Singapore. In India, where large Muslim population resides, efforts to identify and compile a list of available *awqaf* are taking place through the *Waqf* Records Computerization Project (WRCP) under the tutelage of the Ministry of Minority Affairs India [32]. Data obtained are compiled in an online database named the *Waqf* Management System of India (WAMSI). When all of these *awqaf* are registered, coordination of *waqf* for the same purpose will be less of a hassle. The KAPF for instance, was tasked by the Organization of Islamic Cooperation (OIC) to coordinate *waqf* actions among Muslim countries (KAPF, n.d.; Kuwait News Agency, 1999) [33, 34].

There are also countries that coordinate newly founded *awqaf*. This is primarily done by a *waqf* authority that took the initiative to initiate *waqf* funds and categorize them into various purposes. In this regard, *waqf* often in the form of cash are pooled from various donors and placed in these funds; a concept called crowdfunding. For instance, KAPF founded five *waqf* funds for the purpose of holy Quran and its sciences, mosques, scientific and social development, health development, as well as guidance and crisis relief (Busharah, 2012) [35]. Also based in Kuwait, the International Islamic Charitable Organization (IICO) offers cash *waqf* schemes for the purpose of financing certain public goods globally (Mohsin, 2013) [36]. These schemes financed water wells, education, mosques, healthcare, training centres, farms and productive projects, orphans, seasonal projects, social projects, as well as aid relief (Mohsin, 2013) [36].

In regards to the second scenario, *waqf* institutions are increasingly corporatized such as Waqaf An-Nur Corporation in Malaysia and do provide certain public goods like cheap healthcare. Corporatisation of *waqf* has also been progressing in various facets which are management, law, transparency, and revenue making. Countries that require *waqf* registration such as Singapore and Malaysia ensures that *awqaf* are protected and able to defend itself in court. Unfortunately, to the knowledge of this researcher, corporatisation of *waqf* is not done within any municipality. The idea of applying *waqf* in municipalities alone is an alien concept. This is mostly because modern economies are dependent on government expenditures to provide said goods.

Aside from the occurrence of these two scenarios, this researcher believes that sustainable *waqf* is equally important to guarantee perpetual benefits. That is, *waqf* needs to find ways to generate revenue like that of investment fund set up by Caliph Al-Ma'mun and profits from businesses in the case of the Yazaad Bazaar. The best example of revenue generating *waqf* in modern economy is KAPF. Its investment strategy requires the fulfilment of these criteria; economic, *Shariah* (Islamic law), diversifying geographic, diversifying investment instruments, diversifying investment sectors, and regulation (Busharah, 2012) [35]. The economic criteria necessitates the conduct of feasibility studies for every investment activity while the *Shariah* criteria takes into account the minimizing risk factor to safeguard the *waqf* capital. Diversifying geographic, investment instruments, and sectors entails investments in separate locations, a portfolio of investment, and various sectors such as real estate, services and such.

The OIC Fiqh Academy in its Resolution No.140 (15/6) also recommends diversification of assets. The full conditions for investment of *waqf* funds as detailed in the Resolution are (Mohsin, 2014) [30]:

1. The whole conduct of investment must be *Shariah* compliant.
2. In order to minimise risk, diversification as an investment strategy should be considered. Risk can also be managed by obtaining surety ships and guarantees, confirming contracts, and performing feasibility studies.
3. Avoid high risk investments. However, it is permissible to invest cash *waqf* through permissible contracts such as *murabahah* (cost plus), *muḍarabah* (profit sharing, loss bearing), *istisna* (order to manufacture), and others.
4. Chosen investment must be suitable to the corpus of *waqf* and duly protects the *waqf* and beneficiary rights. Thus, *muḍarabah* mode is allowed due to its compatibility with cash *waqf* despite being considered as a high risk investment.
5. *Waqf* investment activities should be transparent.

III. THE THEORETICAL MODEL

Although a form of *waqf* municipality is almost non-existent, Fig. 2 can still be applied as a framework to forecast the impact of *waqf* financing expenditure on debt at the federal government level. After all, Fig. 2 forms an economy which coincides with the Neoclassical DSGE model that also contains three economic agents (Mabugu et al., 2013; Reith, 2014; Hansen and İmrohoroğlu; 2016) [2, 7, 5]. The theoretical model resembles that of Torres (2013) [37] with the addition of *waqf* and government. For simplicity, the economy in this model is assumed to be a closed economy.

DSGE model is based on the General Equilibrium theory formally introduced by Léon Walras in 1874 and culminated in its mathematical proof by Gerard Debreu and Herbert Scarf in 1963 (Starr, 2011) [38]. The theory claims the existence of a set of prices across all markets that produce an overall economic equilibrium when demand equals supply in these markets (Debreu, 1983; Cardenete et al., 2012) [39, 40]. Furthermore, DSGE model is built on microeconomic foundations; a suitable method since it is assumed that altruistic household behaviour is the main drive for *waqf* endowments.

A. Households

The economy consists of many households where each make economic decisions. Since DSGE model can only analyse one economic decision, the concept of a representative household agent is employed where all agents have similar preferences.

Two household functions to be defined are the utility function and budget constraint. Household seeks to maximize total consumption, C_t^τ, and leisure, O_t, in order to attain utility or happiness. Total consumption is the amount of goods and services consumed by the representative agent while leisure is the remaining time left after labour services (L_t). Due to the altruistic behaviour of the representative agent, cash *waqf* contribution essentially becomes part of his consumption. Cash has been chosen instead of other forms of *waqf* because cash can be endowed by households from almost all levels of income class. Hence, C_t^τ can be broken down into main components namely generic consumption (C_t) and cash *waqf* contribution (V_t):

$$C_t^\tau = C_t + V_t \tag{1.0}$$

Total available discretionary time is normalized to 1 so leisure is the total available discretionary time minus labour services or working time. This means that equation containing O_t and L_t can be written as follows:

$$O_t + L_t = 1$$

$$O_t = 1 - L_t \tag{1.1}$$

Budget constraints the utility of the household agent. The agent is the owner of productive factors namely capital, K_t and labour, L_t. By renting these productive factors to firms, the representative agent receives $R_t$which is the return for K_t; and wage, W_t, which is the return for the agent's L_t. V_t also counts as a productive factor but as per *waqf* deed, return from V_t is not gained by the household agent but is used for chosen federal government public expenditure. It is worth mentioning here that the federal government is assumed to name its public expenditure precisely as opposed to broad terms that is used in the national accounts. After paying for tax, T_t, earnings from the household agent is spent on C_t and V_t while the remaining is put into savings, S_t. It is further assumed that due to a competitive sector, S_t is directly transform into investment, I_t, and federal government bonds, B_t, without any cost thus:

