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# Indexing government debt to GDP: A risk sharing mechanism for government financing in Muslim countries

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**Abstract** - Over the past decades much effort and research has gone into establishing a viable set of Islamic financial institutions. An area of utmost importance, which still has gaping holes, is the development of instruments for government financing on a global level. Most Muslim countries, with the exception of a few Gulf countries, are heavily indebted with high reliance on multilateral financing primarily based on high interest rates. This vicious cycle of interest rates and debt have stunted the growth of these nations and worsened the conditions of the masses. This paper is an attempt at introducing the concept of risk sharing instrumentation in the form of GDP-linked Papers for Muslim governments for their financing through multilateral and supranational bodies. Without dwelling much on the Shariah technicalities, we attempt to discuss the potential benefits of transferring government debt in these forms of risk sharing instruments. The authors have attempted to represent the economic benefits of these risk-sharing mechanisms for a set of four indebted Muslim countries with empirical proof. Through this paper, we endeavour to initiate a thought provoking and practical discussion for further development of these instruments for the betterment of Islamic countries.

*Keywords:* risk sharing instruments, sovereign debt, GDP-linked paper, Muslim countries

*JEL Classification Codes:* F34, H63

## 1. Introduction

Islamic finance has progressed phenomenally over the past few decades, moving from a small market in the Arab world to a much larger global presence. Marked with impressive growth, the presence of Islamic finance is estimated to be US\$1.6 trillion and is expected to grow at the rate of 15% over the next few years.

The viability of Islamic finance as an alternative was put to test in the wake of the recent financial crisis, where in the midst of bank failures and stock market crashes, institutions practicing Islamic finance managed to stay afloat and rather provided a buffering effect to the crisis. Several economists argue that due to the innate laws of Islamic finance it was able to withstand the financial crisis much better than its conventional counterpart was.

Yet despite this impressive record, Islamic finance only accounts for 1% of the global financial system. Some scholars are of the opinion that this is due to the substantial indebtedness of Muslim nations. Narrowing in on the Organization of Islamic Centre (OIC) member countries, a study revealed 19 from 39 Heavily Indebted Poor Countries (HIPC) are part of the OIC (IMF, 2010). Furthermore, a mere 6 out of 57 OIC member countries, in the Gulf Cooperation Council (GCC) are prepared to meet financial shocks of sorts. The remainder are heavily reliant on borrowing from the international market to pay off their debts.

Additionally, these countries are dependent on Western financial intermediaries with high interest rates to meet their debt requirements, transacting mainly in dollars. During times of economic instability, liability dollarization (see Calvo et al., 2003; Calvo and Reinhart, 1999; Durdu

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and Mendoza, 2005) and relying heavily on high interest borrowings can backfire for these countries, as they are more likely to have long-term shocks on the economy leading to higher cost of borrowings. Alternatively, they may need to restructure or renegotiate the terms of borrowing or lastly, be forced to employ pro-cyclical policies that would lead to disastrous economic and social outcomes.

One way to avoid any of the above possibilities is to index their debt against real economic variables to reduce financial distress. Several economists advocate the value of indexing government debt reasoning that it would allow for an improved risk sharing among debtor countries and international creditors.

Amongst the key proponents of this instrument is Bailey (1983) who had initially suggested transferring the sovereign debt into claims on the exports of the country. Delving further on this, Krugman (1988) and Froot et al. (1989) studied the virtues of indexing sovereign debts to variables that are controlled by the country, partially or completely.

Shiller (1993) first proposed the concept of a true GDP-linked bonds, which fundamentally were perpetual claims on a fraction of a country's GDP. Similarly, Borensztein and Mauro (2004) also sought to review the case for GDP growth-linked bonds, and Griffith-Jones and Sharma (2006) in their paper summarize the benefits of introducing GDP-linked bonds. Working on Shiller's concept, Obstfeld and Peri (1998) propositioned members of the European Union to issue GDP-linked euro denominated securities. Likewise, Haldane and Quay (1999) argue in favour of indexing sovereign debt to commodity prices. Dzeze (2002) advocated using GDP-indexed bonds as an integral part of restarting the debt of the poorest countries strongly.

