

The Prospect of the GCC Monetary Union and its Expansion to Other MENA Countries

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Abstract This study investigated the possibility of expanding the GCC monetary union to other MENA countries using cluster analysis for the period 2000-2018. It also examined whether the economic characteristics of the countries provide evidence for the readiness of countries for the proposed union. The findings show that there was heterogeneity in the GCC and MENA countries suggesting that the countries were not yet economically ready for the launch of the monetary union. We found evidence in support of the expansion of the GCC monetary union to other MENA countries with two categories of countries, the core and the periphery. We also revealed key variables, including inflation differential, debt service requirement, and current account balance, which clearly demarcated the GCC and other MENA countries. These findings underscore the need for policy-makers in MENA countries to strengthen intraregional trade creating policy, policy coordination, and harmonisation for a successful and sustainable monetary union.

Keywords: optimum currency area, Monetary Union, cluster analysis, Middle East and North Africa (MENA), Gulf Cooperation Council (GCC), economic integration

JEL Classifications: F02, F15, F33, F45, F68

Received 28 November 2023, Revised 31 January 2024, Accepted 13 February 2024

I. Introduction

The collapse of the Bretton Woods International Monetary System in the early 1970s had seen the development of different exchange rate regimes in different parts of the world. Shortly after Bretton Woods, from 1975-1978 four of the current Gulf Cooperation Council (GCC) members (Bahrain, Kuwait, Qatar and the United Arab Emirates) attempted to reach monetary coordination, as a step toward the issuing of a common Gulf currency known as the Gulf Dinar

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Acknowledgments: The author would like to thank the editor Professor Wonmun Shin and anonymous referees for their helpful comments and suggestions. We also express thanks and appreciation to Higher Colleges of Technology for funding this research. The author would also like to thank Ms. Noura Saleh Ali Ibrahim Alblooshi at Al Ain Women's College, Higher Colleges of Technology, United Arab Emirates, for providing valuable research assistance. All remaining errors are of the author.

Funding: This research is funded by the Higher Colleges of Technology in the United Arab Emirates. Applied Research Grant, Fund No 113240 awarded in April 2019.

Conflict of interest statement: I confirm that there is no conflict of interest to disclose for this article.

(Alkoholifey and Alreshan, 2010). Progress on this initiative was slow and the project was abandoned. In May 1981 Saudi Arabia and Oman joined the other four countries to sign the Charter of the GCC. The GCC objectives include coordination, integration, and interconnection between member-states, formulation of similar regulations in the fields of economic and financial affairs, commerce, customs, and communications. As part of the effort to achieve these objectives, the six member-states ratified the Unified Economic Agreement (UEA) in November 1981 which came into force in March 1983. The key objectives of the UEA include economic integration and subsequently the formation of a single currency.

Following the launch of the Euro in 1999, the heads of the GCC met in Oman in December 2001 to lay down concrete steps to launch a single currency at the beginning of 2010. To facilitate economic integration and convergence objectives, the countries pegged their currencies against the US Dollar in 2003. In the same year, to boost regional trade, they removed tariffs and non-tariff barriers of intra-GCC trade and set up common external customs tariffs and common customs regulations (Shebeb, 2016). In 2005, the GCC members adopted the EU convergence criteria shown in Appendix Table A1. Most of these criteria have been fulfilled with the exception of inflation (Abu-Qarn and Abu-Bader, 2008). The common market was launched in 2008 which requires the removal of restrictions on the mobility of goods, labour and capital among member countries. Despite these trade reforms, studies still found that intra-GCC trade, a key benefit of monetary union, was low due to the degree of oil dependence by member-states (Alkoholifey and Alreshan, 2010). The agreement establishing the GCC Monetary Union was signed in Oman by four countries (Bahrain, Saudi Arabia, Qatar, and Kuwait) in December 2008. The agreement established the Monetary Council, to be replaced by the common Central Bank, whose primary objective would be to prepare the necessary infrastructure for establishing the Monetary Union and lay down its analytical and operational capacities.

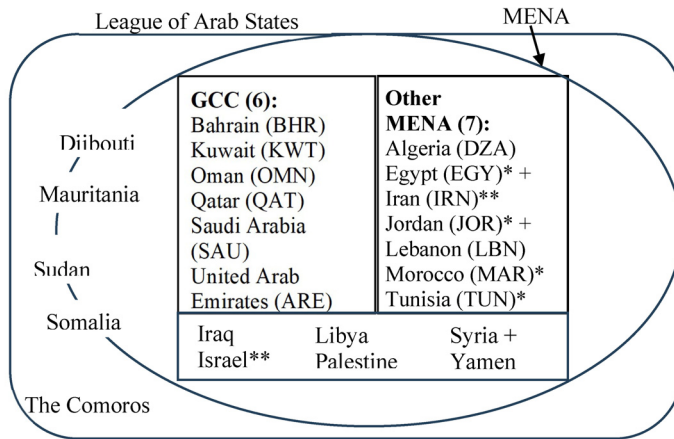
The literature on the progress of GCC convergence and the suitability of countries for monetary union is inconclusive. Despite the extensive research on the GCC Monetary Union (GMU), studies considering the possible participation of other countries in the MENA region are rare. One study by Sahin (2006) evaluated the possibility of forming optimal currency areas for the MENA region using a genetic algorithm with only two variables: inflation and the degree of openness of the countries. His results showed the existence of two or three unions in MENA.

The GCC countries have social and cultural similarities with other MENA countries (see Figure 1). Almost all these nineteen MENA countries, including the six GCC, are also members of a bigger organisation, the League of Arab States.¹⁾ The Greater Arab Free Trade Agreement (GAFTA) also links these countries together where all members of the GAFTA agreement are also members of the Arab League. Other economic blocs also exist within MENA. Agadir

1) The four countries on the circumference of the MENA circle (Djibouti, Mauritania, Sudan, and Somalia) in Figure 1 are sometimes considered as MENA.

Nations, founded on 25 Feb 2004 comprise Egypt, Jordan, Morocco, and Tunisia. The other bloc is the Mashreq Union which comprises Jordan, Egypt, and Syria (Figure 1). Besides these homogenous characteristics, some MENA countries such as Jordan, Morocco, and Yemen have expressed their interests to join the GCC.

Figure 1. Arab League, MENA and GCC countries economic blocs



*Agadir nations, +Mashreq union, **Not a member of the League of Arab States.
 (Source) Author's construction.

The existence of similarities, interests, bilateral and multi-lateral cooperation of GCC, and other MENA countries shown in the overlapping economic blocs in Figure 1 provided the motivation for this paper to explore the macroeconomic characteristics of these countries for a possible expansion of the GMU to an expanded GCC monetary union (EGMU). A study for a possible expansion was justifiable because it would provide the opportunity for a much larger market as the GCC and MENA population and GDP statistics show in Appendix Figure A1². Such increases in population size and GDP resulting from the potential GCC expansion shown in these statistics not only provided the basis for larger exports and imports market but also a much-diversified market that reduced the oil dependence of the GCC countries, as identified in earlier studies.

The objective of this paper, therefore, was to investigate the possibility of expanding the GCC monetary union (GMU) to other MENA countries with a focus on the similarities/dissimilarities of the countries' economic characteristics. It also examined whether the economic characteristics

2) For instance, in 2018 the population increased, by 506%, from the GCC low of 56,651,635 to the MENA total of 343,522,878 and GDP also increased, by 84.3%, from \$1,456,652,644,984 to the MENA total of \$2,684,595,727,800. In 2000, the GCC and MENA split for the GDP was 52.1% and 47.9% and in 2018 54.3% and 45.7% respectively. Similarly, the population split for GCC and MENA in 2000 was 12.1% and 87.9% and in 2018 16.5% and 83.5% respectively.

of the countries would provide evidence for the readiness of these countries for the proposed monetary union. The study, thus, contributes to the limited literature on monetary union in the MENA region in several ways. Unlike Sahin (2006) and other studies our study used seven macroeconomic variables, including the GCC convergence criteria and the optimum currency area (OCA) criteria to provide a more holistic approach. Moreover, the authors covered a much longer period of eighteen years with three sub-periods giving the scope for a deeper and more rigorous analysis and an understanding of the dynamics. Finally, this paper provides up-to-date results for policy-makers as well as a basis for further research.

The rest of the paper proceeds as follows: The next section discusses the theoretical framework and reviews the previous empirical studies. Section III describes the methodology and data sources while section IV presents and discusses the results. Finally, section V concludes with policy implications and suggestions for further research.

II. Theoretical Background and Literature Review

The decision about which currency regime to adopt has received considerable attention in the academic literature. Friedman (1953) wrote extensively on the pros and cons of flexible exchange rates. Mundell (1961) in his seminal paper pioneered the optimum currency area (OCA) with subsequent extension by McKinnon (1963), and Kenen (1969). According to the OCA theory, countries that have similar economic characteristics (homogeneous) can form a monetary union, as one monetary policy would be appropriate. On the other hand, a lack of homogeneity is an indication that a single monetary policy would be unsuitable for such countries unless alternative channels for adjustments are available (Buigut, 2006). Optimality is defined in terms of several OCA criteria, including real exchange rate variability, the similarity of inflation rates, the openness of the economy, the degree of factor mobility, the degree of industrial diversification, price and wage flexibility, the degree of goods market integration, fiscal integration, and political factors (Tavlas, 1993). Other criteria have also been added to the OCA theory: synchronisation of business cycles, the degree of currency substitution, and the credibility of monetary policy.

