

# Economic Integration and a Stable Islamic World

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## Abstract

Defense spending is on the rise in Muslim countries. While most of the Muslim countries are net importers of defense equipment such outbreak is not good news for them. The purpose of this paper is to demonstrate how the creation of strong economic ties and integration would lead to Stability, Certainty, Simplicity and Clarity. this in turn in turn would open the way to the formation of strong alliances between Muslim Countries. We will use partial differential equations that have stable solutions to demonstrate the path in which Muslim countries achieve stability. The least squares method is utilized to estimate the Cobb-Douglas production function for all Muslim countries for the year 2019. We found that conflicts that are happening in Muslim countries are mostly civil wars and the standard historically proven solution for that is to develop a strong internal government which is very dear in current Muslim world. Forming a multi-country alliance can help in this process but that needs some commonality among the participating countries. We argue that the countries should first try to build respect and trust among themselves by getting into economic alliance and then think of converting that into military alliance and protect their regional boundary from internal and external attacks.

**Keywords:** Defense Spending, Economic Integration, Islamic Military Alliance, Muslim Countries, Partial Differential Equations

## 1. Introduction

Muslim world and war have become somewhat synonymous. It will be very difficult to find a Muslim majority country in this world who did not make a news heading because of violent conflicts in its territory. There are many reasons speculated behind such trend. Some are related to past (like insensitive establishment of national boundary while getting independence from colonial period etc.) and some are related to present (like economic deprivation, systematically marginalizing a particular ethnic group etc.) (Gleditsch and Rudolfsen, 2016). However, while we cannot do much regarding what has happened in the past, certainly we can do something to change what is happening now. There is also a remarkable trend in the armed conflicts of the Muslim countries are those are mostly civil war in nature rather than a full-blown war among many competing parties. The purpose of this paper is to demonstrate how it is in the interest of all Muslims Countries to form strong Economic ties among themselves and integrate Economically would lead to Stability, Certainty, Simplicity and Clarity (SCSC). Thus, an Economic Integration among Muslims Countries will pave the way to the formation of an Islamic Military alliance (IMA). This military alliance will aid in maintaining a stable environment. This will strengthen the central government and weaken the competing factions as it will lead to economic opportunities for everyone. In this paper we would like to shed the light on conflicts happening in Muslim countries (from economic perspective) and proposing a solution of having a strong military treaty among Muslim countries. We will also discuss the difficulty that lie in establishing

a common army for Muslim countries. One important note is that the reference to Muslim countries is specific to those countries with majority of the population being Muslim. The countries do not necessarily have to follow Shariah based constitution.

This paper will cover various sections. The next section briefly argues the economic benefits of a war. Which is followed by a discussion on what are the necessary prerequisites for extracting such benefits, then a discussion questioning whether Muslim countries can reap such benefits. Followed by a literature review and a theoretical framework on economic integration of Muslim countries, which is then followed by the methodology of estimating the production function of Muslim countries combined and outlining the results. Finally, it is concluded by two subsequent sections examining how to avoid such conflicts and whether cooperation is a viable option.

### **1.1. What economic benefits conflicting countries get from engaging into wars**

According to different research wars have a number of economic benefits that helped humankind in the past (Porter, 1994). Some of those are:

- a) War subdues hard working productive people and increase production, normally the strong aggressor prefers to attack hardworking economically solvent population rather than militarily active agile nation. Thus, they include economic potential of the subdued force and become affluent.
- b) War helps in the process of creating bigger state stronger government. Wars certainly help to consolidate human habitants, bring them under one roof and make a bigger stronger government.
- c) Stronger government means greater long-lasting peace. Sometimes this peace comes at a (great) expanse of conquered community. Winners sometimes take brutal slaying of hundreds and thousands of men women and children.
- d) War creates pressing needs to efficient mass production (Thies and Baum, 2020). However, such pressing need can initiate high level of supervision, less wastage and therefore greater production.
- e) During wartime higher budget flows to research and innovations happen and many technologies develop. Research and development are one of the key ingredients of economic growth. In fact, many valuable (for civilian purpose) technologies and theories are developed during war time primarily for the use of military. Later on, after the war those were made open for civilian use.
- f) War causes destruction of existing infrastructure and technologies which are easier to rebuild. Normally after or during war people need to re-build things that are destroyed which they already have the prior knowledge for and can institutionalize the rebuilding.

While such benefits are historically proven it is little tricky to see who will get that and who won't. Extraction of such benefits highly depends on factor like whether the country is the winner or loser, whether the war is happening in the country or outside, type of war, length of war etc. Normally an affluent country operating close to the conflicting ones will reap the most benefit of the war. Sometimes the winner country gets benefitted from the spoils of war. But it is hard to expect that country experiencing war in its territory and losing the battle can reap benefits from wars.

## 1.2. Conditions required to extract such benefits (domestic and international)

Normally a country at war extract benefits if that is a winning country and the war happens outside its border. War normally destroys productive facilities therefore battle ground gets heavily damaged no matter whether that is the winning country or losing country. Of course, if a country has a big production base (in defense sector) then that can be an added advantage. However, for a country suffering from civil war there's no good news.