While the idea of GDP-linked debt has been implemented to a limited extent, it received renewed impetus after a wave of financial and debt crisis that flooded emerging markets in the 1990s. Caballero (2002) has suggested the issuance of copper indexed bonds during Chile's financial upheaval. He further recommends making the returns of debt instruments dependent on external shock variables that trigger crises (such as exports, regional economic growth, etc.) arguing that most emerging markets are affected by external shocks that they are not well-equipped to withstand.

Reverting back to our issue at hand, as most of Muslim nations are severely debt ridden, a fundamental question arises: Does Islamic finance have the aptitude to provide for the borrowing and financial needs of Muslim governments? Much has been written about the development and innovation of Islamic finance over the years. Mirakhor et al. (2011 and 2012) believes that risk sharing is the foundation of Islamic finance and is instrumental in the development of any financial products within the ambits of the Shariah.

A dearth in the present literature found concerns GDP-linked papers using the principles of Islamic finance. The potential benefit of using GDP-linked Sukuk was discussed by Diaw et al. (2012) where he proposed structuring the instrument based on forward *ijarah*. Mirakhor (2011) highlights the benefits of using macro-markets and similar GDP-linked papers in his works. Similarly, the prospective benefits from using an equity financed budget for Muslim

countries was discussed by Hasan and Siddiqui (1992) who highlighted that an equity financed deficit is not necessarily unstable and that the output of the economy can be enhanced by the government expenditure policies.

Keeping in mind the evident lack of research on this pertinent topic, this paper aims to assess the benefits of GDP-linked Sukuk, and tries to empirically show some of the key benefits these instruments can offer. This paper also attempts to address some of the concerns from the investor angle, to provide a case for these instruments as alternative to sovereign debt for Islamic countries.

The present paper is structured as follows: Succeeding the introduction is the motivation and justification for the study, which is followed by an insight into the need for GDP-linked Sukuks, benefits and *fiqhi* aspect in Section 3. Section 4 provides some simple empirical results on how the economies will benefit with these instruments, which is followed by discussion on the viability for investors in Section 5. Subsequently, the authors provide concluding remarks.

## 2. Motivation and justification of study

In this study, the primary focus of the authors is to emphasize on the benefits of employing GDP-linked papers for Muslim countries that are emerging but debt ridden. With the substantial growth of Islamic finance over the years, it becomes imperative to introduce instruments that would benefit Muslim economies at large. In particular, the reliance of Muslim nations on high-interest rate borrowing has largely been neglected in Islamic finance, with little to no research available on alternatives.

The motivation for this paper arises from the need of evidence to support the practicality of linking real economic variables to sovereign debt for OIC countries. This will further allow us to examine the efficacy of such instruments on the economies of Muslim countries.

This paper is amongst the few that have discussed the use of GDP-linked instruments, primarily discussed by Diaw and Bacha (2011) who proposed Sukuk structures indexed with real economic variables. The use of real economic variable linked instruments, as proposed in this study, aims to quell instability in Muslim countries and help stabilize government spending while reducing the impact of interest borrowings.

Islamic finance theoretically has the capacity to provide an alternative to these Muslim countries that would allow them to restructure their debt and continue growing as an emerging economy. Islamic finance should aim to be the principal financial system for Muslim countries, hence raising the need for the development of new instruments and products to meet the needs of Muslim economies at both a micro- and macro-level.

This study is novel in this area as it is a humble attempt to initiate an empirical research-based argument to provide policy makers and economists an alternative Shariah compliant instrument as a replacement of the conventional sovereign debt.

In the current literature in conventional finance this area has not been studied in detail. Regarding Islamic finance,

it is very rarely studied area. But considering the structure of Muslim economies, which are primarily indebted economies, the issue of sovereign debt is of immense importance. The objective of this study is to provide empirically evidence on the viability and economic benefits of GDP-linked Sukuks.

### 3. GDP-linked Sukuk

#### *Need for GDP-linked Sukuk*

GDP-linked Sukuk aim to provide a breathing room to economies when they go into recession and on the other side provide an automatic slowing-in mechanism when the economy goes into high growth zones and into overheat. Analysing the advantages of this instrument, we can find two sets of clear advantages from an economic point of view for the Muslim countries.