Following the introduction of the OCA theory, a number of studies in Europe and other parts of the world have used it as a framework to assess the viability of countries planning to form a monetary union. The OCA theoretical framework has also been used extensively in the GMU studies. In their paper, Laabas and Limam (2002) concluded that the GCC countries were yet to fulfil the necessary pre-conditions stipulated in the OCA for monetary union. They noted that oil dependence by member states limited intra-regional trade. They found no evidence of macroeconomic convergence in key variables and a lack of business cycle synchronisation. On the positive side, they found that the exchange rates of GCC members are closely related

to each other and share a common trend although to different degrees. They argued that the main factors favouring the formation of the GMU are the commitment by all members to fixed exchange rate arrangements and the strong political will to achieve economic integration. Despite their findings, the authors are optimistic that the GCC countries are likely to meet the OCA criteria ex-post rather than ex-ante. While the ex-post argument was initiated by Frankel and Rose (1998) in their endogeneity argument, it was, however, challenged by Krugman (1993). On the economic structure of the GCC countries, Shotar and Shams (2005) found significant economic policy differences in GCC countries which they argued could be a potential limit to the benefits derived from the monetary union. Kandil and Trabelsi (2012), Alshehry and Slimane (2012), Alkholifey and Alreshan (2010) and Abu-Qarn and Abu-Bader (2008) found that the GCC was not yet ready for monetary union. Other studies found evidence in support of the formation of the GCC currency union (Hebous, 2006; Pattannaik, 2007).

In their study of the GCC convergence criteria using the European Union experience for the period 2005-2014, Ganguli (2016) concluded that GCC economies were similar in terms of their structural and economic fundamentals. The author noted that most elements of the convergence criteria that were followed by the accession countries in Europe were fulfilled by the GCC member states, particularly during 2011-2014. However, he found wide divergence in fiscal deficit-to-GDP ratios and rising debt-to-GDP ratios during periods of low oil prices. The author commented that heavy dependence on oil and lack of diversification from oil and hydrocarbon-related products in the GDP composition of GCC states posed severe risks to the potential union and oil price shocks, creating concerns for such a union during oil price lows. Given the concerns raised in Ganguli's (2016) study and the fact that it was only based on the six oil-dependent GCC countries, our study contributes to the literature and policy insights as it explored the possibility of expanding the GCC monetary union to include non-oil-dependent nations as a potential source of a more diversified union. In an empirical assessment of the degree to which the GCC met the requirements of an optimum currency area, Pattannaik (2007) found strong evidence of convergence of inflation differential to the GCC average over time although differences existed in observed inflation rates across GCC countries during any year. The author also observed similar economic structures due to a high degree of oil dependence, convergence in business cycles, and a high degree of openness of the six GCC countries. According to him, this suggested that there was a strong case for surrendering national currencies in favour of a one-size-fits-all monetary policy with a common currency and a common exchange rate. Alkholifey and Alreshan (2010) examined the feasibility of the GCC monetary union and uncovered some of the operational issues that were likely to arise in the union. They noted in their conclusion that it was possible that several economic arguments might not explicitly support the notion of the GMU. However, they argued that factors such as low trade were expected to support the project in the long term. Darrat and Al-Shamsi (2005) examined whether the six GCC countries were sufficiently compatible

to form a viable economic and financial bloc in the Gulf region. They found a lack of full economic and financial integration which they said was unlikely the outcome of economic or financial incompatibility among the countries in the region but rather the possible socio-political differences. On a test for common trends and common business cycles among the GCC economies, Abu-Qarn and Abu-Bader (2008) did not find synchronous long-run and short-run movements in output. The authors concluded that the conditions for forming a GCC monetary union had not yet been met. On the other hand, Shebeb (2016) reported mixed findings for GCC. His formal test provided evidence of convergence in inflation rates. However, he reported mixed findings on the synchronization of business cycles. He concluded that there was no consensus among researchers as to whether the GCC countries were ready to form the GMU. Similarly, Arfa (2012) found a lack of convergence in the business cycles of GCC countries and concluded that the countries were not ready to form a monetary union. Espinoza et al. (2011) investigated the extent of regional financial integration in the GCC countries. They found convergence in interest rates and fairly integrated stock markets. With the Multivariate structural Vector Auto-Regression model (VAR) for the period 1980-2006, Kandil and Trabelsi (2012) also found evidence against the formation of a GCC monetary union. However, conditions in their results further suggested that Saudi Arabia, the United Arab Emirates and Qatar had demonstrated higher potential to take the lead in endorsing and fostering a common currency zone.

Few studies had also been conducted on the sustainability of monetary unions in the MENA region. With a sample of eleven countries for the period 1998-2014, Karara (2014) computed a stress level index for members of each potential union using their optimal interest (Taylor) rates. He found two monetary sub-unions: the Saudi Arabia-Kuwait Union and the Mashreq Union (Jordan, Egypt, and Syria) to have relatively low-stress levels and high benefits from a common currency. In contrast, he found that a large MENA union would suffer from very high-stress levels and only modest advantages of a common currency. In a sample of ten countries, including the six GCC countries and the four Agadir nations, over the period 1970-2003, Bacha (2008) used a VAR methodology to examine the feasibility of a common currency area in the MENA region. The author examined the symmetry of the responses of countries within each group to a common external shock. For the GCC, he found a strong monetary sector integration but not for the real sector. Amongst the Agadir nations, the results showed no correlation in real output growth, some correlation among monetary variables but no symmetry whatsoever in response to external shocks. What was common in both GCC and Agadir nations was the absence of any meaningful influence of countries on each other within the bloc.

In assessing the possibility and the likelihood of forming a currency area for MENA countries employing a genetic optimization model Sahin (2006) concluded that countries in the MENA region should consider forming a currency union both to decrease any macroeconomic imbalances and to bring their individual power together to build a new economic power. The Sahin's (2006)

study was limited to the similarity of only two variables - inflation and the degree of openness of the countries. Our study has extended this by considering more variables that comprise the GCC convergence criteria and the OCA theory. Péridy and Bagoulla (2012) analysed and explained the real convergence process in MENA countries over a period of 50 years, focusing on the convergence of MENA countries towards the EU per capita income. Their results showed that despite a lack of s-convergence for the MENA region taken as a whole, the convergence hypothesis was accepted using the g and β -convergence tests, especially for Tunisia, Egypt, Turkey, and Morocco but evidence showed divergence for Jordan and Algeria. The results further suggested that trade specialization and firm agglomeration had been detrimental to the convergence of MENA countries. Our study went beyond the narrow convergence focus on the EU per capita income in the Péridy and Bagoulla (2012) study. We employed a multivariate approach that was contextualised to the combination of GCC convergence criteria and OCA theory.

On the issue of trade and trade agreements, Boughanmi et al. (2016) evaluated how fostering trade partnerships with the rest of the Greater Arab Free Trade Area (GAFTA) could be a better economic course of action for the GCC than entering into preferential trade arrangements with well-established trade blocs outside the region; such as the European Union (EU) using the 8.1 version of Global Trade Analysis Project. They found that the GAFTA scenario yielded the highest welfare gain for the GCC than the GCC-EU Free Trade Agreement scenario which only yielded a smaller positive gain. According to the authors, their results underscored the importance of deepening GAFTA's scope through the introduction of trade facilitation measures as well as measures beyond merchandise trade liberalization. With the use of the Gravity model, Abedini and Péridy (2008) estimated the GAFTA agreement trade effect for the period 1988-2005. Their results showed that regional trade increased by 20% since the implementation of GAFTA. The findings in these two studies were considered relevant to the GCC expansion in our study.