There are no clear-cut theories regarding the beneficial effects of war. Much of it depends on the capability of the country to reap benefit from war time situation.

In fact, the USA somehow managed to reap the benefits of war for a long period of time. In both world wars USA was mostly untouched because of its natural geographic protection both from east and west. While there were no apparent threats from north and south. This gave the US the luxury to get engaged in constant war since the 1960s in different parts of the world while keeping their own boundaries relatively untouched. They successfully mastered production of defense products and systems to the rest of the world with little help of marketing. They also consolidated their control and domination over different countries of the world to extract economic benefit as well as maintaining their regional and global dominance. Some European countries at different occasions benefitted out of the American wars, however there is no consistent effect.

Below we have a graph that shows United States (US) and European Union (EU) export and import of arms. The figure clearly shows that they export lots of arms than they import. US arms export made a steady growth after 2002 following a brief fall between 1998 and 2002.

The graph clearly shows that USA has consistently exported weaponry far more than what they imported. Weapon export of EU countries have exceeded imports for the last three decades. Wars, threat of wars and preparation for wars are the main reasons for such fanatic arms procurement. Certainly, war is doing the trick for them.

One important point needs to be mentioned here is that the benefits that the US got from such military activities is not a gift and nothing came easy. After World War II, USA worked relentlessly along with its strategic allies to establish its hegemon over different parts (eventually over the whole world). This includes diplomatic effort, intelligence effort, superiority in defense research, marketing effort and so on. Their dedication is commendable. Question remains are we doing our part to keep our borders safe let alone extract benefits from wars. A good discussion on this issue is available at Vine (2020).

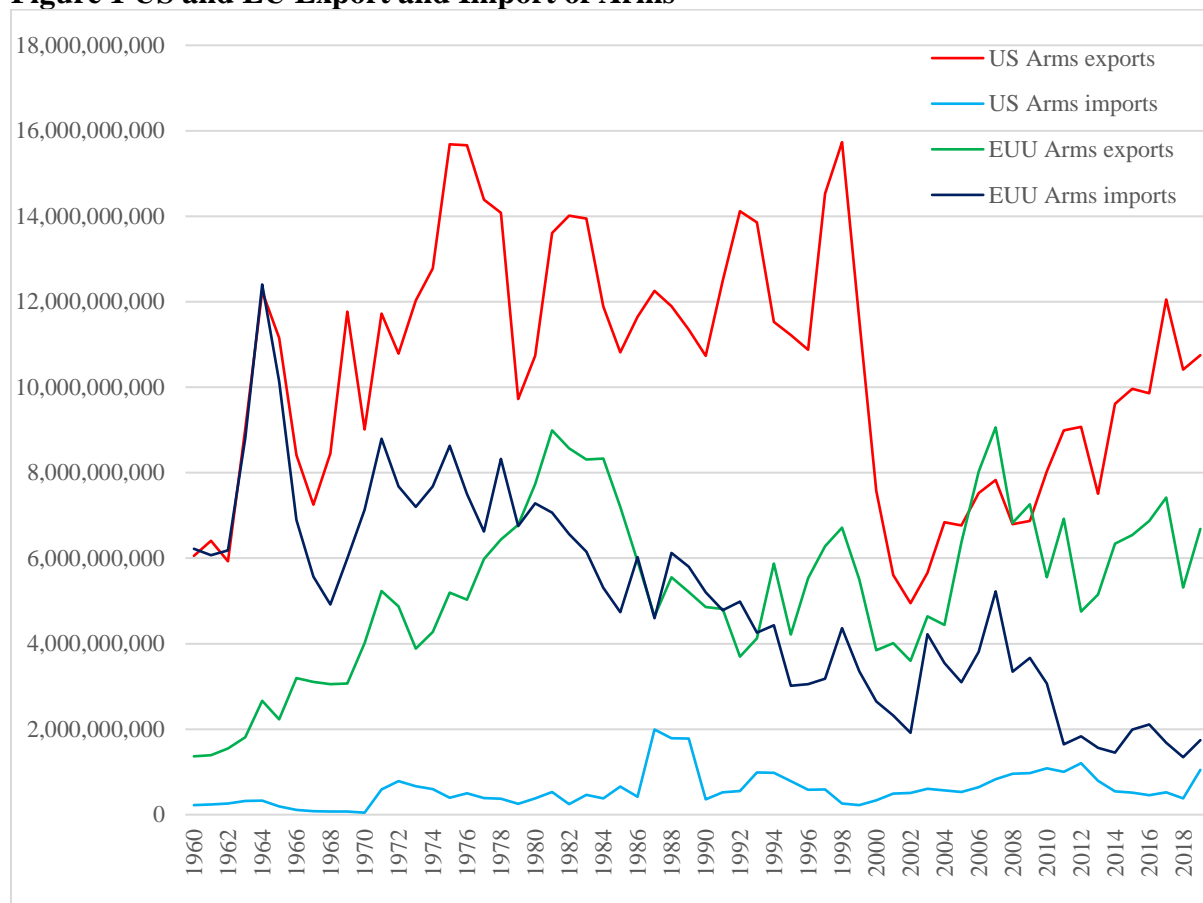
## 1.3. Are Islamic countries capable enough to exploit those benefits