$$S_t = B_t + I_t \tag{1.2}$$

The agent receives a return of R_t^r from purchasing past bonds, B_t, and I_t follows a process of capital accumulation overtime following a simple inventory accumulation equation:

$$I_t = K_{t+1} - (1-\delta)K_t \tag{1.3}$$

Although Equation 1.3 is theoretically correct, capital is actually decided yesterday making capital a predetermined variable. This transforms Equation 1.3 into Equation 1.4:

$$I_t = K_t - (1-\delta)K_{t-1} \tag{1.4}$$

Substituting Equation 1.4 into Equation 1.2, Equation 1.5 is obtained:

$$S_t = B_t + K_t - (1-\delta)K_{t-1} \tag{1.5}$$

Therefore, the intertemporal maximization problem of the representative agent is given as:

$$\max E_t \sum_{t=0}^{\infty} \beta^t U[C_t, O_t, V_t] \tag{1.6}$$

such that

$$C_t + V_t + S_t = W_t L_t + R_t K_{t-1} + B_{t-1}(1 + R_t^r) - T_t \tag{1.7}$$

Equation 1.6 is the utility function of the representative household with $\beta \in (0,1)$ being the intertemporal discount factor which specifies how much the agent values his/her future utility as oppose to his/her current utility. Meanwhile, Equation 1.7 is the household's budget constraint.

To facilitate simple calculation, the utility function can be expressed in a log linear form. Further substituting Equation 1.1 into Equation 1.6 as well as Equation 1.5 into Equation 1.7:

$$\max E_t \sum_{t=0}^{\infty} \beta^t [\mu \log C_t + \gamma \log(1-L_t) + \eta \log V_t] \tag{1.8}$$

such that

$$C_t + V_t + K_t - (1-\delta)K_{t-1} + B_t = W_t L_t + R_t K_{t-1} + B_{t-1}(1 + R_t^r) - T_t \tag{1.9}$$

μ, γ, and ν are the preference parameter for C_t, $1-L_t$, and V_t respectively where $\mu+\gamma+\eta \approx 1$. Specifically, μ represents the proportion of consumer spending to total income, γ represents the proportion of leisure to total income, and η represents the proportion of cash *waqf* endowment to total income. In economic terms, μ can also be defined as the marginal propensity to consume, γ as the marginal propensity to leisure, and η as the marginal propensity to endow cash *waqf*. Basically, these preference parameters indicate the agent's

preferences toward consumption – leisure – cash *waqf* endowment decisions.

By nature, household will want to maximize C_t, V_t, L_t, K_t, and B_t. This household problem can be solved using a dynamic Lagrangian calculation before deriving first order conditions (FOCs):

$$\mathcal{L} = \sum_{t=0}^{\infty} \beta^t \begin{cases} \mu \log C_t + \gamma \log(1-L_t) + \eta \log V_t \\ - \lambda_t [C_t + V_t + K_t - (1-\delta)K_{t-1} + B_t - W_t L_t - R_t K_{t-1} - B_{t-1}(1+R_t^r) + T_t] \end{cases}$$

λ_t is the Lagrange multiplier of period t. As the capital for a given period appears in time t-1 and in time t, the restriction faced by households at time t is:

$$\ldots - \beta^t \lambda_t [C_t + V_t + K_t - (1-\delta)K_{t-1} + B_t - W_t L_t - R_t K_{t-1} - B_{t-1}(1+R_t^r) + T_t] - \beta^{t+1} \lambda_{t+1} [C_{t+1} + V_{t+1} + K_{t+1} - (1-\delta)K_t + B_{t+1} - W_{t+1} L_{t+1} - R_{t+1} K_{t-B_t}(1+R_{t+1}^r) + T_{t+1}] \quad (2.0)$$

The first order conditions (FOCs) of the household problem are:

$$\frac{\partial L}{\partial C} = \beta^t \left[\frac{\mu}{C_t} - \lambda_t\right] = 0$$

$$\lambda_t = \frac{\mu}{C_t} \quad (2.1)$$

$$\frac{\partial \mathcal{L}}{\partial L} = \beta^t \left[\frac{\gamma}{1-L_t}(-1) + \lambda_t W_t\right] = 0$$

$$\lambda_t W_t = \frac{\gamma}{1-L_t} \quad (2.2)$$

$$\frac{\partial \mathcal{L}}{\partial V} = \beta^t \left[\frac{\eta}{V_t} - \lambda_t\right] = 0$$

$$\lambda_t = \frac{\eta}{V_t} \quad (2.3)$$

$$\frac{\partial L}{\partial K} = -\beta^t \lambda_t + \beta^{t+1} \lambda_{t+1} [R_{t+1} + 1 - \delta] = 0$$

$$\beta^t \lambda_t = \beta^{t+1} \lambda_{t+1} [R_{t+1} + 1 - \delta]$$

$$\beta \frac{\lambda_t}{\lambda_{t+1}} = R_{t+1} + 1 - \delta \quad (2.4)$$

$$\frac{\partial L}{\partial B} = -\beta^t \lambda_t + \beta^{t+1} \lambda_{t+1} [1 + R_{t+1}^r] = 0$$

$$\beta^t \lambda_t = \beta^{t+1} \lambda_{t+1} [1 + R_{t+1}^r]$$

$$\beta \frac{\lambda_t}{\lambda_{t+1}} = 1 + R_{t+1}^r \quad (2.5)$$

By equating Equations 2.1 and 2.3, Equation 2.6 is obtained:

$$V_t = \frac{\eta}{\mu} C_t \quad (2.6)$$

Equation 2.6 determines the agent's decision between endowing cash *waqf* or consuming. Basically, the right hand side of Equation 2.6 is the opportunity cost of endowing an additional unit of cash *waqf*. Substituting Equations 2.1 into Equation 2.2, Equation 2.7 is obtained:

$$W_t = \frac{\gamma C_t}{\mu(1-L_t)} \quad (2.7)$$

Equation 2.7 equates the marginal rate of substitution between consumption and leisure $\left(\frac{\gamma}{\mu}\right)$ to the opportunity cost of an additional unit of leisure (W_t). Another way to view W_t is to substitute Equation 2.3 into Equation 2.2 instead:

$$W_t = \frac{\gamma V_t}{\eta(1-L_t)} \quad (2.8)$$

Equation 2.8 equates the marginal rate of substitution between endowing cash *waqf* and leisure to the opportunity cost of an additional unit of leisure.