III. Methodology and Data

A. Cluster analysis

Cluster analysis is a technique commonly used to organise objects into groups (clusters) according to homogeneities such that objects in the same group are as similar as possible. In the context of cluster analysis, the data set consists of n objects (countries in our case) and for each country, there are p variables, which are denoted by

$$X_{np} = \{X_1, X_2, \dots, X_n\}, \text{ where each } X_i = \{X_{i1}, \dots, X_{ip}\}. \quad (1)$$

Each variable is standardised with a mean zero and a standard deviation of one, as in equation 2, in order to treat variables as having equal importance in determining the structure. Standardisation of the variables is also important in order to keep variables with high variances from dominating the cluster analysis. When variables are of different magnitude and are not directly comparable, standardisation helps to overcome this problem.

$$Z = \frac{Y - \bar{Y}}{Std Y} \quad (2)$$

where Y is the original data, \bar{Y} is the sample mean and $std(Y)$ is the standard deviation of Y . We use the standardised variables to classify the objects into clusters using Euclidean distance as a dissimilarity coefficient, which is the distance between two objects i and j and is defined as:

$$d(i, j) = \sqrt{\sum_{k=1}^p (x_{ki} - x_{kj})^2} \quad (3)$$

Hierarchical clustering (HC) is one of the common methods used in the literature for grouping objects. This method attempts to assign each object to one, and only one, cluster. Expressed mathematically, hierarchical clusters must satisfy the following properties:

$$u_{ik} \in 0, 1 \text{ and } 1 \leq i \leq n; 1 \leq k \leq c, \quad (a)$$

$$\sum_{k=1}^c u_{ik} = 1, 1 \leq i \leq n, \text{ and} \quad (b)$$

$$0 < \sum_{i=1}^n u_{ik} < n, 1 \leq k \leq c, \quad (c)$$

where u_{ik} represents the membership coefficient or degree of belongingness of an object i to a cluster k ; c is the number of possible clusters, and n is the number of objects in the data set. Properties (a)-(c) state that a membership coefficient is either zero or one, meaning that an object belongs to either one cluster or the other; the sum of the membership coefficients of an object across clusters is equal to one (i.e. every object must belong to a cluster), and the sum of the membership coefficients in a cluster lies between zero and the total number of objects in the data set (i.e. each cluster must contain at least one but less than all objects in the data set), respectively.

We used the agglomerative hierarchical clustering (AHC) technique to group the countries. To determine which object/cluster to join at each stage we applied the average linkage method (ALM). In this method, the dissimilarity or closeness between clusters 1 and 2 is taken to be the average of all dissimilarities $d(i, j)$, where i is any object of cluster 1 and j is any object

of cluster 2. Assuming n_1 and n_2 are the numbers of observations in clusters 1 and 2, respectively. The average linkage method measures proximity as

$$DistGA_{1,2} = \frac{1}{n_1 n_2} \sum_{i=1}^n \sum_{j=1}^n d(x_{1i}, x_{2j}) \quad (4)$$

We joined the countries using the ALM above to produce the dendrogram. The dendrogram with the highest cophenetic correlation coefficient (CCC) is chosen to group the countries. The CCC determines how well the generated clusters represent dissimilarities between objects and a value close to one represents better clustering.

Letting d be the average of $d(i,j)$, and letting t be the average of $t(i,j)$, the distance generated by the linkage method when two objects are first joined together, then the CCC is defined as

$$CCC = \frac{\sum_{i < j} (d(i,j) - d)(t(i,j) - t)}{\sqrt{[\sum_{i < j} (d(i,j) - d)^2][\sum_{i < j} (t(i,j) - t)^2]}} \quad (5)$$

To determine the optimal number of clusters, we applied two formal rules jointly: the pseudo-F (CHI) index developed by Calinski and Harabasz (1974) and the Duda-Hart stopping-rule (DH). The CHI index is defined as

$$CHI = \frac{S_b / (K - 1)}{S_w / (n - k)} \quad (6)$$

where S_b is the between-clusters sum of squares, S_w is the within-clusters sum of squares, k is the number of clusters and n is the number of objects. Higher values of the index indicate more distinct partitioning and, therefore, better clustering. The variables for our study are in Table 1 and the data sources are in Appendix Table A2. Several studies had applied cluster analysis methodology, in different continents, to assess the suitability of countries for monetary union. (Artis and Zhang, 2001; Buigut, 2006; Ibrahim, 2008; Fontana and Kamara, 2023).

We grouped the countries for the full period 2000-2018 and three subperiods 2000-2007 (prior to the global financial crisis), 2007-2012 (financial crisis period), and 2012-2018 (post-financial crisis period but before the COVID-19 pandemic). The start date of 2000 is the year just before the signing of the GCC single currency agreement by the six member states in 2001 with the target commencement date of 2010. Thirteen countries selected for this study (six GCC and seven other MENA) are shown on the two vertical rectangles in Figure 1. Due to data availability, we excluded from our sample Israel and countries affected by war.

Table 1. Definition of Variables

Variable	Definition and measurement
BUS	Synchronisation in the business cycles: the cross-correlation of the cyclical components of annual GDP of MENA countries using Hodrick-Prescott (H-P) filter (Hodrick & Prescott, 1997) and USA as anchor.
RTI	Trade openness: $\frac{X_{i,MENA} + M_{i,MENA}}{X_i + M_i}$ (Note 1)
INF	Convergence of inflation: the absolute inflation differential between each country (X_i) and the anchor country (X_{USA}), i.e. $ X_i - X_{USA} $.
RER	Real exchange rate volatility: standard deviation of the first difference of the annual natural logarithm of the real exchange rate in the five years preceding period t. This means for the 2018 exchange rate volatility, the standard deviation of the first difference of the logarithm of the real exchange from 2013 to 2017. (See note 2)
RES	Reserves to imports ratio: calculated as total reserves divide by 4 months imports.
DSR	Debt servicing requirement: ratio of Gross Government debts to GDP.
CAB	Current account balance: ratio of current account balance to GDP.

Note. (1) where $X_{i,MENA}$ denotes exports of country i to other MENA countries, $M_{i,MENA}$ denotes imports of country i from other MENA countries, X_i and M_i are country i's total exports and total imports respectively. (2) Real exchange rate computed as the nominal exchange rate in local currency per unit of US\$ of a given year multiplied by the domestic GDP deflator divide by foreign GDP deflator (US GDP deflator is used as the foreign).

IV. Results and Discussion

A. Pre-clustering results

First, we examined the data and the descriptive statistics before the grouping process to have an understanding of the data and possible variables that might be the source of dissimilarities. The optimum currency area theory and convergence criteria data with the descriptive statistics for 2000-2018 are shown in Table 2. Similar descriptive statistics for the three subperiods 2000-2007, 2007-2012, and 2012-2018 were also computed but not reported. A graphical representation of the regional averages for all four periods is shown in Figure 2. In Table 2, the maximum figures are indicated in italics and bold, and the minimum figures are in italics.

Table 2. OCA and GCC Convergence Criteria (2000-2018)

Country	BUS	RTI	RER	INF	RES	CAB	DSR
Algeria	0.70	<i>0.04</i>	0.73	7.83	9.18	6.09	24.46
Bahrain	0.16	0.29	0.61	7.01	0.88	4.05	39.62
Egypt	-0.27	0.14	0.31	8.53	2.30	-0.98	83.86
Iran	0.10	0.10	0.39	15.05	<i>0.77</i>	4.43	18.43
Jordan	-0.24	0.25	0.49	3.13	2.11	-7.00	84.85
Kuwait	0.68	0.09	0.57	11.27	2.99	27.24	13.18

Table 2. Continued

Country	BUS	RTI	RER	INF	RES	CAB	DSR
Lebanon	-0.85	0.15	0.68	2.88	6.33	-19.27	153.32
Morocco	-0.39	0.08	0.47	1.28	1.99	-3.51	58.89
Oman	-0.54	0.25	0.57	11.43	1.69	4.09	16.80
Qatar	-0.64	0.09	0.52	10.91	2.35	17.44	33.86
Saudi Arabia	0.24	0.11	0.50	8.67	9.29	12.76	31.72
Tunisia	-0.03	0.06	0.21	2.14	1.02	-6.34	52.91
United Arab Emirates	0.82	0.10	0.45	7.72	0.96	9.50	12.76
Descriptive statistics							
MENA:							
Min	-0.85	0.04	0.21	1.28	0.77	-19.27	12.76
Max	0.82	0.29	0.73	15.05	9.29	27.24	153.32
Mean	-0.02	0.14	0.50	7.53	3.22	3.73	48.05
GCC:							
Min	-0.64	0.09	0.45	7.01	0.88	4.05	12.76
Max	0.82	0.29	0.61	11.43	9.29	27.24	39.62
Mean	0.12	0.16	0.54	9.50	3.03	12.52	24.66
OTHERS:							
Min	-0.85	0.04	0.21	1.28	0.77	-19.27	18.43
Max	0.70	0.25	0.73	15.05	9.18	6.09	153.32
Mean	-0.14	0.12	0.47	5.84	3.38	-3.80	68.10

(Source) Author's calculation.

