



REVIEW ARTICLE

# Islamic Game Theory approach for overcoming base erosion and profit shifting challenges for the Organization of Islamic Cooperation

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| Keywords<br>Islamic Finance<br>Base Erosion<br>Profit Shifting<br>Islamic Law<br>Digital Economy<br>Game Theory<br>Deep Learning | <ul> <li>Abstract.</li> <li>Purpose: This paper aims to demonstrate a framework for addressing base erosion and profit-shifting challenges in the Organization of Islamic countries.</li> <li>Design/Methodology/Approach: The paper is based on inferential deductive research and a game theory approach.</li> <li>Findings: The paper suggests new strategies for overcoming the challenges of base erosion and profit shifting while strengthening adherence to Islamic law.</li> <li>Research Limitations/Implications: The research is limited to publicly available data and estimates for the game theory approach. This may</li> </ul> |
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| Received: 08 September 2022<br>Accepted: 20 June 2023  | <ul> <li>represent a limit given the potential lack of more detailed and recorded data.</li> <li>Practical Implications: The framework may significantly assist in shaping multilateral agreements on taxation. Social implications: The framework would lead to fairer taxation and stronger support of the society.</li> <li>Originality/Value: This paper demonstrates a new framework addressing the challenges of base erosion and profit shifting.</li> <li>KAUJIE Classification: B0, E0, E31</li> <li>JEL Classification: E61, E69, F30</li> </ul>  |

### **INTRODUCTION**

International taxation has come to the forefront in the public discourse in recent years, given the extensive information that is available outlining how multinational corporations utilize international tax planning in order to minimize their tax burdens. While this attempt at minimizing taxation is nothing new, the growing digital economy and the ability of corporations to serve markets from anywhere without having a physical presence in the countries have exacerbated this challenge (Ross & Herrington, 2013). Companies have become rather creative in setting up complex business structures in order to maximize tax benefits while enhancing their transfer pricing. This has led to considerable challenges

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for both developed and developing countries, where developing countries have been more significantly affected, given that their corporate tax revenue represents a greater share than for developed countries (Van Apeldoorn, 2018).

There has been a G20-OECD project on base erosion and profit shifting (BEPS) with the aim of developing an action plan to strengthen the international corporate tax system via the limitation of tax avoidance opportunities. The intensity of international tax competition has increased significantly, which has been rather detrimental to the economies and population, depriving them of necessary income streams (Heitmüller & Mosquera, 2021).

While most developed countries in Europe and North America have been pushing for fairer taxation, research has shown that developing countries are more affected by profit shifting limiting their ability to strengthen public services and enhance economic growth. There are generally two different types of cross-border externalities that affect the taxation of international corporations. The first is base spillover which is the impact of one country's tax policy on the tax base of other countries. Such spillovers may result from real activities, such as investments or the internal transfer pricing of funds. In line with Islamic principles, it is essential to separate the two components from each other, as one creates real value (investments into the economy), while the other is just a shifting of profit and funds without any value creation. The second is strategic spillover which is the effect of a country's tax policy choices on the tax policy changes in other countries. This can be considered as tax competition where other countries are competing with different tax policies (Baker & Murphy, 2019).

For most advanced economies, there is substantial evidence for base spillovers. Such studies have found that a ten percent point reduction in the effective tax rate led to an increase in foreign direct investment by more than 30 percent (Mooij & Ederveen, 2008). Another attempt at estimating the paper-based shifting of profits concluded that for a ten percentage points higher tax rate, there was a reduction in reported profit of around 8 percent (Heckemeyer & Overesch, 2017). Multinationals have utilized various techniques to optimize their profit-shifting. Further research outlined the main attempts at how multinational corporations aim to minimize their overall tax responsibilities via performing cross-boundary transfers and intercompany funds re-allocations (Dharmapala, 2014). Similar projections for the transfer of earnings for developing nations are also predicted, even if the majority of these outcomes are predominantly for advanced economies. According to calculations, a 10-point drop in foreign taxes may result in a 2.5–3 point drop in earnings reported for Sub-Saharan African and Caribbean nations (Klemm & Van Parys, 2012).

