Granger Causality and the Factors underlying the Role of Younger Generations in Economic, Social and Political Changes in Arab Countries

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Abstract

This paper examines the causality between social, technological, and political variables with macroeconomic variables in 19 Arab countries: Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, United Arab Emirates, Palestine, and Yemen. It uses the Granger causality test to determine causal relationships using data between years 1962 and 2015. Empirical findings reveal unique causality profile for each of the Arab countries. Results also suggest the most important variables in the determination of the economic growth in Arab economies, separately. Variables related to the demography of the new generation, ICTs and use of social media appear to be playing important causal roles, in the sense of Granger tests. This implies that economic, future social and political decisions need to account for these findings and that policies need to be geared towards for further inclusion of the aspirations and expectations of the youth.

JEL: J62; I25.

Keywords: Granger Causality, Arab Countries, Macroeconomic Variables, Social Variables, Technological Variables, Political Variables.

Introduction

This research is a follow-up to the one focusing on the analytical description of the main variables that are likely to characterize the current era that is surrounding the newest generations (Driouchi & Harkat, 2017; Harkat & driouchi, 2016a and 2016b). It attempts to reveal the links and relationships between economic, social and political variables that are likely to lead to understanding different types of changes in the Arab economies. This second step in this type of research keeps assuming that the youngest segments of the population in Arab economies do have specific characteristics relative to the oldest generations and that these features are interconnected. It aims at determining the directions and amplitudes of these interrelations to better assess the arguments for higher inclusion of the youth in the policy making in these countries.

The present paper is composed of a literature review, a part focusing on method, data and hypotheses. This is followed by the presentation and discussion of the empirical results related to using Granger causality.

I. Literature Review

Rhee (2015), Devlin, Hansen (2001), and Alhowaish (2014) assess the causality between economic input, population, and health spending to evaluate the health care system in different economies. The contribution of Dănăcică, Belaşcu, and Ilie (2010) relates to the causal relationship between higher education and economic growth. Findings reveal in the case of Romania that the significant relationship between these variables is initially caused by the GDP growth. Similar studies were conducted for some other countries such as Zimbabwe, Greece (Zivengwa, 2012; Pegkas, 2014).

With regard to other social variables, Feridun (2005), Mwangi, Mwenda (2015), Ma (2014), Aurangzeb, Asif (2013),Boubtane, Coulibaly, and Rault (2013) evaluate the Granger causality of migration variables and unemployment with economic growth. Empirical findings show the unidirectional causality of the immigration on the GDP per capita variable in the case of Norway.

Concerning Arab economies, recent studies assess the link between demographic and social indicator with macroeconomic variables. In the case of the United Arab Emirates, the economic performance has significant and positive

relationships with the unemployment and inflation rate and a significant relationship with the population growth rate (Ossman, 2016). For Egypt and Jordan, findings reveal the negative relationship between the GDP growth and unemployment (Elshamy, 2013; Kreishan, 2010). In Algeria, Morocco, Tunisia, United Arab Emirates, Kuwait and Bahrain, previous research shows a positive relationship between the unemployment and education (Driouchi, 2014a; Driouchi, 2014b). The education within Arab economies are linked to social variables such as school dropout rate, and are also linked to macroeconomic variable including GDP growth, GDP per capita, and unemployment (Harkat, Driouchi, Achehboune, 2016a). Other studies that relate to the link between political stability and economic growth are made (Khandelwal, Roitman, 2013).

Recent research on Arab economies concerns the causalities related to countries economic growth. Pirayesh, Forouzandeh, & Hossein (2016) indicate the causal relationship between economic growth, non-oil exports, and import demands in the case of Jordan. Other research shows the link between the financial markets in Arab economies and their economic growth (Borlea, Mare, Achim, & Puscas, 2016; Pradhan, Arvin, Bahmani, & Bennett, 2016). Draghma, Iriqat (2016) use the Granger causality test to evaluate economic variables such as unemployment and inflation rate in the case of Jordan, Palestine and Israel. Hodrab, Maitah, and Luboš (2016) indicate that the GDP per capita results in the increase of the information density in the Arab countries.

Regarding the causality between macroeconomic variables and political variables, recent research uses the Granger causality test in order to show that the unemployment in Arab countries causes political instability (Harkat, Driouchi, Achehboune, 2016b).

II. Method and Data

The method used in this paper is fully based on Granger causality. The Granger causality test enables prediction the causality between the variables in a sense that if x causes y, if x is able to increase the accurateness of the prediction and forecast of y. The two equations for testing for this latter relationship are given as:

$$X_t = \alpha + \sum_{i=1}^{m} \beta_i X_{t-1} + \sum_{j=1}^{n} \tau_j Y_{t-1} + \mu_t$$

$$Y_t = \theta + \sum_{i=1}^{p} \phi_i Y_{t-1} + \sum_{j=1}^{q} \psi_j X_{t-1} + \eta_t$$

The unidirectional Granger-causality from X to Y means that the X variable increases the prediction of Y but not vice versa and is presented as:

$$\sum_{j=1}^{n} \tau_j \neq 0, \text{ and } \sum_{j=1}^{q} \psi_j = 0$$

The unidirectional Granger-causality from Y to X means that the Y variable increases the prediction of X but not vice versa and is presented as:

$$\sum_{j=1}^{n} \tau_j = 0, \text{ and } \sum_{j=1}^{q} \psi_j \neq 0$$

The bidirectional Granger-causality between Y to X means that both the Y variable increases the prediction of X and vice versa and is presented as:

$$\sum_{j=1}^{n} \tau_j \neq 0, \text{ and } \sum_{j=1}^{q} \psi_j \neq 0$$

The independence between Y to X means that there is no Granger causality between the two variables and is presented as:

$$\sum_{j=1}^{n} \tau_j = 0, \text{ and } \sum_{j=1}^{q} \psi_j = 0$$

The Granger causality results are summarized per country, while each table is presented in a node graph that indicates the causality at a significance level of 5% with an arrow, and indicates the causality at 10% significance level with a dashed arrow.

The data selected consist of four main categories. The first category relates to the social variables that are: population (Po), net migration (NM), and education

(Edu). The second category is simply the technological one that is represented by the Internet access (IA) variable. The third category concerns political variables that are: political stability and no violence (PS), rule of law (ROL), government effectiveness (GE), regulatory quality (RQ), and control of corruption (CoC). The final category relates to macroeconomic variables that are: GDP growth (GDPG), unemployment of the age between 15 and 24 (Un), external public debt stocks (EPDS), gross domestic savings (GDS), and the industry value added (IVA). The data frame of the data is between the years 1962 and 2015.

With regard to the political variables, each is interpreted differently. The political stability and absence of violence measures the likelihood of a government destabilization by violent means including unconstitutional means and terrorism. For the government effectiveness, it is a measure that gives inducements of the mutual relationship between public and civil services besides political pressure. The regulatory quality measures the government support to the private sector. Concerning the control of corruption, it measures the power exerted by the public sector on the private one. Finally, the rule of law measures the extent at which the law governs the economy.

As to test for the causality between social variables and economic variables, between the technological variable and economic variables, and between political variables and economic variables, the Granger causality test is used in order to test for the hypotheses summarized below.