Figure 2. Regional averages of variables

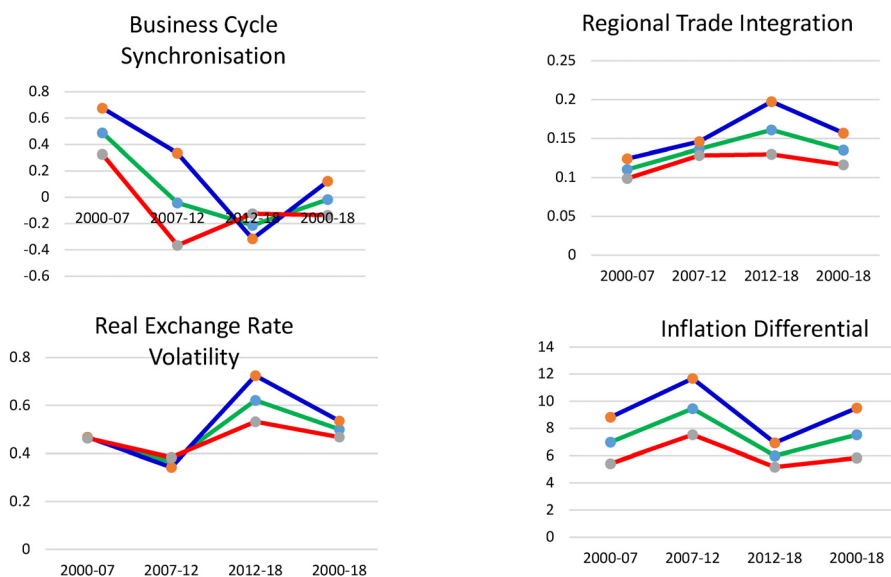
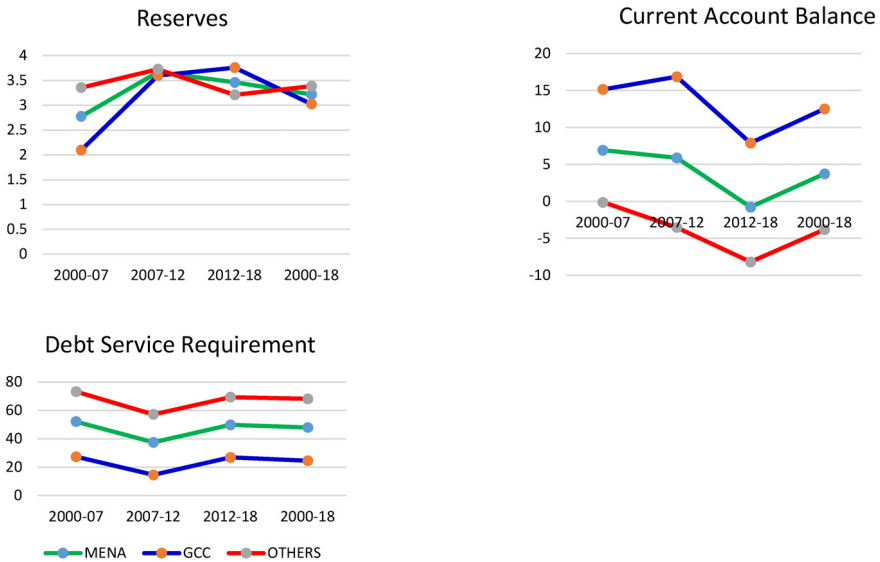


Figure 2. Continued



Clearly, Table 2 and Figure 2 provide evidence of dissimilarities in variables for the MENA countries. For the OCA variables (BUS, RTI, RER and INF), the GCC and other MENA countries showed differences in business cycle synchronization, real exchange rate volatility, and the extent of trade within the MENA region. On average, the GCC trade within the region was 16%, and other MENA countries 12% as compared to 14% for the MENA region. Bahrain with 29% RTI was the most trading nation within GCC and MENA followed by Oman and Jordan 25% each. The least trading nations within the MENA region were Algeria 4%, and Tunisia 6%. Prior to the global financial crisis (GFC) intraregional trade, though low, was similar between the two zones as shown in Figure 2. However, divergence in trade followed after the GFC. The trend is similar to the business cycle. Prior to the GFC (2000-2007), all countries showed positive business cycles. During the GFC (2007-2012) and after (2012-2018) eight and nine countries respectively reported negative business cycles including five GCC for 2012-2018. Saudi Arabia showed a positive business cycle in all four periods similar to the UAE which only reported a negative cycle following the GFC (2012-2018). The pattern of the business cycles of the countries suggests evidence of a lack of synchronization. There was also a common trend in the intraregional trade variable (RTI) that the GCC average consistently outperformed the other MENA countries and was always above the MENA average.

In Figure 2, Inflation differential, debt service requirement and current account balance clearly demarcate the two sets of countries with no convergence in any of the four periods. For the current account balance, the GCC countries show a consistently better performance than the other countries for all the periods under consideration, with Kuwait consistently showing the highest

balance of 27.24%, 29.81% and 37.43 in 2000-2018, 2000-2007, and 2007-2012 respectively. While the GCC was always above the MENA average, the other countries had not only fallen below the MENA average but had also reported an average negative balance of 3.80%. Lebanon had shown the largest negative balance of 19.27%. The GCC's performance in the current account balance over the other MENA countries may be partly explained by their higher intraregional trade. On the debt service requirement, other MENA countries' performance was below the GCC. The GCC average debt to GDP was 24.66% which was below the MENA average of 48.05%. The other MENA countries' debt-to-GDP ratio was 68.10% which was above the MENA average. The difference in debt to GDP ratio between the two zones persisted in all periods. The GCC country with the highest debt ratio of 39.62% was Bahrain as compared to 153.32% for Lebanon in the other countries. Such a difference has important implications since the debt-to-GDP ratio is one of the convergence criteria of the GCC common currency project.

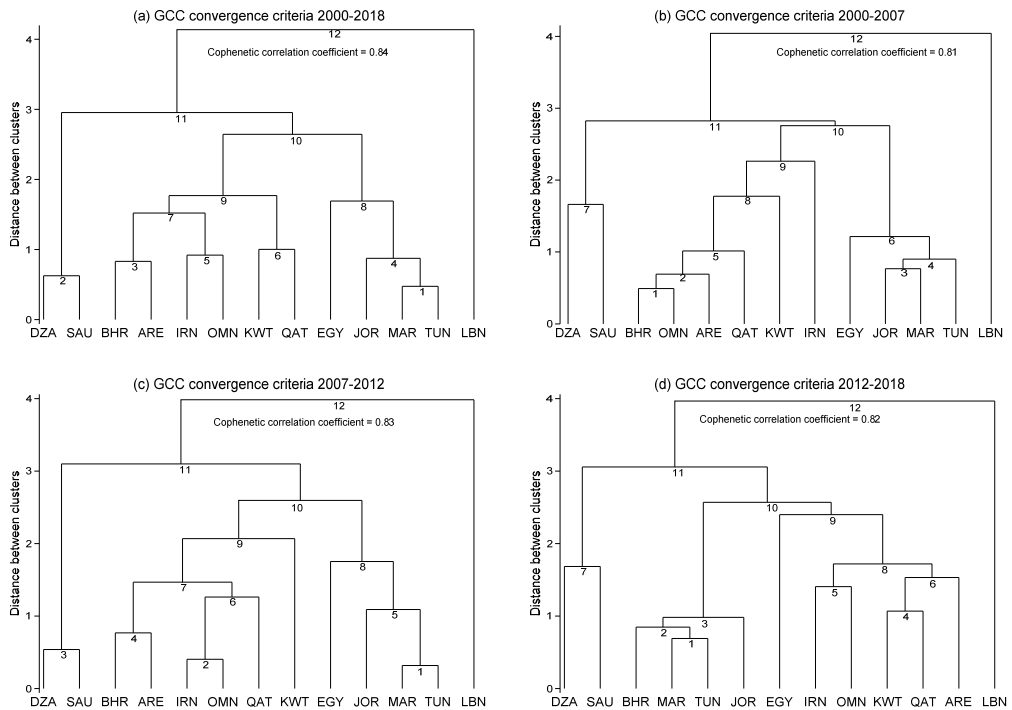
Table 2 and Figure 2 show stark differences in inflation rates between the GCC and other MENA countries with the latter outperforming the former. The persistence of the dissimilarities in inflation differential in all periods between the GCC and other MENA countries is of specific importance for a number of reasons: Firstly, inflation is an overlapping variable for OCA and GCC convergence criteria making it prominent in studies involving either the OCA or convergence variables. Secondly, one of the key functions of any central bank is price stability and for this purpose, inflation is one of the key target variables to achieve this function. A common currency will have a common central bank with a common interest rate for all member states. On average the GCC inflation differential was 9.5% compared to 5.84% for other MENA countries as shown in Table 2. Inflation differential, such as the one that exists in Figure 2 and Table 2, raised the question of the appropriateness of a single interest rate that could combat different inflations for the members of the currency union. It was clear that the GCC average inflation rate was consistently higher than the other MENA countries and the MENA average. Not only that, the inflation rates within the GCC were polarised with three countries (Kuwait, Oman, and Qatar) in double digits and the other three (Bahrain, Saudi Arabia, and the United Arab Emirates) in single digits for the period 2000-2018 in Table 2. Such diversity in inflation rates within GCC and MENA countries raises the key question of the appropriateness of a single monetary policy that can fit all countries in a common currency.

In summary, the descriptive statistics indicated a low level of intraregional trade, although in relative terms the GCC countries demonstrated, on average, a better intraregional trade performance over the other MENA countries. There was also a lack of business cycle convergence within GCC and MENA countries. Three key macroeconomic variables clearly separated the GCC countries from other MENA countries, namely inflation differential, debt service requirement, and current account balance.

