Iraq's Development Cocktail: A two-way street passing through economic institutions and human capital. By Kozahn Wahid

Forward

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Abstract

Economic growth in Iraq has been mainly the subject of fluctuating oil crises. The diversification of the economy away from oil dependency is a called-for policy by many national and international scholars. This paper investigates the growth pattern in Iraq determined by an interaction effect of human capital and economic institutions. It shows that a non-oil-based possibility is real in Iraq, both in the short and long-term. It is an attempt to shed light on whether Iraq needs to simultaneously improve its human capital accumulations (proxying quality and quantity of schooling and health) with its institutions or individual improvements. We use autoregressive distributed lag method that shows a significant and robust relationship. The finding of this paper empirically illustrates the possibility of room for maneuver in an otherwise seemingly political and social deadlock: increased education investment is the beacon of optimism.

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1.Introduction

Iraq is a country that has been tormented by sectarian violence and political conflict in the past four decades. The latest Islamic State war put an end to the short-lived economic growth spell of post-2010 which with it trust in a prosperous Iraq diminished. In the backdrop of this dystopian narrative, this paper is an attempt to empirically show the possibility of increasing room for maneuver. The room for maneuver is created by transforming Iraq into a prosperous country. A prosperous Iraq would be a step to alleviate the impact of wealth inequality and give a chance for entrepreneurship and a thriving economy (McMurray, 2017). This paper argues that this is achieved by improving quality of economic institutions, all the while reforming and upgrading the human capital (HC) of the country. It focuses on the interaction between institutions and HC: *do sound institutions make HC more productive*?

Iraq is the focus of this paper. For a long time, policymaking in Iraq has been based on political contestations and regional power interests. Now is the time to start basing policymaking on evidence coming from rigorous empirical analyses. Econometric methods are only feasible for Iraq due to the availability of time-series data that stretches enough in time for growth analyses (25 years).

The importance of human capital and its quality as well as of sound institutions for economic growth has been widely recognized over the past two decades in Iraq. Challenges in accounting for the quality of HC and the soundness of institutions have for a long time given

support for the Solow model, which was essentially based on the measurements of macro-economic accounts, as developed in the period of 1930-1960. In the Solow model, physical capital is the driver of economic growth. Denison's (1967) observation that there was more to growth than physical capital resonated widely in the community of research economists. Ample attempts were made to find proxy measures for HC (and its quality) and for the soundness of institutions and to relate these measures to economic growth.

We present results that showcase a strong interaction effect between economic institutions and human capital in Iraq. This paper is an effort to inform policymakers about the short term and long-term policymaking in Iraq and shed light onto a part of economic steering that can lead to prosperous development of the country.

With this study we stand on the shoulders of earlier pioneers in explaining economic growth from HC and institutions. The broadness of these shoulders is presented in section 2 below. Yet, previous work leaves still many questions unanswered. Firstly, questions pertaining to the quality of HC. New measurements allow us to re-examine the importance of the quality of HC for economic growth. Moreover, the data on the quality of institutions from the past decade make it possible to re-examine the trend in the importance of institutions for the Iraqi economy. In section 3 we present a literature review of institutions and human capital in Iraq. The interaction between HC and institutions in the model presented in section 4: to what extent is the role of HC for growth strengthened (or weakened) by the quality of the institutions in the country? To our knowledge, this interaction effect has not appeared in the literature before, and certainly not for Iraq.

The empirical strategy of this paper – in section 4 – employs an Autoregressive Distributed Lag (ARDL) as a fit method to estimate the interaction effect of HC and institutional quality. The method reduces endogeneity problems and cointegration issues effectively and is a relatively new improvement to other statistical methods in HC and institutional studies. The results show, firstly, that HC measured by quality gives a much better insight on the importance of people for economic growth and, secondly, that growth is much better explained if the interaction term between human capital and institutions is recognized.

In section 5 a presentation and discussion of the data on other variables is shown. The conventional HC proxy has been the average "number of years in school" in the labor force

(Barro, 1998). Significant results were obtained, even though it was acknowledged that the quality of a year of schooling might systematically differ between countries with the former being the main driver of the quality of human capital in a country. This paper addressed this concern by using two indicators that proxy for human capital that were highly correlated with education quality data: Human Development Index developed by UNDP and Liberal Democracy Index developed by the Varieties of Capitalism project. This was made possible as these data on quality were collected for Iraq too which now is an apt time to conduct long-term analyses on.

Section 6 is a series of specification tests that are done to reduce the chances of false positives in our results hence, yielding robust results. Section 7 provides a discussion of the results with extensive comparative analysis of Iraq with the MENA region in an effort to contextualize Iraq's standing in the analysis. Section 8 gives policy recommendations and concludes.

2. The shoulders on which we stand

2.1 HC and Growth

The first growth accountants, like Solow (1956), Abramovitz (1956) and Denison (1967), noticed that a piece was missing in the growth puzzle when only laid out in physical capital: the *residual.* This was variously attributed to the quality of the labor force and to the insights gained from Research and Development (R&D). Mincer (1958) shed some light on this: using the American censuses to demonstrate that the quality of the labor force played a significant role, with Becker (1962) following him. According to his findings, one-fifth of the growth in the American economy was accounted for by schooling and the educational system. Institutions were not given enough explanation in the days of growth accounting. The analysis of the contribution to growth is marked by differences in the measurement of HC, as is further considered in section 5.1. HC is to be distinguished from R&D, as Rivera-Batiz & Romer (1991) express explicitly. The proceeds from R&D, i.e., the new technologies and improved processes, paves the way for a *leap* in size and market share by firms who invest in R&D. That leap is facilitated by HC.

Solow (1956), Arrow, (1962), and Schumpeter (1942) assume that the level of technology in an economy is a publicly provided good, so that this level appears as a time dependent multiplier in the production function.

The 1990s showed an explosion of empirical work on the role of HC in production and productivity, after the seminal theoretical work of Tinbergen (Tinbergen, 1975), using a production function with different types of HC, followed by Ritzen (Ritzen, 1977). Barro (1991) developed a global data-base on HC using years of education in the population to proxy HC. He finds with an OLS estimation that an additional year of schooling yields a 2% increase in total output. Since then there has been a wave of empirical studies, often using the Barro and Lee's data set (such as Temple (1999), De la Fuente & Doménech (2006), Engelbrecht (1997) and Cattles (Cattles, 2019)).

2.2 Institutions and Growth

Institutions are commonly introduced and implemented through regulatory frameworks which are legally enforced and hence must rely on political decision-making. As such, the terms institutions and regulation are used interchangeably. We mostly rely for our variables on the definition of regulation from Crafts (2006): a set of tools for introducing disturbances to fix market failures and externalities by using the *Doing Business* index from the World Bank (see section 4.2). "Institutions" are not merely confined to the regulation of markets, as North suggests (North, 1990, p. 3): "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction." This includes the efficiency of government and the application of the rule of law as included in the Governance Indicators of the World Bank.

Public Interest Theory from Pigou (2013) laid the groundwork for the view that regulation may contribute to economic growth by preventing and amending market failures, as well as a screening process to block low-quality firms. Yet Public Choice Theory (Peltzman, 1976; Stigler, 1971; Tullock, 1967) argues the opposite: regulation is a tool wielded by monopolies to guard against the inflow of competition by smaller firms, marking it a socially inefficient endeavor. Bureaucrats reap the benefits from regulation as bribes (Peltzman, 1976; Tullock, 1967). These opposite views have supporters in empirical analyses, with "corruption" making a bridge: corruption is an index of the efficiency of regulation (Djankov et al. (2002), Bardhan (1997 and Belitski et al. (2016) (Loayza & Servén, 2010). Public Choice Theory lies at the basis of the 1990-2010 policies in most OECD countries that led to reducing the size of government and deregulation, as large governments and regulatory burden appeared to lower productivity (Barro, 1991) (Alfaro & Chari, 2014; Fernandes et al., 2018).

At the same time, it is clear that Japan, Asian Tigers and China could grow quickly because of institutions (and HC). Doing business eased drastically, property rights were secured despite political rivalries, and courts could impartially settle civil disputes (Huff, 1997, Barro & Sala-i-Martin, 2004). Of course, it is the quality not the number of regulations, as Gørgens et al. (2004) show. The overall consensus is that effective insitutions matter for economic growth (Acemoglu et al., 2003; Easterly & Levine, 2003; Hall & Jones, 1999; North & Thomas, 1973; Sokoloff & Engerman, 2000; and Dias & Tebaldi, 2012). In Table 1 in appendix I, we present an overview of a selection of studies on growth and institutions. In many of these studies HC has been introduced as well.

