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# An Islamic Game Theory approach for overcoming base erosion profit shifting challenges for the Organization of Islamic Cooperation (OIC)

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### **Abstract**

BEPS (Base erosion and profit shifting) challenges have been present between the countries of the OIC for a considerable period of time, leading to significant tax losses to its societies. This has further led to challenges, as tax dues, demanded by Islamic law, are not collected. In this situation, corporations and individuals aim to exploit tax benefits in order to minimise their overall taxation. We here present a new framework integrating Game theory and Islamic values for addressing the challenges with BEPS for the OIC. The framework outlines seven key strategies in order to address BEPS issues, resolving the potential tax abuses by corporations while maintaining closer alignment with Islamic values. Furthermore, our framework provides a deep learning cooperative game theory model for the optimisation of the tax rates in the multilateral taxation agreement in order to create the most overall benefit for all participants of the OIC.

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# The 'right to participate in cultural life'

Purpose – this article aims to demonstrate a framework for addressing base erosion profit shifting challenges in the Organization of Islamic countries. In terms of its Design/methodology/approach – this research is based on inferential deductive research and game theory approach.

Findings – the paper demonstrates new strategies for overcoming the challenges of base erosion and profit shifting while strengthening adherence to Islamic law. Concerning its Research limitations and implications – this article would help the member countries of the OIC to collaborate on achieving greater taxation revenue success and strengthening collaboration.

In terms of its *Practical implications* – the framework may significantly assist in shaping multilateral agreements on taxation; for its *Social implications* – the framework would lead to fairer taxation and stronger support of the society; its *Originality/value* – this article demonstrates a new framework addressing the challenges of Base erosion profit shifting.

International taxation has come to the forefront in recent years within international economics and political debates, given the extensive information now available outlining how multinational corporations utilise international tax planning in order to minimize their tax burdens. While this attempt at minimising taxation is nothing new, the growing digital economy and the ability of corporations to serve markets from anywhere in the world without having a physical presence in any country, has exacerbated the challenge (Ross & Herrington, 2013). Companies have become 'creative' in setting up complex business structures in order to maximise tax benefits while enhancing their transfer pricing. This has led to considerable challenges 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 taken place (a now well-known) 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. Needless to say, 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 (Heitmueller & 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, 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's country 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. This is a general challenge that arises from corporations and individuals utilize existing taxation agreements that may allow for profit shifting. The second type is strategic spillover, which is the effect of a country's tax policy choices on the tax policies 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 (De Mooij & Ederveen, 2008). Another attempt at estimating the paper-based shifting of profits concluded that there was for a ten percentage points higher tax rate, a reduction in reported profit of around 8 percent (Heckemeyer & Overesch, 2017). Multinationals have utilised various techniques to optimize their profit-

shifting. Further research outlined the main attempts at how multinational corporations aim to minimise their overall tax responsibilities (Dharmapala, 2014). While most of these results are primarily for advanced economies, similar expectations for the shifting of profits for developing countries are equally expected. There have been estimates for Sub-Saharan African and Caribbean countries that a 10-point tax reduction abroad may lead to a 2.5 to 3 points decrease in profits reported (Klemm & Van Parys, 2012).

In order to minimise challenges related to BEPS, the OECD suggested 15 action items in order to reduce the negative effects tax competition may have on governments (Oguttu, 2015). The first action item is addressing the tax challenges of the digital economy. The digital economy is a gamechanger, given that corporations may provide products and services within a jurisdiction without the need to ever have a physical presence. 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. 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.

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 Mudarabaha loan 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).

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 foreigncontrolled 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 (OECD, 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 taxed mostly 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 to limit these deductions to an EBITDA ratio of 10 % to 30 % (Durst, 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 (OECD, 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) (OECD, 2013).

The seventh action item emphasises 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, Greil, & Hilse, 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 (OECD, 2013).

Game theory is the process of modeling 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', referring to any set of circumstances whose results depend on the actions of two or more decision-makers — the players are strategic decision-makers within the game context, and each strategy represents a complete action plan. A component of any game is the information set that determines which

information is available to the players at any given point (Ross, 2018).

One of the key assumptions in game theory is that the players all act in a rational way and aim to maximize their payoff. The assumption of rationality is a key concept in conventional economics, simplifying and standardising the decision behavior (Krapohl, Ocelik, & Walentek, 2021). The assumption of rational behavior is not always warranted as it emphasises that individuals solely focus on their own interests in making decisions without taking into account the interests of the society and their benevolence: This is critical in Islamic economics, where Islamic norms of support and benevolence are key criteria in decision making, and the support to society is critical. In practice, this may be debatable given that Muslims may not necessarily behave like Homo Islamicus.

One of the key models outlining the relation between individual decision-making to one's own self-interest is the 'prisoner dilemma'. The prisoner dilemma is a key game that follows the process of two prisoners that have been arrested by the police (Carfí, Donato, & Schiliró, 2019). The police do not have enough evidence for the jury to convict both of them, but they have enough evidence to send each of the prisoners away for a related crime, which is the theft of a car. The penalty for this is two years. Each of the prisoners gets the offer to confess and implicate their partner, while the partner does not confess, then the prisoner will go free while the partner gets ten years. If they both confess, both of them will get five years. In order to transform the problem into a utility maximization problem, if a prisoner gets ten years, then he will have a utility value of zero, while for two years, he will have a utility value of 7. Similarly, for five years, he will get a utility of 4, and for ten years, he will have zero utility (Baistrocchi, 2008). The utility payoff matrix for this problem is then visualized in Table 1 (below).

