The Turkey/Qatar – Egypt/UAE/Saudi Arabia blocs

A Comparative Data Analysis

Panagiotis Podiotis

Department of International and European Studies

University of Macedonia

Thessaloniki, Greece

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Supervisor: Prof. Zarras Konstantinos.

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Introduction

As the fourth paradigm being "data intensive scientific discovery" (Hey, et al., 2009) becomes increasingly more relevant across all academic sectors, traditional perceptions and perspectives are challenged more than ever. The debate gets even more heated and complex in sciences like International Relations which by nature study complex matters. Can data science truly and fully explain the world? For the time being definitely not. Can it lead to more fine-tuned policies? I prefer to answer yes. In that context, this paper makes use of an extensive dataset in an effort to better analyze an IR reality.

This Paper

The present paper can be considered a primary-level Data Analysis project. Data extracted from the CIA World Factbook (hereinafter Factbook) (CIA, 2019, p. About) were summarized and explored. The Factbook[1] has been chosen as the source of data for this project for the following reasons:

1. It provides a big volume of data across a variety of sectors[2].
2. High confidence can be placed on the data since the CIA is one of the most recognized and prestigious US governmental agencies specializing on intelligence.
3. Data are open-source and available for download.
4. The author has worked extensively with the Factbook by having converted it in dataset format (Podiotis, 2020)[3] and by having conducted various ML sub-projects with it.
5. There is a general lack of extensive datasets which cover International Relation topics in such a wholistic manner.

This paper aims to provide with an extensive quantitative comparison of the Turkey/Qatar and Egypt/UAE/Saudi Arabia blocs. Through the analysis of the quantitative data, qualitative characteristics will be inferred. Ultimately, the author hopes to provide with a clear picture of the real-world dynamics and relative sizes of the two conflicting (mostly politically) sides.

[1] The latest available version (2018 version, uploaded on Jan 04, 2019 01:51 PM – downloaded 15/05/2020) of the CIA World Factbook which was downloaded through the official web portal was used. This version of the Factbook uses data from 2015-2018 depending on each country and available sources.
[2] The Factbook covers 12 thematic areas for each entry (country), namely: History, People and Society, Government, Economy, Energy, Geography, Communications, Transportation, Military, Terrorism, Transnational Issues. Each Thematic area (category) consists of numerous fields providing numeric or textual data points.
[3] Pending title and official submission.

Data, Tools, Methodology

The Factbook contains both numerical and textual data. This paper makes use only of the numerical ones. Furthermore, the target countries (Turkey, Qatar, Egypt, United Arab Emirates and Saudi Arabia were extracted from the main CIA World Factbook dataset into a new one. It should be noted that the original dataset has been subjected to missing value imputation (MAPE 0%-15%) with machine learning methods in the context of a different paper (Podiotis, 2020). Columns with missing or only same values were dropped. The resulting dataset consists of 5 rows, each one representing one country, and 227 columns[4] covering various different data points for each country. Data points span 10 thematic areas, namely: Geography, People and Society, Government, Economy, Energy, Communications, Military and Security, Transportation, Terrorism and Transnational Issues. This dataset was then Scaled using minimum-maximum values per column in order to tackle the different measurement units (ex. billion barrels for oil related data versus amount of ports). Countries were then averaged (Turkey with Qatar, UAE with Egypt and Saudi Arabia) in order to create two new entries, each one representing the respective bloc. Geometric Mean was used where applicable[5] in order to reduce the effect of extreme values considering that the countries forming each bloc have important quantitative differences (ex. the populations of Egypt and of the UAE) with almost "outlier-like" characteristics.

All of the above tasks were carried out with the help of Python 3.7 & 3.8 (Python Foundation, 2001) programming language, within the JetBrains PyCharm Community Edition 2019.2.2 x64 (JetBrains, 2000) Integrated Development Environment. Libraries used were sklearn (scikit-learn developers, 2020), pandas (Wes McKinney and the Pandas Development Team, 2020), scipy (Eric, et al., 2001), matplotlib (Hunter, 2007) and numpy (Oliphant, 2006). Microsoft Excel used complimentary.