Islamic countries do not meet the criteria to extract the benefits from war outlined in the previous section. Although most of the Muslim countries (or countries with Muslim majority, to be specific) are and were in war situation for considerably long periods, their economic conditions are deteriorating monotonically. Partly this is because the wars that these countries are facing, are civil wars and that is the worst kind of conflict in terms of fatality and property loss. Although there are some arguments regarding economic benefits of civil wars (The Adelphi Papers, 1998), those are

mostly at the cost of other conflicting fraction of the same country. It also corrodes social bondage and trust among its citizens of the conflicting country which is vitally needed for economic growth.

Figure: USA and European Union arms export and import  
(Data source: World bank database)

**Figure 1 US and EU Export and Import of Arms**



Civil war is defined as a war that happens between armed groups within a country not necessarily having any involvement from the outside. Sometimes these armed groups fight against the government of a country and makes things bloody and messy. In 2020, there were many civil wars taking place within Muslim countries: Afghanistan, Yemen, Ethiopia, Burkina Faso, Libya, Kashmir, Pakistan and Sudan. In all these countries there are militant fractions who (according to their claim) are trying to establish peace and justice in their country and accusing the other fighting groups of not flowing Islam. This is unfortunately a very common story and it is not at all out of context to doubt that shrewd political leaders and war lords are using Islam for fulfilling their narrow worldly goal. In 2019 Turkish presidential spokesman said that 60 percent of conflicts globally are occurring in Muslim nations (Anadolu agency, 2020) which can be an understatement of the reality.



The table below shows a partial list of Muslim majority countries engaged in civil wars only

**Table 1 Muslim Countries Experiencing/Experienced Civil War**  
(UCDP/PRIO Armed Conflict Dataset, Petersson and Magnus, 2020)

| Country             | Time      | Type of war        |                             |
|---------------------|-----------|--------------------|-----------------------------|
| Afghanistan         | 1978-2020 | Internal civil war | Internationalized civil war |
| Algeria             | 1991-2018 | Internal civil war | Internationalized civil war |
| Azerbaijan          | 1991-2017 | Internal civil war | Internationalized civil war |
| Bangladesh          | 1975-2017 | Internal civil war |                             |
| Bosnia-Herzegovina  | 1992-1995 | Internal civil war | Internationalized civil war |
| Burkina Faso        | 2018-2019 |                    | Internationalized civil war |
| Chad                | 1966-2019 | Internal civil war | Internationalized civil war |
| Egypt               | 1993-2019 | Internal civil war |                             |
| Ethiopia            | 1960-2020 | Internal civil war | Internationalized civil war |
| Indonesia           | 1950-2018 | Internal civil war |                             |
| Iran                | 1946-2020 | Internal civil war | Internationalized civil war |
| Iraq                | 1958-2020 | Internal civil war | Internationalized civil war |
| Lebanon             | 1958-2017 | Internal civil war | Internationalized civil war |
| Libya               | 2011-2020 | Internal civil war | Internationalized civil war |
| Malaysia            | 1958-1981 | Internal civil war | Internationalized civil war |
| Mali                | 1990-2020 | Internal civil war | Internationalized civil war |
| Mauritania          | 1975-1978 | Internal civil war |                             |
| Morocco             | 1971-1989 | Internal civil war |                             |
| Oman                | 1957-1975 |                    | Internationalized civil war |
| Pakistan            | 1971-2020 | Internal civil war | Internationalized civil war |
| Sierra Leone        | 1991-2001 |                    | Internationalized civil war |
| Somalia             | 1982-2020 | Internal civil war | Internationalized civil war |
| Sudan               | 1963-2020 | Internal civil war |                             |
| Syria               | 1966-2020 | Internal civil war | Internationalized civil war |
| Tajikistan          | 1992-2011 | Internal civil war | Internationalized civil war |
| Turkey              | 1984-2020 | Internal civil war |                             |
| Uzbekistan          | 1998-2004 | Internal civil war |                             |
| Yemen (North Yemen) | 1962-2020 | Internal civil war | Internationalized civil war |

Islamic countries cannot extract any economic benefit from this situation at all. Their economies are devastated, infrastructure destroyed, production capacity crippled, agriculture lost, healthcare education and other civic services postponed this is pretty much the situation of civil war prone area. On top of that they must buy military equipment and systems to get more offensive power against their own people.