From Equation 2.1:

$$\lambda_{t+1} = \frac{\mu}{C_{t+1}} \quad (2.9)$$

Substituting Equation 2.9 and Equation 2.1 into Equation 2.4 and Equation 2.5:

$$\frac{C_{t+1}}{C_t} = \beta(R_{t+1} + 1 - \delta) \quad (3.0)$$

$$\frac{C_{t+1}}{C_t} = \beta(1 + R_{t+1}^r) \quad (3.1)$$

Equation 3.0 defines the condition of the agent's decision about investment. Basically, the agent compares the utility of consumption with that of investment. On the other hand, Equation 3.1 indicates that the agent compares the utility of consumption with that of purchasing bonds.

B. Firms

The concept of representative agent is also employed here. The representative firm obtain production factors, L_t, K_t, and V_t from households to be converted into final goods (Y_t). Firms then pay labor $W_t L_t$ and $R_t K_{t-1}$ to households and channelling return $V_t D_t$ to the federal government. Specifically for Malaysia, $V_t D_t$ is channeled to Yayasan Waqaf Malaysia, a federal government trust body enacted by the Department of *Awqaf*, Zakat and Hajj. The federal government is obliged to use $V_t D_t$ to finance for identified public expenditures only. Since the sole owners of production

factors are the households, firms do not make investment decision nor decide on the amount of hired inputs from period to period. This is to simplify the theoretical model following Torres (2013) [37]. It causes the maximization problem of the firm to become a static equation:

$$\pi = Y_t - W_t L_t - R_t K_{t-1} - V_t D_t \quad (3.2)$$

Y_t follows a Cobb-Douglas production function and has constant returns to scale:

$$Y_t = A_t F(K_{t-1}, L_t, V_t) = A_t K_{t-1}^{\alpha} L_t^{\rho} V_t^{1-\alpha-\rho}$$

A_t is the technology or total factor productivity. Following Galí, Vallés and López-Salido (2007) [41], A_t is normalized to unity so Y_t becomes:

$$Y_t = K_{t-1}^{\alpha} L_t^{\rho} V_t^{1-\alpha-\rho} \quad (3.3)$$

α is the output elasticity of K_{t-1} and ρ is the output elasticity of L_t. Thus, the firm's maximization problem becomes:

$$\pi = K_{t-1}^{\alpha} L_t^{\rho} V_t^{1-\alpha-\rho} - W_t L_t - R_t K_{t-1} - V_t D_t \quad (3.4)$$

The firm will want to maximize labour, capital, and cash *waqf* contribution. To solve the firm's problem, FOCs are derived:

$$\frac{\partial \pi}{\partial L} : \rho K_{t-1}^{\alpha} L_t^{\rho-1} V_t^{1-\alpha-\rho} - W_t = 0$$

$$W_t = \rho K_{t-1}^{\alpha} L_t^{\rho-1} V_t^{1-\alpha-\rho} \quad (3.5)$$

$$\frac{\partial \pi}{\partial K} = \alpha K_{t-1}^{\alpha-1} L_t^{\rho} V_t^{1-\alpha-\rho} - R_t = 0$$

$$R_t = \alpha K_{t-1}^{\alpha-1} L_t^{\rho} V_t^{1-\alpha-\rho} \quad (3.6)$$

$$\frac{\partial \pi}{\partial V_t} = (1-\alpha-\rho) K_{t-1}^{\alpha} L_t^{\rho} V_t^{-\alpha-\rho} - D_t = 0$$

$$D_t = (1-\alpha-\rho) K_{t-1}^{\alpha} L_t^{\rho} V_t^{-\alpha-\rho} \quad (3.7)$$

Substituting Equations 3.3 into Equation 3.5, 3.6, and 3.7, the below equations are respectively obtained:

$$W_t = \frac{\rho Y_t}{L_t} \quad (3.8)$$

$$R_t = \frac{\alpha Y_t}{K_{t-1}} \quad (3.9)$$

$$D_t = \frac{(1-\alpha-\rho) Y_t}{V_t} \quad (4.0)$$

Equations 3.8 to 4.0 show that the rate of productive factors (wage, capital return, and cash *waqf* return) are a constant proportion of the total output over factor quantity ratio.

C. Federal Government

The federal government budget constraint is given as:

$$B_t = B_{t-1}(1+R_t^r) + G_t - T_t - V_t D_t \quad (4.1)$$

The government borrows B_t when T_t and value of return from cash *waqf*, $V_t D_t$ are insufficient to finance for total federal government expenditures, G_t (i.e. sum of federal government operating and development expenditure), federal government debt B_{t-1}, and interest on that debt (R_t^r). It must be stressed that the federal government's responsibility as a *waqf* manager is to spend the return of cash *waqf* only on permissible public expenditures as stated in the *waqf* deeds.

Let $\hat{S}_t = T_t - G_t$ and dividing Equation 4.1 by Y_t:

$$b_t = b_{t-1}(1+R_t^r) - \hat{s}_t - v_t D_t \quad (4.2)$$

whereby,

$$b_t = \frac{B_t}{Y_t} \quad (4.3)$$

$$v_t = \frac{V_t}{Y_t} \quad (4.4)$$

$$\hat{s}_t = \frac{\hat{S}_t}{Y_t} \quad (4.5)$$

The fiscal policy rule that determines the primary balance-to-GDP ratio, $\hat{s}_t$ is specified as:

$$\hat{s}_t = \theta_0 \bar{\hat{s}} + \theta_1 \hat{s}_{t-1} + \theta_2 D_t + e_1 \quad (4.6)$$

whereby, $\theta_0 = 1 - \theta_1 - \theta_2$ and e_1 is the error term. This manner of specification is almost similar to Sakuragawa and Hosono (2011) [4] and Torres (2013) [37]. Equation 4.6 simply states that the current primary balance-to-GDP ratio is determined by its steady state value ($\bar{\hat{s}}$), its past value, and the current rate of return from cash *waqf*, D_t. The insertion of D_t in Equation 4.6 actually captures the excess income from cash *waqf*.