Political Background

The Turkey-Qatar bilateral (bloc1) relation is no secret. It has been ongoing for several decades with a sharp deepening over the past few years. In that context in 2018, *"numerous agreements, protocols and memoranda of understanding were signed, which further strengthen the cooperation between Turkey and Qatar in various fields."* (Turkish Ministry of Foreign Affairs, 2020). Moreover, Turkey maintains its largest overseas military base in Qatar (AL JAZEERA NEWS, 2017) which is often used for the projection of Turkish influence in the region. The Muslim Brotherhood is central in this relationship and one may argue that it is the force which leads to the alignment of interests between the two parties. Qatar is the only gulf monarchy which supports the Muslim Brotherhood, one of the greatest fears of the other Sunni monarchies since it proclaims Islamic democracy in the Middle East (Foizee, 2017). Turkey views the Muslim Brotherhood positively and maintains a strong cooperation with the movement. This bilateral is multi-vector spanning over topics such as the Syrian civil war and the Libyan matter among other.

On the other hand, one finds the Saudi Arabia – United Arab Emirates – Egypt trilateral (bloc2). One of the most important, if not the most import, element of conflict between the two blocs is the Muslim Brotherhood. Both Saudi Arabia and the UAE view the overturn of their regimes as inevitable if the Muslim Brotherhood dominates the region. The internal order of Egypt has been rocked multiple times by the Muslim Brotherhood for almost a century. In 2013 Egypt designated the Muslim Brotherhood as a terrorist group (McCrummen, 2013). The different stance of Muslim Brotherhood is not the only thing which grows the schism between the two blocks. Conflicting economic interests in parallel with respective policies as in the case of Libya (Hammond & Kebhaj, 2017) have led to further entrenchment of both sides also boosted by the Saudi-led blockade of Qatar in 2017.

Summarizing, we can safely argue that the main dividing line between the two blocs is the Muslim Brotherhood. The first bloc views the brotherhood as an opportunity to increase its influence while for the second bloc it is a threat to their political order. Lastly, conflicting interests and policies in regard to the Syrian civil war, Libya and energy further zoom on the differences of both blocs.

[4] See Appendix A: Data and Nomenclature.

[5] In columns with non-zero values and number of observations >2.

Comparative Data Exploration

1. Homogeneity of bloc members

The cumulative standard deviation of each bloc was calculated by adding the standard deviation of all 227 columns of data. Data were scaled on a 0-1 range.

Table 1. Cumulative Standard Deviations of Blocks

Blocs	*Cumulative Standard Deviation*
1. Turkey/Qatar	96.98
2. Saudi Arabia/UAE/Egypt	87.00

Interestingly, despite the fact the bloc2 consists of three heterogenous states it presents a smaller cumulative standard deviation thus a higher homogeneity in terms of the 227 factors examined. Opposite, bloc1 is less homogenous by almost 10%. The biggest discrepancies between the states of bloc 1 refer to a wide array of sectors including energy (gas production, LNG terminal, pipelines, oil imports/exports), geography (irrigated land, forest land), transportation (highways, ports, airways), climate, government etc. At the same time, fewer and smaller differences in bloc 2 are associated with indexes of lesser importance (ex. diseases, naturalization age limits etc.).

2. Differences

The biggest differences between the two blocks are provided below:

Table 2. Greatest Differences

	Difference (0=min 1=max)
military-and-security-military-branches amount	0,69
geography-maritime-claims exclusive economic zone	0,66
geography-maritime-claims continental shelf	0,66
geography-climate_arid	0,66
energy-electricity-access population without electricity	0,65
economy-household-income-or-consumption-by-percentage-share lowest 10%	0,62
transportation-pipelines oil/gas/water	0,60
economy-household-income-or-consumption-by-percentage-share highest 10%	0,59
economy-gdp-composition-by-end-use investment in fixed capital	0,56
transportation-pipelines oil	0,56
transportation-pipelines liquid petroleum gas	0,55
transportation-ports-and-terminals container port(s) (teus)	0,54
energy-electricity-access electrification - urban areas	0,53
transportation-ports-and-terminals lng terminal(s) (import)	0,5
transportation-merchant-marine by type container ship	0,5
geography-climate_temperate	0,5
government-citizenship residency requirement for naturalization_20	0,5
government-government-type_parliamentary republic	0,5
government-legal-system_civil	0,5
government-citizenship dual citizenship recognized_yes	0,5

The countries of bloc 2 (UAE/Saudi Arabia/Egypt) have considerably more military branches. This may be partially attributed to the form and structure of government and the relatively young armed forces. Egypt

has always been a traditional military power in the area with extensive armed forces while the UAE and Saudi Arabia are pursuing ambitious weapons and militarization projects aiming to create strong and operational armed forces. On the other hand, both Qatar and Turkey have settled on their armies which have proven to be more effective so far.

Bloc 1 faces challenges regarding its exclusive economic zone and continental shelf and continental shelf. In the case of Turkey with Greece in the Aegean and Qatar is obstructed by the tight geography of the Persian Gulf.