Hypotheses of the causality between each two variables to be tested under the Granger causality test

Population	H_0: GDP Growth does not Granger cause Population H_A: Population does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Population H_A: Population does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Population H_A: Population does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Population H_A: Population does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Population

	H_A: Population does not Granger cause Industry Value Added (US$)
Net migration	H_0: GDP Growth does not Granger cause Net Migration H_A: Net Migration does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Net Migration H_A: Net Migration does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Net Migration H_A: Net Migration does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Net Migration H_A: Net Migration does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Net Migration H_A: Net Migration does not Granger cause Industry Value Added (US$)
Education	H_0: GDP Growth does not Granger cause Education H_A: Education does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Education H_A: Education does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Education H_A: Education does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Education H_A: Education does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Education H_A: Education does not Granger cause Industry Value Added (US$)
Internet Access	H_0: GDP Growth does not Granger cause Internet Access H_A: Internet Access does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Internet Access H_A: Internet Access does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Internet Access H_A: Internet Access does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Internet Access H_A: Internet Access does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Internet Access H_A: Internet Access does not Granger cause Industry Value Added (US$)
Rule of Law	H_0: GDP Growth does not Granger cause Rule of Law H_A: Rule of Law does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Rule of Law H_A: Rule of Law does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Rule of Law

	H_A: Rule of Law does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Rule of Law H_A: Rule of Law does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Rule of Law H_A: Rule of Law does not Granger cause Industry Value Added (US$)
Government Effectiveness	H_0: GDP Growth does not Granger cause Government Effectiveness H_A: Government Effectiveness does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Government Effectiveness H_A: Government Effectiveness does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Government Effectiveness H_A: Government Effectiveness does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Government Effectiveness H_A: Government Effectiveness does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Government Effectiveness H_A: Government Effectiveness does not Granger cause Industry Value Added (US$)
Regulatory Quality	H_0: GDP Growth does not Granger cause Regulatory Quality H_A: Regulatory Quality does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Regulatory Quality H_A: Regulatory Quality does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Regulatory Quality H_A: Regulatory Quality does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Regulatory Quality H_A: Regulatory Quality does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Regulatory Quality H_A: Regulatory Quality does not Granger cause Industry Value Added (US$)
Control of Corruption	H_0: GDP Growth does not Granger cause Control of Corruption H_A: Control of Corruption does not Granger cause GDP Growth
	H_0: Unemployment (15-24) does not Granger cause Control of Corruption H_A: Control of Corruption does not Granger cause Unemployment (15-24)
	H_0: External Public Debt Stocks (Long-Term) does not Granger cause Control of Corruption

	H_A: Control of Corruption does not Granger cause External Public Debt Stocks (Long-Term)
	H_0: Gross Domestic Savings (%GDP) does not Granger cause Control of Corruption H_A: Control of Corruption does not Granger cause Gross Domestic Savings (%GDP)
	H_0: Industry Value Added (US$) does not Granger cause Control of Corruption H_A: Control of Corruption does not Granger cause Industry Value Added (US$)

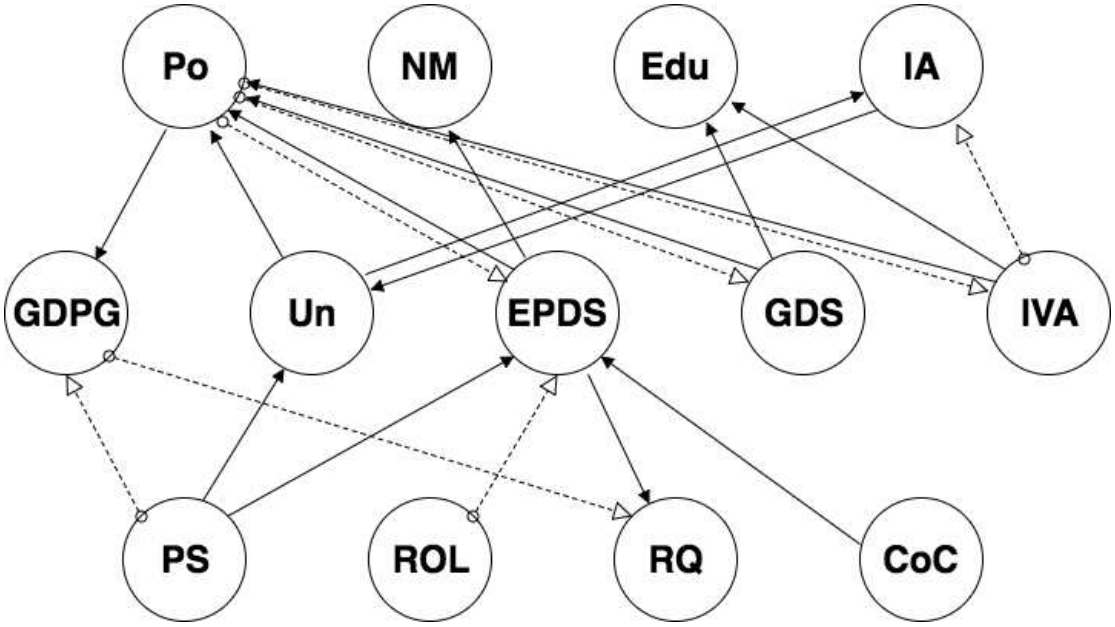
III. Results of Granger Causality tests

These results are introduced respectively for each Arab country. In the case of Algeria (Figure 1), the population of the youngest segment causes the GDP growth at a significance level of 5%, and at a level of significance of 10%, it also causes the external public debt stocks, the gross domestic savings and the industry value added. In addition to that, economic variables that cause the population growth at a significance level of 5% are unemployment, the external public debt stocks, the gross domestic savings, and the industry value added. With regard to the net migration, it is only caused by the external public debt stocks while the education is caused by both the gross domestic savings and the industry value added.

Concerning the technological variable, the Internet access causes the unemployment and the gross domestic savings while it is caused by both the unemployment and the industry value added.

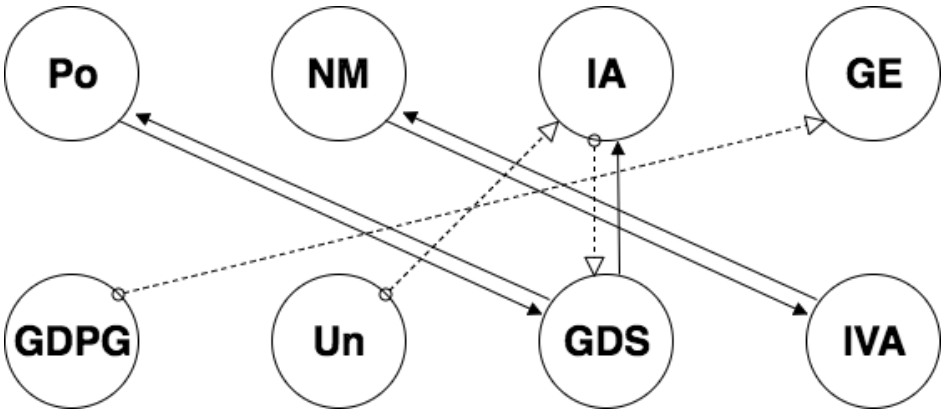
For the political variables, the political stability and no violence causes both the GDP growth, the unemployment, and the external public debt stocks while the rule of law and the control of corruption cause only the external public debt stocks. This latter economic variable, in addition to the GDP growth cause the regulatory quality in Algeria.