2.3 Interactions

Early on, there was an awareness in growth studies about the possible complementarity between HC and institutions in the causation of economic growth. This is best presented in Engerman and Sokoloff (2005, p.12): well educated agents will strive to reform the existing institutions as a positive sum game. They can be more welcoming of new opportunities in the views of technological and environmental changes. The protection of property rights, power rotation, transparency in political institutions translate into rigorous economic institutions where strong interest groups in society will not give more power to already powerful groups but will redistribute power on the basis of merit. Hence, entrepreneurs will be incentivized to invest in their learning because they will have a secure channel to increase their well-being (Acemoglu et al., 2005).

From Acemoglu, Johnson and Robinson (2005a) one can deduce that the role of both institutions and human capital may be quite different in distinct stages of development, on the one hand due to endogeneity (i.e., HC may impact institutions non-linearly) as well as through different interactions between institutions and HC in promoting economic growth.

3. Iraqi Institutions and Human Capital

To relate this paper directly to Iraq, we find it necessary to allocate a section to contextualize the literature review to Iraq. Below, we will aim to give an assessment of Iraqi institutions as it relates to our institutional indicators, International Country Risk Guide's (ICRG) *Quality of Government* and World Governance Index's *Liberal Democracy*.

3.1 Quality of Government in Iraq: A proxy for economic institutions

3.1.1 ICRG Quality of Government Index

In societies where private property rights and enforcing contract mechanisms are weakly based in social legal institutions, individuals favor redistributive measures more than productive ones (Knack, 2002). Knack & Keefer (1995) show that the ICRG is positively correlated to economic growth as it also moderates the effect of human and physical capital accumulation. The indicator measures, *inter alia*, corruption in government, the rule of law, expropriation risk, repudiation of contracts by government, and quality of the bureaucracy (Howell, 2013). This indicator is fit for Iraq since it incorporates all the governance aspects that the country is known to be weak on.

The ICRG quality of government aggregate score should capture the improvements and decline of these attributes of Iraqi institutional governance. The indicator is measured on a 0-100 scale where 0-49.9 means very high risk and 80-100 is very low risk. The ICRG is focusing 50% on political risks and the other 50% on financial and economic risks in a given country (Howell, 2007, 2013). We believe that risk analysis in a country is not only business- or investment-related but is a reflection of the quality of institutions in that given country, hence our usage of the variable. To conduct robustness checks of our model, we also use another institutional variable. The World Governance Indicators (WGI) (Kraay et al., 2010), despite numerous criticisms (Knoll & Zloczysti, 2012; Langbein & Knack, 2010; Thomas, 2010) measures economic institutions accurately. Much of the concern is that the WGI measures the same aspects of institutions as the ICRG variable. However, only the Liberal Democracy is used here from the WGI, and we run a pairwise correlation that only returns 0.62 coefficient, meaning we can capture aspects of governance institutions that are not present in the ICRG variable.

Iraq's corruption is deeply rooted in its institutional framework. The presence of paramilitary activity (Williams, 2009), inequal redistribution of oil benefits (Le Billon, 2005), and fractionalized political and economic system (Abdullah, 2019) are major reasons for expecting a low score on the ICRG score in regards to corruption. Furthermore, the dearth of rule of law is also rooted in certain elites impeding the procession of constitutional rights and

the implementation of civic and criminal codes wherever their verdicts go against the interests of such elites (Moore & Parker, 2007).

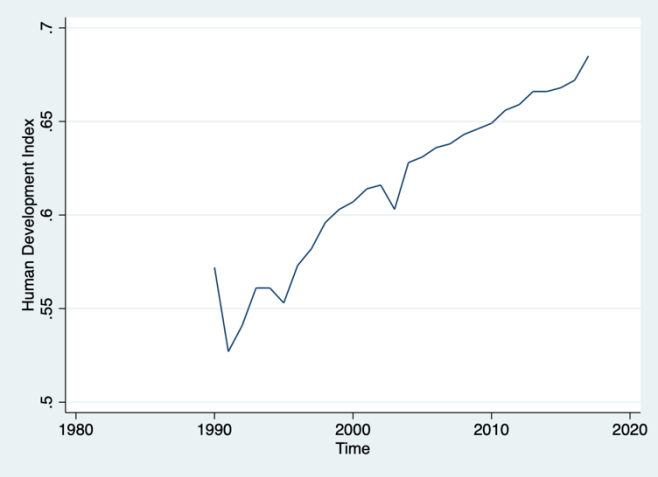
The *Tragedy of the Commons* phenomenon may not be better portrayed anywhere else than in Iraq. Grappling over control for resources is one of the major risks that Iraqi economic and political institutions run. Such fierce competition is a symptom of the lack of the rule of law (and its enforcement, of course) and rampant corruption: a catalyst to increase expropriation risk. Many anecdotal and academic sources document how civilians are stripped of their lawful properties due to dissent with more leveraged entities (Al-ossmi & Ahmed, 2016; Baumann, 2019; *Iraq's Christians Say They Are Victims of Expropriation, Intimidation*, 2021).

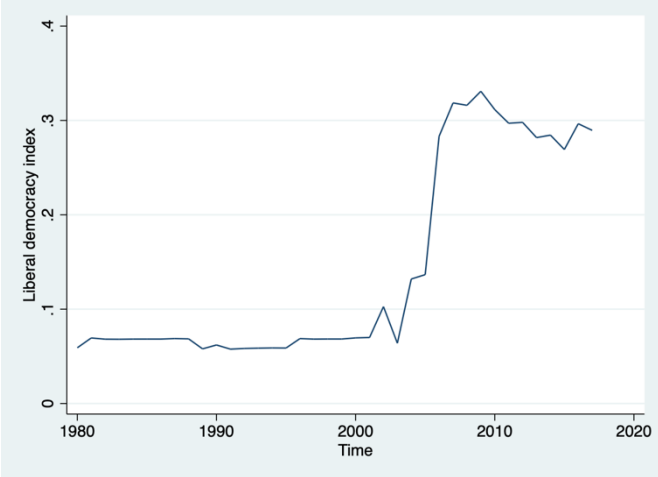
We can also see that the problem of development in Iraq is strongly related to the incompetency of the bureaucracy in either implementing, reforming, and monitoring policies. Al-ossmi & Ahmed (2016) examine the state of the Land Tenure Administration in Iraq and find that it embodies a slow, obsolete administration that cannot keep up with the demand for land, its transaction and development. A vital piece of economic growth comes from infrastructure establishment and maintenance, and Iraqi governing of political and economic institutions have failed to funnel spending towards infrastructure which would foster private market growth, government spending efficiency, and attract foreign direct investment (Zimmermann & Aljuboori, 2013). In addition, all of the previous points were testimony that investment in Iraq would be a risky endeavor, since the maturity of contracts cannot be guaranteed or that products or services may not be delivered in full.

3.2 Human Capital in Iraq

The current state of the Iraqi human capital stock can be more promising. Repeated conflict has torn the incentive structures that once flailed the country as the best performer in the region (World Bank, 2017). For our definition of human capital in the previous section, we will focus on education and its quality as a proxy of human capital in Iraq. We acknowledge that health, social protection, and water, sanitation, and hygiene(WASH) aspects are also vital to the analysis of human capital as mentioned by Tull (2018), but will not be included in this analysis.

Figure 1: Human Capital (UNDP_HDI) in Iraq (1970-2014. *Figure 2: Human Capital (Liberal Democracy) in Iraq (1980-2017)*





As shown in figure 1, human capital stock has been constantly rising in Iraq, in terms of years of schooling and returns to education in the country. However, we see a slight plateauing of the curve after 2010, but due to our data restriction we cannot confirm it. There is documentation, however, for human capital dropping after 2014 due to the ISIS insurgency (Tull, 2018). Even if not, the quality of teachers and education have been at its nadir during this period. However, from our time series we aim to show that slight increases in quality and quantity of schooling in Iraq directly increases economic growth as the societal returns surpass personal gains.

In a survey of literature on the Iraqi human capital condition, few academic works can be collected that can give a qualitative image. An important departure point may not be what many would suggest – the post-Saddam period – but rather when Saddam came to power. Again, inducing what North (1990) puts forth in relation to institutions building and change – that is, slow and stubbornly path-dependent – we believe that certain national qualities developed at the beginning of Saddam Hussein's rule, especially when the authoritarian regime could shape up institutions easily by force without political and social acceptance needed.