Interestingly, way more people in bloc 2 (UAE/Saudi Arabia/Egypt) seem to live without electricity, probably mostly foreign low paid workers and desert tribes.

The household income or consumption reveals important things about the structure of concerned societies. The countries of block 2 seem to have stronger and more extensive middle classes while countries of bloc 1 have both strong small and high classes but weaker middle classes.

Turkey and Qatar invest almost 4 times more on fixed capital while bloc 2 members invest more on inventories.

Block 2 maintains a very extensive network of oil and LPG pipelines and ports while bloc 2 has way more LNG ports and terminals revealing another dichotomy between the two blocs, the oil versus gas one.

3. Similarities

The biggest similarities between the two blocks are provided below:

Table 3. Greatest Similarities

	Similarity (0=max 1=min)
terrorism-terrorist-groups-home-based	0,00
people-and-society-age-structure 15-24 years	0,00
economy-gdp-composition-by-end-use government consumption	0,00
transportation-merchant-marine by type other	0,01
people-and-society-school-life-expectancy-primary-to-tertiary-education total	0,01
communications-telephones-mobile-cellular total subscriptions	0,01
people-and-society-birth-rate	0,01
economy-budget revenues	0,01
people-and-society-infant-mortality-rate female	0,02
geography-land-use agricultural land	0,02
economy-exchange-rates hist	0,02
people-and-society-sanitation-facility-access urban	0,03
people-and-society-school-life-expectancy-primary-to-tertiary-education male	0,03
energy-electricity-installed-generating-capacity	0,04
people-and-society-infant-mortality-rate total	0,04
communications-telephones-mobile-cellular subscriptions per 100 inhabitants	0,04
people-and-society-infant-mortality-rate male	0,04
geography-land-use other	0,05
transportation-airports-with-paved-runways total	0,05
economy-gdp-composition-by-sector-of-origin agriculture	0,05

Most similarities are related to economy and society. Both blocs have similar amounts of home-based terrorist groups, and government expenditures (in terms of GDP). Education, mortality rates and cell phone

usage are also similar. Overall, similarities are less specific compared to the differences. The societies of both blocs are very similar.

Furthermore, the visual inspection of the data distributions of both blocs along with the Kolmogorov-Smirnov test (performed between every bloc and a list of possible distributions in order to determine bets fit distribution) found that both blocks have different (non-normal) distributions, thus the Mann Whitney u test (non-parametric) is more appropriate in comparing both blocs.

Table 4. Overall Statistical Difference Testing

	Values
statistic	23297
p	<0.05

Apparently, blocs 1 & 2 are statistically different. This means that there are important statistical differences between the 227 data points describing each bloc (scaled to 0-1 range). These data cover a very extended array of sectors and explain the political, social, economic realities of each bloc with high precision.

4. Clustering

Mean Shift clustering (Derpanis, 2005) was conducted on the five countries using all 227 columns as feature data. This approach was selected for the fact that it is proven, robust and bias-free[6]. After the clusters were found, descriptive statistics (mean values, percentiles and standard deviations) for each cluster were generated and then exported for visual inspection. Findings are presented below:

Table 5. Country clusters and comments

Cluster	Countries	Comments
1.	Turkey, Egypt	Both countries are characterized by the Factbook as presidential republics, one of the strongest differentiating features against the other countries which are monarchies. GDPs are also characterized by high imports of goods and services. Large populations, high birth rates and relatively high infant mortality rates play an important role in this cluster. Moreover, comparatively low production and exports of energy natural resources prove to be crucial differentiating factors. Also have comparatively higher energy diversification (in terms of electricity production sources).
2.	Saudi Arabia	Has a comparatively huge reserve of foreign exchange and gold. Many airports and ports, and interestingly the most foreign based terrorist groups. Very high employment, stock of money, energy reserves and production. Overall, this cluster (Saudi Arabia alone) is mostly defined by high economic and energy related factors and low: Energy imports, inflation, GDP growth, few ethnic groups, home based terrorist groups and pipelines among other.
3.	Qatar, UAE	Characterized mostly by social factors such as high 25-54 years age structure, high female and overall literacy, life expectancy at birth, mother's mean age at birth etc. Moreover, energy-related factors are also high. On the other side, both countries have relatively smaller infrastructure (highways and airports), largely due to their size, but also smaller participation in international organizations. As cluster 2, lack of electricity production source diversity.

[6] Mean Shift is unsupervised, no number of clusters is provided by the author, the algorithm provides with the number of clusters found thus bias is eliminated.