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 decision at the same time and cannot share information with each other. The prisoner 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 noncooperative game theory, where the models and assumptions differ. Non-cooperative game theory implies the individual at the center of the analysis 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 emphasises the self-interest of the individual without taking into account the benefits to society. Therefore, cooperative game theory may be more suitable to investigate and analyse the behaviors of agents within a society, taking into account the teachings of Islam in dealing with each other. Specifically, international taxation requires cooperation as any individual behavior in one's own self-interest will incur damages to the overall society and nation itself. The key difference between cooperative and noncooperative game theory is that in noncooperative game theory, there is the possibility to have binding contracts, and all the players are individuals. While there have been several wellstudied 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 Shariah Law or other agreements within the organisation.

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 organisation of Islamic countries and utilise a game theory approach to providing the best strategies for the participating countries taking into account Islamic values. The framework consists of 7 key strategies to address BEPS challenges within the OIC, taking into account Islamic values (Figure 1). The seven key strategies focus on Islamic smart digital taxation, the strengthening of Islamic foreigncontrolled 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. In the Islamic economy, Infaq is another key pillar that provides support for those in need in order to reconcile the heart and the cause of Allah (Haniffa & Hudaib, 2012). Furthermore, we will demonstrate a game theory approach at modeling the interactions between these countries such that they overall maximize their benefits while maintaining adherence to Islamic law.

The first strategy is *smart digital taxation*, which addresses the Islamic taxation challenges in the digital economy. The digital economy has posed considerable challenges related to Islamic taxation as there is not necessarily a physical location of where the transaction takes place. Furthermore, the value of collected user data is significant, given that companies such as Google and Facebook base their entire business models on the utilization and monetization of the data that are





collected within the jurisdictions (Corrigan, Alhabash, Rousu, & Cash, 2018).

Furthermore, virtual land taxes have taken on a critical role, with several plots of land being sold for significant amounts of money. While there are still questions around to what extent virtual land is permissible and to what extent it is treated similar to physical land in Islamic law, virtual land can be regarded as permissible and shares a significant degree of similarities with physical land. Given the importance of avoiding considering the digital economy separate from the rest of the economy, this implies that taxation of virtual and physical land should be similar. Islamic law specifies the Islamic land tax (Kharaj) that applies to both Muslims and Non-Muslims 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 soil, and whether it is suitable for higher-value crops. Similarly, the rate may depend on whether the land can be utilised 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. Kharaj 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. Kharaj may be equally applied to virtual land. Given that virtual land may be equally utilised for the creation of services and provisioning of computational power, the same form of taxation may be utilised. Taking this into account, there may be other forms of Islamic taxes, such as Zakat or Jizyah, which may be imposed on the digital currency holdings that are not productively utilized. While technically Zakat is not tax in its implicit sense, it is a form of mandatory almsgiving in many nations.

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 Kharaj, 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 Islamic-controlled foreign companies are

necessary that link any transfer of profits to real activities. 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 Quran and Prophet Mohammed emphasised 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 Islamic cooperation organization 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 determine 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 within the organization. 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 an 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 Shariah 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 profit shifting challenges that are faced by the governments of the members of the OIC. 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 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 of 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>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 depends for each nation on which tax rate it wants to apply in order to fulfill 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 Shariah 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. 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:

$$N(S,d) = arg \max_{x \in S} \prod_{i=1}^{n} (x_i - d_i)$$

This ensures that the solution leads to everyone being better off than in the case of a 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 in the determination of the utility set S is a datadriven approach utilizing machine learning. 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 optimisation problem can be easily achieved utilising a global optimisation genetic algorithm that determines the most optimal solution. Furthermore, additional constraints may be imposed if desired. We demonstrate this model on a few African countries and outline in Table 2 the tax revenues. Based on these data, several estimated decision outcomes were obtained taking into account the tax revenue changes. The most optimal decision is that all of the countries collaborate and exchange information, as otherwise a disagreement would lead to a worsening of taxation revenues for the majority of countries.

Table 2: Tax revenues (million USD) for African countries (based on availability per OECD database).

Tax Revenues (million USD)	2015	2016	2017	2018	2019
Chad	632.96	479.80	623.13	869.57	886.48
Egypt	48,385.91	47,985.51	35,904.60	37,309.38	43,063.72
Mali	1,987.41	2,313.12	2,568.24	2,276.53	2,913.92
Mauritania	897.54	908.10	985.08	1,129.82	1,106.53
Morocco	27,146.66	28,388.88	30,662.52	33,314.80	33,952.72
Niger	1,218.87	1,087.94	1,059.53	1,434.93	1,342.15
Nigeria	29,808.83	21,357.31	21,410.16	26,682.36	26,706.70
Senegal	2,914.87	3,239.62	3,420.95	3,824.79	3,863.96
Seychelles	410.34	458.56	491.88	534.22	541.46
Tunisia	13,056.97	12,381.41	12,322.25	12,778.96	13,443.78

### Conclusion

BEPS challenges have been present between the countries of the OIC for a considerable period of time, leading to significant tax losses to the societies. This has further led to challenges for the societies as tax dues that are demanded by Islamic law are not collected as corporations and individuals aim to exploit tax benefits in order to minimize their overall tax. We have presented a new framework integrating Game theory and Islamic values for addressing the challenges with BEPS for the OIC. The framework outlines seven key strategies in order to address the BEPS issues, resolve the potential tax abuses by corporations and maintain closer alignment with Islamic values. Furthermore, the framework provides a deep learning cooperative game theory model for the optimization of the tax rates in the multilateral taxation agreement in order to create the most overall benefit for all participants of the OIC.

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