#### 1.4. What can be done by the Islamic countries to avoid such wars

The wars that Muslim countries face are mostly civil wars and there are some sort of commonalities among their characteristics. A Muslim majority country has some strategic importance that a superpower has stake in. So, the superpower along with the help of some local neighboring countries (in most cases these local allies are Muslim majority country as well) try to address an injustice or an issue in the target country (which may not have anything to do with the interest of the superpower). Obviously, the target country is not happy with that. But they cannot say much as the injustice that was exposed in their country is hard to deny or to cover. Sometimes ethnic conflicts also come into play. Long standing grievances among certain group is not something to ignore. These are made complicated by involvement of international or regional forces along with their over commitment to the marginalized group. Normally the international force does not have any intention to get into the war directly as that approach has not been found effective in many cases. So, they just want to start a war so that local factions and other interested groups may carry on.

While such model is used over and over again but it is still effective as Muslim countries have many different caveats in their operation and it is not difficult to find systematically marginalized groups in Muslim countries. Once the war outbreaks, more and more factions join the party with diverse agenda which leads to incremental killings. These groups are in most cases supported internally or externally. This is a potentially dangerous situation and there is no easy way out.

The recent political turmoil in the region also contributed to this matter. There is no denial that political turmoil in the peninsula in recent past brought out many issues that were kept hidden for a long period. But is also true that it dismantled many of the long-lasting governments (dictators?) of the region. What these governments did was somehow shut every group up in their country, some groups experienced brutality, some experienced threat, some favor, some political leverage, some recognition and so on. This may not be very ethical, but it works. They somehow brought peace and control in their economy. That peace is for economic purpose and not necessarily in anthropological sense. But once these leaders are gone there appeared a power vacuum and that resulted in internal chaos.

## 2. Literature Review

Vast literature discussed the concept of economic integration and its success in some parts of the world. Data on trade shows that the amount of intra-trade within the European Union, Asia-Pacific and North America was disproportionately high. A probable explanation is the geographical proximity among these three regions. Geographical proximity will result in decrease of transport costs, short delivery time, less interest payments on export credits and low spoilage. Krugman (1991) asserted that the disproportionate intra-trade in these three regions is largely due to proximity, i.e., proximity promotes trade. Krugman (1991) claimed that the three trading blocks are welfare enhancing natural groupings. In addition, common language plays a crucial part in trade facilitation by improving exporters/importers understanding of culture, and commercial and legal systems of one another. To examine this concept Frankel, Stein, and Wei (1995) added a dummy variable that has a value of one if the country-pair in question had a favorable impact on trade, and zero if they did not.

The Islamic world is constantly engaging in military conflicts due to both civil wars and foreign intervention. Kurpebayeva (2021) had studied the effect of the Arab spring on the influence of competing nations in the Middle East. The paper had examined how Saudi Arabia, Egypt, Qatar, Iran, Turkey, US, Russia and China had all tried to increase their influences in the Middle East. In other words, they all tried to benefit from the environment that Arab spring has created in order to increase their control in the Middle East. The discussion had revealed that Iran, US and Russia were the most beneficial in expanding their control in the Middle East. Meanwhile, Turkey, Saudi Arabia, Egypt, Qatar and China were unsuccessful in taking advantage of the situation in order to expand their hegemony.

This is why countries in the Muslim world had increased their budgets on defense spending. The governments of the Middle East had tried to protect themselves from foreign intervention and prevent civil war within their borders. A number of papers had discussed the effect of defense spending on economic growth in various Muslim countries. Samarah and Tuncay (2020) studied the interaction between defense expenses and macroeconomic indicators in selected countries of the Middle East and North Africa (MENA) region. The world economy faces unprecedented chaos with increased unemployment, inequality, financial impotence and ecological deterioration. The conflicts that occur especially in the MENA region have put forward the concept of defense economy. The data was collected for a 10-year period (2006-2016). A Vector Auto Regression analysis was performed indicating that defense spending had a negative effect on the economy.

Habibullah, Hirnissa and Baharom (2013) examined the long run Granger causality relationship between defense spending and economic growth for 20 selected Organization of Islamic Countries (OIC). The Error-Correction Model (ECM) was used for the period 1960 to 2005. The defense spending was measured by the ratio of defense spending to GDP, meanwhile economic growth was measured by the real GDP per capita. The paper indicated that there was a one way long run Granger causality running from economic growth to defense spending for Burkina Faso, Indonesia, Kuwait, Saudi Arabia, Sudan, Togo and Turkey. Meanwhile, the paper has also indicated that there was a one way long run Granger causality running from defense spending to economic growth for Iran, Mauritania and Nigeria. Finally, the rest of the OIC countries had no relationship between defense spending and economic growth.

Yildirim (2005) studied the effects of military expenditures on economic growth for Middle Eastern countries including Turkey. The paper examined the time period 1989–1999. A cross-section and dynamic panel estimation technique were used to examine the relationship between defense expenditure and economic growth. The paper's results of the empirical analysis have concluded that defense expenditure enhances economic growth in the Middle Eastern countries and Turkey as a whole.