The OECD proposed 15 action measures to mitigate BEPS difficulties and lessen the adverse consequences that tax competition may have on nations (Oguttu, 2015). Understanding the individual action items, and how they affect BEPS as well as the economies of the OIC is paramount for further analysis. The first action item is addressing the tax challenges of the digital economy. The digital economy is a game-changer, given that corporations may provide products and services within a jurisdiction without the need to ever maintain a physical presence there. The challenges arise from the fact that existing tax regulations incorporate the nexus of physical presence, which may be inadequate in the light of a different business

model. The nexus of permanent establishment typically considers that there is a physical presence in the form of an office or factory. Hence, a shift to the nexus of significant digital presence is definitely the best approach to avoid double taxation related to profits derived from the digital economy (Katterbauer, 2020). The conclusion is that the digital economy is not separate from the rest of the economy, which would enable to ensure that companies operating digitally within a country would be considered to be established and have to pay taxes.

The second key action item is the neutralization of effects on hybrid mismatch. Hybrid mismatch arrangements relate to the differences in the tax treatment of entities between one jurisdiction and another. For example, a *mudārabah* may be considered in one jurisdiction a form of debt where some of the costs are tax-deductible, while in other jurisdictions, the same structure may not satisfy the criteria for a tax deduction (Fung, 2017). Specifically, in such an instance the profits obtained from the *mudārabah* would constitute profit and have to be taxed.

The third key action item is the strengthening of controlled foreign companies (CFC) that lead to the taxation of income from CFC for the resident shareholders. This is based on conditions that have to be met and can be a rule that determines whether a subsidiary is located in a low-tax jurisdiction and derives passive income from the other entity. Such an application of rules leads to the fact that the low-taxed income of foreign-controlled subsidiaries is taxed in the country of residence of the parent company. This reduces the incentive of corporations to shift profits to subsidiaries in low tax-jurisdictions (Erosion, 2013).

The fourth key action item is the limitation of base erosion from interest deductions and other financial payments. The main objective in this instance is to shift around debt as debt itself is generally taxed differently across the world. In the OECD approach, net interest deductions may not be linked at all to real economic activity. Given the strong focus of Islamic law on the avoidance of Riba and Gharar, there has to be a strong real economic activity link in order to claim such benefits. There are general recommendations by the OECD to limit these deductions to an EBITDA ratio of 10 % to 30 % (Michael, 2015).

The fifth action is to counter harmful tax practices that focus on transparency and substance. The first part of this is the focus on real substantial activity requirements in order to obtain a preferential tax regime (Erosion, 2013).

One of the key action items related to international treaties is action item 6 which focuses on the prevention of treaty abuses. Specifically, the tax treaties should not be utilized in order to achieve double non-taxation. This can be achieved via the incorporation of a limitation-on-benefits (LOB) provision in addition to a principal purpose test (PPT) (Erosion, 2013).

The seventh action item emphasizes the importance of preventing the artificial avoidance of the permanent establishment status. There have been many corporations that aim to avoid the establishment of permanent establishment (PE), although they conduct a considerable degree of business in the country. The general idea is to reduce the PE threshold in the OECD model tax convention to avoid such instances (Alley & Emery, 2017). Action items 8 to 10 address the challenges of transfer pricing that require that the transfers represent real value

generation and not just to shift profits artificially (Förster et al., 2020).

Another key item, action item 11, is the measurement and monitoring of BEPS preventive action items and to analyze the overall extent of tax revenue losses. Measurement and monitoring are essential in order to finetune and adapt action items to make them as effective as possible (Bradbury & O'Reilly, 2018).

Another action item is the requirement of taxpayers to disclose their aggressive tax planning arrangements and provide transparency about it. Specifically, it addresses mandatory disclosure rules for aggressive tax planning. The 13th action item is the examination of transfer pricing documentation that has to become more transparent. The 14th and 15th action items relate to the enhancement of dispute resolution mechanisms and the development of multilateral instruments to avoid the renegotiation of multiple bilateral taxation treaties. The latest action item plays a critical role in overcoming the challenges related to the current large web of separate bilateral tax treaties that may differ widely amongst each other even though they are mostly based on the OECD Model Tax Treaty (Erosion, 2013).

#### LITERATURE REVIEW

Game theory is the process of modelling the strategic interaction that exists between two or more players that contain a set of rules and outcomes. Game theory can be applied to any situation between two or more players where there are known payouts or quantifiable consequences. The term game theory arises from the word game that refers to any set of circumstances whose results depend on the actions of two or more decision-makers. Each strategy in such a game reflects an entire action plan, and the players function as strategic decision-makers inside the game's environment. The information set that decides the information the players have access to at any one time is a part of every game (Ross, 2018).