B. Hierarchical clustering

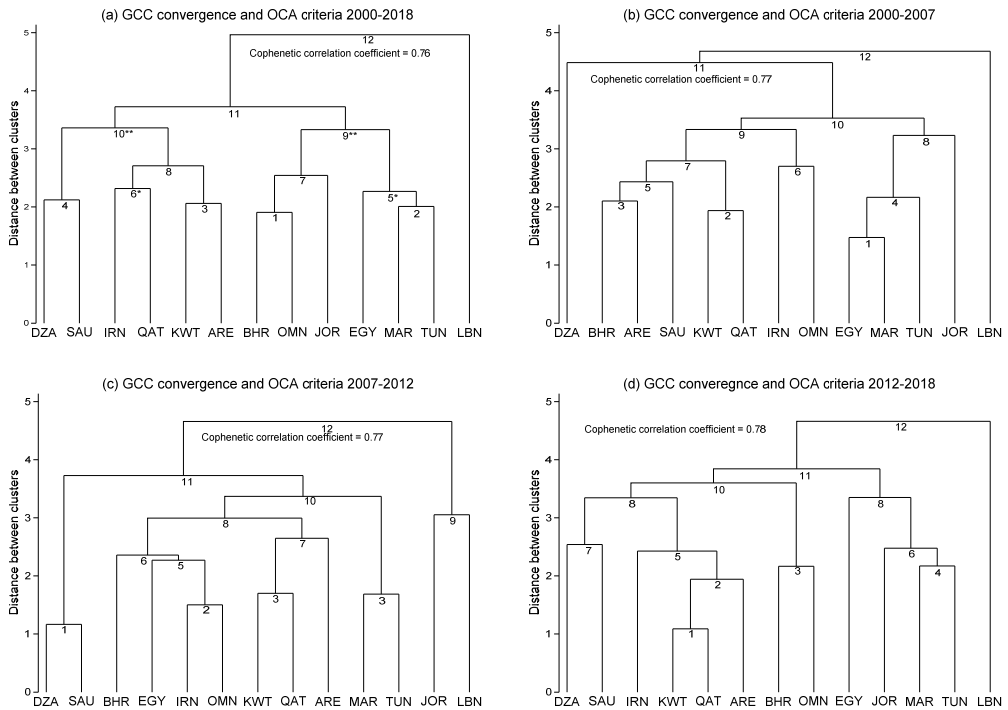
We applied the cluster methodology to group the countries using data on the seven variables over the full period 2000-2018 and three sub-periods: 2000-2007, 2007-2012 and 2012-2018. The three sub-periods enabled us to analyse the degree to which the changing policy environments, at the national and international levels, had impacted the homogeneity across these countries over time. Our dynamic clustering approach provided a test of how stable the countries were over time and acted as a validation of our model to produce robust outcomes. The merging of the countries is shown in the dendrograms in Figure 3 (GCC convergence variables) and Figure 4 (GCC and OCA variables) for the average linkage agglomerative algorithm. The average linkage method was the most appropriate for our analysis because it yielded the highest cophenetic correlation coefficient (CCC) of 0.84, 0.81, 0.83, and 0.82 for the convergence criteria and 0.76, 0.77, 0.77, and 0.78 for all the seven variables for 2000-2018, 2000-2007, 2007-2012, and 2012-2018, respectively.

Figure 3. GCC convergence criteria dendrograms



(Source) Author's results from STATA.

Figure 4. GCC convergence and OCA criteria dendrograms



(Source) Author's results from STATA.

The reported CCC for all eight dendrograms in Figures 3 and 4 is reasonably high, meaning that the cluster information generated by these dendrograms is a good representation of the dissimilarities in the data. The CCC for the convergence criteria (Figure 3) are all above 0.8 as compared to above 0.7 for the seven combined variables (Figure 4). This indicates that the cluster information generated by the dendrograms of the former is a better representation of the dissimilarities in the data than the latter. We present both sets of results to incorporate robustness into our analysis.

In each of Figures 3a-3d and Figures 4a-4d the vertical axis represents the distance (or dissimilarities), and the horizontal axis indicates the countries in our sample (country codes are in Figure 1). Starting with the left of the dendrogram in Figure 3a, Algeria and Saudi Arabia are merged at level 2. On the right of the dendrogram, the first two countries to be merged at level 1 are Morocco and Tunisia which are joined by Jordan at level 5 and Egypt at level 8. These merged countries represent the Agadir nations. On the extreme right is Lebanon which showed a stark difference from the rest of the countries by being the least dissimilar country that merged all other countries at the topmost level (level 12). In the middle of the dendrogram are five GCC countries and Iran (the 5+1) which are all merged at level 9. The most similar of these countries are Bahrain and the UAE which are merged at level 3, followed by Iran

and Oman merged at level 5, and finally Kuwait and Qatar at level 6. The 5+1 group in the middle and the Agadir nations on the right are merged at level 10 before they are joined by the Saudi and Algeria (SAUDZA) group at level 11.

The 2000-2007 and 2007-2012 groupings in Figure 3b and Figure 3c respectively repeat the grouping of 2000-2018 in Figure 3a: the SAUDZA group on the left, the 5+1 group in the middle, the Agadir nations on the right, and Lebanon on the extreme right. The joining in 2012-2018 (Figure 3d) while similar to the previous joining shows a slight difference. The SAUDZA and Lebanon show no difference. The only difference is Bahrain joined with the Agadir nations and Egypt is now located between the 5+1 and the Agadir nations. Overall, the joining of the countries for the four periods in Figure 3 demonstrates consistency.

We combined the two variable categories (GCC convergence and OCA) and present in Figure 4 (a-d) the four dendrograms for the four periods. We already noted that the CCC of these dendrograms ranged from 0.76 to 0.78 which is slightly below the dendrograms in Figure 3 (0.81 to 0.84) but still a reasonably good representation of the data. Whilst not exactly identical, the joining of the countries in Figure 4 is similar to Figure 3. Apart from Figure 4b (2000-2007), Saudi Arabia and Algeria (SAUDZA) join together in all the other three dendrograms and Lebanon continues to be alone as the last country to join the rest on the extreme right except Figure 4c (2007-2012) where it joins together with Jordan at level 9. The combination of the seven variables in Figure 4 shows logical consistency in the joining of the countries. A close examination of the the dendrograms for the GCC convergence criteria and the seven combined variables in Figures 3 and 4 respectively, joined with the CHI and DH stopping rules, suggests an optimal number of four groups. The grouping results for the full period and the three sub-periods, using the GCC convergence variables are presented in columns 6-9 of Table 3. We also present, in columns 2-5 of Table 3, the grouping results for the full period and three subperiods using the seven OCA and convergence variables. The last column in Table 3 shows the grouping results for the full period using the OCA variables. It is important to note that inflation convergence is an overlapping variable that belongs to both OCA and convergence variables making it a specifically key variable in our analysis.

In Table 3, countries in bold are non-GCC countries grouping with GCC countries and those in italics are GCC countries grouping with non-GCC countries.

We have two grouping categories in Table 3. The GCC countries are mainly in groups 1 and 2 which we describe as countries above the line and the other MENA countries are mainly in groups 3 and 4 which are below the line. Overall, we performed nine groupings as shown in Table 3. Table 4 summarises the number of times each country grouped with the GCC (grouping above the line). The second to last column of Table 4 shows the percentage grouping of each country above the line. The variable means for the convergence criteria groups and all variable groups are in Tables 5 and 6, respectively.

Table 3. Grouping Results Using Average Linkage

Group	All seven variables				Convergence criteria				OCA Variables
	2000-2018	2000-2007	2007-2012	2012-2018	2000-2018	2000-2007	2007-2012	2012-2018	2000-2018
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	SAU	DZA	DZA	ARE	SAU	DZA	DZA	DZA	IRN
1	DZA		SAU	QAT	DZA	SAU	SAU	SAU	EGY
1				DZA					SAU
1				SAU					QAT
1				KWT					DZA
1				IRN					ARE
1									KWT
2	KWT	ARE	IRN	BHR	OMN	IRN	OMN	TUN	BHR
2	ARE	OMN	ARE	OMN	KWT	BHR	ARE	JOR	OMN
2	IRN	QAT	OMN		QAT	QAT	BHR	MAR	JOR
2	QAT	BHR	EGY		IRN	ARE	IRN	BHR	
2		SAU	KWT		ARE	KWT	KWT		
2		KWT	QAT		BHR	OMN	QAT		
2		IRN	BHR						
3	<i>BHR</i>	JOR	TUN	EGY	TUN	MAR	JOR	<i>KWT</i>	LBN
3	EGY	EGY	MAR	MAR	JOR	JOR	TUN	IRN	MAR
3	<i>OMN</i>	MAR		TUN	EGY	TUN	MAR	<i>ARE</i>	
3	JOR	TUN		JOR	MAR	EGY	EGY	<i>OMN</i>	
3	MAR							<i>QAT</i>	
3	TUN							EGY	
4	LBN	LBN	LBN	LBN	LBN	LBN	LBN	LBN	TUN
4			JOR						

(Source) Author's grouping results from STATA.