Since defense spending is not contributing to economic growth in the Muslim countries, then they are better off if they all cooperate. Economic cooperation will be the first step in building a Muslim block. As Muslim countries remove barriers to free trade and economic integration, they will all benefit from the virtues of free trade. Countries are constantly signing free trade agreements in order to acquire the advantages of free trade (Sülün, 2021, p.39). This will also allow them to benefit from economies of scale. As a result, trust and dependence on one another will occur.



Permanent economic growth is a result of a geographical economic integration. This is due to the fact that there will be an increase in the market size, a decrease in the cost of trade, and greater efficiency which will lead to an increase in the purchasing power. Integration will cause an increase in trade flows and new ideas. (Rivera-Batiz and Romer, 1991). As the process of integration occurs, the differences and discrimination among nations are eliminated (Balassa, 1961).

Vidya, Prabheesh, and Sirowa (2020) examined the cause-and-effect relationship between cross-country network analysis and regionalization. A sample of 50 countries including both developed and developing countries was utilized. The results of the study indicated that trade regionalization was mainly dominated by developed regions. In addition, trade liberalization decreased the gap between the center and the periphery. Trade liberalization did not lead to a reduction of transport cost or geodesic distances.

Finally, a military alliance will be formed. Yamin (2018) provided a new model for Islamic peacekeeping force known as Islamic Military Alliance (IMA) which was formally known as the Islamic Military Counter Terrorism Alliance (IMCTC). This force creates a bridge for all the Muslim countries to work together regardless of nationality, status and creed to serve humanity. Shahab Ahmed (2018) examined the unique nature of the relationship between Pakistan and Saudi Arabia. This examination was achieved through looking at the dimensions of Saudi Arabia's cultural and political influence on Pakistan. It also considers the kingdom's hegemonic strategies and the manner in which Islamabad revised its strategies to comply with Saudi Arabia's demands. Finally, the paper demonstrates how Saudi Arabia utilizes its diplomatic strategies, political pressure and pledges of generous financial assistance to ensure Pakistan's participation in the Islamic Military Alliance to Fight Terrorism (IMAFT). Qumber, Ishaque and Riaz (2017) examined the basic contours and prime motives behind formation of IMA. The article's aims and objectives are to analyze the efficacy of countering violent extremism with potential implications for Pakistan. The article suggests a way forward for Pakistan to convert joining the IMA into opportunity by minimizing challenges.

This paper will examine the convergence of Islamic countries into a military alliance, we will adopt a more theoretical approach through looking at the path of a partial differential equation (PDE) going to a stable solution.

### **3. The Theoretical Framework**

#### **3.1 How economic integration should be formulated among Muslim countries**

Economic integration is ranked according to the following levels: 1) free trade: at this level, tariffs between member nations are reduced significantly, meanwhile others are eliminated. Nevertheless, every member nation will maintain its own tariffs with third-party countries. The general goal of free-trade agreements is to develop economies of scale and comparative advantages, which promote overall economic efficiency. 2) custom union: at this level, member countries formulate common external tariffs to third-party countries, and develop a common trade regime. 3) common market: at this level, services, and capital flow freely within member countries and manifesting expanding economies of scale and comparative advantages. Nonetheless, every member country's market has its own regulations. 4) single market: at this level, all tariffs are eliminated for trade

between member countries, forming a uniform/single market with free movement of labor. In addition, a harmonization of both monetary and fiscal policies among member countries leading to a higher level of political integration. 5) economic union: at this level, a common market and a custom union are developed. The member countries have common policies on product regulation, freedom of movement of goods, services, and factors of production; thus, capital and labor will flow freely among member countries and follow a common external trade policy. 6) economic and monetary union: at this level a common currency is used. 7) political union: at this level, the sovereignties of member countries are considerably reduced due to the advanced integration with a common government (Rodrigue 2017).

### 3.2 Universal Declaration of Human Rights (UDHR) among Muslim countries

Human rights are an integral part of the Qur'an, which covers various articles of the Universal Declaration of Human Rights. This section provides few key ones, starting with article 1 of the UDHR:

“All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood” (UN General Assembly, 1948).

Article 2 of the UDHR:

“Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional or international status of the country or territory to which a person belongs, whether it be independent, trust, non-self-governing or under any other limitation of sovereignty” (UN General Assembly, 1948).

On the other hand, Islam preaches for treating others as we wish to be treated, i.e. the *ethic of reciprocity*:

"None of you [truly] believes until he wishes for his brother what he wishes for himself." (See Hadith no. 13 in Imam Al-Nawawi's Forty Hadiths). From this extends the principle that each individual is of equal worth, simply because they are human. As such, every human being should be considered of equal value despite superficial differences” (Fai, 2022).

“As mentioned above, the following verse outlines the brotherhood between people: *‘O mankind, We created you from the same male and female, and rendered you distinct peoples and tribes, that you may recognize one another. The best among you in the sight of GOD is the most righteous. GOD is Omniscient, Cognizant...’* (Qur'an, 49:13)

Prophet Muhammad (peace be upon him) said, ‘An Arab has no superiority over a non-Arab, or a non-Arab over an Arab, or a black person over a white, or a white over a black person except by being more righteous’ (Prophet’s Farewell Sermon),” (Fai, 2022).