Firstly, since the payment of profit is linked to the actual growth of the economy, it can reduce the likelihood of crises. In comparison to the normal borrowing mechanism that Muslim economies are subjected to via plain vanilla sovereign bonds or multilateral agency debts, the payments are fixed, and any slowdown in economy results in a ballooning of debt.

In existing literature, there is an immense amount of evidence on the sovereign debt's position of dependence on the economic growth. A glance at the history shows that slow growth has primarily underlined debt crises, like the Latin American crisis of 1980's and the near complete default of the Heavily Indebted Poor Countries of 1990's. In economic theory and its applications, the ratio of external debt to GDP is a significant predictor of impending crises. Detragiache and Spilimbergo (2001) in their study empirically show that an increase of 10% in the debt/GDP ratio has an impact of nearly 20% increment in the probability of the crisis. In another study by Easterly (2001), he argues with proof that a hundred basis point decline in GDP growth rate is associated with 1.5 times more debt rescheduling in the fifteen years that follow.

In recent times, Argentina in the global economic system has flirted with the concept of GDP-linked borrowings. Although the conventional GDP-linked bonds differ from the conceptual Sukuk proposed in this paper, the mechanics of economics can be argued for a benchmark and as an example. There appears to be opposing views on how much the Argentinian government benefited from GDP-linked borrowing, but economic numbers show a stable growth and recovery for the economy.

Secondly, GDP-linked Sukuk, as an alternative to the conventional debt, reduce the need of procyclical policies, which have stunted the growth of most Muslim countries post crises. It acts as automatic stabilizers in the case of an economic slowdown and in boom periods. Considering the example of Pakistan, post 2008 stock market crash, and civil unrest owing to terrorism, the economy slowed down. Having immense amounts of external debt, which had a fixed interest payment due, the country had to revert to an IMF bailout plan, thus incurring another 10 billion dollar loan to meet its prior commitments. The increase in debt and the bailout plan came with specific conditions of fiscal tightening and tax reforms. These policies of fiscal

tightening and tax reforms and removal of subsidies provide a further negative impact on growth. A fiscal tightening by the government would reduce the expenditure in the country influencing the industrial sector's growth.

Similarly, an increase in tax and removal of subsidies would reduce the disposable income of the people, thus reducing the consumption in the country. Both of these results end in amplifying the economic downturn. Calvo (2003) highlights some of these issues in his literature on sudden stops, where he argues that sovereign debt fails to serve as a device for inter-temporally smoothing the impact of such slowdowns.

#### *Key benefits of GDP-linked Sukuk*

In this section we try to highlight the key benefits GDP-linked Sukuk offer the issuing country from an economic perspective:

- In case the economy of the issuing country experiences a persistent low growth phase, the GDP-linked papers provide a cushion against mounting debt as in conventional borrowing. Since the payment due on these papers would vary with the growth rate, the Debt/ GDP ratio would only increase via a deficit borrowing of the country. This would lead to a less probability of default, and provide breathing room for policy makers to expand fiscally or through tax cuts to boost the economy.
- Usually emerging countries and HIPC countries (where most Muslim economies fall) face extreme difficulty for borrowing in times of crises due to weak economic numbers. With GDP-linked papers, since their liabilities would reduce, that would provide room for counter cyclical policies to boost the economy.
- As Barro (1995) highlights, a mechanism of linking GDP with the liability of the country can provide ease of maintaining smoother tax rates and provide basic infrastructure to the population in times of crises without increasing tax rates.
- It has been observed, in the case of many Islamic countries, as well as emerging economies, the tendency to go into frivolous expenditure in the times of high economic growth, which may lead to overheat of the economy followed by a recessionary phase to bring the economy back to equilibrium level. Amongst the key Islamic countries, the case of Indonesia and Malaysia, in the early 1990s is an example. The economic crash of 1997 affected the region bringing the growth number to negative in one year after a decade of double-digit growth. If the government is using GDP-linked paper, in times of high growth the payment on Sukuk will be higher as well, which will keep a check on excessive fiscal expansion.