D. Market Clearing

The feasibility constraint in the economy can be stated as:

$$Y_t = C_t + V_t + I_t + G_t \quad (4.7)$$

whereby,

$$G_t = g_t Y_t \quad (4.8)$$

g_t is simply G_t over Y_t or the total federal government expenditure over GDP. It follows an AR(1) process:

$$g_t=(1-\varphi)\bar{g}+\varphi g_{t-1}+e_2 \quad (4.9)$$

whereby, $\bar{g}$ is the steady state value of g and e_2 is the error term. This form of specification follows Torres (2013) [37].

Fig. 3 shows the relationship between primary balance and debt. When primary deficit occurs (G-T), the value of debt increases. When primary surplus occurs (T-G), the value of debt decreases. Thus the incorporation of D in the primary balance (Equation 4.6) causes primary deficit to reduce which will eventually lead to primary surplus and reduced debt.

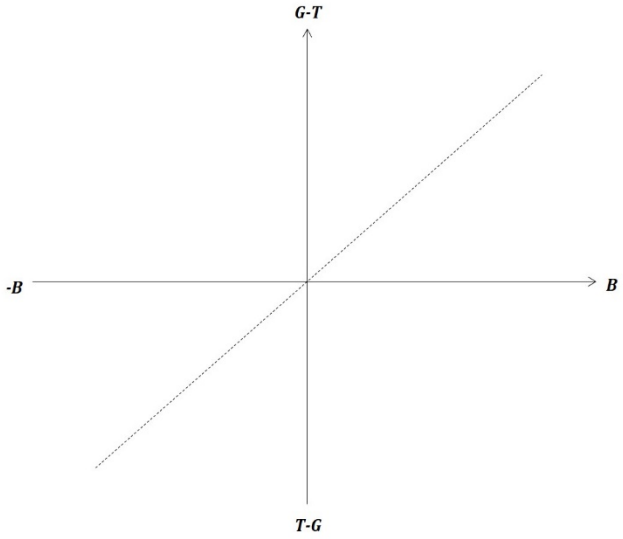

Figure 3. The Relationship between Primary Balance and Debt

IV. MODEL EQUILIBRIUM

The model equilibrium is derived from the theoretical model. It involves calculating sequences of endogenous variables which are C_t, L_t, V_t, K_t, W_t, R_t, I_t, R_t^r, D_t, G_t, Y_t b_t, v_t, $\hat{s}_t$, and g_t such that the balance path conditions are satisfied. Since there are 15 endogenous variables, thus 15 equations are needed to calculate the equilibrium of this modelled economy. These sets of equations are:

$$I_t=K_t-(1-\delta)K_{t-1} \quad (1.4)$$

$$V_t=\frac{\eta}{\mu}C_t \quad (2.6)$$

$$W_t=\frac{\gamma C_t}{\mu(1-L_t)} \quad (2.7)$$

$$\frac{C_{t+1}}{C_t}=\beta(R_{t+1}+1-\delta) \quad (3.0)$$

$$\frac{C_{t+1}}{C_t}=\beta(1+R_{t+1}^r) \quad (3.1)$$

$$Y_t=K_{t-1}^{\alpha}L_t^{\rho}V_t^{1-\alpha-\rho} \quad (3.3)$$

$$W_t=\frac{\rho Y_t}{L_t} \quad (3.8)$$

$$R_t=\frac{\alpha Y_t}{K_{t-1}} \quad (3.9)$$

$$D_t=\frac{(1-\alpha-\rho)Y_t}{V_t} \quad (4.0)$$

$$b_t=b_{t-1}(1+R_t^r)-\hat{s}_t-v_tD_t \quad (4.2)$$

$$v_t=\frac{V_t}{Y_t} \quad (4.4)$$

$$\hat{s}_t=\theta_0\bar{\hat{s}}+\theta_1\hat{s}_{t-1}+\theta_2D_t+e_1 \quad (4.6)$$

$$Y_t=C_t+V_t+I_t+G_t \quad (4.7)$$

$$G_t=g_tY_t \quad (4.8)$$

$$g_t=(1-\varphi)\bar{g}+\varphi g_{t-1}+e_2 \quad (4.9)$$

V. DETERMINING PARAMETER VALUES

Parameter values are acquired through extrapolation, ordinary least squares (OLS) estimation, and values supplied by the literature. These methods are approved by Torres (2013) [37].

The value of η is rather difficult to obtain because almost no recent studies has been done to determine its value for Malaysia. Hence this study uses the household consumption expenditure for year 2016, the latest report published by Department of Statistics Malaysia (DOSM) (2017) [42]. Unfortunately, there is no value recorded in the report for η. However, assuming that public awareness on *waqf* is heightened, the component of miscellaneous goods and services may as well be replaced with cash *waqf* endowment. Making that item as a proxy for η, η can thus be assigned its value of 0.077. Meanwhile, recreation services and culture is a proxy for γ which holds the value of 0.05. As a result, $\mu=1-0.077-0.05=0.873$.

Meanwhile, Iwata, Khan, and Murao (2003) [43] estimated α as 0.19 and ρ as 0.58 for Malaysia using non parametric technique. The value of $\delta=0.07$ is appropriate for Malaysia as claimed by Nagaraj (2005) [44]. $\beta=0.97$ is deemed appropriate and taken from Torres (2013) [37]. Using Eviews, θ_0, θ_1, θ_2, and φ are estimated via OLS method as shown below.