This concept is common among most Muslims, and it can be the grassroots for fueling the process of economic integration. In addition, the common faith will enable us to integrate more rapidly.

### 3.3 Partial differential equations and spatial economics

In this paper, we will use spatial economics to demonstrate the effect of economic integration between Muslim countries to enable the convergence into a stable environment. Individuals move from one location to another in order to improve their economic status, i.e., different locations have different economic returns on individual lifetime. Thus, location plays a role in an individual's income and different services he/she receives, and it is considered as an asset for an individual (Bilal and Rossi-Hansberg, 2018). We know that borders between nations create spatial segregation, i.e. some countries will have higher income than others although they are next to each other, due to the presence of a border. For example, Saudi Arabia and Yemen. Thus, spatial segregation also occurs between countries and within a country. Creating an economic integration will aid in factors of production in moving across borders and creating a more equitable income distribution between nations. So, eliminating the border restrictions will aid in creating more opportunities for lower income nations. The economic integration will also create confidence between nations and allow for military alliances.

Spatial economics combines the study of both international trade and geography on the economy. It also explains trade patterns. Thus, economic integration between Muslim countries will allow for the evolution of different trade pattern. Despite the fact that most Muslim countries are endowed with natural resources, agricultural sector, and a tourist sector; yet trade between nations might result in a spill over to building a strong manufacturing sector (Zeng, 2021). PDEs are used in macroeconomics, mathematics and economics go hand in hand (Achdou, Buera, Lasry, Lions and Moll, 2014). We will use PDE that contains stable solutions to model the Muslim countries to converge to an environment that is characterized by Stability, Certainty, Simplicity and Clarity (SCSC). We will use PDE with piecewise constant arguments. We will start our analysis with the following PDE that will model the wellbeing of a representative Muslim country:

$$\begin{cases} u_t(x, t) = a2u_{xx}(x, t) + bu_{xx}(x, [t]) + cu_{xx}(x, 2[t+1]), & t > 0, \\ u(0, t) = u(1, t) = 0, \\ u(x, 0) = v(x), \end{cases}$$

where  $a, b, c \in \mathbb{R}$  and  $a \neq 0$ ,  $u: Q = [0, 1] \times [0, \infty) \rightarrow \mathbb{R}$ ,  $v: [0, 1] \rightarrow \mathbb{R}$ ,  $[\cdot]$  signifies the greatest integer function.

(Wang, 2018, 2).  $u$  will denote the GDP per Capita;  $x$  denotes space and  $t$  denotes time. The above equation has numerical asymptotic stability conditions when the mesh ratio and the corresponding parameter satisfy certain conditions. In addition, the conditions under which the numerical stability region contains the analytic stability region are also established (Wang, 2018).

Thus, this equation has a numerical solution which is a stable solution. In other words, the above equation that models the representative Muslim country will move closer and closer to the stationary position as it integrates economically with its neighboring countries and other Muslim countries. So as Muslim countries integrate economically, socially, and politically across time, the

PDE will converge to the stable solution. Therefore, it is in the interest of all Muslim countries to engage first in an economic block, which will be later developed as a fully integrated block. This will minimize the military intervention of neighboring countries and superpowers into the internal affairs of Muslim countries. It should be rather easy to converge to such alliance since the role model for most Muslims is the Prophet Mohammad (may peace be upon him). It is true that different versions or explanation of his life are present, however, they are all very similar to one another and should not create such a divide.

As the PDE moves into asymptotic path, the level of integration between Muslim countries will be increasing and thus, converging into a stable solution. The level of integration will start by building confidence, forming a strong economic coalition, strong social ties, and finally as strong military alliance. This will create a peaceful environment that will strengthen the central government, and finally create a better economic opportunity for everyone. This will also minimize the military foreign interventions in the conflicts of the competing parties. Now, we will generalize our representative Muslim country equation by the following below equation:

$$\sum_{i=1}^n u_{nt}(x, t) = a2u_{nxx}(x, t) + bu_{nxx}(x, [t]) + cu_{nxx}(x, 2[t + 1])$$

This equation will represent all the Muslim countries where  $n$  denotes the number of Muslim countries ( $n = 57$ ).

#### 4. Methodology

The PDF demonstrates how an economic alliance will lead to a stable solution and better economic opportunities for all Muslim countries. Let us know see how this economic integration will look like. In this section we will develop a model that will show the production function for all Muslim countries combined. We will use the Cobb-Douglas production function given by the following equation:

$$Y = A K^{\alpha} L^{\beta}$$

Where  $Y$  is the output,  $A$  is a parameter that represents the effect of factors excluding capital and labor on output,  $K$  is capital stock,  $0 < \alpha < 1$ ,  $0 < \beta < 1$  and  $L$  is labor. In the case of the Cobb-Douglas,  $\alpha + \beta = 1$  there is a constant return to scale (Quirk, 1987, p. 151).