Conclusion

It is once again proved that interest is the dominant factor in alliance forging. The policy in relation to the Muslim Brotherhood overcomes financial and social similarities. Moreover, considering that countries of blocs 1 and 2 tend to cooperate with states with similar forms of government may also suggest that countries with same government types are more eager to cooperate but further analysis is suggested on the matter. The findings of this paper also suggest that political factors remain strong compared to economic ones due to the fact that even though Qatar has more intense financial transactions with neighboring Gulf states it chooses to side with Turkey mostly because of political matters. Of course, one may argue that the political choices of a country are subject to economic relations as in the case of Egypt which is financially sustained by Saudi Arabia but this is not always the case. Considering the heterogenous nature of blocs, the types of regimes, the introduction of Islamic rhetoric and doctrine into politics in a volatile region leads to the conclusion that both Tukey/Qatar and UAE/Saudi Arabia/Egypt blocs are short-term tools and not long-term agents of change. At the same time, both blocs compromise of two components, the first is energy rich and militarily weak[7] countries like Saudi Arabia and UAE and more moderate in both Qatar and the economically weak but militarily capable one, being Turkey and Egypt. Both strong armies and economy (mostly for financing others as in the case of Egypt - Saudi Arabia) are vital elements of regional politics.

Ultimately, the author hopes to have provided with an inclusive yet easily interpretable outline of the two blocs dominating recent regional events and hopes to fuel future research moving along the axis of computational international relations (Unver, 2018) and the fourth paradigm in general.

Appendix A: Data and Nomenclature

The dataset used comprises of the following 227 columns (data points) for each and every country studied:

Nomenclature Guide: Every column name begins with one of the following sections (in the respective order): 1) amount/sum/num/enc stating the data type contained and how it was generated (in the case of amount, sum, enc). All of these columns contain numerical data except “enc” columns which contain categorical data encoded into numerical (using one-hot encoding). Columns with “amount” express the amount of the respective element (ex. column amount transportation-ports-and-terminals major seaport(s) describes the number of ports) while columns with “sum” describe quantities (ex. sum transportation-ports-and-terminals container port(s) (teus) which describes the volume of cargo). 2) (imp): xx.xx. Not included in all columns. This mean that the original data had missing values which were calculated-imputed with the specified Mean Absolute Percentage Error. 3) The Data category (ex. geography) followed by field and subfield divided by “-“. 4) “hist” appears at the end of some column titles denoting that data of various years were available and the latest were selected.
Columns: amount terrorism-terrorist-groups-home-based, amount terrorism-terrorist-groups-foreign-based, amount transportation-ports-and-terminals lng terminal(s) (import), amount people-and-society-major-infectious-diseases water contact diseases, amount people-and-society-ethnic-groups, amount geography-natural-resources, amount transportation-ports-and-terminals lng terminal(s) (export), amount government-international-organization-participation, amount transportation-ports-and-terminals oil terminal(s), amount transportation-ports-and-terminals major seaport(s), amount geography-environment-international-agreements party to, amount transportation-ports-and-terminals container port(s) (teus), sum transportation-ports-and-terminals container port(s) (teus), sum transportation-pipelines condensate, sum transportation-pipelines gas, sum transportation-pipelines liquid petroleum gas, sum transportation-pipelines oil, sum transportation-pipelines oil/gas/water, sum transportation-pipelines refined products, amount geography-land-boundaries-border-countries-overall, sum transportation-merchant-marine by type bulk carrier, sum transportation-merchant-marine by type container ship, sum transportation-merchant-marine by type general cargo, sum transportation-merchant-marine by type oil tanker, sum transportation-merchant-

[7] In terms of operational efficiency and proved results.