Figure 1: Causality results between economic variables and social, technological, and political variables of Algeria



Regarding the social variables of Bahrain (Figure 2), the population has a mutual causality with the gross domestic savings while the net migration has a mutual causality with the industry value added. For the technological variable, the Internet access is caused by the unemployment at a significance level of 10%, and the gross domestic savings at a significance level of 5%, and at a 10% significance level, it causes the gross domestic savings. Finally, the government effectiveness is caused by the GDP growth.

Figure 2: Causality results between economic variables and social, technological, and political variables of Bahrain



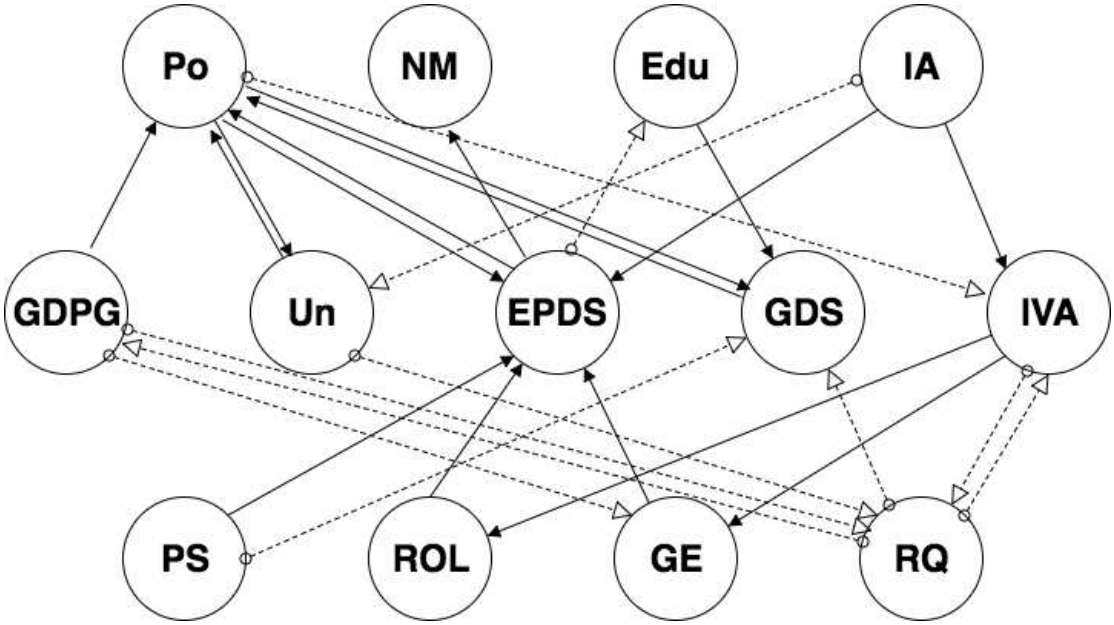
In Egypt (Figure 3), the GDP growth causes the population, the regulatory quality, and the government effectiveness and is it only caused at a 10%

confidence interval by the regulatory authority. Concerning the unemployment it has a mutual causality with the population, causes the regulatory quality and is caused by the Internet access.

The external public debt stocks is caused by the population, the Internet access, the political stability, the rule of law, and the government effectiveness, but causes the population and the net migration at 5% significance level, and the education at a 10% significance level.

For the gross domestic savings variable, it has a mutual causality with the population and is caused also by the education, the political stability, and the regularity quality. Finally, the industry value added, it causes the rule of law and the government effectiveness, it is caused by the Internet access and the population, and has a mutual causality with the regulatory quality.

Figure 3: Causality results between economic variables and social, technological, and political variables of Egypt

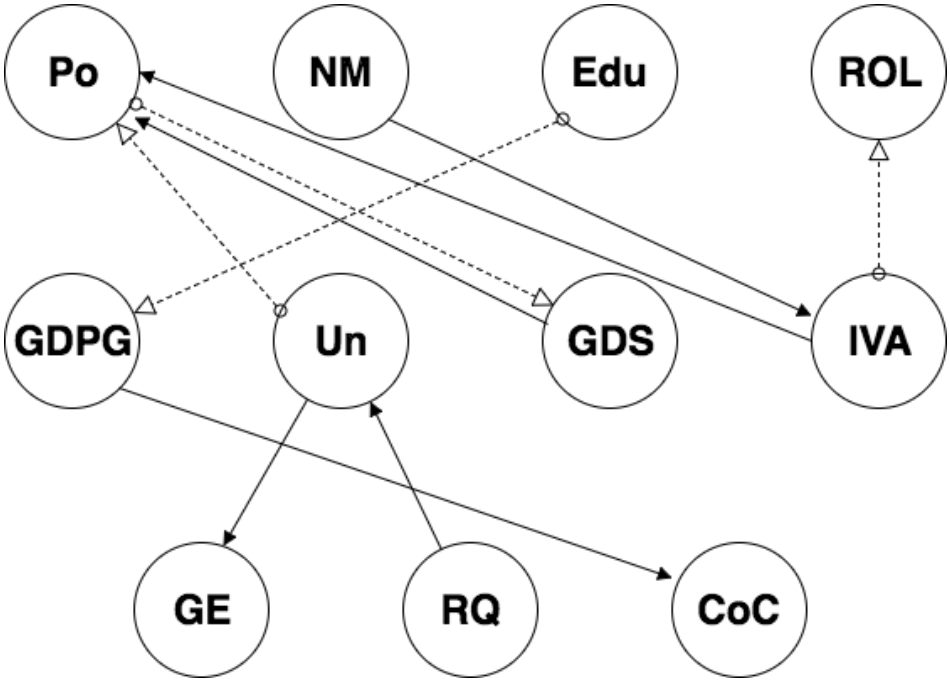


With regard to the social variables in Iraq (Figure 4), the population is caused by the unemployment, the industry value added, and the gross domestic savings, while it causes only this latter variable. The net migration causes the industry value added and the education causes the GDP growth. The technological

variable does not have any causality relationship with any of the economic variables.

For the political variables that has a significant causality with the economic ones, the rule of law is caused by the industry value added, the government effectiveness is caused by the unemployment, and the control of corruption is caused by the GDP growth. Finally, the regulatory quality causes the unemployment.