$A$  is known as Total Factor Productivity (TFP). We will transform the Cobb Douglas production function to a linear function by taking the log of both sides:

$$\log Y = \log A + \alpha \log K + \beta \log L$$

Our econometric model is as follows:

$$\log Y = \beta_0 + \beta_1 \log k + \beta_2 \log L + \varepsilon$$

Where  $\beta_s$  are the parameters to be estimated and  $\varepsilon$  represents the random error term.



The Least Square regression model will be used to estimate the above econometric model. Hence, we will use the Classical Regression Model represented by the equation below.

$$Y = \alpha + \beta X + \varepsilon$$

Where, Y is the dependent variable,  $\alpha$  is the y intercept,  $\beta$  is the coefficient that represents the slope of the line or the rate of change, X is the independent variable, and  $\varepsilon$  is the error term (Samarah, 2016).

The Ordinary Least Square model is the best linear and unbiased estimator.

The regression model explains the variations of Y variable based on the variations in the X variable. The regression model explains the variations in Y based on the variations in X. One of the assumptions of the regression model is X being non-stochastic, i.e., the X variable is not randomly generated and does not follow a probability distribution. However, this does not imply that Y is non-stochastic. This is due to the simple fact that Y does not only depend on X, but also on the error term. The error term is a disturbance measure, i.e., the X variable acts as a signal while the error term acts as a noise (Samarah, 2016).

The simple linear regression model is expanded to include more explanatory variables. This will aid in explaining the variations in the Y variable. Thus, the multiple linear regression model is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$

Where Y is the dependent variable;  $\alpha$  is the y intercept;  $X_1, X_2, \dots, X_n$  are the independent variables;  $\beta_1, \beta_2, \dots, \beta_n$  are the coefficient of the X variables; and  $\varepsilon$  is the error term (Samarah, 2016).

## 5. Results

The Eviews 10 software was used to analyze the data. The data was collected from the Global Competitiveness Index 4 for 2019 and the World Bank for the Muslim countries.

The Least Squares regression model was used to estimate our econometric model. After running the regression analysis, we will start our analysis with f-test. The p-value for the f-test is 0.003983, using  $\alpha = 0.05$ ,  $\alpha > p$ -value, we reject the null hypothesis and thus at least one beta does not equal to zero.

Now we carry out the t-test, using  $\alpha = 0.05$  and the p-value of the t-test is 0.0005, 0.0406 and 0.0013 for  $\beta_0, \beta_1$  and  $\beta_2$  respectively. So  $\alpha > p$ -value for  $\beta_0, \beta_1$  and  $\beta_2$ , hence we reject the null hypothesis and thus the betas are significant. Therefore, we have the following model:

$$\log(\text{GDPPC}) = 7.8 + 0.39 \log(K) + 0.71 \log(L)$$

This model has an  $R^2$  of 0.58, thus 58 percent of the variations in the GDPPC are explained by the model. Our analysis had indicated that one unit in capital will result in a 0.39 unit increase in the Log of the GDP per Capita. Meanwhile, a one unit increase in labor will result in 0.71 increase in the Log of the GDP per Capita.

The regression model was conducted for only one year, 2019, since this was the year before the COVID-19 pandemic. So, we noticed that the formation of the new production function reveals that this cooperation is characterized by being labor abundant.

The table below shows the level of GDP per capita for the year 2019 in each of the selected countries of the Muslim world.

**Table 2 Level of GDP per Capita for Selected Muslim Countries in 2019**

| Countries            | GDP      |
|----------------------|----------|
| Kuwait               | 30,839.2 |
| Jordan               | 4,278.3  |
| Iran, Islamic Rep    | 5,491.4  |
| Egypt                | 2,573.3  |
| Algeria              | 4,237.5  |
| Oman                 | 19,302.2 |
| Lebanon              | 9,257.3  |
| Morocco              | 3,359.1  |
| United Arab Emirates | 40,711.4 |
| Turkey               | 9,346.2  |
| Tunisia              | 3,423.2  |
| Saudi Arabia         | 23,566.4 |
| Qatar                | 70,779.5 |
| Bahrain              | 25,850.5 |
| Mauritania           | 1,142.5  |
| Pakistan             | 1,555.4  |
| Malaysia             | 10,941.0 |
| Nigeria              | 2,049.1  |
| Bangladesh           | 1,744.0  |
| Indonesia            | 3,870.0  |
| Mozambique           | 475.6    |

Source: The Global Competitiveness Index 4 for 2019 and the World Bank.

## 6. Solution

Of course, history has a solution to offer. History says a strong government can either peacefully or via another war eliminate such local disturbances. Unfortunately, history also teaches us that the winner party resolves conflicts with its power – sometimes applying excessively brutal force

– and rewrites history. A better solution will be peacefully bringing all on the discussion table. But that won't be easy.