Any instrument is not viable for financial markets until it provides benefits to both sides involved in the transaction. Although in this paper we aim to provide a concept of a possibility of using GDP-linked papers in Muslim economies, why it may work is provided in the following passage by listing the potential benefits to the buyer of this instrument.

- Diversification of investments: The economic cycles of different countries are far from being correlated perfectly. Although there exists regional correlation

to some extent, but global perfectly correlated economic cycles is a utopian scenario. The investors in these papers can diversify their portfolio while keeping their investments in the real sector of the economy instead of financial papers only.

- An application of GDP-linked papers will provide a smoothing of the economic growth of the Muslim and emerging economies, reducing the probability and frequency of defaults. From an investor perspective, a default is a high cost of litigation and restructuring.
- While in developed countries, the stock markets provide an investment opportunity into the future prospects of the real sector, in Muslim economies, the stock markets are still at nascent stage. Issuance of GDP-linked Sukuk will provide an opportunity to investors to invest in the potential of the real economy.

### *Insight into structure and Fiqhi issues*

The proposal for a GDP-linked Sukuk has been raised in the corridors of Islamic finance previously in a paper by Diaw et al. (2011), where they have proposed an Ijarah based GDP-linked Sukuk for public sector funding and debt management. The proposal of this Sukuk takes into account this earlier study and is an attempt to further the idea. Whereas the previous study proposes an ijarah-linked paper, we propose a pure musharakah linked paper.

The idea of authors is to issue a musharakah paper by the government as the wakil of the country, where the underlying business is the economy as a whole. Keeping in mind the musharakah nature, where profit is paid on actual profit is the business, which in this case is the growth of the economy. This idea is subject to Shariah debate and approval, but in the understanding of the authors if we consider the economy as one business, there should not be a problem in sharing of the risk of the business (economy).

A key insight of this model is that in case the economy goes to zero growth or negative growth in any year, the investors would share in the losses, which would mean a reduction in their principle amount invested in the business (economy). This sharing in risk of the economy via a musharakah paper is different from indexation of the debt, since a debt is not created when a musharakah Sukuk is shared, but is similar to issuance of equity shares in the business (economy) of the country.

The issuance of indexation is a much-debated topic under the Shariah law, but is primarily focused on “debt” and not much has been discussed and debated on the issue of Equity shares linked to GDP. Bacha and Mirakhor (2012), provide a strong argument in favor of development of similar GDP-linked securities, linking it to welfare of Ummah through the concept of macro markets.

## **4. Empirical analysis**

### *Empirical evidence for some Muslim economies*

The empirical section shows some primary basic economic numbers to analyze what benefit GDP-linked Sukuk may provide to the Muslim economies. To make our analysis, we take into account four countries, Malaysia, Indonesia, Iran and Turkey. These four countries throughout the

Islamic world comprise nearly 60% of the GDP of Islamic ex GCC countries. These four countries have experienced economic crashes and have been under external debt for the past few decades.

For a simple review of the benefits of a GDP-linked sovereign can be illustrated by taking the example of our sample countries. Suppose a simple musharakah based GDP-linked Sukuk was used for all financing of these four countries from 1985 onwards, including conversion of the existing debt to this instrument. The country would have to pay a profit rate of whatever the growth of the underlying business is – in this case the economy of the country. In any year where the business (economy) does not grow, there would be a zero payment of profit.

For the purpose of this example, we make the strong assumption that the composition of the debt and the changes in the debt levels does not have any impact on the behavior of any of the other variables in the economy during 1985–2010. What repayments the countries would have had to make and the interest cost savings is illustrated in the Figure 1. The graphs show, what was the actual interest payment and debt forgiveness in each year as a representative of the cost the country actually had to bear due to conventional mode of financing. In addition, the payments for GDP-linked Sukuk are shown for the same period and the savings as a percentage of the national income each year.

Looking at the Malaysian case, the Malaysian economy after a short decline in the mid-1980s bounced back and grew at a robust speed for the second half of the eighties and first part of nineties. This was followed by the infamous Asian financial crisis of 1997, which brought the ASEAN economies down to their knees in a matter of a year. With a couple of years of negative economic growth, the economy was propped back up with fiscal support policies and capital controls. Indonesia experienced a similar crisis but decided to take the multilateral agency bailout plan, and both economies have experienced a revival in economies in the last decade.