TABLE I. OLS Estimation of ŝ

Dependent Variable: S
Method: Least Squares
Date: 01/16/19 Time: 13:33
Sample (adjusted): 1999Q2 2018Q2
Included observations: 77 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.045361	0.007196	-6.303320	0.0000
S(-1)	-0.029819	0.115908	-0.257263	0.7977
D RETURN	-0.011057	0.072939	-0.151597	0.8799

R-squared	0.001077	Mean dependent var	-0.044334
Adjusted R-squared	-0.025921	S.D. dependent var	0.044100
S.E. of regression	0.044668	Akaike info criterion	-3.340957
Sum squared resid	0.147644	Schwarz criterion	-3.249640
Log likelihood	131.6268	Hannan-Quinn criter.	-3.304431
F-statistic	0.039876	Durbin-Watson stat	2.044819
Prob(F-statistic)	0.960930		

Note that symbols cannot be specified as a variable in OLS estimation using Eviews, certain alphabets are illegal, and results generated by Eviews always show variables as capital letters. Hence in Table 1, S is actually ŝ while D RETURN is simply D. Data of Malaysian federal government expenditure (G), federal government revenue (T), and GDP (Y) from the first quarter of 1999 to the second quarter of 2018 were obtained from Bank Negara Malaysia (2000 – 2018) [45] or the Central Bank of Malaysia. Meanwhile, the proxy of *D* is quarterly returns of Public *Ittikal* (PI) Fund from the same period. PI is a *Shariah* compliant unit trust fund offered by Public Mutual Berhad. It consists of *Shariah* compliant equities and related securities from among others, Tenaga Nasional Berhad, Telekom Malaysia Berhad, Sime Darby Berhad, IHH Healthcare Berhad, and Axiata Group Berhad (Public Mutual Berhad, 2016) [46]. Thus, it matches with the argument of the place of public *waqf* in modern economy (Fig. 2) in that collected cash *waqf* are connected with firms through investments. Based on Table 1, Equation 4.6 can be specified as:

$$\hat{s}_t=-0.045361-0.029819\hat{s}_{t-1}-0.011057D_t \qquad (5.0)$$

From Equation 5.0, the parameter values can be determined as:

$\theta_2=-0.011057$,

$\theta_1=-0.029819$

$\theta_0=1-(-0.029819)-(-0.011057)=1.040876$

TABLE II. OLS Estimation of g

Dependent Variable: G(1)
Method: Least Squares
Date: 01/16/19 Time: 14:09
Sample (adjusted): 1999Q2 2018Q1
Included observations: 76 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.253924	0.030517	8.320720	0.0000
G(-1)	0.012044	0.115043	0.104694	0.9169

R-squared	0.000148	Mean dependent var	0.257014
Adjusted R-squared	-0.013363	S.D. dependent var	0.067426
S.E. of regression	0.067875	Akaike info criterion	-2.516334
Sum squared resid	0.340919	Schwarz criterion	-2.454999
Log likelihood	97.62071	Hannan-Quinn criter.	-2.491822
F-statistic	0.010961	Durbin-Watson stat	2.148828
Prob(F-statistic)	0.916902		

Based on Table 2, Equation 4.9 can be specified as:

$$g_t=0.253924+0.012044g_{t-1} \qquad (5.1)$$

Hence, from Equation 5.1, the parameter value can be determined as:

$$\varphi=0.012044$$

Table 3 lists the parameter values.

TABLE III. The Parameter Values

Parameter	**Definition**	**Values**
μ	Preference parameter of consumption	0.873
γ	Preference parameter of leisure	0.05
η	Preference parameter of *waqf* contribution	0.077
ρ	Output elasticity of labour	0.58
α	Output elasticity of capital	0.19
δ	Depreciation rate of capital	0.07
β	Intertemporal discount factor	0.97

θ_0	Parameter of fiscal policy rule	1.040876
θ_1	Parameter of fiscal policy rule	-0.029819
θ_2	Parameter of fiscal policy rule	-0.011057
φ	Parameter of expenditure per GDP	0.012044

Source: Iwata, Khan and Murao (2003), DOSM (2017), Nagaraj (2005), Torres (2013), Public Mutual Berhad (1999-2018), [43, 42, 44, 37, 47] and authors' calculation.

VI. STEADY STATE ANALYSIS

The steady state values refer to the values of endogenous variables that remain constant throughout time. Steady state occurs when the modelled economy has stationarised and is in equilibrium condition. This particular study decides to find the steady state values by using the method adopted in Torres (2013) [37] which are solving simultaneously most of the equations in the model equilibrium while subjecting the remaining equations to OLS estimation. The former requires eliminating the equations' time subscript and solving simultaneously most of the equations in the model equilibrium. Thus the equations are converted into:

$$\bar{I}=\delta\bar{K} \quad (5.2)$$

$$\bar{V}=\frac{\eta}{\mu}\bar{C} \quad (5.3)$$

$$\bar{W}=\frac{\gamma\bar{C}}{\mu(1-\bar{L})} \quad (5.4)$$

$$1=\beta(\bar{R}+1-\delta) \quad (5.5)$$

$$1=\beta(1+\overline{R^r}) \quad (5.6)$$

$$\bar{Y}=\bar{K}^{\alpha}\bar{L}^{\rho}\bar{V}^{1-\alpha-\rho} \quad (5.7)$$

$$\bar{W}=\frac{\rho\bar{Y}}{\bar{L}} \quad (5.8)$$

$$\bar{R}=\frac{\alpha\bar{Y}}{\bar{K}} \quad (5.9)$$

$$\bar{D}=\frac{(1-\alpha-\rho)\bar{Y}}{\bar{V}} \quad (6.0)$$

$$\bar{b}=\frac{\bar{s}+\bar{v}\bar{D}}{\overline{R^r}} \quad (6.1)$$

$$\bar{v}=\frac{\bar{V}}{\bar{Y}} \quad (6.2)$$

$$\bar{Y}=\bar{C}+\bar{V}+\bar{I}+\bar{G} \quad (6.3)$$

$$\bar{G}=\bar{g}\bar{Y} \quad (6.4)$$

Note that the " ¯ " sign on the variables denote steady state variables.

Substituting $\delta=0.07$ into Equation 5.2 and $\beta=0.97$ into Equation 5.5 as well as Equation 5.6, below are respectively obtained:

$$\bar{I}=0.07\bar{K} \quad (6.5)$$

$$\bar{R}=0.1009$$

$$\overline{R^r}=0.03093$$

Inserting the values of $\alpha=0.19$ and $\bar{R}=0.1009$ into Equation 5.9:

$$\bar{K}=\frac{\bar{Y}}{0.5311} \quad (6.6)$$

Replacing Equation 6.6 into Equation 6.5:

$$\bar{I}=0.07\left(\frac{\bar{Y}}{0.5311}\right)$$

$$\bar{I}=0.1318\bar{Y} \quad (6.7)$$

Substituting $\eta=0.077$ and $\mu=0.873$ into Equation 5.3:

$$\bar{V}=0.08820\bar{C} \quad (6.8)$$

From Equation 5.1, the steady state value of $\bar{g}$ can be derived:

$$(1-\varphi)\bar{g}=0.253924$$

$$(1-0.012044)\bar{g}=0.253924$$

$$\bar{g}=0.2571$$

Hence Equation 6.4 becomes:

$$\bar{G}=0.2571\bar{Y} \quad (6.9)$$

Inserting Equations 6.7, 6.8, and 6.9 into Equation 6.3:

$$\bar{Y}=\bar{C}+0.08820\bar{C}+0.1318\bar{Y}+0.2571\bar{Y}$$

$$\bar{C}=0.5616\bar{Y} \quad (7.0)$$

Inserting the values of $\gamma=0.05$ and $\mu=0.873$ into Equation 5.4:

$$\bar{W}=\frac{0.05\bar{C}}{0.873(1-\bar{L})} \quad (7.1)$$

Substituting Equation 7.0 into Equation 7.1 and rearranging:

$$\bar{W}(1-\bar{L})=0.03216\bar{Y} \quad (7.2)$$

Substituting $\rho=0.58$ into Equation 5.8, Equation 7.3 is obtained:

$$\bar{W}=\frac{0.58\bar{Y}}{\bar{L}} \quad (7.3)$$

Substituting Equation 7.3 in Equation 7.2, $\bar{L}=0.9475$ is obtained. Substituting $\alpha=0.19$ and $\rho=0.58$ into Equation 5.7:

$$\bar{Y}=\bar{K}^{0.19}\bar{L}^{0.58}\bar{V}^{0.23} \quad (7.4)$$

Assigning $\bar{L}=0.9475$, Equation 6.6, Equation 6.8, and Equation 7.0 into Equation 7.4, $\bar{Y}=0.4125$ is obtained. Assigning $\bar{Y}=0.4125$ and $\bar{L}=0.9475$ into Equation 7.3, $\bar{W}=0.2525$ is obtained. Inserting $\bar{Y}=0.4125$ into Equation 7.0, $\bar{C}=0.2317$ is obtained. Inserting $\bar{C}=0.2317$ into Equation 6.8, $\bar{V}=0.02044$ is obtained. Substituting $\bar{V}=0.02044$ and $\bar{Y}=0.4125$ in Equation 6.0, $\bar{D}=4.6416$ is obtained. Substituting $\bar{V}=0.02044$ and $\bar{Y}=0.4125$ in Equation 6.2, $\bar{v}=0.04955$ is obtained. Substituting $\bar{v}=0.04955$, $\bar{D}=4.6416$ and $\bar{R}^{r}=0.03093$ in Equation 6.1:

$$\bar{b}=\frac{\bar{\hat{s}}+0.04955(4.6416)}{0.03093} \quad (7.5)$$

Value of $\bar{\hat{s}}$ can be derived from Table 1:

$$1.040876\bar{\hat{s}}=-0.045361$$

$$\bar{\hat{s}}=-0.04358$$

Hence, using $\bar{\hat{s}}=-0.04358$, $\bar{b}=6.02688$ is generated. Assigning $\bar{Y}=0.4125$ to Equation 6.6, $\bar{K}=0.7767$ is generated. Assigning $\bar{K}=0.7767$ into Equation 6.5, $\bar{I}=0.05437$ is generated. Finally, assigning $\bar{Y}=0.4125$ to Equation 6.9, $\bar{G}=0.1061$ is generated. Table 4 lists the steady state values of the modelled economy.

TABLE IV. Steady State Values

Steady State	**Values**
$\bar{L}$	0.9475
$\bar{Y}$	0.4125
$\bar{W}$	0.2525
$\bar{R}$	0.1009
$\bar{C}$	0.2317
$\bar{V}$	0.02044
$\bar{I}$	0.1385
$\bar{K}$	0.7767
$\bar{v}$	0.04955
$\bar{R}^{r}$	0.03093
$\bar{D}$	4.6416
$\bar{\hat{s}}$	-0.04358
$\bar{b}$	6.02688
$\bar{G}$	0.1071
$\bar{g}$	0.2571

VII. SIMULATION RESULT

The first step in simulation is to induce shock to the model equilibrium. Shock is perturbation introduced to the system in order to observe the deviations of the variables in comparison to their steady state values and the trend of variables before the variables return to the steady state (Torres, 2013) [37]. For the purpose of this study, shock in $\hat{s}$ is introduced to indicate an increase in *waqf* return by specifying 1% shock to e_1. As a consequence of this shock, impulse response function (IRF) of variables that are affected by the shock will be generated. The generated IRF of b will determine the impact of *waqf* financing public expenditure on debt. 1% is a sufficient amount of shock to produce IRFs. The software used for simulation are Dynare and Matlab.

Fig. 4 depicts the IRFs of b, $\hat{s}$ and R^{r} upon 1 percent increase on the standard deviation of Equation 4.6. The y-axis of the graphs represents each variables' unit of deviation from its steady state value while x-axis represent the period of time. Hence at its basic, the IRF show the trend of variables upon shock before the variables return to the steady state (Torres, 2013) [37].

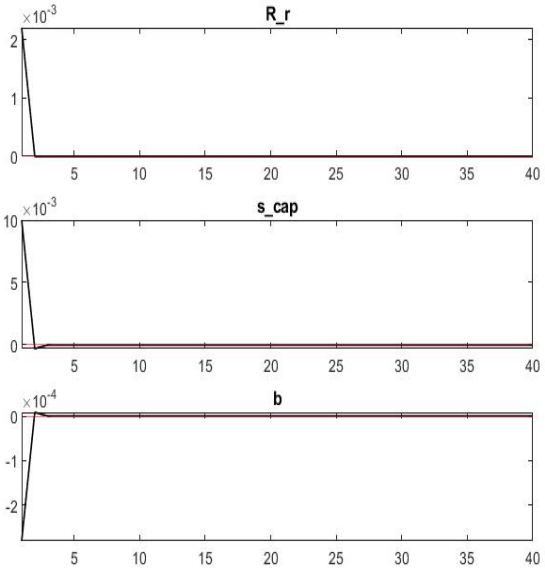

Figure 4. The IRFs of b, ŝ and R^r upon 1% Increase in e_1

As can be seen in Fig. 4, increase in 1% of e_1 translates into an increase of 1% in ŝ. This indicates a reduction in primary deficit which resonates with the claim made by Çizakça (1998) [18] and Marzuki et al. (2012) [19]. R^r also increases upon impact but at a lesser rate namely 0.2%. On the other hand, an increase of 1% in ŝ has an opposite impact on b. The rate of increase in b is lowest which is 0.025% before heading back to its steady state. This goes to show that the incorporation of D in the fiscal policy rule (Equation 4.6) impacts ŝ the most followed by R^r and lastly b. Several deductions can be derived.