Looney (1992) gives one of the earliest accounts of human capital in Iraq. His comparison to Iran is invaluable. Iraq mainly spent on war machinery during and after the eight-years-long Iran-Iraq war in the eighties, while Iran also spent greatly on human capital. This was one of the main reasons why the reconstruction of Iraq lagged while Iran took the highway to a strong regional power. It is evident in hindsight that Iraq's education has deteriorated (Jawad & Al-Assaf, 2014) while Iran's has prospered (Esfahani & Pesaran, 2009). It is also evident

in cross-country growth regressions that initial levels of human capital is a strong predictor of human capital at a later point in time (Romer, 1989). In this paper we focus on human capital as an essential factor in "salvaging" the remaining institutional structures of Iraq. Higher levels of education (with more quality) in low-income countries is linked with more development for that country (Hanushek, 2013).

3.2.1 Liberal Democracy as a Proxy for Human Capital

The argument in this paper for using Liberal Democracy is that democracy increases the effectiveness of government where government spending should end up in its intended use as allocated in the financial year's budget, not plundered, but spent diligently. Good governments can build the social infrastructures that induces more investment in a country than diverting them away. As North (1990) elaborates, institutions are a set of rules and procedures that clarify expectations from other agents and decrease defecting for the better well-being of its intended individuals. Good governments are also such institutions that lay down the rules of game in the private market in a way that increases skills and physical capital accumulation, allocates resources in an efficient way, and promotes sound trade policies, *inter alia*. On the contrary, bad governments exact high transaction costs (Alam et al., 2017) and expropriatory tax policies and reduce incentive for workers to invest in skills accumulation (Hall & Jones, 1999).

Therefore, this paper aims to establish that a country with an effective government also has better quality institutions in other regards such as political ones. This in turn, will help in incentivizing its population to invest in human capital as the return on investment will be higher than investment. Moreover, the social spillovers of human capital investment will generate a benevolent cycle where citizens are more aware of social circumstances, averse to inequality, and require change in governance for more fair distribution of wealth (Murphy & Topel, 2016; Roland Bénabou, 1994).

Iraq is a country that fares below-average in the context of Liberal Democracy. The constant upheavals and armed conflicts in Iraq have broken its unified and centralized governmental institutions. This was most clear during the ISIS breakdown in Mosul. Empirically, Lee & Whitford (2009) show that Iraq is among the bottom of the Middle East and North Africa cluster when it comes to Liberal Democracy. Another integral discussion point on Iraqi institutions is the presence of a wealth of oil resources. Many researches have corroborated the notion that oil in weak democracies does not lead to prosperity, but to corruption, underdevelopment, aggression and inequality (Colgan, 2013; Karl, 2007; Ross, 2012). Weak

institutions have led oil money to be allocated to political parties, individuals, paramilitary groups, and most dangerously terrorist groups (al-Chalabi, 2007). When interests have been crystallized in that sense, institutional reform becomes arduous. However, we aim to show in this paper that a dual path to development in Iraq is possible that curbs the possibility of running into a quagmire in terms of reforms, which many may currently feel about the country's standing (Campbell & Falk, 2015).

3.1.1 An Interaction Effect in Iraq

Tull (2018) shows that people in Iraq can still achieve high returns through jobs by learning English and increasing their education levels. The aim of this paper is to show that kickstarting, or boosting, human capital accumulation in Iraq can have lasting effects in the non-oil dependent development of the country's economy. This is because it drives the country into a positive loop of human capital investment that could push for better institutions, which in turn provide more room for more human capital accumulation. What is integral to the discuss herein is the aforementioned argument that effective governments foster the accumulation of skills because there is the incentive to reap the returns to such investments on a personal and social level. There is already evidence that economic development also has a Granger causal relationship with institutional quality (Law et al., 2013). This paper proposes that it is through the levels of human capital that institutions aid economic growth. Once a certain number of investments have been done in skills and education of a population, that population would require better institutions to accommodate the improvement in skills and education. Going back to the definition of North (1990), a revamped stock of knowledge and skills would push the political and economic structures in a country to review the rules, procedures, and norms in private markets and public institutions. Hence this paper's proposition.

4. Model

$$y_{it} = \beta_0 y_{it-1} + \beta_1 IN_{it} + \lambda H_{it} + \theta IN_{it} * H_{it} + \alpha X_{it} + \eta_i + u_{it} \qquad (1)$$

y_{it} is our dependent variable: GDP and GDP per capita growth rate. Since our model is a dynamic fixed effect, β_0 represents the lag effect of GDP per capita on contemporaneous levels. *IN* represents the measure of institutions. *H* is the natural log of the HC variable. a shows the effect of a set of control variables X_{it}. The covariates, X_{it}, investment rate, international openness, government spending, fertility rates (only for models where GDP is dependent variable), size of government, terms of trade, political institutions. The interaction effect is θ. There are two conditions for the (1) specification to hold:

a. **The error terms should not be correlated with the independent variables, $E(U_{it}|X_{it}, \dots, X_{i1}) = 0$.**

b. **The panel residuals should not be correlated with each other either. Namely, the residual of the prior period is not correlated with the contemporaneous one, $E(U_{it}|U_{it-1}, \dots, U_{i1}) = 0$.**

To satisfy the two conditions, we apply a difference equation. As in Eq. (1).

$$y_{it} = \emptyset(y_{it-1}) + \beta(IN_{it} - IN_{it-1}) + \lambda(H_{it} - H_{it-1}) + \theta[(IN_{it} * H_{it}) - (IN_{it-1} * H_{it-1})] + \alpha(X_{it} - X_{it-1}) + \eta_i + (u_{it} - u_{it-1}) \quad \textbf{(2)}$$

Levine & Renelt (1992) as well as Temple (1999) point out the severe reduction of regressions in growth analysis due to no accounting for unobserved country heterogeneity. Pooled regressors assume the same intercept for all countries, while this is unlikely to be the case, as social, political, and economic position of countries differ.

For our methodology we conduct several tests suggested by the literature to establish firmer causal relationships. Firstly, we conduct stationarity tests. We believe that institutional quality improves over time with a trend and drift that renders our main variables of interest, institutional quality, human capital and GDP per capita nonstationary.

As shown in our specification tests below, in tables 3 and 4, the specification is suffering from unit root and is cointegrated. Moreover, the nature of our sample is close to what Im et al. (2003); Pesaran et al. (1999) and Pesaran & Smith (1995) describe as large T and large N. They also rightly point out that pooling coefficients and residuals is not appropriate. To that end, they propose the pool mean group estimator that pools long run coefficients but allow short-run coefficients to differ across groups. This will first eliminate unit roots and also reduce the possibility of spurious regressions.

In cross-country regressions where macroeconomic characteristics are different, change slowly over time, hence the presence of time fixed effects and country fixed effects, which constitute dynamic panel estimators are reliable. However, as Baltagi et al. (2000) show, the simultaneous equations in a dynamic fixed effect model may confront the issue of endogeneity in the correlation of the error terms and the lagged fixed effect. To see whether this is a problem in our model, we conduct a Hausmann test to check for significant difference between pooled mean-group estimator and dynamic fixed panel estimators. The only difference is that in the latter the short run and error-correction term of cointegrating variables are set constant, which is reasonable as we are clustering errors on regions based on

the assumption that regions hold relatively similar country in structure, economic and political institutions (Diamond, 1997) which is relevant to our MENA region analysis below. Acemoglu et al. (2002) show that colonial origins are the influences that shape regional characteristics, but they still hold these similar characteristics. Our test shows that endogeneity is not a problem and favors the dynamic panel estimator.

5. Variables and data

5.1. Measuring HC

Measurement of physical capital appeared in the early days of growth accounting as straightforward issue, since such data were available in macroeconomic accounts. Yet increasingly it was realized that physical capital is also proxied in macroeconomic accounts. These proxies do not often include quality aspects, as brought out by Jorgenson and Fraumeni's (1992). For example, a modern laptop computer of a few hundred dollars has the same capacity as a housing block for a then modern computer in 1970.