With liberalization policies in Indonesia, a massive influx of foreign investment supported by steady infrastructure development has resulted in high economic growth figures. Within these two economies, in our example for using GDP-linked Sukuks, the graphs show the crisis would have resulted in zero payments during the crisis years, providing room to the government for fiscal expenditure, to propel the economy further. Governments using GDP-linked Sukuk would have obtained a large reduction in the interest bill, leaving more room to avoid procyclical fiscal measures. Large interest savings would also have applied during the sudden slowdown of 2008–2009. In the case of Malaysia, the average profit payment over the 25-year period amounts to 5.99% as compared to 6.54% average interest payments that were paid by the Malaysian government. In addition to the lower average payment, over the period, Malaysia would have saved nearly 14% of its national income. In the case of Indonesia the difference between profit payment on GDP-linked Sukuk and interest payment is a mere 30 basis points annually, but the savings as a percentage of national income would have been 5%.

On the other hand, Turkey has had a unique economic growth case, where the real GDP has experienced high

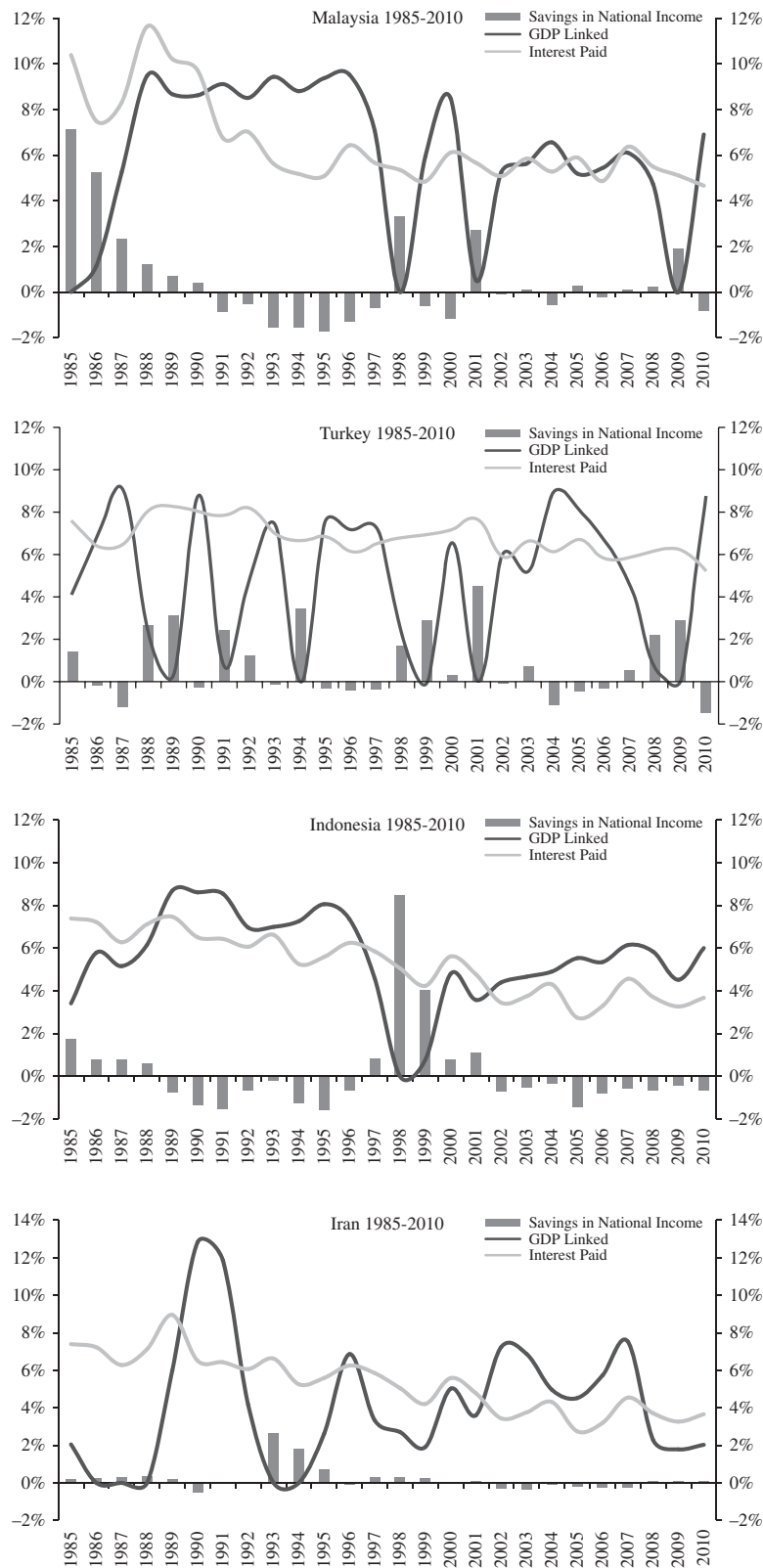


Figure 1. Interest savings over the economic cycle.

volatility as compared to other countries. With its strategic location as the bridging country between Europe and Asia, Turkey has experienced internal economic crises during our sample period.

The 1980–88 Iraq-Iran war benefitted the Turkish economy. At that time, the Turkish economy increased trade with both countries and became the supply route for Iraqi oil exports. The end of war in 1988 saw a sudden slowdown in the economy, which stabilized with the economic policy of import substitution of the then government. The economy again received a major blow during the Persian Gulf War, with a nearly \$3 billion loss due to reduced trade. Saudi Arabia, Kuwait, and the United Arab Emirates (UAE) moved to compensate Turkey for these losses, and by 1992, the economy again began to grow rapidly, before it was plunged again into crisis in 1994, owing to government