Firstly, the increase in ŝ after impact extends the finding of Ambrose et al. (2018a) [16] that is *waqf* financing expenditure is not only doable but also practical. Secondly, the increase in R^r after impact suggests that government will induce households to save more within an economic framework that recognises altruism (cash *waqf* contribution). This can be explained by referring to the equations in the theoretical model. As indicated in Equation 1.2, savings will further increase investment. In turn, capital may increase (Equation 1.3), firms will be more productive (Equation 3.3), profits will increase and more return can be generated to finance expenditure (Equation 3.2 and Equation 4.6). Thirdly, b has the least impact because employing D to reduce debt might not be enough aside from government borrowing and collecting T. Albeit having the least impact, this result still answers the main purpose of the study namely b is reduced when *waqf* finances expenditure.

There are two possible ways that debt is reduced. First, as *waqf* is now financing public goods, idle tax can be channelled to finance government debt. Second, the government would not need to borrow a large sum in the future as internal financing from *waqf* has been acquired. Thus intuitively in the long term, it is highly likely that government are able to reduce tax rates significantly. Therefore, it can be stated that *waqf* financing public expenditure has an impact of decreasing federal government debt. This result also concurs with the findings of Çizakça (1998) [18] and Marzuki et al. (2012) [19].

Note that other variables namely C, L, V, K, W, R, I, R^r, D, G, Y, v, and g are not affected by the change in ŝ hence no IRFs are generated. Intuitively, it indicates two things. One, V is not affected because the amount of V is not modelled as an AR(1) process. To model V as an AR(1) process is impossible because most State Islamic Religious Councils in Malaysia were unwilling to release the values of *waqf* fund in quarterly frequencies, some did not provide them despite persistent enquiries, while others cannot disclose the values. It is standard practice to use data in quarterly frequencies when simulating DGSE model. Second, the 1% increase did not affect the other aforementioned variables because of a simple fact whereby *waqf* return is not distortionary in nature.

VIII. SUMMARY AND CONCLUSIONS

This paper had shown that *waqf* financing public expenditure has an impact of reducing government debt by considering the altruistic behaviour of households. Such result was also obtained by considering the intermediary role of *waqf*. It showed that *waqf* can aid in government debt reduction and provided evidence of a significant third sector role on public finance dynamics. Thus, this paper provides a fresh contribution on the field of modern public finance. Further research can be done by considering an open economy and/or model the cash *waqf* data according to an AR process. Considering that cash *waqf* alone (aside from borrowing and tax collection) has smaller impact on government debt, further research can also be done by modelling other government policy and/or financial instrument together with cash *waqf*.

REFERENCES

[1] Marattin, L., Marzo, M. and Zagaglia, P. 2011, "A welfare perspective on the fiscal-monetary policy mix: The role of alternative fiscal instruments", *Journal of Policy Modeling* Vol.33 No.6, pp. 920-952.

[2] Mabugu, R., Robichaud, V., Maisonnave, H. and Chitiga, M. 2013, "Impact of fiscal policy in an intertemporal CGE model for South Africa", *Economic Modelling*, Vol. 31 No.2, pp. 775-782.

[3] Qin, D., Cagas, M. A., Ducanes, G., Magtibay-Ramos, N. and Quising, P. 2006, "Empirical assessment of sustainability and feasibility of government debt: the Philipines case", *Journal of Asian Economics*, Vol.17 No.1, pp. 63-84.

[4] Sakuragawa, M. and Hosono, K. 2011, "Fiscal sustainability in Japan", *Journal of the Japanese and International Economies*, Vol.25 No.4, pp. 434 - 446.

[5] Hansen, G. D. and İmrohoroğlu, S. 2016, "Fiscal reform and government debt in Japan: A neoclassical perspective", *Review of Economic Dynamics*, Vol.21 No.3, pp. 201-224.

[6] Cogan, J. F., Taylor, J. B., Wieland, V. and Wolters, M. H. 2013. "Fiscal consolidation strategy", *Journal of Economic Dynamics & Control*, Vol.37 No.2, pp. 404-421.

[7] Rieth, M. 2014, "Myopic governments and welfare-enhancing debt limits", *Journal of Economic Dynamics and Control*,Vol.38 No.1, pp. 250-265.

[8] Faridi, F. R. 1983, "A theory of fiscal policy in an Islamic state", in Ahmed, Z., Iqbal, M. and Khan, M. F. (Eds), *Fiscal Policy and Resource Allocation in Islam*, Institute of Policy Studies and International Centre for Research in Islamic Economics, Islamabad, Leicester, pp. 27-58.

[9] Kahf, M. 2014, *Notes on Islamic Economics: The Charitable Sector*, Ad Dawhah, Qatar.

[10] Arshad, M. N. M. and Haneef, M. A. M. 2016, "Third sector socio-economic models: how waqf fits in?", *Institutions and Economies*, Vol.8 No.2, pp. 75-93.

[11] Siddiqi, M. N., 1995. An overview of public borrowing in early Islamic history. *Journal of Islamic Economic Studies*, Vol.2 No.2, pp. 61-78.

[12] Gil, M. 1998, "The earliest waqf foundations", *Journal of Near Eastern Studies*, Vol.57 No.2, pp. 125-140.

[13] Babacan, M. 2011, "Economics of philanthropic institutions, regulation and governance in Turkey", *Journal of Economic and Social Research*, Vol.13 No.2, pp. 61-89.

[14] Biancone, P. P. and Radwan, M. 2019, "Social finance and financing social enterprises: an Islamic Finance prospective, *European Journal of Islamic Finance*, Special Issue Islamic and Social Finance, pp. 1 – 6.

[15] Frenkel, Y. 1999, "Political and social aspects of Islamic religious endowments ("awqaf"): Saladin in Cairo (1169-73) and Jerusalem (1187-93)", *Bulletin of the School of Oriental and African Studies, University of London*, Vol.62 No.1, pp. 1-20.