Figure 4: Causality results between economic variables and social, technological, and political variables of Iraq

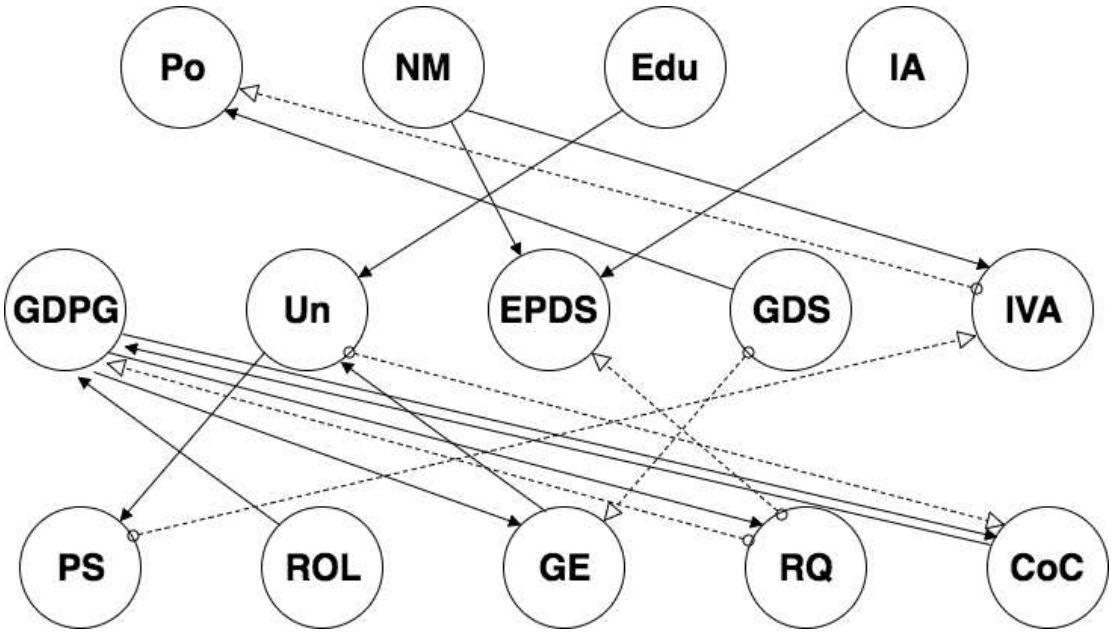


In Jordan (Figure 5), the GDP growth has a mutual causality with both the control of corruption and the regulatory quality, causes the government effectiveness, and is caused by the rule of law variable. For the unemployment variable, it is caused by both the government effectiveness and the education while it causes the political stability and absence of violence and the control of corruption at 5% and 10% significance levels, respectively.

For the external public debt stocks variable, it is caused by the net migration and the Internet access at 5% and the regulatory quality at 10% while the gross domestic savings causes both the population and the government

effectiveness. Finally, the industry value added causes the population and is caused by the net migration and the political stability.

Figure 5: Causality results between economic variables and social, technological, and political variables of Jordan



Regarding Kuwait (Figure 6), the Internet access causes the unemployment. For the political variables, at a significance level of 10%, the rule of law is caused by the GDP growth, and the control of corruption is caused by the unemployment while at a 5% significance level, the regularity quality is caused by the gross domestic savings.

Figure 6: Causality results between economic variables and social, technological, and political variables of Kuwait

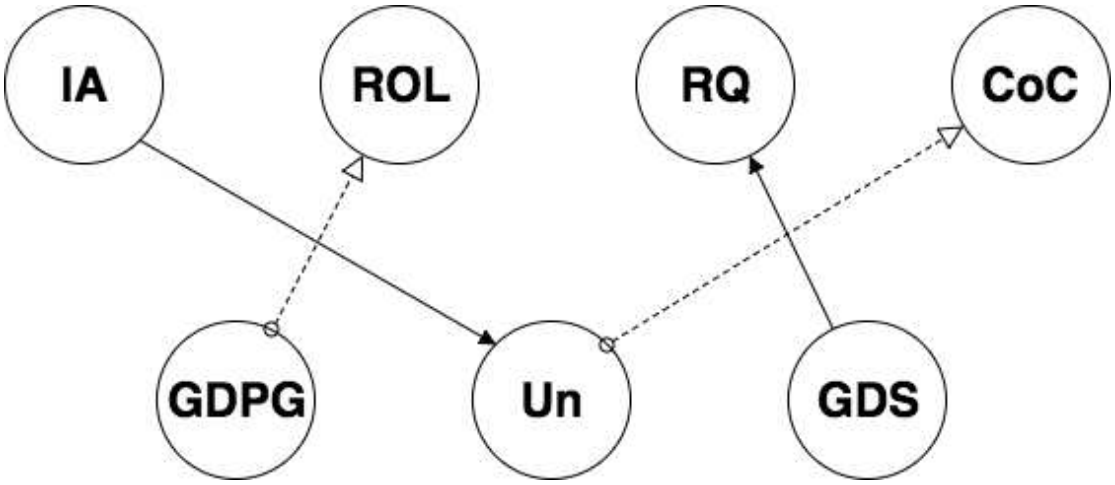
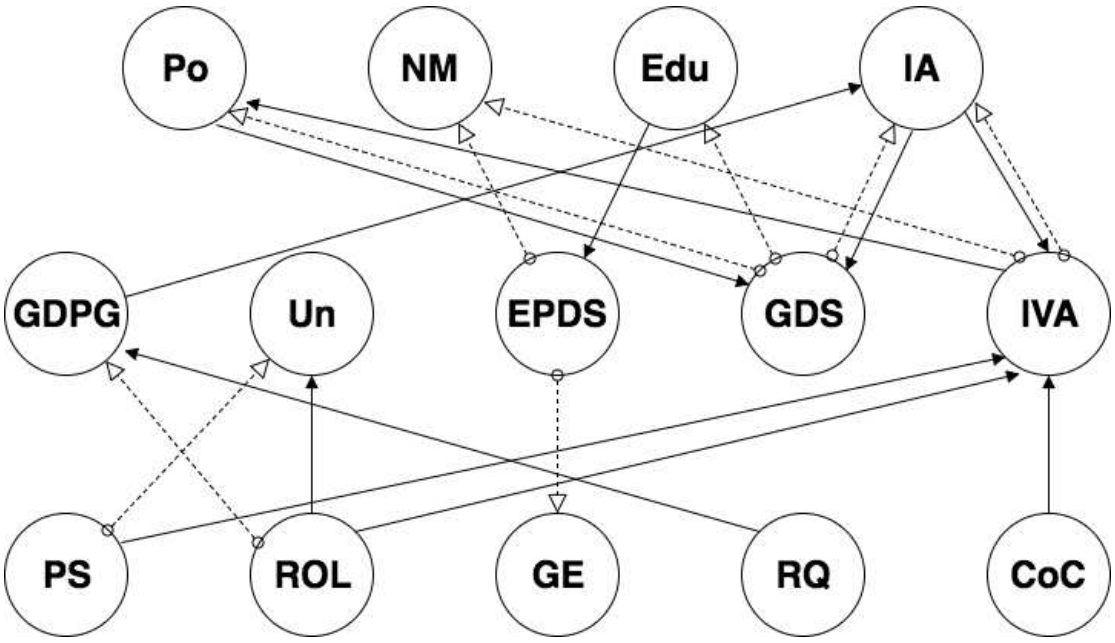


Figure 7 indicates the causality results for the case of Lebanon. The population is caused by both the industry value added and the gross domestic savings while it causes only this latter variable. For the net migration, it is caused at a 10% significance level by the external public debt stocks and the industry value added while the education variable causes the external public debt stocks and is caused by the gross domestic savings.