Table 4. Grouping Summary

Country	All variables	Convergence variables	OCA variables	Total (Out of 9)	%	Group
Algeria	4	4	1	9	100	SAUDZA
Saudi Arabia	4	4	1	9	100	
Bahrain	3	4	1	8	89	FIVE+1
Iran	4	3	1	8	89	
Kuwait	4	3	1	8	89	
Qatar	4	3	1	8	89	
United Arab Emirates	4	3	1	8	89	
Oman	3	3	1	7	78	

Table 4. *Continued*

Country	All variables	Convergence variables	OCA variables	Total (Out of 9)	%	Group
Egypt	1	0	1	2	22	
Jordan	0	1	1	2	22	AGADIR
Morocco	0	1	0	1	11	
Tunisia	0	1	0	1	11	
Lebanon	0	0	0	0	0	OTHER

(Source) Author's calculation from Table 3.

Note. The number of times countries grouped in groups 1 and 2 (above the dotted line) in Table 3. Out of 4 for all variables, out of 4 for convergence variables and out of 1 for OCA variables (9 in total).

Group 1, in Table 3, consists of mostly Saudi Arabia and Algeria in all nine groupings which is consistent with the joining of the countries in the dendrograms in Figures 3 and 4. In 4 out of the 4 groupings for the convergence criteria these two countries grouped together, which indicates a high and consistent level of similarities in economic characteristics. As summarised in Table 4 100% of the time, Saudi Arabia and Algeria were grouped above the line, and due to their level of similarity, we describe these two countries as the SAUDZA group. The key economic characteristics of this group included low intraregional trade, high inflation, high real exchange rate volatility, high reserves and low debt service requirement. In all the cases that Saudi Arabia and Algeria were grouped in group 1, their inflation differential was always higher than the MENA average. The group and MENA average inflation differential from Table 5 is 5.33-11.23 and 5.98-9.44 respectively.

Table 5. *Group Variable Mean (Average Linkage Method)-Convergence Criteria*

Period	Group no	INF	RES	CAB	DSR
2000-2018	1	8.25	9.24	9.43	28.09
	2	10.57	1.61	11.13	22.44
	3	3.77	1.86	-4.46	70.13
	4	2.88	6.33	-19.27	153.32
	MENA mean	7.53	3.22	3.73	48.05
2012-2018	1	5.33	10.54	-0.41	12.855
	2	2.26	1.34	-6.155	69
	3	9.31	1.86	6.78	34.10
	4	2.18	7.46	-25.13	141.49
	MENA mean	5.98	3.46	-0.76	49.83
2007-2012	1	11.23	12.32	14.83	10.04
	2	12.52	1.58	14.80	14.66
	3	5.29	1.74	-5.95	58.42
	4	3.89	6.52	-18.01	145.88
	MENA mean	9.44	3.66	5.898	37.51

Table 5. *Continued*

Period	Group no	INF	RES	CAB	DSR
2000-2007	1	7.55	6.49	16.21	50.63
	2	10.69	1.47	13.19	19.44
	3	2.195	2.27	-1.69	72.74
	4	2.77	5.13	-14.58	168.34
	MENA mean	6.98	2.77	6.94	52.09

(Source) Author's results from STATA.

Table 6. *Group Variable Mean (Average Linkage Method)-All Variables*

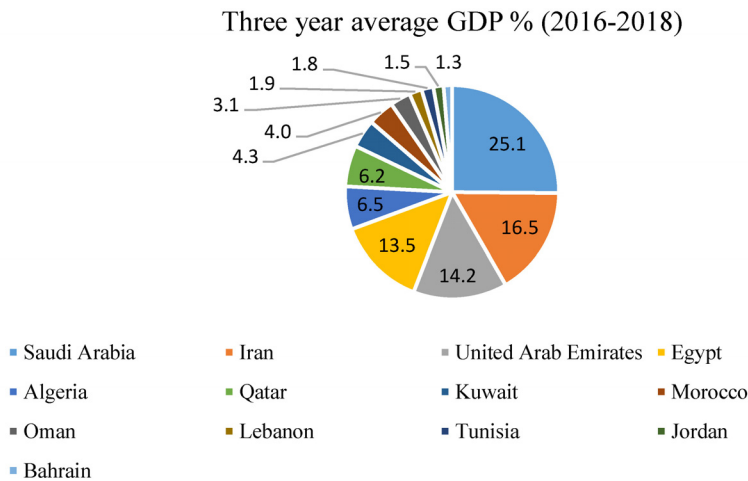
Period	Group no	BUS	RTI	RER	INF	RES	CAB	DSR
2000-2018	1	0.471	0.076	0.614	8.25	9.23	9.43	28.09
	2	0.242	0.097	0.482	11.24	1.77	14.65	19.56
	3	-0.216	0.178	0.443	5.59	1.66	-1.61	56.15
	4	-0.85	0.146	0.677	2.88	6.33	-19.27	153.32
	MENA mean	-0.018	0.135	0.499	7.53	3.22	3.73	48.05
2012-2018	1	-0.291	0.098	0.702	7.791	4.875	8.039	19.700
	2	-0.536	0.378	0.769	5.280	1.296	-2.193	43.863
	3	0.187	0.148	0.367	4.556	1.424	-7.148	75.093
	4	-0.692	0.153	0.859	2.183	7.462	-25.127	141.489
	MENA mean	-0.213	0.161	0.621	5.978	3.462	-0.760	49.830
2007-2012	1	0.932	0.072	0.342	11.272	12.324	14.824	10.035
	2	0.018	0.147	0.319	12.323	1.635	12.497	22.776
	3	-0.41	0.077	0.338	1.975	1.538	-5.909	46.504
	4	-0.858	0.224	0.574	4.998	4.238	-14.317	107.551
	MENA mean	-0.042	0.136	0.365	9.442	3.665	5.900	37.509
2000-2007	1	0.237	0.024	0.723	7.958	8.171	16.402	38.637
	2	0.600	0.120	0.465	10.181	1.951	13.595	25.610
	3	0.451	0.109	0.374	2.195	2.268	-1.684	72.743
	4	0.101	0.137	0.577	2.766	5.134	-14.576	168.340
	MENA mean	0.488	0.111	0.466	6.983	2.772	6.943	52.094

(Source) Author's results from STATA.

The high inflation exhibited by Saudi Arabia as part of the SAUDZA group had important implications for our analysis because it is the largest economy in the GCC and MENA. Saudi Arabia constitutes 46.3% of the GCC GDP and 25.1% of the MENA GDP (Figure 5). Whichever monetary union comes into existence, the GCC monetary union or the expanded GCC monetary union, Saudi Arabia is the largest economy and most likely to have a great influence on policy. During periods of Asymmetric shocks, the common central bank would have the dilemma of the appropriate monetary policy that can fit all countries for the economic stabilisation of member

states. On a positive note, during periods of economic shocks, the SAUDZA group with the highest reserve and low debts within the MENA countries might be able to intervene from a fiscal policy stance to complement the monetary policy of the common central bank in stabilising the union economy. It might be argued that other GCC countries had high inflation like Saudi Arabia and therefore a common interest rate might be appropriate for these countries. However, such an argument may not be compelling for a couple of reasons. Firstly, the countries are not within the limit bound of the convergence criteria and have missed the inflation target most of the time. Secondly, a high-inflation currency is likely to be a weaker currency relative to lower inflation currencies and this might not be the type of currency that the GCC countries were planning to create. Working toward lower inflation by all GCC countries should therefore be a better policy direction.

Figure 5. Three-year average GDP% of MENA countries (2016-2018)



(Source) Author's construction from World Development Indicators (WDI).

From Table 5 the SAUDZA group had the highest reserve ranging from 6.49 in 2000-2007 to 12.32 in 2007-2012 as compared to the MENA average of 2.77 to 3.66 for the same periods. It is also clear from Table 5 that each time Saudi Arabia and Algeria grouped together their current account balance consistently outperformed the MENA average. The group average range was -0.41 (2012-2018) to 14.83 (2007-2012) whereas the MENA average range was -0.76 (2012-2018) to 6.94 (2000-2007).

The second group produced in our results in Table 3 is Group 2 which we describe as the Five plus One (5+1) group. In five of the nine groupings, two for all variables (2000-2007, 2007-2012) and three for the convergence criteria (2000-2018, 2000-2007, 2007-2012), group 2 contained five of the GCC countries (United Arab Emirates, Oman, Qatar, Bahrain, Kuwait)

plus Iran, hence the name Five plus One group. The economic characteristics of this group include the lowest reserve rate of 1.47, 1.58 and 1.61 in 2000-2007, 2007-2012, and 2000-2018, respectively, a high positive current account balance closer to the SAUDZA group, low debt similar to SAUDZA group, and highest inflation. From Table 5 the group 2 inflation differential rate reached 12.52 in 2007-2012 when the MENA average was 9.44. The only group that is closer to this group at 11.23 is SAUDZA in group 1. The high inflation rate of the 5+1 countries is reflected in group 3 (at 9.31) when five of the group 2 countries grouped with Egypt in 2012-2018 (column 9 of Table 3). In all the groupings it was observed that any group with GCC countries always increased the inflation rate of those groups. The SAUDZA and the 5+1 groups are similar in terms of inflation, current account balance, and debt service requirement but a stark difference exists in reserves. Although the 5+1 group satisfied the convergence criterion reserve requirement; its reserve level was, however, below the SAUDZA group which is one of the reasons these two groups of countries are rarely grouped together. What is strikingly common in our results is that the GCC countries were characterised by high inflation rates.