[16] Ambrose, A. H. A. A., Aslam, M. and Hanafi, H. 2018a, "The possibility of using waqf to finance the Malaysian federal government's public expenditure", *Journal of Southeast Asian Studies*, Vol.23 No.2, pp. 89-106.

[17] Ambrose, A. H. A. A., Aslam, M. & Hanafi, H. 2018b, "A proposed model for waqf financing public goods and mixed public goods in Malaysia", International Journal of Islamic and Middle Eastern Finance and Management, Vol.11 No. 3, pp. 395-415.

[18] Çizakça, M. 1998, "Awqaf in history and its implications for modern Islamic economies", *Islamic Economic Studies*, Vol.6 No.1, pp. 43-70.

[19] Marzuki, M. U. M., Shahimi, S., Ismail, A. G. and Embong, Z. (2012), "*Tackling poverty: a look at cash waqf*", in Prosiding Perkem VII, Ipoh, Malaysia, Vol. 2, pp. 1611-1623.

[20] Kuran, T. 2001, "The provision of public goods under Islamic law: Origins, impact, and limitations of the waqf system", *Law & Society Review*, Vol.35 No.4, pp. 841-898.

[21] Akhtar, M. R. 1995, "Provision of public goods in an Islamic economy", *The Pakistan Development Review*, Vol.34 No.4, pp. 879-885.

[22] Peri, O. 1992. "Waqf and Ottoman welfare policy: The poor kitchen of Hasseki Sultan in eighteenth-century Jerusalem", *Journal of the Economic and Social History of the Orient*, Vol.35 No.2, pp. 167-186.

[23] Bonine, M. E. 1987, "Islam and commerce: waqf and the Bazaar of Yazd, Iran", *Erdkunde*, Vol.41 No.3, pp. 182-196.

[24] Pestoff, V. A. 1992, "Third sector and co-operative services - An alternative to privatization", *Journal of Consumer Policy*, Vol.15 No.1, pp. 21- 45.

[25] Evers, A. and Laville, J.-L. 2004, "Defining the third sector in Europe", in Evers, A. and Laville, J-L. (Eds), *The Third Sector in Europe*, Edward Elgar, Cheltenham, Northampton, pp. 11-42.

[26] Defourny, J. and Pestoff, V. 2008, "Images and concepts of the third sector in Europe", available at: http://emes.net/content/uploads/publications/WP_08_02_TS_FINAL_WEB.pdf (accessed 7 March 2016)

[27] Waqaf An-Nur Corporation Berhad, 2015, *Laporan Tahunan Waqaf An-Nur Corporation Berhad*, Johor Bahru: Waqaf An-Nur Corporation Berhad.

[28] Biancone, P. P. and Radwan, M. 2018, "Social finance and unconventional financing alternatives: an overview", *European Journal of Islamic Finance*, No.10, pp. 1-5.

[29] Setia, A., 2014, "Waqf and the civic economy", *Islamic Sciences*, Vol 12 No.2, pp. 174-182.

[30] Mohsin, M. I. A. 2014, *Corporate Waqf from Principle to Practice: A New Innovation for Islamic Finance*, Pearson Malaysia Sdn Bhd, Kuala Lumpur.

[31] Majlis Ugama Islam Singapura. 2016, "MUIS: WAQF Administration"available at: http://eresources.nlb.gov.sg/webarchives/details/www.muis.gov.sg.cms.services.zakatwaqf.aspx.id.7616.html

[32] Ministry of Minority Affairs India. n.d., "Waqf Records Computerization Project" available at: http://www.wakf.gov.in/homepage/homepage.php

[33] Kuwait Awqaf Public Foundation. n.d., "International Coordination" available at: https://ww2.awqaf.org.kw/English/AboutMunicipality/InternationalCoordination/Pages/default.aspx

[34] Kuwait News Agency (1999), "Kuwait entrusted by OIC to coordinate waqf action among Muslim states", available at: http://www.kuna.net.kw/ArticlePrintPage.aspx?id=1040745&language=en (accessed 12 May 2015)

[35] Busharah, K. M. A. (2012), "Kuwait Awqaf Public Foundation, (KAPF), developmental social experience and prospects", working paper, United Nations Economic and Social Commission for Western Asia, Beirut, 19-20 December.

[36] Mohsin, M. I. A. 2013, "Financing through cash waqf: a revitalization to finance different needs", *International Journal of Islamic and Middle Eastern Finance Management*, Vol. 6 No.4, pp. 304 - 321.

[37] Torres, J. L. 2013, *Introduction to Dynamic Macroeconomic General Equilibrium Models*, Vernon Press, Malaga.

[38] Starr, R. M. 2011, *General Equilibrium Theory: An Introduction*, Cambridge University Press, New York.

[39] Debreu, G., 1983, "Economic theory in the Mathematical mode", available at: http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1983/debreu-lecture.html (accessed 5 September 2016).

[40] Cardenete, M. A., Guerra, A.-I. and Sancho, F., 2012, *Applied General Equilibrium: An Introduction*, Springer-Verlag Berlin Heidelberg, Dordrecht, London, New York.

[41] Galí, J., Vallés , J. and López-Salido, J. D. 2007. "Understanding the effects of government spending on consumption", *Journal of the European Economic Association*, Vol.5 No.1, pp. 227-270.

[42] Department of Statistics Malaysia, 2017, "Report on household expenditure survey 2016", available at: https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=323&bul_id=WnZvZWNVeDYxKzJjZ3RlUVVYU2s2Zz09&menu_id=amVoWU54UTl0a21NWmdhMjFMMWcyZz09 (accessed 10 January 2019)

[43] Iwata, S., Khan, M. S. and Murao, H. 2003, "Sources of economic growth in East Asia: A nonparametric assessment", *IMF Staff Papers*, Vol.50 No.2, pp. 157-177.

[44] Nagaraj, S. 2005, "Derivation of a total net capital stock series for Malaysia, 1955-2004", working paper, Faculty of Economics and Administration, University of Malaya, Kuala Lumpur, 2005.

[45] Bank Negara Malaysia (2000 – 2018), "Monthly Statistical Bulletin", available at: http://www.bnm.gov.my/index.php?ch=en_publication&lang=en

[46] Public Mutual Berhad, 2016, *Quarterly fund review*, Kuala Lumpur: Public Mutual Berhad.

[47] Public Mutual Berhad, 1999-2018, "Rate of Return of Public Ittikal Fund", Unpublished raw data.

Editor in Chief

Editorial Board