borrowings. Post crisis, the economy stabilized but experienced sharp downturns due to military assault in Iraq, the economic slowdown of Europe and the financial crisis of 2007. With this volatile nature of the economy, GDP-linked Sukuk, would have provided savings as a percentage of national income to the tune of 24% during this period, while the average payment per annum for GDP-linked paper is 4.77% compared to 6.83% average annual interest paid by Turkey.

The fourth country in the sample, Iran, with its decade-long war with Iraq in the 1980s and subsequent international sanctions owing to its nuclear research has experienced an economic situation marked by dogged growth, where it has been impacted by sanctions and restrictions on its oil export. Iran has the largest Islamic financial assets in the world, and using the Musharakah based GDP-linked Sukuk would have benefitted in aggregate savings of 6% over national income while the average profit payments on GDP-linked papers would have been 4.07% as compared to actual interest payments of 5.30% annually that Iran paid to external lenders.

### Debt/GDP stabilization effect

To illustrate the benefits of the GDP-linked Sukuk, in stabilizing the Debt/GDP ratio of a country we perform a simple exercise. For our sample countries using the well-established identity in fiscal economics:

$$\frac{D_t}{Y_t} = (1 + r - g_t) \left( \frac{D_{t-1}}{Y_{t-1}} \right) - S_t$$

where  $D_t$  is government debt,  $Y_t$  is output,  $s_t$  is the primary surplus as a share of GDP,  $g_t$  is the growth rate, and  $r$  is the interest/profit rate on the debt.

Using actual data for the time period under consideration, holding all other values of growth as constant (a very strong assumption), we simulate the new Debt/GDP levels for these four economies. Table 1 reports the standard deviation as a volatility measure of the Debt/GDP ratio during that period. It is evident that using the GDP-linked Sukuk would reduce the volatility in the Debt/GDP ratio for all the countries minus turkey, where it stays similar. Although the difference in the standard deviation doesn't seem huge, but if it is translated in absolute dollar terms, it goes in excess of a US\$1 billion for these countries.