Measures of HC are even more difficult to acquire as company accounts (and hence national accounts) do not contain such valuations. Several measurement methods are encountered in the literature:

- HC is the costs to raise a child to the point of entering the labor market (Schultz (1961) based on Engel (1883)), augmented by on the job learning (Kendrick (1976). HC is decomposed into the workers with different levels of education in the labor force (Tinbergen, 1975, Ritzen, 1976). HC in a country is the total number of years of education in the labor force (Barro and Lee, 1990).
- HC as the number of workers by level of education multiplied by the rate of return to that education in a country (Psacharopoulos and Patrinos, 2002). The rate of return presumably already captures a substantial part of the private contribution to production so that it is difficult to interpret the coefficients of growth models using this measure of HC.
- Competency based measures of HC are prominent. When applied to country differences, number of years in school, schooling levels or costs of schooling may not say much about competencies of workers and hence their productivity. These measures have become available in the years since 2000 when the project International Student Assessment gradually expanded to 79 countries in 2020. This project provides comparable insight into the literacy and numerical skills of 16 year old. Hanushek (1996), Hanushek & Kimko (2000) and Hanushek & Wößmann (2007) show that increased spending in education does not strongly

equal HC improvement. Spending in effective institutional structures leads to competency, while competencies are statistically significantly related to economic growth. However, a weakly stable, ineffective institutional structure may not promise improved schooling quality. We ran a pairwise correlation between Altinok et al. (2018) database of quality of education (based on PISA, PIRLS, TIMSS international aptitude tests) and Penn World Tables (PWT 10.0) which returned 0.82. We can confidently assume that the PWT 10.0 human capital variable also captures the quality of education to some practical extent.

- Lastly, there are multidimensional measurement of HC. The most common variable that has been used in this regard is United Nations' Development Program's Human Development Index (HDI). It has been shown that the HDI captures human capital better than mere measurement of years of schooling (*Human Development Index (HDI) | Human Development Reports*, n.d.; Ramirez et al., 1997; Ranis, 2004; Ranis et al., 2000). This improvement in relation to mean years of schooling comes from accounting for health indicators and life-expectancy indicators. A pairwise correlation between the PWT version 10 HC variable and the HDI is 0.8. However, even with a higher correlation coefficient, there may be some aspects of the labor force quality that are not captured only by returns to education and years of schooling as done by the PWT human capital variable.

We use both the UNDP HDI and PWT 10.0 human capital variables to proxy for the levels of human capital in our cross-country regressions for robustness analysis. Similar outcomes would strengthen our analysis and reduce endogeneity problems.

5.2 Measuring Institutions

As Table 11 in appendix I shows, previous studies have used a great variety of measures of institutions to assess their impact on growth. Key measures are summarized below:

- A main measure of economic institutions is provided by both the Fraser Institute and the Heritage Instititute where they provide an index mainly based on property rights, government spending, international trade openness, and regulatory quality among others (Miller et al., 2021). In neoclassical economic theory, these indices are well-suited to explain economic growth as increased trade, small government, and protective property rights augment capital and labor (Carlsson & Lundström, 2002).
- The World Bank provides data to measure governance and ease of doing business. World Governance Index measures the quality of governance, both political and

economic from 1998 to 2019. We only use the data from 2000-2019 due to availability in that period. Data is normalized to mean zero and standard deviation of one.

- Polity IV (Polity IV Project: Home Page (systemicpeace.org) data on the degree of democracy/autocracy available for 167 countries for the period 1946-2013.
- Other sources, like Transparency International and the International Country Risk Guide.

5.3 Data

Tables 2 and 3 present the variables, sources, and correlation matrix of the data we used in this analysis. GDP per capita measured by constant 2010 Dollars, gross capital formation as a percentage of GDP, population growth, natural resources as amount of oil produced, government spending as a percentage of GDP, and openness (measured by exports minus imports) are taken from World Development Indicators. Human capital Index is taken from publicly accessible UNDP's Human Development Index (HDI) and measure of Liberal Democracy of the Varieties of Democracy Dataset (Coppedge et al., 2019). We use the ICRG's political and economic risk measure from the Quality of Government project (Dahlberg et al., 2021; Howell, 2013) to account for the quality of institutions. The Bayesian Corruption Index – developed by Standaert (2015) – is used as it is more efficient and includes more variation and data availability for Iraq than other notable indicators such as Transparency International's Corruption Perception Index.

Table 1: Descriptive Statistics

Variable	Source	N	Mean	Std. Dev.	Min	Max
GDP per Capita (constant 2010 USD)	WDI	38	8.171	.346	7.267	8.692
Gross Fixed Capital Formation (GFCF)[1]	WDI	38	15.987	13.111	.734	51.409
Liberal Democracy	Vdem	38	.143	.108	.058	.331
ICRG	QOG	34	.229	.066	.111	.361
Trade[1]	WDI	38	69.78	42.782	.021	154.235
Government Spending[1]	WDI	38	19.03	9.954	2.332	43.382
FDI[1] (inward)	WDI	38	.006	1.635	-4.542	4.562
Bayesian Corruption Index (BCI)	QOG	34	57.271	.689	55.968	58.983

1. Variable is measured as a percentage of GDP.
Note: The period under scrutiny is 1986-2017.

Table 2: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) GDP per Capita	1.00										

(2) GFCF	0.57	1.00									
(3) HDI	0.90	0.74	1.00								
(4) Lib. Democracy	0.62	0.76	0.83	1.00							
(5) ICRG	0.40	0.49	0.44	0.46	1.00						
(6) Lib. Dem.*ICRG	0.61	0.76	0.79	0.94	0.69	1.00					
(7) ICRG*HDI (ln)	0.55	0.65	0.66	0.66	0.95	0.85	1.00				
(8) Trade	0.58	0.07	0.52	0.10	-0.11	0.04	0.04	1.00			
(9) Gov. Spending	0.62	0.51	0.71	0.60	0.05	0.52	0.26	0.56	1.00		
(10) FDI	-0.31	-0.34	-0.22	-0.13	-0.13	-0.16	-0.18	0.18	0.01	1.00	
(11) BCI	-0.36	-0.49	-0.53	-0.77	-0.47	-0.79	-0.57	0.05	-0.44	-0.28	1.00

6. Specification and Diagnostic Tests

Our analysis herein is for a single country: Iraq. We need to perform certain tests to be sure that we are not conducting spurious regressions. We perform country-specific serial correlation and, lastly, we test for unit roots and cointegration of our relatively long series of panels.

6.1 Serial Correlation

Cumby & Huizinga (1990) developed a portmanteau test for serial correlation in time series estimations that performs well in Monte Carlo exercises, we choose this test as it accounts for the dynamic nature of our model. The presence of serial correlation in the residuals renders the estimate standard errors and hypothesis testing inefficient and biased. This happens when the time effect term is correlated with the individual regressors across time, but not with the error term. As it happens, in a survey of 46 empirical economic papers in three top related journals Kezdi (2003) shows that only six have taken serial correlation into account, which poses serious question on validity of results. We take serial correlation into account to curb this mistake. We check for the presence of serial correlation with up to two lags in the interaction model with liberal democracy and one lag in the interaction model with HDI. The result from table 3 shows that we fail to reject the null of no serial correlation, however weakly that may be since we are close to rejection.

Table 3: Cumby-Huizinga Serial Correlation Test

Model	*Chi2*	*P-Value*	*Degrees of*	*MaxT*	*Balance?*

			Freedom		
Interaction Model (Lib. Dem)[2]	0.886	0.346	1	32	Balanced
Interaction Model (HDI)[1]	0.259	0.611	1	27	Balanced

Note 1: Superscripts are the number of lags used to be aligned with the mode of the number of lags used in the ARDL model for regressors. For liberal democracy interaction the lag is two and for HDI one.

Note 2: Ha: Errors are serially correlated

Ho: Errors are serially uncorrelated

6.2 Unit Root & Cointegration Tests

When analyzing long term panel data, there is a need to test for the presence of unit roots and cointegration due to probable common stochastic disturbance. Nonstationary panels run the risk of lagged values not predicting the future and also introducing bias in the model that heavily reduces its applicability to out-of-sample entities (i.e., external validity concern). Moreover, we are also at the risk of only estimating spurious regressions that seemingly show significant coefficients.

The time series nature of our analysis allows us to use the Augmented Dickey-Fuller (ADF) test. The test can be represented as:

$$y_t = \alpha + \beta y_{t-1} + \delta_t + \xi_1 \Delta y_{t-1} + \xi_2 \Delta y_{t-2} + \cdots + \xi_k \Delta y_{t-k} + v_{i,t} \qquad \text{(X)}$$

Including more lags of the dependent variable ensures that serial correlation in the residuals is not a problem anymore. One issue in conducting unit root tests is the choice of lags. This is essential in Dickey-Fuller unit root test since it eliminates serial correlation in the series through augmenting lags and first differences of cross-section averages with individual series in the ADF regression. We first run information criteria analysis to determine the number of lags with Akaike Information Criteria (AIC) by setting the maximum lag to four.