One of the fundamental tenets of game theory is that all participants act rationally and want to maximize their rewards. A fundamental idea in traditional economics is the presumption of rationality, which standardizes and simplifies decision-making (Krapohl et al., 2021). The assumption of rational behavior is not always warranted as it emphasizes that individuals solely focus on their own interests in making decisions without taking into account the interests of society and their benevolence. This is critical in Islamic economics, where Islamic norms of support and benevolence are key criteria in decision-making, and support to society is critical.

The prisoner's dilemma is a crucial paradigm for illustrating how people make decisions based on their own self-interest. A popular game, The Prisoner's Dilemma, chronicles the experiences of two convicts who have been detained by the authorities (Carfí et al., 2019). The police have enough evidence to send each of the convicts to jail for a similar crime, the theft of a car, even if they are unable to persuade the jury to condemn both of them. The penalty for this is two years. Each of the prisoners gets the offer to confess and implicate their partner, and if the partner does not confess, then the prisoner will go free while the partner gets ten years. If they both confess, they will both receive five years in prison. If a prisoner is

given 10 years, the issue may be changed into a utility maximization problem since he will have a utility value of zero for ten years, but a utility value of seven for two years. Similar to that, he will receive a utility of 4 for five years, and zero for 10 (Baistrocchi, 2008). The utility payoff matrix for this problem is then visualized in Table 1.

| TABLE 1     Prisoner Dilemma Utility Matrix |         |                     |        |
|---|---------|---------------------|--------|
|   |         | Prisoner II Confess | Refuse |
| Prisoner I                                  | Confess | 4,4                 | 10,0   |
|   | Refuse  | 0,10                | 7,7    |

The assumption in the game is that both prisoners have to make the decisions at the same time and cannot share information with each other. The prisoner's dilemma is a simple game that has to be significantly expanded in order to be representative of realistic games relating to the challenges faced in the international taxation regime (Collins & Kumral, 2020). Game theory can be generally divided into cooperative and non-cooperative game theory, where the models and assumptions differ. Non-cooperative game theory implies the individual is at the center of the analysis that is concerned with doing well for himself within the specified rules and possibilities. When it comes to Islamic economics, non-cooperative behavior is not desirable as it emphasizes the self-interests of the individual without taking into account the benefits to society. Therefore, cooperative game theory may be more suitable to investigate and analyze the behaviors of agents within a society, taking into account the teachings of Islam in dealing with each other. When we link international taxation to game theory, we see that it requires cooperation as any individual's self-centred behavior would cause damage to the overall society and nation itself. The key difference between cooperative and non-cooperative game theory is that in non-cooperative game theory, there is the possibility to have binding contracts, and all the players are individuals. While there have been several well-studied solution approaches via the Nash equilibrium, the non-cooperative games may not suit multilateral taxation agreements within an organization such as the Organization of Islamic Conference (OIC). Specifically, it would imply that every country aims to solely benefit itself and not adhere to any agreements, be it in the form of Sharī'ah Law or other agreements within the organization.

Cooperative game theory approaches are the only suitable ones as they allow for binding contracts to be taken into account and deal with both players as individuals and in coalitions. The games require a finite number of players where there may also be some coalitions that are subsets of the population structure. These coalitions can be contractual agreements or general firm understanding between the parties of the game. In almost every economic interaction, there are some binding agreements or existing collaborations that may affect the decision-making.

## **METHODOLOGY & ANALYSIS**

We have developed a new framework that addresses the base erosion profit shifting challenges encountered within the organization of Islamic countries and utilize a game theory approach to providing the best strategies for the participating countries while taking Islamic values into account. The framework consists of 7 key strategies to address BEPS challenges within the OIC, taking Islamic values into account (Figure 1). The seven key strategies focus on Islamic smart digital taxation, the strengthening of Islamic foreign-controlled corporation rules, and increased transparency. Further strategies address the prevention of abuse of preferential tax agreements and the accurate measurement and monitoring of taxation. Finally, the implementation of an effective dispute mechanism in combination with a multilateral taxation agreement adhering to Islamic values is key for reducing base erosion and avoiding harming the societies of the OIC. Tax revenues play a fundamental role for the governments to provide services to their citizens, support the poor and help the overall economy to strive. Furthermore, we will demonstrate a game theory approach at modelling the interactions between these countries such that they overall maximize their benefits while maintaining adherence to Islamic law.