With regard to the technological variable, the Internet access has a mutual causality with both the industry value added and the gross domestic savings and also is caused by the GDP growth.

The causality between the economic and the political variables are also significant. The political stability causes both the unemployment and the industry value added at 5% and 10% significance levels, the rule of law causes the GDP growth at 10% and the unemployment and industry value added at 5%. For the remaining variables, the government effectiveness is caused by the external public debt stocks while the regulatory quality causes the GDP growth and the control of corruption causes the industry value added.

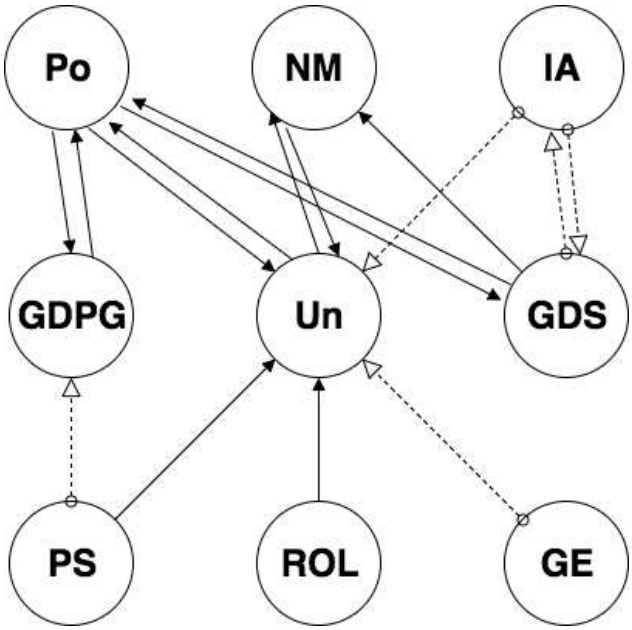
Figure 7: Causality results between economic variables and social, technological, and political variables of Lebanon



Concerning Libya (Figure 8), the population causes and is caused by the GDP growth, the unemployment and the gross domestic savings while the net migration has a mutual causality with the unemployment and is caused only by the gross domestic savings. For the Internet access, at a 10% significance level, it causes both the unemployment and the gross domestic savings, while it is only caused by this latter variable.

The political stability in Libya causes the GDP growth and the unemployment at 10% and 5% significance level, respectively, and both the rule of law and the government effectiveness causes the unemployment.

Figure 8: Causality results between economic variables and social, technological, and political variables of Libya



In the case of Mauritania (Figure 9), the GDP growth causes both the rule of law and the government effectiveness at 5% and 10% significance levels, respectively while both the industry value added and the gross domestic savings cause the net migration and the education, but the gross domestic savings is caused by the population. For the external public debt stocks variable, it causes both the net migration and government effectiveness and is caused by the Internet access. Concerning the remaining economic variables, unemployment has a mutual causality with the net migration. It causes the rule of law, and it is caused

by the population and government effectiveness at 10% significance level and regulatory quality and control of corruption at 5% significance level.

Figure 9: Causality results between economic variables and social, technological, and political variables of Mauritania

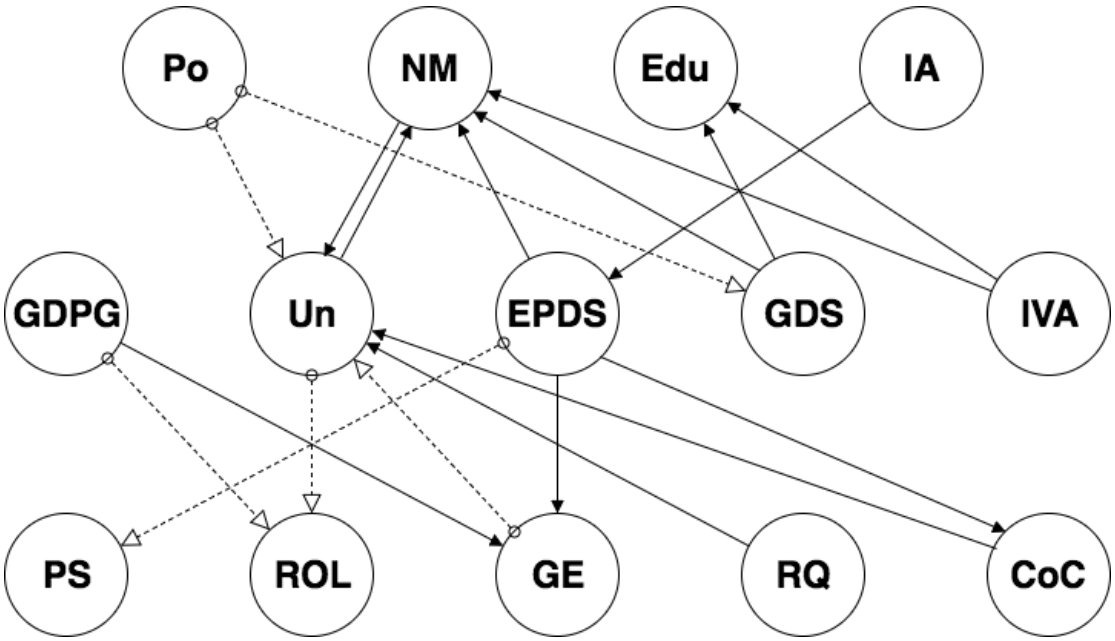


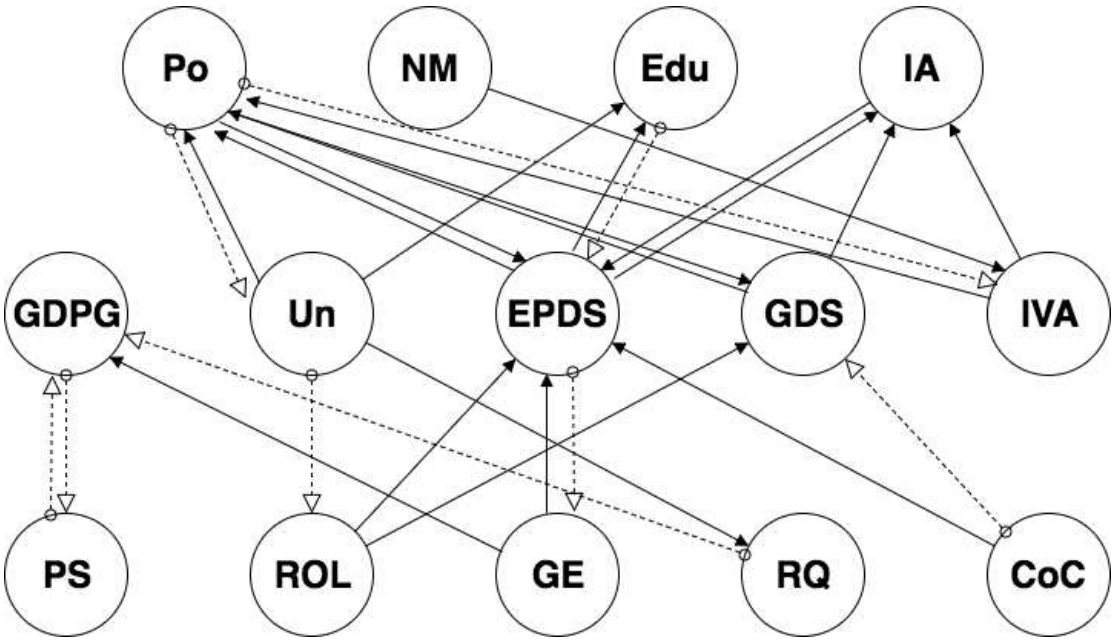
Figure 10 summarizes the Granger causality tests of Morocco. With regard to the social variables, the population has mutual causalities with all the economic variables except the GDP growth, the net migration causes only the industry value added, and the education is caused by the unemployment and has a mutual causality with the external public debt stocks.