**Table 1.** Standard deviation of Debt/GDP.

	Iran	Indonesia	Malaysia	Turkey
Without GDP-linked papers	0.087	0.267	0.122	0.061
With GDP-linked papers	0.084	0.256	0.110	0.061

Tables 2 and 3 represent the maximum and minimum value of the Debt/GDP ratio for a comparative analysis of actual and simulated using GDP-linked Sukuk. For our sample countries, we observe that during the 25 year period under study, the maximum levels of Debt/GDP would have been substantially lower for Indonesia and Malaysia by nearly 300 basis and 400 basis respectively. In the case of Turkey and Iran, the maximum level of Debt/GDP would have been considerably lower as well. Same trend holds for minimum level of Debt/GDP ratio, where the minimum levels would have been much less than the actual Debt/GDP ratios these countries experienced.

**Table 2.** Maximum value of Debt/GDP.

	Iran	Indonesia	Malaysia	Turkey
Without GDP-linked papers	39.11%	158.69%	77.48%	57.62%
With GDP-linked papers	38.63%	155.50%	73.43%	55.78%

**Table 3.** Minimum value of Debt/GDP.

	Iran	Indonesia	Malaysia	Turkey
Without GDP-linked papers	2.93%	27.57%	29.30%	32.80%
With GDP-linked papers	2.67%	28.34%	29.04%	31.35%

The earlier results highlight the potential benefits of having GDP-linked Sukuk as a replacement of conventional debt. Nevertheless, the illustrations in earlier tables have been provided under strong assumption of keeping all factors constant. In reality, the potential benefits may be large owing to interacting nature of economic variables. We have assumed that the primary surplus remained the same as actual every year in our sample period, but it is important to note that while using this Sukuk fiscal policy economic growth and in savings/increments in profit payment may respond. This would change the primary surplus and thus may amplify the benefits achieved by these instruments in stabilizing the Debt/GDP ratio.

Primarily in years of sluggish or negative growth with debt sustainability as a major concern, governments



**Table 5.** Correlation of GDP growth rates amongst selected few Islamic countries.

	Bangladesh	Egypt	Indonesia	Iran	Malaysia	Nigeria	Tunisia	Turkey
Bangladesh	1.000	0.369	(0.125)	0.321	(0.127)	0.070	0.431	0.225
Egypt		1.000	0.003	0.043	0.013	0.214	0.336	0.001
Indonesia			1.000	0.101	0.778	0.122	(0.096)	0.177
Iran				1.000	0.182	0.304	0.559	0.063
Malaysia					1.000	(0.009)	0.027	0.296
Nigeria						1.000	(0.020)	0.074
Tunisia							1.000	0.142
Turkey								1.000

tend to move towards an increase in the primary surplus, effectively implying that fiscal policy is procyclical. In our sample countries, this is evident when we analyze the primary surplus during economic downturns. In the case of Malaysia and Indonesia it was evident during the Asian financial crisis when Malaysia with an average deficit of 6% in 1997–98 moved to a 6% surplus in the succeeding 2 years. This is a common occurrence in Islamic countries, which are primarily liquidity constrained and have to impose these policies to maintain their credibility in the international credit market.

## 5. Viability for investors

By illustrating some of the ways GDP-linked Sukuk can benefit the Islamic countries, within our sample countries, the authors do realize that implementation of these instruments require a much more thorough and rigorous empirical work. In addition to the fine-tuning of these instruments, a major obstacle that can be foreseen is the creation of markets for new instruments globally. Past experiences with the introduction of innovative instruments in world credit markets has been met with skepticism and resistance.

Since GDP-linked Sukuk based on pure musharakah structure is a novel idea in the Islamic financial landscape, not much debate has happened on potential obstacles. Nevertheless, owing to the global economic environment, these instruments would have to be introduced in the world financial markets, which are dominated by the conventional investors. Due to this reason, we borrow some of the concerns of global investors from literature of conventional finance that seem to hold valid for these instruments as well.

A serious question is based on whether international investors would be willing to directly expose their investments to volatility of GDP in Muslim and emerging countries. In the understanding of the authors, international investors are already exposed to the economic growth of the country implicitly via the investments in the stock markets and the standard debt contracts. If a country goes into a recessionary phase, and debt sustainability levels are breached, the borrower country is likely to default or go into a restructuring program, which is a heavy legal and financial cost. The GDP-linked Sukuk tends to provide a buffer against the possibility of default and its costs by providing the investors a steady return that is bound to pay a higher amount in the long term as economies pick up.