Table 4: Augmented Dickey-Fuller Unit Root Test Results

Variable	*Z(t)*	*%5 Critical Value*	*No. of Lags*	*Trend & Constant*
GDPPC (ln)	-2.744*	-3.550	2	YES

Capital (ln) (% of GDP)	-1.868*	-3.552	0	YES
Openness (ln)	-2.023*	-3.556	1	YES
Gov. Spending (% of GDP)	-1.760*	-3.560	2	YES
HDI	-1.392***	-3.600	3	YES
Lib. Democracy	-2.287 **	-3.564	3	YES
ICRG Score	-2.761*	-3.576	2	YES
FDI (% of GDP, Inward)	-2.014*	-3.556	1	YES
Bayesian Corruption Index	-5.701	-3.584	4	YES

Note 3:. denotes integration of order I(1). ** denotes integration of order I (2) and so on.*

Note 4: Ho: Random walk without drift. Absolute values of z(t) higher than critical value fails to reject Ho.

Since our sample includes unit root, we are inclined to perform panel cointegration test to see whether joint residuals of our model are not cointegrated – that is, not moving along in similar stochastic trends that can lead to spurious regressions. We perform the Johansen test of cointegration for both our interaction models, one with liberal democracy and one with HDI. Moreover, our Autoregressive Distributed Lag (ARDL) model rests upon the assumption that our model not only does contain unit root but also that its variables are cointegrated. Aside from this test, we can also check for the presence of a levels relationship in our models by conducting the test developed by Kripfganz & Schneider (2020) and whether the cointegration is corrected for in the ARDL estimation.

Table 5: Johansen Test of Cointegration with Liberal Democracy.

Rank	***Parameters***	***Log Likelihood***	***Eigenvalue***	***Trace Statistics***	***Critical Value 5%***
0	99	-54.189862	.	449.5691	208.97
1	116	26.294563	0.99346	288.6002	170.8
2	131	76.227276	0.95588	188.7348	136.61
3	144	112.9657	0.89935	115.2579	104.94
4	155	134.01752	0.73172	73.1543*	77.74
5	164	150.34842	0.63965	40.4925	54.64
6	171	159.66121	0.44125	21.8669	34.55
7	176	166.90928	0.36428	7.3708	18.17
8	179	170.42584	0.19731	0.3376	3.7
9	180	170.59466	0.0105		

Note 1: The model is cointegrated of rank 4 meaning there are 4 cointegrated equations in the model.

Table 6: Johansen Test of Cointegration with HDI.

Rank	***Parameters***	***Log Likelihood***	***Eigenvalue***	***Trace Statistics***	***Critical Value 5%***

0	18	-60.526834	.	290.0158	208.97
1	35	-13.22748	0.96991	195.4171	170.8
2	50	12.820285	0.85477	143.3215	136.61
3	63	36.042246	0.82096	96.8776*	104.94
4	74	54.916685	0.75294	59.1287	77.74
5	83	65.766385	0.55232	37.4293	54.64
6	90	74.287018	0.46802	20.3881	34.55
7	95	78.54996	0.27078	11.8622	18.17
8	98	82.432505	0.24994	4.0971	3.74
9	99	84.481047	0.14079		

Source: Author's Calculations

Note 1: The model is cointegrated of rank 3 meaning there are 3 cointegrated equations in the model

7. Results

Testing our model gives us insightful results that informs policymaking on the national level in Iraq. Due to panel ARDL which tests whether each of our included variables have short-term effect on growth, we can also see only the relevant variables that influence growth.

In all our models, the error correction term stays negatively significant at the 1%, noting that in the presence of any shocks to our equilibrium model there is a convergence back to equilibrium. Given Iraq's recent history of sustained turmoil, where our timeframe includes only three violent wars, this is good news. But in Iraq, the economy does not go on growth or degrowth spells. We can see this as the lags of our dependent variable is not significant in any direction, insinuating that predictability of the time length of growth is problematic. After each war, there seems to be a rebound to prior levels. The speed of this rebound is also favorable as it exceeds 1 (in absolute value) for the first two models and is in the order of 0.3 (in absolute value) for the interaction model. In the interaction, this brings even more positive insight that in the presence of an interaction term between human capital and economic institutions, economic growth is converged to pre-shock time in a more persistent way, but with the caveat that more work needs to be done to speed up the process.

In our first model, we have the proxy of liberal democracy for levels of human capital included without either our institutional or interaction terms. We see that there is a significantly positive relationship with economic growth. Also, Human Development Index (HDI) presents a stronger positive long-term and short-term significant effect on growth in Iraq, on levels and growth of HDI (i.e., long-term coefficients and short-term ones). However, our liberal democracy indicator presents a significant negative effect in the short-term. This may be due to the variable also capturing aspects seemingly unrelated to human capital, such as freedom of speech. The literature shows that changes in democracy – for the

better – is correlated negatively with growth as it causes conflict (political and social) before an economy reaches its "new" democracy equilibrium (Barro, 1996; Feng, 1997).

Trade and government spending present marginal effect on growth. Bear in mind, our trade variable also works as a proxy for oil exports as those captures a large portion of trade in Iraq. We opted for this option when an oil indicator was collinear with the trade variable because trade can also capture imports that cannot go unnoticed in Iraq due to manufacturing productivity being slowed and most commodities being imported from neighboring countries. However, its effect is marginal on economic growth, which is possibly due to the negative effect of oil trade (i.e., the oil curse), captured largely by the variable, has on other institutions such as political stability. Moreover, it is not surprising that government spending presents a negative effect on growth in Iraq. First, this is also shown in the literature as demonstrated early by Barro (1990), potentially by having a crowding-out effect on the private sector. Contextually, most of Iraq's government spending is for public employees' payrolls that eventually sustains a certain level of consumer demand in the market for which most products are imported, therefore not influencing growth.

Two indicators that remain and pose striking results are the physical capital (GFCF) and Foreign Direct Investment (FDI). The former presents a weak correlation with growth when we use the level of liberal democracy as our human capital proxy; however, when using HDI, no effect is seen. Physical capital increase only creates a positive effect on growth when there is room in the economy for its accumulation to be invested. War, conflict, and instability tightens room for secured investments. Hence, capital accumulation may mostly be "burnt" in depreciation. Short-term analysis corroborates same results as shown in table 5. On the latter, FDI presents a negative effect on growth. The literature mainly portrays a positive causal relationship between FDI and GDP per capita (Chowdhury & Mavrotas, 2006; Hansen & Rand, 2006). In Iraq, FDI is mainly lower than regional peers such as the UAE due to conflict; however, much of the FDI may be directed through large oil conglomerates whose investments do not contribute to the development of a strong private market, more so when government spending is accounted for as most oil money is funneled in government spending. Notwithstanding, in the short term FDI does seem to provide transient boosts to economic growth, while GFCF still presents a negative effect.

Lastly, for the first model we have a variable measuring corruption. Iraq has not been faring well on many corruption indices. For instance, it ranks as the 170th nation in the Corruption Perception Index of Transparency International, only ahead of countries like Afghanistan and

North Korea (Transparancy International, 2018). Moreover, the literature establishes a negative correlation between corruption and economic growth, most notably shown by Djankov et al. (2006) and Mauro (1995). However, in the liberal democracy indicator model, corruption does not present long-term effects on growth, but only when HDI is used. Nevertheless, more corruption does present a significant negative effect in the short-term.

Table 6: Results with Liberal Democracy. & Human Development Index (HDI). Dep. Variable is GDP per Capita (ln)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ECM Adjustment	Long-Run	Short-Run	ECM Adjustment	Long-Run	Short-Run
Error Correction Term						
L. GDPPC (ln)	-1.473***			-0.768***		
	(0.262)			(0.104)		
Long-Run Coefficients						
GFCF (% GDP)		-0.016			-0.053***	
		(0.009)			(0.013)	
Liberal Democracy		0.975***				
		(0.197)				
HDI (ln)					4.727***	
					(0.799)	
Trade (%GDP)		0.006***			0.001	
		(0.001)			(0.001)	
Gov. Spending (% GDP)		0.001			0.029**	
		(0.007)			(0.012)	
FDI		-0.192***			-0.091***	
		(0.025)			(0.020)	
Bayesian Corruption Index		-0.297***			-0.227***	
		(0.046)			(0.055)	
Short-Run Coefficients						
LD. GDPPC (ln)			0.874***			0.101
			(0.204)			(0.061)
L2D. GDPPC (ln)			0.257*			
			(0.122)			
D. GFCF (% GDP)			0.020**			0.016**
			(0.008)			(0.005)
LD. GFCF (% GDP)			0.023***			
			(0.006)			
L2D. GFCF (% GDP)			0.010*			
			(0.005)			
D. Trade (%GDP)			-0.005**			
			(0.002)			
LD. Trade (%GDP)			-0.003*			