We now turn to the two groups below the line in Table 3. Group 3 comprises mostly the four Agadir nations - Jordan, Egypt, Morocco, and Tunisia. These four countries were grouped in six of the nine groupings (67%) in Table 3. Three of these groupings (2000-2018, 2000-2007, 2012-2018) were for all variables and three (2000-2018, 2000-2007, 2007-2012) were for the convergence variables. Two GCC countries, Bahrain and Oman, grouped with the Agadir nations in 2000-2018 for all variables. These two countries, apart from grouping with other GCC members in group 2, grouped distinctively in 2012-2018 in column 5. For a better understanding of the economic structure of the GCC countries, we examined these two countries as a group of their own. First, we considered the economic characteristics of the Agadir nations in group 3. As shown in Table 6 the intra-regional trade of these countries was below the MENA average and the 5+1 group but above the SAUDZA group. The group intra-regional trade was boosted to 17.8%, above the MENA average, in 2000-2018 (column 2) by the two most trading GCC countries Oman and Bahrain. In Table 6, the Agadir nations exhibited the lowest exchange rate volatility at 0.374, 0.367, 0.443 in 2000-2007, 2012-2018 and 2000-2018, respectively. The group was also characterised by low inflation differentials compared to the SAUDZA and 5+1 groups. In terms of inflation differential, the Agadir nations group was outperformed only by Lebanon in group 4 in all cases. The result therefore indicated that the other MENA countries had a lower inflation rate than the GCC countries. From Table 5 the group also had low reserves but relatively better than the 5+1 group. This, however, did not breach the GCC convergence requirement since the average reserve ratios were all above 1. The current account balance of the Agadir nations was consistently negative for all four periods in Tables 5 and 6 and only better than Lebanon in group 4. The debt service requirement of the group was relatively

high, placing it next to the Lebanon group.

We examined the triangular grouping pattern of two of the GCC countries - Oman and Bahrain - to understand their specific economic characteristics. In eight out of the nine groupings, these two countries grouped with other GCC countries in group 2 as shown in Table 3. In 2012-2018 (column 5) while four of their group 2 peers in the 5+1 group grouped with the SAUDZA in group 1, Oman and Bahrain were still together in group 2. The third leg of the triangle was that the two countries had also grouped with the four Agadir nations in group 3 (column 2). To understand the dynamics of the groups we examined the economic characteristics of these two countries using group 2 of 2012-2018 in column 5 of Table 3. From Table 6 the two countries emerged as the most intra-regional trading countries in GCC and MENA with an average trading index of 37.8% compared to 16.1% for MENA. Lebanon in group 4 was the second most intra-regional trading nation with only 15.3% in the same period. Similar to other GCC countries the exchange rate volatility of Oman and Bahrain is above the MENA average. Unlike other GCC countries with a high rate of inflation differential Oman and Bahrain in this grouping had shown a moderately lower rate of inflation (5.28%); that is, below the MENA average (5.98%) and only outperformed by the Agadir nations in group 3 (4.56%) and Lebanon in group 4 (2.18%). The SAUDZA group in Group 1 joined by three other GCC countries (UAE, Qatar, Kuwait) and Iran shows the highest inflation differential of 7.79% in the same grouping period. However, a closer and more comprehensive look at the results in other periods could not provide us with evidence to support the conclusion that Oman and Bahrain are low-inflation countries as a result of this single isolated grouping of the two countries. The results as a whole suggest a polarisation of inflation between high-inflation countries (GCC) and low-inflation countries (other MENA) as demonstrated in the clear demarcation in Figure 2. In addition to intra-regional trade, another distinguishing feature of Oman and Bahrain that separated them from other GCC countries is an average negative current account balance of -2.19% compared with 8.04% for the SAUDZA group in group 1 of the same period. Although the 43.86% debt service requirement of these two countries was lower than the MENA average of 49.8% and that of group 3 (75.09%), and group 4 (141.5%) it was, however, relatively higher than the 19.7% of the SAUDZA in group 1. These differences in economic features demonstrate another diversity within the GCC and MENA countries.

Lastly, we examined group 4 in which seven out of the nine groupings, Lebanon was shown as a singleton. We had already seen in our dendrograms in Figures 3 and 4 that Lebanon was a country on its own; that is, it was always the last to join other countries at the highest level suggesting a high degree of dissimilarities with the other countries. Our grouping results in Table 3 show Lebanon as a singleton in group 4 most of the time which is consistent with our dendrograms in Figures 3 and 4. Lebanon's intra-regional trade was relatively high revolving around the MENA average, and it was next to Oman's and Bahrain. This level of trade within MENA and

the potential to increase trade in the union could be a motivation for Lebanon to work towards convergence for future membership of the expanded monetary union. Real exchange rate volatility was the highest for Lebanon in all the groupings with the exception of 2000-2007 where it was exceeded by group 1 (SAUDZA) as shown in Table 6. Another important economic feature of Lebanon was that it had the lowest inflation rate in the MENA region. Its inflation differential ranged from 2.18 in 2012-2018 to 2.88 in 2000-2018. The MENA average ranged from 5.98 in 2012-2018 to 9.44 in 2007-2012 while the GCC countries' inflation differential ran into double digits. The country was also characterised by high reserves ranging from 5.13 in 2000-2007 to 7.46 in 2012-2018 compared to the MENA average of 2.77 in 2000-2007 to 3.66 in 2007-2012. Its reserve level was next to the SAUDZA group. The two adversely distinctive economic features of Lebanon in group 4 were the highest negative current account balance and the highest debt service requirement in the MENA region. Its current account balance ranged from -14.58 in 2000-2007 to -25.13 in 2012-2018 compared to the MENA average of -0.76 in 2012-2018 to 6.94 in 2000-2007. The country's debt service requirement was in triple-digit percentages ranging from 141.49% to 168.34% in 2012-2018 and 2000-2007, respectively. These percentages were much higher than the MENA average range of 37.51-52.09 in Table 6. A succinct summary of the economic characteristics of the groups is shown in Table 7.

Table 7. *Summary of Economic Characteristics of Groups*

Variable	SAUDZA	FIVE+1	OMN-BHR	AGADIR	LBN
Inflation (INF)	High	Highest	Average	Low	Lowest
Intraregional trade (RTI)	Low	High	Highest	Low	Average
Real exchange rate volatility (RER)	High	Average	High	Lowest	Highest
Reserve (RES)	Highest	Lowest	Average	Low	High
Current Account Balance (CAB)	Highest+	High+	Low-	Low-	Highest-
Debt (DSR)	Low	Low	Low	Average	Highest

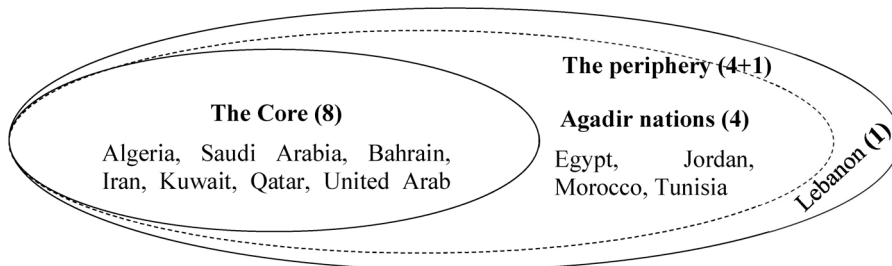
(Source) Author's results.

Based on the above analyses, our results revealed three key economic variables that distinctively separated the GCC and other MENA countries. These included inflation differential, debt service requirement, and current account balance. The results showed that the GCC countries had a high inflation rate compared to the other MENA countries that exhibited low inflation consistently in all the four periods under consideration. It was the opposite of debt service requirements and current account balance. In both variables, the GCC countries outperformed other MENA countries. In all periods under consideration for the SAUDZA, the 5+1 showed a low debt-to-GDP ratio way below the 60% threshold in the GCC convergence criteria. We found the Agadir nations to have a moderately high debt-to-GDP ratio, in most cases slightly above the 60% threshold. The Lebanon debt-to-GDP ratio was exceptionally high and, in some cases,

the ratio was more than twice the 60% threshold, making it exceptionally different from not only the GCC countries but also from the Agadir nations. The results revealed a similar pattern in current account balance where the Saudi Arabia and Algeria (SAUDZA) group exhibited the highest positive current account balance and Lebanon had the highest negative balance most of the time. We also found the exchange rate volatility of the GCC countries to be much higher than the Agadir nations, and exceeded only by Lebanon. Intra-regional trade within the GCC and MENA was low and much lower for the SAUDZA group and the Agadir nations. Oman and Bahrain were the highest trading nations within the GCC and MENA.