Regarding the technological variable, Internet access, is also has a mutual causality with the external public debt stocks, and is further caused by the gross domestic savings and industry value added.

For the political variables, they all have significant causalities with economic variables. For the political stability and absence of violence variable, it has a mutual causality with the GDP growth at 10% significance level. The rule of law is caused by the unemployment, and causes both the gross domestic savings and the external public debt stocks. The government effectiveness has a mutual relation with this latter variable, and in addition to that, it causes the GDP growth. Finally, the regulatory quality causes this latter variable at 10% significance level

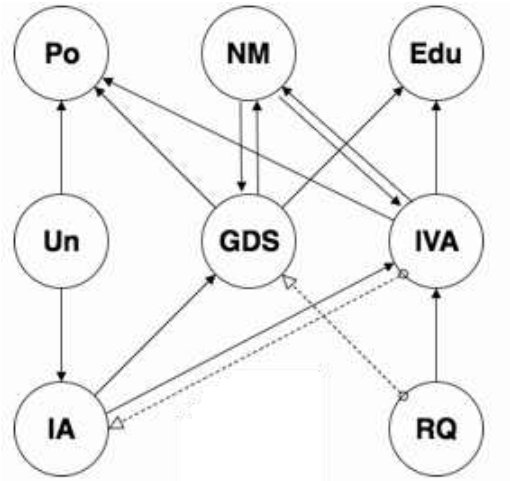
and is caused by the unemployment, while the control of corruption causes the gross domestic savings at 10% and the external public debt stocks at 5%.

Figure 10: Causality results between economic variables and social, technological, and political variables of Morocco



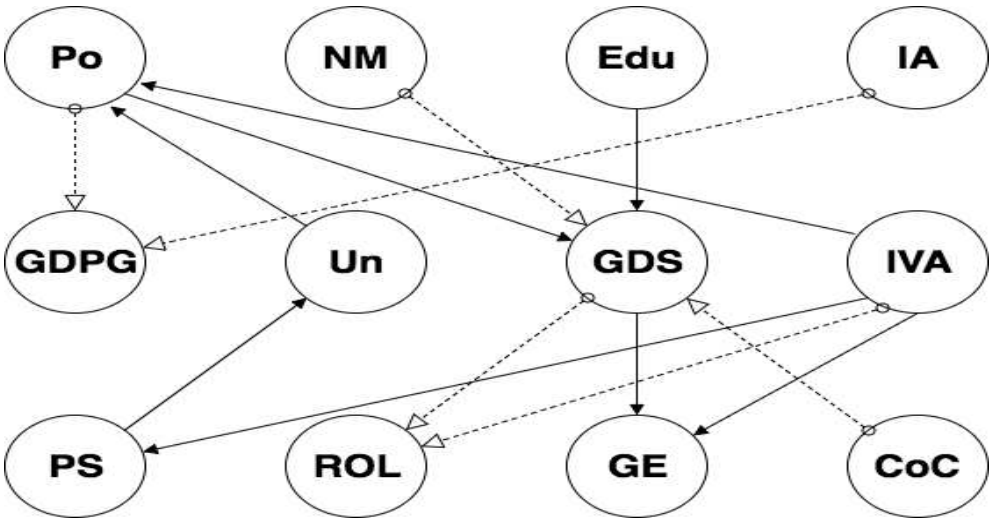
In the case of Oman (Figure 11), the gross domestic savings and the industry value added causes all the social variables where only the net migration causes these latter variables as well. The population is also caused by the unemployment. For the Internet access, it is caused by the unemployment and the industry value added at 5% and 10%, respectively, while it causes both the gross domestic savings and the industry value added. Finally, the regulatory quality causes both the gross domestic savings and the industry value added at 10% and 5% significance levels, respectively.

Figure 11: Causality results between economic variables and social, technological, and political variables of Oman



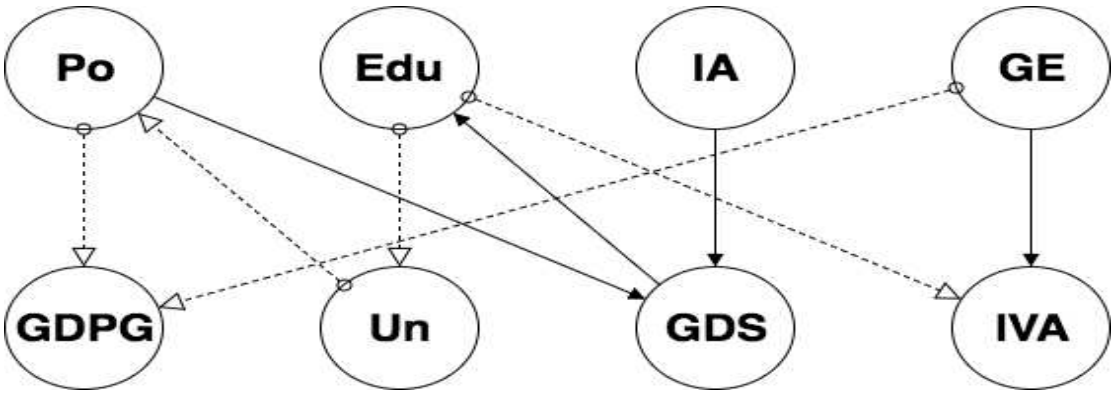
In the case of Qatar (Figure 12), the GDP growth is caused at a 10% significance level by the population and the Internet access while the unemployment is caused by the political stability and the absence of violence and causes the population. For the gross domestic savings variable it causes the rule of law at 10% and also causes the government effectiveness at 5% significance level. In addition to that, the gross domestic savings is caused by the net migration and the control of corruption variables at 10% significance, and by the population and education at a level of significance of 5%. Finally, the industry value added causes the population, the political stability, the rule of law, and the government effectiveness.