			(0.001)			
L2D. Trade (%GDP)			-0.005***			
			(0.001)			
D. Gov. Spending (% GDP)			-0.025***			-0.018***
			(0.008)			(0.005)
D. FDI			0.154**			
			(0.052)			
LD. FDI			0.232***			
			(0.041)			
L2D. FDI			0.149***			
			(0.031)			
D. Bayesian Corruption Index			0.355**			0.103
			(0.126)			(0.072)
LD. Bayesian Corruption Index			0.477***			0.234***
			(0.105)			(0.065)
LD. Bayesian Corruption Index						-0.014***
						(0.004)
Constant			36.627***			18.099***
			(7.513)			(2.502)
Observations	31	31	31	26	26	26
R^2	0.974	0.974	0.974	0.929	0.929	0.929
Adjusted R^2	0.915	0.915	0.915	0.853	0.853	0.853
Log-Likelihood	55.50	55.50	55.50	46.05	46.05	46.05
F-stat	10.04	10.04	10.04	16.99	16.99	16.99
t-stat	-5.617	-5.617	-5.617	-7.370	-7.370	-7.370

*Note1: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Note2: (L.) denotes lags of the variable and (D.) denotes first difference of the variable.

Note3: Optimal maximum lag selection was attained by Akaike Information Criteria through Stata's "varsoc" routine.

For our models in table 6, we include ICRG's quality of government (ICRG) into our models of table 5. The speed of convergence slows down when we account for economic institutions quality. In terms of significance, our model results mostly remain the same, but for GFCF in model 2 losing significance at 10%. Moreover, government spending, FDI and trade's significance is reduced to 10% from 5%. All in all, they stay on the same side of the scale, albeit with higher negative values. We see a significant drop in our liberal democracy variable, showing that institutional quality captures most of the effect of human capital on growth. However, in model 5, HDI seems to be the "all-capturing" variable: ICRG does not stand significant.

In the short-term, HDI presents an even stronger effect when accounting for ICRG. An explanation is that economic institutional quality is a mediator variable for the effect of human capital on economic growth. This result further clears the fog: a positive interaction between the two variables may be present in Iraq.

Table 7: Results with Human Capital and ICRG. Dep. Variable: GDP per capita (ln)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ECM Adjustment	Long-Run	Short-Run	ECM Adjustment	Long-Run	Short-Run
Error Correction Term						
L. GDPPC (ln)	-0.954***			-0.909***		
	(0.106)			(0.075)		
Long Run Coefficients						
GFCF (% GDP)		0.004			-0.016***	
		(0.007)			(0.005)	
Liberal Democracy		1.131***				
		(0.280)				
HDI (ln)					5.191***	
					(0.730)	
ICRG		1.780***			-0.043	
		(0.499)			(0.497)	
Trade (%GDP)		0.007***			0.003***	
		(0.001)			(0.001)	
Gov. Spending (% GDP)		-0.016***			-0.014**	
		(0.005)			(0.005)	
FDI		-0.120***			-0.070***	
		(0.027)			(0.016)	
Bayesian Corruption Index		-0.052			-0.107***	
		(0.052)			(0.036)	
Short-Run Coefficients						
D. GFCF (% GDP)			-0.010*			
			(0.005)			
D. Trade (%GDP)			-0.004***			-0.002**
			(0.001)			(0.001)
D. Bayesian Corruption Index			-0.240**			
			(0.108)			
Constant			9.898***			15.519***
			(2.723)			(1.767)
Observations	32	32	32	27	27	27
R^2	0.869	0.869	0.869	0.945	0.945	0.945
Adjusted R^2	0.797	0.797	0.797	0.915	0.915	0.915

Log-Likelihood	31.70	31.70	31.70	37.36	37.36	37.36
F-stat	16.21	16.21	16.21	36.28	36.28	36.28
t-stat	-8.956	-8.956	-8.956	-12.17	-12.17	-12.17

*Note1: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Note2: (L.) denotes lags of the variable and (D.) denotes first difference of the variable.

Note3: Optimal maximum lag selection was attained by Akaike Information Criteria through Stata's "varsoc" routine.

Moving on to table 7 where the crux of this paper lies, we can confirm that a positive and strongly significant interaction effect is present on economic growth. Outstanding, the coefficients on the interaction are "off the charts", providing substance for an informed policy to instill greater institutional reform all the while incentivizing human capital accumulation. Importantly, in model 2, we can note that ICRG reverses its sign in the presence of the interaction term, however the human capital variables stay significantly positive, much more so than results in table 6. In model 5, on the other hand, ICRG is only significant at 10% level which is much weaker than the results in table 6. This is due to the interaction explaining most of the variation in the data, as also testified by the satisfiable R^2. This accepts our initial hypothesis that the dual path to Iraqi macroeconomic reform starts from institutional reform: a benevolent cycle of prosperity in the long-term. Interestingly, in the short run, such interaction presents a negative effect, maybe in such fashion of policy shocks being introduced: a "swimming against the tide" period.

Another major point to discuss is that in the short-term government spending turns positive, but is not significant unlike the other prior models, albeit a negative long-run coefficient. Moreover, in the interaction present with HDI and ICRG, we see that FDI's sign in the short-term changes into positive and significant at 10%. This is an indication that with bettering both institutions and HDI Iraq can develop an environment that can attract foreign investment, a policy long sought by the Iraqi government and the United States' mission to Iraq (U.S. Department of State, 2020). Such policies essentially include directing more resources into R&D and diversifying the economy away from oil. These two simultaneous policies can create a suitable atmosphere for private market and manufacturing growth that turns government spending from a curse into a blessing.

In the interaction of model 5, investment in HDI includes health and education together, education being years of schooling and health in life-expectancy and a decent standard of living. In model 2, we aimed to capture educational attainment mostly as there is evidence for better democracies having higher educational attainments. As we highlighted before,

education quality matters as much (Hanushek, 2005). Hence, our HDI is aimed to capture this component. The stark differences in the coefficients may show this difference. Better standard of living and longer life usually coincides in countries with better educational quality (Whitebook, 2003). We see that the large coefficient of the Liberal Democracy interaction is when quantity of education increases, but to change the quality of it too, a slower dynamic is at play. This may be biased by the history of slow education quality improvements in Iraq, but also possibly that Iraq needs to invest in increasing its educational attainment first then increase quality or increasing those two simultaneously. Running a robustness check of this interpretation (not shown here, available upon request), HDI is interacted with Liberal Democracy to see if an interaction exists (holding the same covariates constant). A positive and significant at 10% coefficient of the magnitude 16.99 establishes the relationship. Hence, Iraq needs to increase educational attainment while improving its educational quality.

A last point to mention is the significant (only for Liberal Democracy interaction) negative effect of the interaction terms in the short run. Improvements on both of our key variables may create shocks that will in turn create market disturbances due to political rivalries, or settlement on new, better improvements in economic institutions such as trade laws and tightening labor market policies. These will have a negative effect on production which is reflected in growth; but as the economy bounces back to equilibrium, this effect is resulted in a better condition compared to the pre-shock period.

*Table 8: Results with Interaction Term (HC * ICRG). Dep. Variable: GDP per Capita (ln)*

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ECM Adjustment	Long-Run	Short-Run	ECM Adjustment	Long-Run	Short-Run
Error Correction Term						
L. GDPPC (ln)	-0.356**			-1.103***		
	(0.142)			(0.119)		
Long Run Coefficients						
GFCF (% GDP)		-0.012			-0.024***	
		(0.015)			(0.006)	
Lib. Democracy		14.929*				
		(7.503)				
HDI (ln)					3.438***	
					(1.029)	
ICRG		-0.321			5.719*	
		(1.823)			(2.635)	
Trade (%GDP)		0.018**			0.003***	