Secondly, the issue of risk exposure and diversification while using GDP-linked Sukuk is an implementation issue. Studying the economic structure of different regions and considering that Muslim economies are spread far and wide across the globe, the economic cycles are not perfectly synchronized and have low or negative correlations. If a mass issuance of the GDP-linked Sukuk is done by Muslim countries, from an investor perspective a well-diversified portfolio can be constructed to hedge against over exposure to a single business cycle. Table 4, provides the correlation matrix for GDP growth rate amongst a selected few Islamic countries.

Our sample countries are highlighted in grey. It can be observed from the specific countries that most of them have a varying correlation in growth with each other. Malaysia and Indonesia, being in the same region and having similar economic fundamentals, tend to have a high correlation while these two countries with Iran have a very low correlation. Looking at the selected few countries, we observe that there are traces of negative correlation between Islamic countries as well, for instance, in the case of Bangladesh with Malaysia/Indonesia, and Nigeria with Malaysia. This bodes well from an investor perspective for diversification and builds a good case for these instruments.

## 6. Conclusion

This study focuses on the predicament of several Muslim countries that are debt-ridden and struggling to finance their debt. Most commonly, these countries turn to western financial intermediaries offering high interest rates to meet their debt requirements. Unfortunately, the reliance of Muslim nations on high-interest rate borrowing has largely been neglected in Islamic finance, with little to no research available on alternatives.

The development of financial instruments for sovereign financing has only just begun whereby a few seminal studies started to show how Shariah compliant instruments can help alleviate Muslim nations from their current predicament.

Owing to fact that 51 out of 57 OIC member countries are debt-ridden, the authors propose a solution to this problem found within the ambit of Islamic finance. Stemming from conventional finance, the authors recommend the use of GDP-linked papers using the principles of Musharakah. The paper highlights the key benefits of using GDP-linked Sukuk arguing that such an instrument will allow for a

lower probability of default, which permits counter cyclical policies to boost the economy. Similarly, it leads to an ease of smoother tax rates and curbs excessive spending during times of economic growth.

Covering Malaysia, Indonesia, Iran and Turkey, the authors attempt to further emphasize the benefits of GDP-linked Sukuks. In the case of Malaysia, using GDP-linked sovereign paper would have provided an average profit payment of 5.99% as compared to a 6.54% interest payment that was paid by the Malaysian government over the 25-year period. This would provide more room for Malaysia to avoid procyclical fiscal measures. In addition, Malaysia would have saved nearly 14% of its national income.

Indonesia, on the other hand, only shows a difference of 30 basis points between the profit payments and interest rate payments on GDP-linked sovereign paper and borrowings. Nonetheless, the savings on its national income would have amounted to 5%. The case of Turkey showed that due to the volatile nature of the economy, GDP-linked Sukuk would have provided a savings of around 24% as a fraction of national income. The average payment per annum for GDP-linked paper is 4.77% compared to 6.83% average annual interest paid by Turkey. Lastly, Iran's saving would have been 6% over national income while profit payments would have been only 4.07% compared to the 5.30% that was paid out to lenders.

The authors further highlight that using GDP-linked Sukuk would reduce the volatility in the Debt/GDP ratio for the countries. The maximum value of Debt/GDP ratio was considerably lower for all four countries, with Malaysia and Indonesia recording a reduction of nearly 400 bases and 300 bases respectively. Parallel trends apply for minimum levels of Debt/GDP ratio, where the minimum levels would have been much less than the actual Debt/GDP ratios that these countries experienced.

While this study lays out an introductory emphasis on the benefits of a GDP-linked Sukuk, it is not without limitations. The implementation of this study has been restricted to only four countries; further research calls for a much larger sample study. Furthermore, this study makes an assumption that all interactions of economic variables remain the same, while in reality a more detailed analysis would be better to see how using these instruments will change the behaviour of growth and other economic variables.

This preliminary study is an emphasis on the benefits of Islamic finance as an alternative for government financing. The empirical evidence provided by this study is promising and provides an avenue for further research. The plight of Muslim nations with respect to their debt structure has largely been ignored in Islamic finance. It is the opinion of the authors that such instruments are vital for the support and development of Muslim nations and should be further researched.

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