Figure 12: Causality results between economic variables and social, technological, and political variables of Qatar



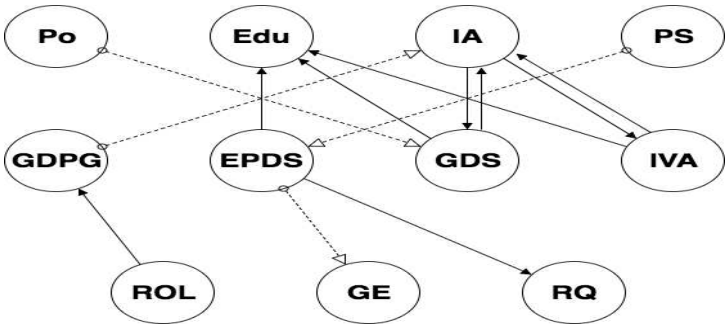
In the case of Saudi Arabia (Figure 13), the population causes both the gross domestic savings at 5% and GDP growth at 10% while it is caused by the unemployment variable. The education causes both the unemployment and the industry value added at a 10% significance level while it is caused by the gross domestic savings. For the technological variable, it only causes the gross domestic savings while the political variable, government effectiveness causes the industry value added and the GDP growth at 5% and 10% significance levels, respectively.

Figure 13: Causality results between economic variables and social, technological, and political variables of Saudi Arabia



Regarding Sudan (Figure 14), the GDP growth is caused by the rule of law and causes the Internet access that has mutual causality with both the gross domestic savings and the industry value added. For the external public debt stocks, it is caused by the political stability and causes the education the regulatory quality and the government effectiveness. While both the gross domestic savings and the industry value added cause the education, the gross domestic savings variable is caused by the population.

Figure 14: Causality results between economic variables and social, technological, and political variables of Sudan



In the case of Syria (Figure 15), the gross domestic savings variable has a mutual causality with the population, the education, and the Internet access and causes the net migration. With regard to unemployment, it has a mutual causality with population, is caused by the Internet access, and causes the net migration, the regulatory quality, and the government effectiveness while the external public debt is causes by the control of corruption and causes only the population. Finally, the industry value added is caused by both the net migration and the education and causes the Internet access.

Figure 15: Causality results between economic variables and social, technological, and political variables of Syria

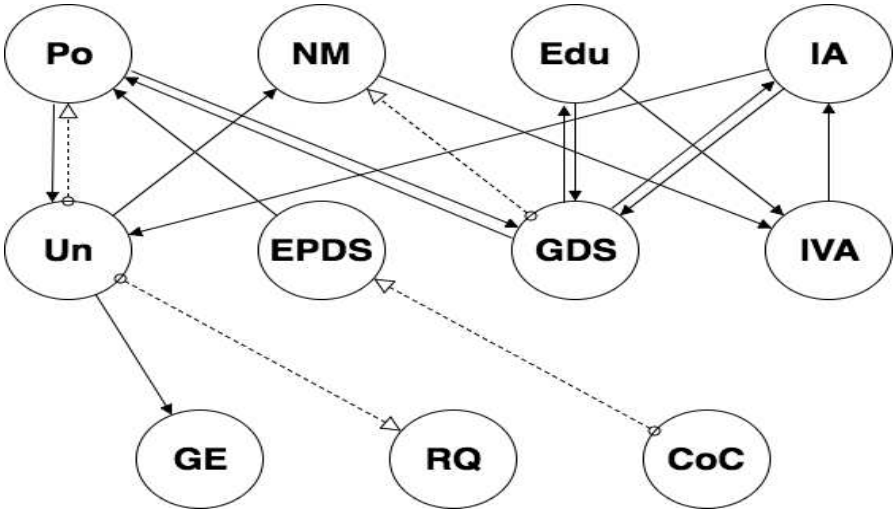
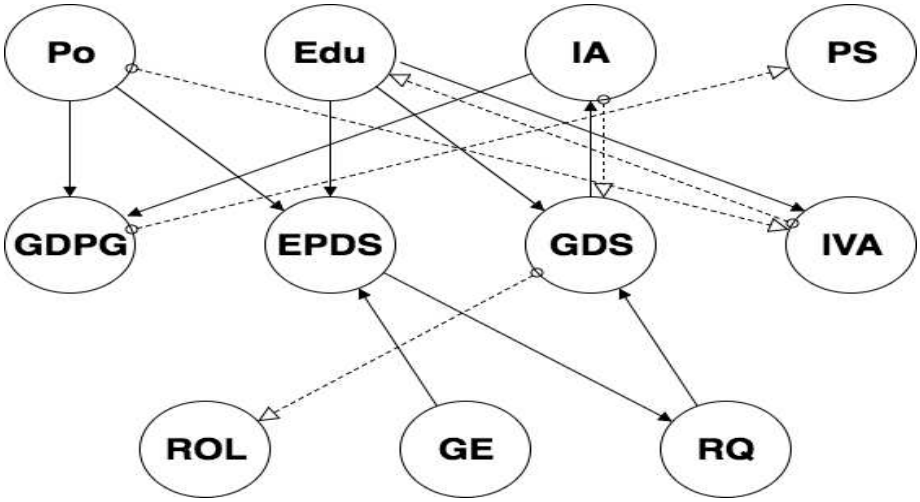


Figure 16 summarizes the causality results of Tunisia. The population causes both the GDP growth and the external public debt stocks at a 5% significance level and the industry value added at a 10% significance level. For the education, it has a mutual causality with the industry value added and causes both the external public debt stocks and the gross domestic savings. This latter variable has a mutual causality with the Internet access. The GDP growth is caused by the Internet access at a 5% significance level, and causes the political stability at a 10% significance level.

For the remaining political variables, the rule of law is caused by the gross domestic savings, the government effectiveness causes the external public debt stocks that causes the regulatory quality. The regulatory quality variable also causes the gross domestic savings.

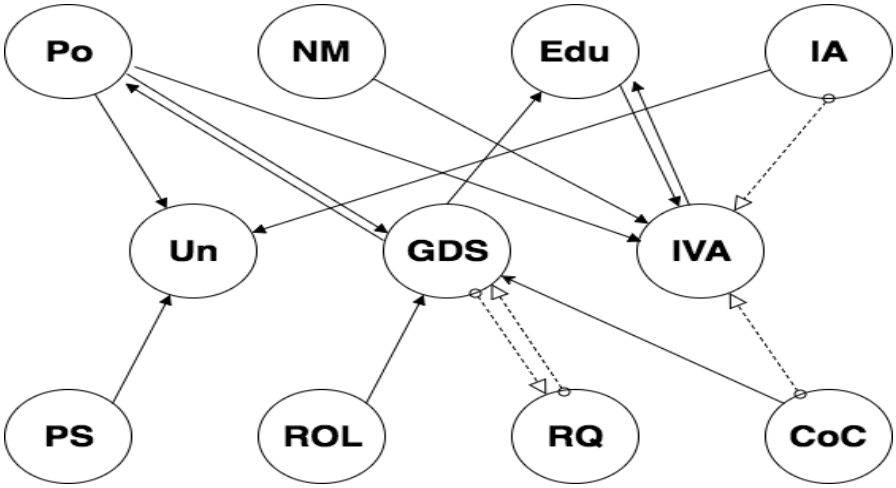
Figure 16: Causality results between economic variables and social, technological, and political variables of Tunisia



In the United Arab Emirates, the population has a mutual causality with the gross domestic savings and causes both the unemployment and the industry value added. This later variable is caused by the net migration, the political stability causes unemployment and the rule of law causes the gross domestic savings. This latter causes the education that has a mutual relationship with the industry value added. The Internet access causes both the unemployment and the industry value added.