		(0.007)			(0.001)	
Gov. Spending (% GDP)		-0.036*			-0.018**	
		(0.019)			(0.008)	
FDI		0.418			-0.081***	
		(0.266)			(0.019)	
Bayesian Corruption Index		2.408*			-0.140***	
		(1.258)			(0.039)	
Interaction Effect						
Lib. Democracy*ICRG		**48.874***				
		(25.738)				
ICRG*HDI (ln)					**12.588****	
					(5.661)	
Short-Run Coefficients						
LD. GDPPC (ln)		-0.495***				
		(0.125)				
D. GFCF (% GDP)		-0.011**				0.012*
		(0.005)				(0.006)
LD. GFCF (% GDP)		0.008				
		(0.005)				
D. Lib. Democracy		-3.091***				
		(0.930)				
D.ICRG		1.260*				-4.697
		(0.570)				(3.317)
LD. ICRG		3.360***				
		(0.780)				
D. Lib. Democracy*ICRG		**-15.522*****				
		(3.719)				
LD. Lib. Democracy*ICRG		**-29.832*****				
		(4.441)				
D. HDI (ln) *ICRG						**-8.791**
						(6.322)
D. Trade (%GDP)		-0.003**				-0.003**
		(0.001)				(0.001)
D.FDI		-0.251***				0.047*
		(0.042)				(0.026)
LD.FDI		-0.243***				
		(0.039)				
D. Bayesian Corruption Index		-0.976***				
		(0.118)				
D. Gov. Spending (% GDP)						0.010
						(0.006)
Constant		-44.863***				20.215***
		(8.005)				(3.540)
Observations	32	32	32	27	27	27

R^2	0.986	0.986	0.986	0.969	0.969	0.969
Adjusted R^2	0.951	0.951	0.951	0.928	0.928	0.928
Log-Likelihood	67.36	67.36	67.36	45.38	45.38	45.38
F-stat	24.69	24.69	24.69	14.18	14.18	14.18
t-stat	-2.506	-2.506	-2.506	-9.305	-9.305	-9.305

*Note1: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Note2: (L.) denotes lags of the variable and (D.) denotes first difference of the variable.

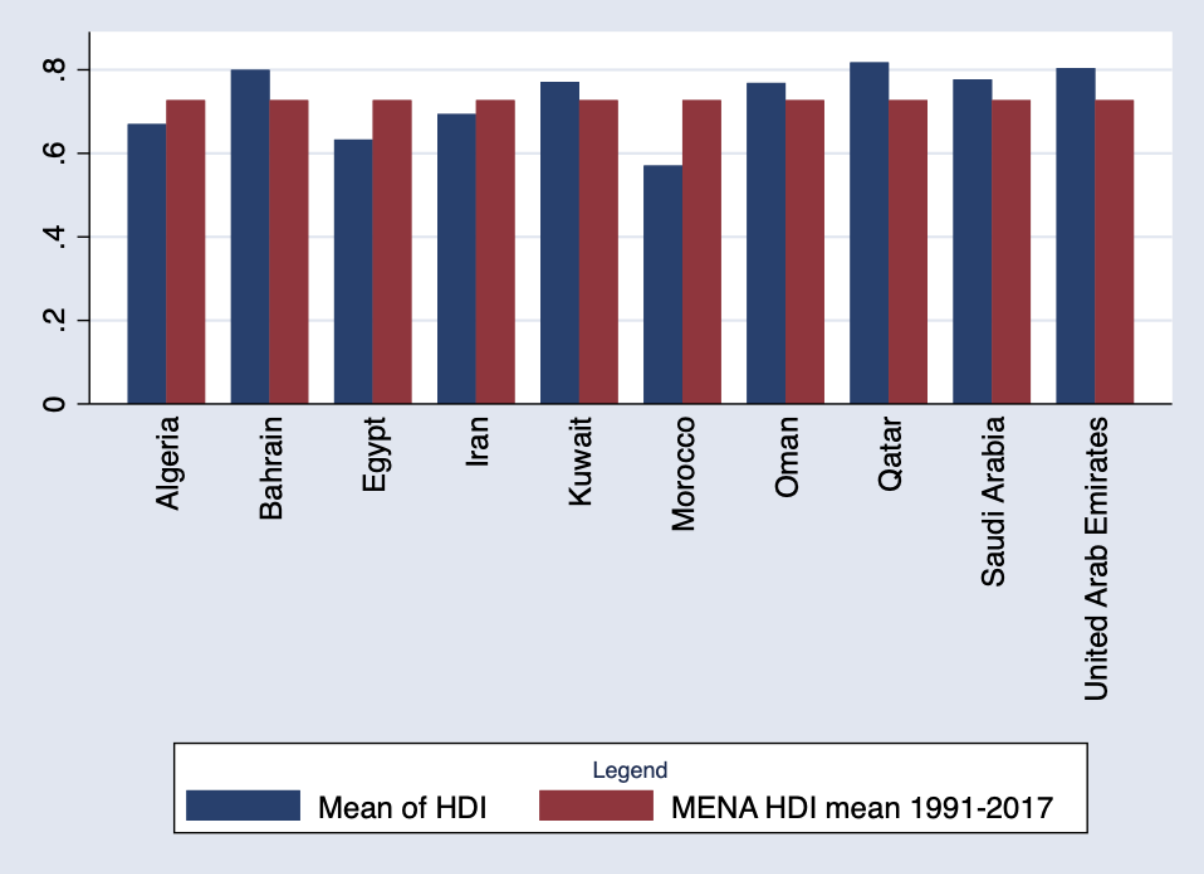
Note3: Optimal maximum lag selection was attained by Akaike Information Criteria through Stata's "varsoc" routine.

7.1 Comparative Analysis with MENA Region

We deem it fit to compare the results of Iraq for the same model with the countries of the region of Middle East and North Africa (MENA). The motivation for such analysis is that Iraq shares many of its institutional and economic attributes with these countries. For example, many of the neighboring countries of the region are also oil exporters. Moreover, some of these countries share the same political institutions development routes (starting from monarchies to authoritarianism then to republicanism). We choose a sample of eight countries[1] that can best resemble the similarities with Iraq. Mostly the judgement comes from the share of oil revenue to GDP. This assumption is made based on the evidence that oil producing countries that are situated in similar geographical areas tend to have similar political, economic, and social characteristics. Figures 3 and 4 show the similarity of institutional quality ratings and human capital accumulation. Also figure 5 shows the amount oil takes up in a country's GDP.

[1] Algeria, Egypt, Iran, Jordan, Morocco, Saudi Arabia, Tunisia, United Arab Emirates are the set of countries.

Figure 3: Mean of Human Development Index for MENA region countries sample.



Source: Author's Calculations

Note 1: Red bars stay static as they are means of the timeframe of this research for comparison with country-specific comparison.

The results in tables 9 and 10 show that Iraq fares differently with MENA region countries. The variables used for the main analysis in the Results section were reused here but with averages taken by year. For instance, for the year 2005, values for GDP per capita were averaged for all countries. We rant the same cointegration and unit root tests which yielded similar results as before: hence the use of the same ARDL panel method.

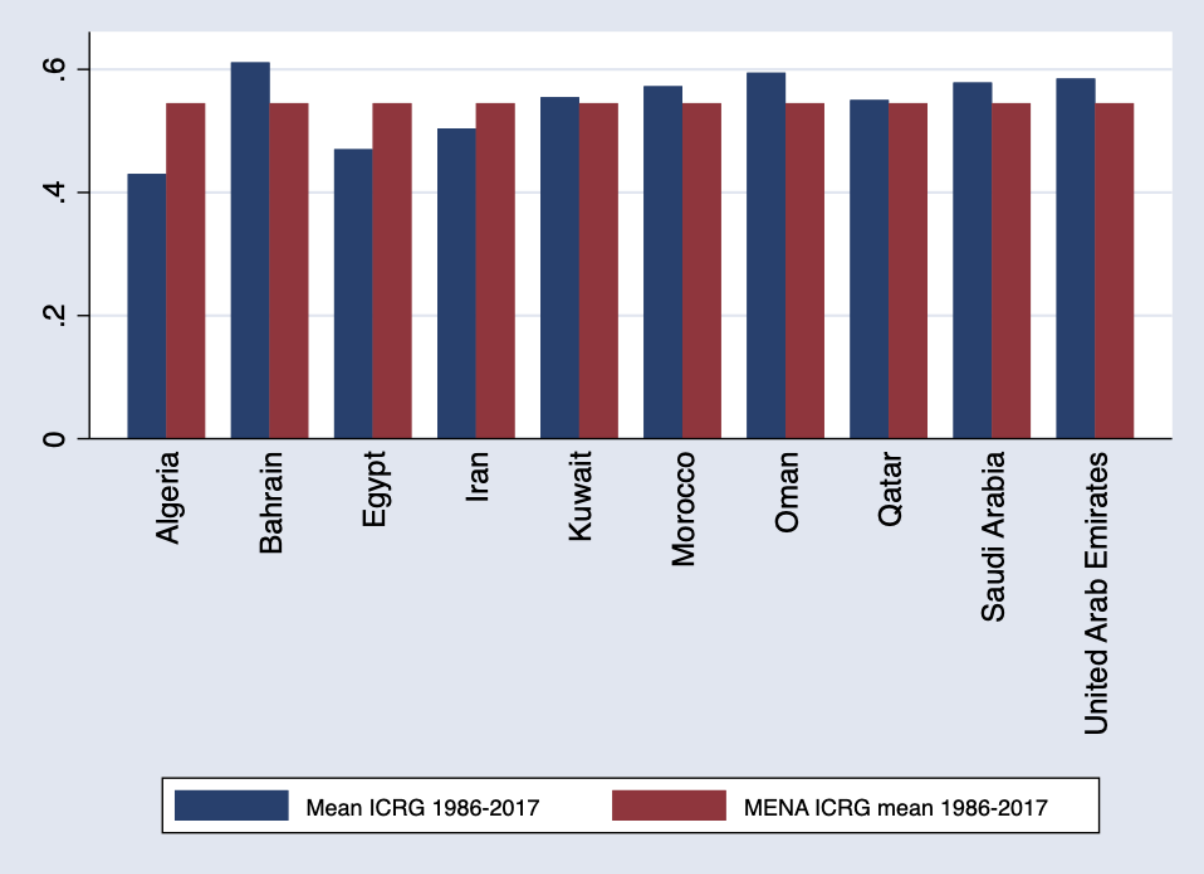
We can note that the results are with stark differences with HDI proxy. Without an interaction effect, human capital development is strongly positively significant. However, on the inclusion of an interaction effect, we find a negative relationship significant at 10% level. Our ICRG variable stays negatively significant which shows that institutional advancement does not lead to more economic growth. This may be linked to the relationship that exists in the literature between improvement of institutions and instability which can be harmful for physical capital inflow that reduces growth (Barro, 1996). However, it is important to note the lagged difference of the ICRG variable which is positively significant. We can infer that institutional quality yields fruit in the medium run. Nonetheless, the MENA countries seem to not be adept at reaping those gains because of continuous conflict undoing them.