FIGURE 1. Islamic BEPS Strategy Framework for the OIC

The first strategy is smart digital taxation, which addresses the Islamic taxation challenges in the digital economy. Islamic taxation has been significantly hampered by the digital economy since transactions do not always occur in a physical location. Additionally, considering that businesses like Google and Facebook rely their whole business models on the usage and monetization of the data that are acquired within the jurisdictions, the value of obtained user data is enormous (Corrigan et al., 2018). Furthermore, with some property parcels being sold for high prices, virtual land taxes have assumed a crucial function. While there are still questions around the extent to which the use of virtual land is generally regarded as permissible and shares a significant degree of similarities with physical land. Given the importance of avoiding considering the digital economy as separate from the rest of the economy, this implies that the taxation of virtual and physical land should be similar. Islamic

law specifies the Islamic land tax that applies to both Muslims ('ushr) and Non-Muslims (*kharāj*) alike (Johansen, 2016). The tax is levied on the size of the acreage of the land, but the rate depends on the output potential of the land. For conventional land in the traditional context, this depends on whether it is irrigated, the quality of the soil, and whether it is suitable for higher-value crops. Similarly, the rate may depend on whether the land can be utilized for office, housing, or other services and the return that may be generated. This may be in the form of rental returns or service provisioning revenues that are generated. The maximum tax rate is half the value of the crop that is generated, and in the case of failure due to climatic factors, the tax rate is not applied. If the yields are low because of negligence, then the landowner is still held accountable for paying their rates. This may also imply that the land is sold to another individual that may make better use of it. *Kharāj* emphasizes that landowners have the responsibility to utilize their land effectively and realize its potential. Given that the land is a gift by God, it should not be wasted. *Kharāj* may be equally applied to virtual land. Given that virtual land may be equally utilized for the creation of services and provisioning of computational power, the same form of taxation may be utilized. Taking this into account, there may be other forms of Islamic taxes, such as *zakāh* or *jizyah*, which may be imposed on digital currency holdings that are not productively utilized.

A key difference between virtual and physical land is that the virtual land may be hosted on various servers, which may be located in different jurisdictions. In order to avoid double taxation challenges related to taxation such as  $khar\bar{a}j$ , virtual land needs to be considered located in the jurisdiction where the user is officially located.

The second action item is the strengthening of rules related to foreign enterprises that are controlled by a parent company. Specifically, strict rules on foreign companies following Sharī'ah principles are necessary that link any transfer of profits to real activities, and not solely the shifting of profits between subsidiaries via transfer pricing. This may be in the form where the physical activity takes place or where the key personnel is located. This is in strong agreement with Islamic principles to connect the economy with real activities and impose a tax on unproductive capital.

The third strategy is to focus on improving transparency and reducing harmful tax practices. The Qur'ān and Prophet Mohammed (PBUH) emphasized the importance of good governance and character. This shall be implemented in the form of substantial activity requirements in order to receive preferential tax treatment. Furthermore, cooperation amongst the member states of the OIC is critical, requiring compulsory information exchange on tax rulings and adherence to Islamic laws on good faith dealings and governance. The fourth strategy is to prevent abuse of tax treaties that are agreed on between different countries. Specifically, taxation treaties shall not lead to double non-taxation, which is to the detriment of all participating countries. Therefore, tax treaties should incorporate an Islamic limitation-on-benefits (LOB) provision in addition to the principal Islamic purposes test (PPT). The Islamic LOB provision is key as it ensures that the corporations have sufficient real activities and a connection to the country where they claim the tax benefits. This is a key tenet in Islamic Law that should be adhered to. In combination with the quest for good governance and Islamic principles, the principal Islamic purposes test is key to determining whether the sole objective

of the operation structure is solely for the benefit of the tax treaty benefits.

A fifth key strategy is the effective measurement and monitoring of BEPS activities by corporations. This is important for analysis and enhancing cooperation amongst the member countries to avoid corporations' abuse of tax benefits and ensure that they contribute fairly to the societies.