Finally, the regulatory quality has a mutual causality with the gross domestic savings. This latter variable is caused by the control of corruption that also the industry value added.

Figure 17: Causality results between economic variables and social, technological, and political variables of United Arab Emirates



In Palestine (Figure 18), the GDP growth is caused by the population and causes net migration. This latter variable is caused by the unemployment that itself is caused by the education. For the gross domestic savings variable, it is caused by the net migration and causes education.

Finally, the industry value added has a mutual causality with the regulatory quality, is caused by the Internet access and population, and causes the government effectiveness.

Figure 18: Causality results between economic variables and social, technological, and political variables of Palestine

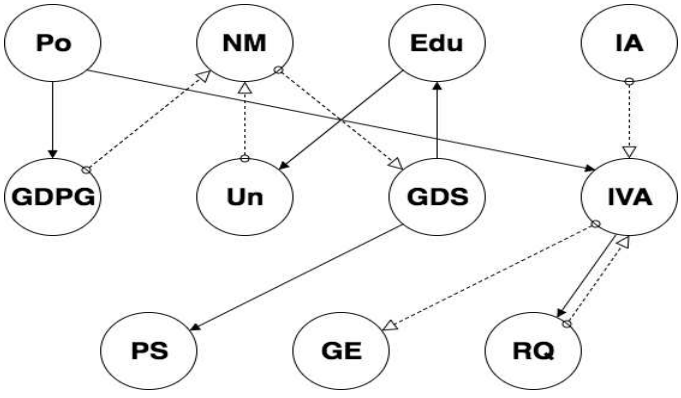
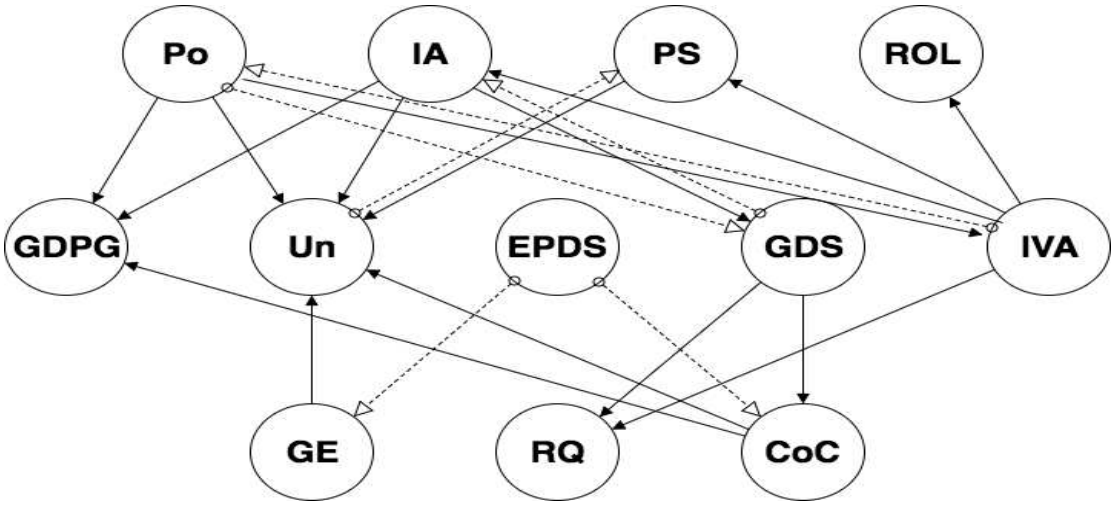


Figure 19 summarizes the causality results of Yemen. The population variable has a mutual causality with the industry value added and causes also the GDP growth, the unemployment, and the gross domestic savings. For the Internet access, it has a mutual causality with the gross domestic savings, is caused by the

industry value added, and also causes the GDP growth and the unemployment. This latter variable has a mutual causality with the political stability and absence of violence, which is also caused by the industry value added.

For the remaining political variables, the rule of law is caused by the industry value added while the control of corruption is caused by the gross domestic savings and the external public debt stocks. This latter causes both the unemployment and the GDP growth. Finally, the regulatory quality is caused by both the gross domestic savings and the industry value added while the government effectiveness causes the unemployment and is caused by the external public debt stocks.

Figure 19: Causality results between economic variables and social, technological, and political variables of Yemen



IV. Discussion of results

The attained results show that the youngest segments of the population in each of the Arab countries are under series of influences that are social, economic and political. On the other hand, the youngest segments of the population are consequently under a large number of influences that affect certainly their decision making processes in comparison with the oldest generations. The levels of causation mobilize a large set of variables that entertain a complex array of effects. But, there are variations in causality when moving from one Arab country to the other. Kuwait appears to be having the lowest level of causalities with the Internet access causing unemployment. For the political variables, at a

significance level of 10%, the rule of law is caused by the GDP growth, and the control of corruption is caused by the unemployment while at a 5% significance level, the regularity quality is caused by the gross domestic savings. A similar pattern is exhibited by Bahrain, Oman and Saudi Arabia but not fully by Qatar and UAE as members of the GCC countries.

All the other countries have a larger array of causalities. For example, in Yemen, the population variable has a mutual causality with the industry value added and causes also the GDP growth, the unemployment, and the gross domestic savings. For the Internet access, it has a mutual causality with the gross domestic savings, is caused by the industry value added, and also causes the GDP growth and the unemployment. This latter variable has a mutual causality with the political stability and absence of violence, which is also caused by the industry value added. For the remaining political variables, the rule of law is caused by the industry value added while the control of corruption is caused by the gross domestic savings and the external public debt stocks. This latter causes both the unemployment and the GDP growth. Finally, the regulatory quality is caused by both the gross domestic savings and the industry value added while the government effectiveness causes the unemployment and is caused by the external public debt stocks.

North African countries do also exhibit a large array of causations. For Morocco, the population has mutual causalities with all the economic variables except the GDP growth, the net migration causes only the industry value added, and the education is caused by the unemployment and has a mutual causality with the external public debt stocks. Regarding the technological variable, Internet access, is also has a mutual causality with the external public debt stocks, and is further caused by the gross domestic savings and industry value added. For the political variables, they all have significant causalities with economic variables. For the political stability and absence of violence variable, it has a mutual causality with the GDP growth at 10% significance level. The rule of law is caused by the unemployment, and causes both the gross domestic savings and the external public debt stocks. The government effectiveness has a mutual relation with this latter variable, and in addition to that, it causes the GDP growth. Finally, the

regulatory quality causes this latter variable at 10% significance level and is caused by the unemployment, while the control of corruption causes the gross domestic savings at 10% and the external public debt stocks at 5%.

Conclusion

This research has been seeking to find causal relationships between series of economic, social and political variables that relate to the role played by current and old generations in Arab countries. The levels of causation as revealed through Granger causality tests, based on the available data, have been established. They show two major types of patterns that distinguish GCC countries and the other Arab countries. But, the two types of economies need to include the characteristics, aspirations and expectations of the newest generations in order to ensure further economic growth and development.

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