marine by type other, amount military-and-security-military-branches, num geography-area total, num geography-coastline, num geography-maritime-claims territorial sea, num geography-maritime-claims exclusive economic zone, num geography-land-use agricultural land, num geography-land-use arable land, num geography-land-use permanent crops, num geography-land-use permanent pasture, num geography-land-use forest, num geography-land-use other, num geography-irrigated-land, num people-and-society-population, num people-and-society-dependency-ratios potential support ratio, num people-and-society-death-rate, num people-and-society-urbanization urban population, num people-and-society-urbanization rate of urbanization, num people-and-society-infant-mortality-rate total, num people-and-society-infant-mortality-rate male, num people-and-society-infant-mortality-rate female, num people-and-society-drinking-water-source urban, num people-and-society-drinking-water-source rural, num people-and-society-drinking-water-source total, num people-and-society-sanitation-facility-access urban, num people-and-society-sanitation-facility-access rural, num people-and-society-sanitation-facility-access total, num people-and-society-unemployment-youth-ages-15-24 total, num people-and-society-unemployment-youth-ages-15-24 male, num people-and-society-unemployment-youth-ages-15-24 female, num economy-gdp-purchasing-power-parity hist, num economy-gdp-official-exchange-rate, num economy-gdp-per-capita-ppp hist, num economy-gross-national-saving hist, num economy-gdp-composition-by-end-use household consumption, num economy-gdp-composition-by-end-use government consumption, num economy-gdp-composition-by-end-use investment in fixed capital, num economy-gdp-composition-by-end-use exports of goods and services, num economy-gdp-composition-by-end-use imports of goods and services, num economy-gdp-composition-by-sector-of-origin agriculture, num economy-gdp-composition-by-sector-of-origin industry, num economy-gdp-composition-by-sector-of-origin services, num economy-labor-force, num economy-unemployment-rate hist, num economy-budget revenues, num economy-budget expenditures, num economy-taxes-and-other-revenues, num economy-budget-surplus-or-deficit, num economy-public-debt hist, num economy-inflation-rate-consumer-prices hist, num economy-commercial-bank-prime-lending-rate hist, num economy-stock-of-narrow-money hist, num economy-stock-of-broad-money hist, num economy-stock-of-domestic-credit hist, num economy-current-account-balance hist, num economy-exports hist, num economy-imports hist, num economy-reserves-of-foreign-exchange-and-gold hist, num economy-debt-external hist, num economy-exchange-rates hist, num energy-electricity-access population without electricity, num energy-electricity-access electrification - total population, num energy-electricity-production, num energy-electricity-consumption, num energy-electricity-exports, num energy-electricity-imports, num energy-electricity-installed-generating-capacity, num energy-electricity-from-fossil-fuels, num energy-electricity-from-hydroelectric-plants, num energy-electricity-from-other-renewable-sources, num energy-crude-oil-production, num energy-crude-oil-exports, num energy-crude-oil-imports, num energy-crude-oil-proved-reserves, num energy-refined-petroleum-products-production, num energy-refined-petroleum-products-consumption, num energy-refined-petroleum-products-exports, num energy-refined-petroleum-products-imports, num energy-natural-gas-production, num energy-natural-gas-consumption, num energy-natural-gas-exports, num energy-natural-gas-imports, num energy-natural-gas-proved-reserves, num energy-carbon-dioxide-emissions-from-consumption-of-energy, num communications-telephones-fixed-lines total subscriptions, num communications-telephones-fixed-lines subscriptions per 100 inhabitants, num communications-telephones-mobile-cellular total subscriptions, num communications-telephones-mobile-cellular subscriptions per 100 inhabitants, num communications-internet-users total, num communications-internet-users percent of population, num transportation-national-air-transport-system number of registered air carriers, num transportation-national-air-transport-system inventory of registered aircraft operated by air carriers, num transportation-national-air-transport-system annual passenger traffic on registered air carriers, num transportation-national-air-transport-system annual freight traffic on registered air carriers, num transportation-airports, num transportation-airports-with-paved-runways total, num transportation-airports-with-paved-runways 2,438 to 3,047 m, num geography-maritime-claims contiguous zone, num geography-maritime-claims continental shelf, num people-and-society-health-expenditures, num people-and-society-hospital-bed-density, num people-and-society-obesity-adult-prevalence-rate, num communications-broadband-fixed-subscriptions total, num communications-broadband-fixed-subscriptions subscriptions per 100 inhabitants, num transportation-airports-with-paved-runways under 914 m, num transportation-airports-with-unpaved-runways total, num transportation-airports-with-unpaved-runways under 914 m, num transportation-roadways total, num transportation-roadways paved, num transportation-roadways unpaved, num transportation-merchant-marine total, num geography-land-boundaries total, num geography-elevation mean elevation, num people-and-society-maternal-mortality-rate, num people-and-society-physicians-density, num economy-market-value-of-publicly-traded-shares hist, num economy-stock-of-direct-foreign-investment-at-home hist, num economy-stock-of-direct-foreign-investment-abroad hist, num transportation-airports-with-paved-runways over 3,047 m, num transportation-airports-with-paved-runways 1,524 to 2,437 m, num transportation-airports-with-paved-runways 914 to 1,523 m, num transportation-airports-with-unpaved-runways over 3,047 m, num transportation-airports-with-unpaved-runways 2,438 to 3,047 m, num transportation-airports-with-unpaved-runways

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