Our results provide no evidence to support convergence in the business cycle in the GCC countries or within MENA. There are clear dissimilarities in the business cycle ranging in most cases from high positive to high negative. The lack of business cycle synchronisation finding in our study is consistent with the findings of Laabas and Limam (2002), Arfa (2012), and Alshehry and Simane (2012).

Figure 6. Final grouping of countries



(Source) Author's design from results.

Given the grouping in Table 3, the percentage summary in Table 4 and the summary of Economic characteristics in Table 7 our results suggest two groups as shown in Figure 6: the core and the periphery. The core consisted of the SAUDZA group and the 5+1 group which comprised eight countries: Algeria, Saudi Arabia, Bahrain, Iran, Kuwait, Qatar, United Arab Emirates, and Oman. The periphery consisted of the four Agadir nations Egypt, Jordan, Morocco, and Tunisia in the middle layer and Lebanon in the outer layer. Our results, therefore, suggest that in an expanded GCC monetary union, two countries - Algeria and Iran - were already in convergence with the six GCC countries and were therefore part of the eight core nations. In the periphery, we had the four Agadir nations which despite their lower performance in some economic variables had shown outstanding performance in inflation and real exchange rate volatility in which the core countries had not been able to excel. This indicated the potential for these countries to match with their counterparts in the core in meeting the convergence criteria when given the chance of accession to the expanded monetary union. The second category of the

periphery countries was Lebanon. This country had the lowest inflation in MENA outperforming the GCC countries and the Agadir nations. It also had a healthy reserve ratio. However, its lower performance in debt to GDP ratio, current account balance, and real exchange rate volatility cannot equate its potentiality to join the expanded monetary union to that of the Agadir nations.

Our results provide no evidence in favour of the GCC countries' readiness to form a successful and sustainable monetary union due to the dissimilarities among the countries and high inflation rates. However, the possible expansion of the GCC monetary union to other MENA countries is supported by our results. These findings are similar to earlier studies (Kandil and Trabelsi, 2012; Alshehry and Slimane, 2012; Boughanmi et al., 2016). According to Shotar and Shams (2005), significant economic policy differences in GCC countries could be a potential limit to the benefits derived from the monetary union. It could be argued that the GCC expansion finding in our study could provide access to a larger and more diversified market to boost intraregional trade and increase the benefits of the monetary union. The expanded union leading to the extension of the GCC free trade agreement, tariff removal, and common market to other MENA countries could increase intra-regional trade much higher than the positive gain reported by Boughanmi et al. (2016).

V. Conclusion and Policy Implications

Following the collapse of the Bretton Woods International Monetary System in the early 1970s economic integration and the common currency agenda in the six GCC countries of the Middle East commenced in 1975. A wider acceptance of this initiative led to the signing of the GCC charter in 1981 with subsequent reforms, including the acceptance of the EU convergence criteria in 2005 and the establishment of a common market in 2008. Despite these developments, convergence remained a challenge for the six nations' single currency project. Moreover, studies revealed that intra-regional trade was low due to the dependence on oil by the Gulf states. The year 2010, set as the date for the commencement of the GCC single currency, was missed.

This study investigated the possibility of expanding the GCC monetary union to other MENA countries with a focus on the similarities/dissimilarities of the countries' economic characteristics. It also examined whether the economic characteristics of the countries provided evidence for the readiness of countries for the proposed monetary union. We conducted our study applying cluster analysis on thirteen MENA countries, including the six GCC countries, for the period 2000-2018. The study findings support the expansion of the GCC monetary union to other MENA countries. However, there is no evidence supporting that the countries were ready for the implementation of the proposed monetary union. We found heterogeneity within the GCC

and other MENA countries. In an expanded union, the results revealed two sets of countries, the core and the periphery. The core consisted of Algeria, Saudi Arabia, Bahrain, Iran, Kuwait, Qatar, the United Arab Emirates, and Oman. The periphery comprised the four Agadir nations Egypt, Jordan, Morocco, and Tunisia in the middle layer, and Lebanon in the outer layer (Figure 6). In addition to the low level of intra-regional trade within the region, the study also revealed three key variables that clearly distinguished the GCC countries from the other MENA countries: inflation differential, debt service requirement, and current account balance. The GCC countries were characterised by high inflation whilst the other MENA countries showed much lower inflation rates. In terms of debt service requirement and current account balance the GCC countries performed much better than other MENA countries although heterogeneity within the GCC and other MENA existed. Furthermore, we found no evidence to support the synchronisation of business cycles within GCC and other MENA countries.

The policy implication of these asymmetries, in light of the OCA theory, is that a one-size-fits-all monetary policy for these countries is inappropriate and may have costly consequences due to the loss of flexible policy instruments for individual countries. Also, the credibility of monetary policy is important for a successful and sustainable monetary union. This requires an anchor country, usually, with low inflation. Saudi Arabia, the largest economy, in GCC and MENA with the potential to provide the anchor is among the eight core countries in the high inflation bracket. It is, therefore, imperative for the monetary authority of the GCC Monetary Council in consultation with national central banks to enhance their multilateral surveillance mechanisms, backed by policy harmonisation, to curb inflationary pressure in the GCC countries. Such a policy direction will not only help with inflation convergence but also lower inflation which will lead to a common currency that is credible enough to compete with other currencies on the global stage. Furthermore, policy harmonisation and expansion of the GCC monetary union to the other MENA countries that are also already in GAFTA will enhance the trade-creating capability of the region through a wider and more diversified common market, while harnessing the benefits of a single currency. As Boughanmi et al. (2016) and Abedini and Péridy (2008) already provided evidence on the regional trade-creating effect of GAFTA, it is, therefore, our recommendation that policy-makers in MENA should strengthen the implementation of this agreement in order to boost intra-regional trade in the region.

Our study is not without limitations. It was based on a selected sample of thirteen MENA countries, thereby omitting other major economies in the region due to data availability and other related reasons. We suggest further studies on the possible expansion of the GCC monetary union with a methodology that can control for missing data to capture a much larger sample in the region. Similar to previous studies, inflation was a policy concern in our study. Future studies on the determinants of inflation in GCC and MENA countries could provide vital information that could be of use to policy-makers in the region.

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Appendix

Table A1. *GCC Convergence Criteria*

Criteria	Definition
Inflation rate	Inflation rates among GCC members must not be more than 2% points higher than the weighted average, based on GDP size, of inflation rate in all GCC
Interest rate	the short-term rates must not be more than 2% points higher than the average of the lowest three short term interest rates among the GCC members
Foreign exchange reserve	Each country should hold a sufficient amount of foreign reserves of no less than four months' worth of imports
Annual government deficit	Annual fiscal deficit should not be more than 3% of GDP for central government
Annual government public debt	Annual government debt should not be more than 60% of GDP

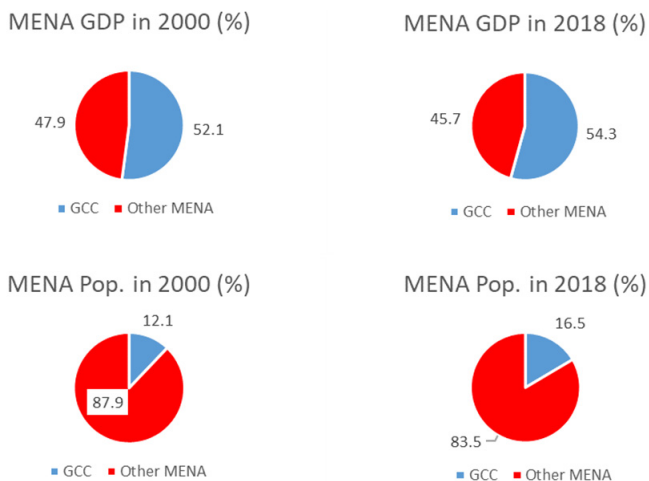
(Source) Alkholifey and Alreshan (2010: pp33-35).

Table A2. *Data Sources*

Data	Source
GDP (Constant 2010 US\$)	World Bank, World Development Indicator (WDI)
Inflation-GDP deflator (annual %)	World Bank, World Development Indicator (WDI)
Nominal exchange rate/official exchange rate (Local currency per unit of US\$)	World Bank, World Development Indicator (WDI)
Total reserves, US\$ (Gold at market price)	IMF, International Financial Statistics (IFS)
Current Account Balance (Percent of GDP)	IMF, World Economic Outlook (WEO)
General Government Gross Debt (Percent of GDP)	IMF, World Economic Outlook (WEO)
Exports and Imports (US\$)	IMF, Direction of Trade Statistics (DOTS)

Databases accessed via UK Data Service: <https://www.ukdataservice.ac.uk/>

Figure A1. MENA GDP and population for 2000 and 2018 (%)



(Source) Author's construction.