Although we may talk about a strong government but is it not easy for the case of Muslim countries. Islam argues for Allah (SWT) fearing, representative and benevolent government but yet that is not always what we get. So, getting a strong government acceptable to all parts of the society is not often we see. Especially in the middle of the power vacuum that we mentioned earlier we can't be too optimistic.

Alternatively, we can create huge power with the alliance of Muslim countries. In case of cooperation to occur among countries, they need to have common goals. Unfortunately, there are certain factors that may affect a possible common treaty among Muslim sovereigns:

- a) No common enemy, although Muslim countries are mostly concentrated in one region yet there is no country which is considered enemy by all Muslim governments.
- b) No common friend, ironically other than few “not so important” countries it is very hard to find a country that has dependable good relationships will all Muslim countries. Of course, we are talking from strategic perspective, not the economic one.
- c) Countries have different agenda and sometimes hidden agenda. This is neither unexpected nor uncommon among sovereigns but if that interferes with regional security then that becomes an issue of concern.
- d) No established boundary of code of conduct, interfering into another country's domestic issue is not something uncommon among Muslim countries.

In the middle of such difficult situation rather than jumping into military cooperation, countries should first try to have economic cooperation. And if that succeeds then they may try for common currency or barrier free trade within the Muslim countries. This can be considered as a preamble of larger strategic cooperation (and building trust) among countries.

Not to mention countries should also try to diffuse tension among different fighting fractions within their boundaries peacefully to demonstrate their acceptance as a country leader.

Unfortunately, that is also something that we do not see too often. OIC countries have in total almost one fourth of world's population and 15.2% of world's GDP (SESRIC | OIC ECONOMIC OUTLOOK 2019). OIC countries are experiencing GDP growth at least at the same rate as the world is experiencing. Per capital GDP (constant price PPP adjusted) of OIC region was 10,265 US dollars in 2018. This is a huge market and most importantly a growing market in general. If OIC countries do more trade among themselves then that can create favorable atmosphere for trust and mutual interdependence. However, data shows that OIC countries have less than 20% trade within themselves.

**Table 3 Percentage of Intra OIC Exports and Imports**

|         | Exports |       |       | Imports |       |       |
|---------|---------|-------|-------|---------|-------|-------|
|         | 2016    | 2017  | 2018  | 2016    | 2017  | 2018  |
| Average | 13.92   | 12.32 | 12.17 | 16.40   | 17.13 | 17.05 |
| Maximum | 51.25   | 52.79 | 69.39 | 61.51   | 58.14 | 53.85 |
| Minimum | 0.03    | 0.04  | 0.10  | 1.56    | 2.31  | 2.17  |

This is not something encouraging. IMF has identified 802 zero import pairs within OIC countries. This indicates that there is a huge potential for the member countries of the largest interstate coalition of the world to cooperate through trade. We need to explore that first to build mutual respect and dependence among us. These countries have many things in common including values. People of these countries are religious and anything in the name of Islam, the holy book or sunnah motivates them and make them compassionate. This needs to be explored for our greater growth. Jointly Muslim countries are endowed with many natural resources and bounties of nature. They also have a very rich cultural and archeological heritage that are asset of the whole world. All these when combined for economic use can make this coalition an economic superpower. But for that we need to have mutual respect for each other's sovereignty, internal affairs and preferences. That can lead us to economic cooperation. Without this basic level accomplished it will be very optimistic to expect cooperation at military level.

So far, the only success that we have in uniting ourselves for military reasons is Islamic Military Alliance to Fight Terrorism (IMAFT) founded few years ago in Riyadh, Saudi Arabia. Saudi Arabia successfully convinced all major Muslim countries along with some non-Muslim majority countries to join IMAFT. This is certainly a huge success. But we need to keep in mind that this alliance is formed to combat terrorism among Muslim countries, and it has not yet run any military operation. Islamic State (IS) was very active until recently and it demeaned authority of every government. So, in one sense IS was a common enemy for every country. This certainly played an important role bringing all together. However, it will be little optimistic to expect that such cooperation will be available when we will seek that for combating civil war.

## 7. Conclusions

In this paper we tried to shed more lights on armed violence in Muslim countries and tried to think about its possible solution and advise on public policy. Researchers have found that Muslim countries are not systematically more violent than other non-Muslim majority countries (Gleditsch and Rudolfson, 2016). We can find explanations for that and more importantly we can try to think of ways to avoid violence through proper policies. We argued here that since most of the wars that are going among Muslim countries are civil wars in nature, a logical solution for that will be strong internal government. Governments without proper support from within is likely to face internal disturbances. International (effective) cooperation is hard to achieve as these countries have very few things in common while taking decisions strategically. We argued here that countries should first adapt their policies to try to develop economic cooperation among themselves to check whether they can develop some sort of trust and respect for each other which is crucial for developing military alliance. In this paper, we demonstrated how economic cooperation will lead to a stable environment, using the path of PDEs to achieve a stable solution. We then developed a



simple econometric model to demonstrate the production function of all Muslim countries combined revealing the kind of economy that can emerge.

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## Statements and Declarations

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