The sixth key strategy is the effective implementation of dispute mechanisms within the OIC countries for tax issues. The OIC is in an ideal position to set up an independent dispute panel that supervises the interpretation of the tax treaty regulations. The final key strategy is for the OIC to set up a multilateral tax treaty agreement that would cover all OIC countries and would be deemed in agreement with Sharī'ah Law and able to enhance overall economic cooperation amongst the member states. The development of multilateral instruments plays a key role in ensuring Islamic-compliant taxation as it allows to have a unified instrument across all member countries without the need for bilateral taxation treaties that may result in considerable challenges and potential deviations with different taxation interpretations.

The implementation of these key strategies remains vital in order to overcome existing base erosion and profit-shifting challenges that are faced by the governments of the members of the OIC. This is supported based on the OECD findings, and taxation challenges that arise from the reduced taxation base and will be later outlined in the analysis. Specifically, the implementation of a multilateral treaty on taxation and the avoidance of the erosion of the tax base is critical in order to maintain the well-being of all member countries and ensure that corporations pay their fair share of taxes. While these agreements are critical, a key aspect is the determination of an efficient way to determine the best overall outcome for all member states that leads to the best overall outcome and the maintenance of Islamic values of honesty, transparency, and mutual benefits.

In order to provide a model, we present a new cooperative game theory approach for analyzing the negotiations required for addressing the BEPS challenges utilizing a treaty organization model. For this, we assume the set N=1,,n, is the set of all countries within the OIC, and the set S is the payoff profile that exists of the tax revenues generated from the various multilateral agreements, and the payoff profile d in case there is no taxation agreement. The objective of the model is to get every country to participate in the agreement in some form, but if one of the participants refuses to agree to the agreement, then everyone will have the values in the payoff profile d where no agreement is reached. A crucial part of the model is that the set S needs to have elements x such that  $x_i$ d. Otherwise, there would be no incentive to reach an agreement, and every country will solely focus on avoiding reaching any agreements or collaboration, which is contrary to Islamic principles. The utility function for each nation depends on the tax rate it wants to apply in order to fulfil the strategies for BEPS avoidance and maintain its compliance with Islamic law. The utility function then generates overall tax revenue for each of the participating countries, where the tax rate is restricted to ranges as set forth in Sharī'ah law. In the case of disagreement, the assumption is that the overall revenue d is less than several solutions in the set S.

In order the most optimal decision for all the OIC participants, the Nash Rule can be applied. The Nash rule requires the maximization of the product of the agents' gains from the outcome in the case that the multilateral agreements fail. This is represented via.

$$N(S,D) = \lim_{x \to \infty} \prod_{i=1}^{n} (x_i - d_i)$$
<sup>(1)</sup>

which ensures that the solution leads to everyone being better off in agreement than in disagreement, and the constraints ensure there is no solution that makes one of the participants worse off than in the case of a disagreement, and that the taxation rates are within acceptable limits. A key part in the determination of the utility set S is a data-driven approach utilizing machine learning, given that the utility set may have to be estimated based on the economies' tax revenue data, subject to various situations.

Specifically, tax revenues from certain constellations of tax rates amongst the member states are available based on which a deep learning model can be developed to estimate tax revenues for multiple tax rate constellations. Specifically, a deep feedforward (DFF) network may be the preferred choice to estimate the tax revenues for all the member states from the individual taxation rates (Horel & Giesecke, 2020). Furthermore, the network is robust with respect to providing sufficiently accurate estimates for variations in the tax rate data. Solving the above optimization problem can be easily achieved utilizing a global optimization genetic algorithm that determines the most optimal solution. Furthermore, additional constraints may be imposed, such as the minimum number of participating nations in the agreement in order to be a viable solution.

#### Conclusion

BEPS issues have existed amongst the OIC nations for a sizable amount of time, causing societies to suffer large tax losses. This has further created problems for societies as tax obligations required by Islamic law are not being paid as businesses and people try to take advantage of tax breaks to pay the least amount of tax possible. We have put up a fresh approach that combines Islamic principles with game theory to address the BEPS issues facing the OIC. In order to address BEPS challenges, address possible corporate tax evasion, and maintain a tighter relationship with Islamic principles, the framework includes seven important initiatives. In order to maximize the total benefit for all OIC participants, the framework also offers a deep learning cooperative game theory model for tax rate optimization in multilateral taxation agreements.

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