An interesting observation is that the speed of convergence in the MENA region is significantly faster than the one in Iraq. Trade policy should be shifted to more openness in Iraq so that gains can be made from this quick convergence rate. FDI on average has a positive significant relationship on growth in the MENA region which can be an indicator for the fast convergence rate, but not in Iraq which is negative. This is highly probable to be caused by the "detachment" of Iraq from the trade blocs in the MENA region. A stable government that has strong regional standing can help its gains on growth from FDI. Higher FDI levels can increase the rate of technology spillover in neighboring economies (Caselli et al., 1996). However, it is apt to note the negative significant relationship of trade and growth. Since most of the MENA countries are oil-exporting countries, their balance of payments generally tends to be negative as they are not industrial economies hence turning oil revenue into large-scale importations, the famous phenomenon of the Dutch disease at work.

Corruption in the MENA, similar to Iraq, is a main variable for imposing a negative influence on growth. In the region the variable only becomes significantly negative when the interaction effect is included shedding light on the notion that gains from an interaction can be easily undone through corruption. Therefore, the agenda needs to put fighting corruption as an impending priority. It should not go without pointing out that corruption in the short term does not pose any significant on growth. However only over the long term its influence is observed. This can be due to the shaping of institutions effect that corruption has over the many years under scrutiny.

Lastly, it is important to note a similarity in the physical capital variable. Both in the MENA and in Iraq physical capital seems to have a negative effect on growth. Eliciting the effect of oil again is prudent here. The financial capital gains from oil revenues do not easily translate into physical capital in Iraq firstly due to conflict reasons. Second, capital flight seems to be a major concern in Iraq as political contestations pose risks on the security of property rights (Jassim & Abeer, 2013). Moreover, there is evidence that in times of recession (in Iraq mainly caused by instability) oil revenue has a high negative effect on total factor productivity and hence on physical capital (Agnani & Iza, 2011). In the short run, physical capital presents a positive significant effect. In the presence of the interaction effect, we can see an increased level of positive influence on growth from physical capital accumulation. Also, in the long term its negative effects are less significant on growth in the second model with the interaction.

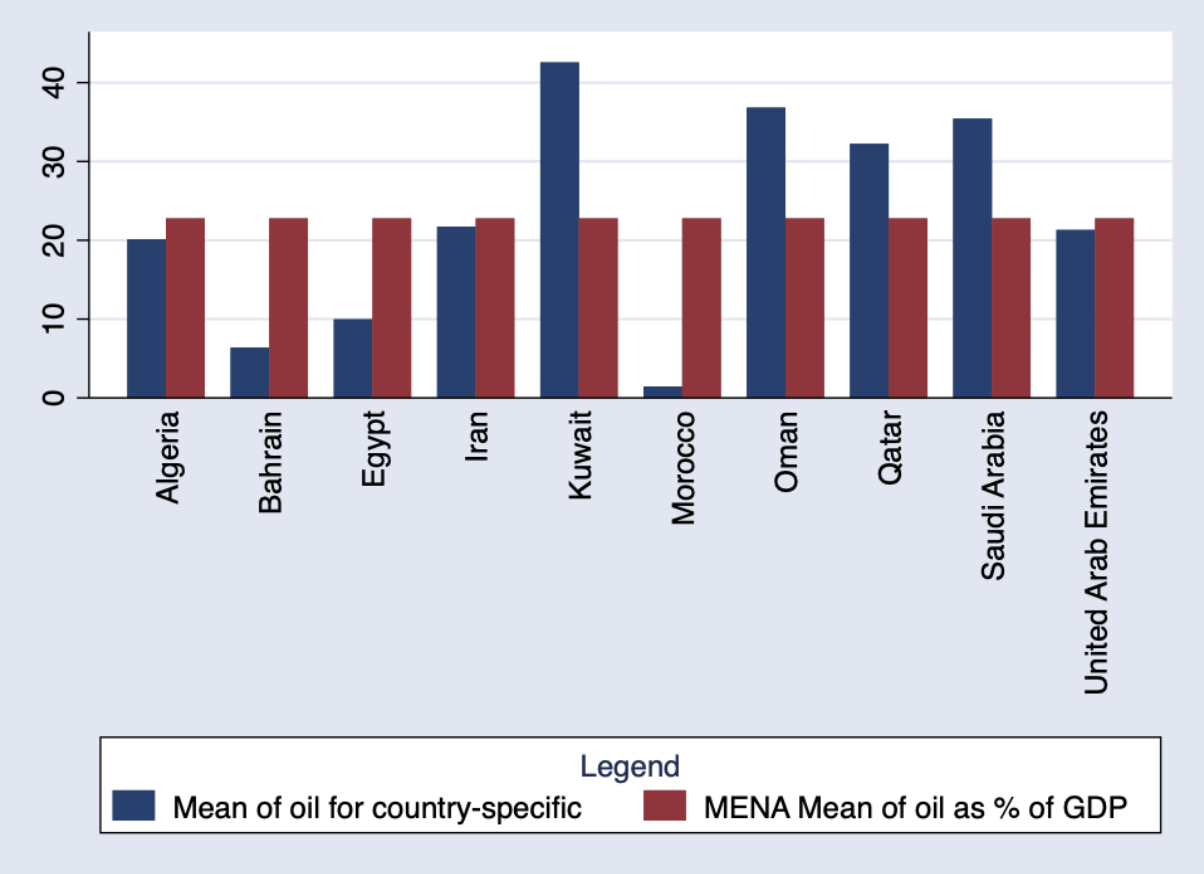
Figure 4: ICRG quality of government indicator for MENA countries.



Source: Author's calculations

Note 1: Red bars stay static as they are means of the timeframe of this research for comparison with country-specific comparison.

Figure 5: MENA region countries with their respective oil revenues as a share of GDP.



Source: Author's calculations

Note 1: Red bars stay static as they are means of the timeframe of this research for comparison with country-specific comparison.

*Table 9: Interaction for the MENA region (ICRG*HDI). Dep. Var: GDPPC (ln)*

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ECM Adjustment	Long-Run	Short-Run	ECM Adjustment	Long-Run	Short-Run
			Error Correction Term			
L. GDPPC (ln)	-3.075***			-6.262**		
	(0.395)			(1.348)		
			Long Run			
GFCF (% GDP)		-0.027***			-0.052**	
		(0.003)			(0.006)	
HDI (ln)		1.574***			0.589	
		(0.268)			(0.261)	
ICRG		-1.874***			-2.975***	
		(0.163)			(0.282)	
Trade (%GDP)		-0.005***			-0.012**	
		(0.001)			(0.002)	
Gov. Spending (% GDP)		-0.022***			-0.042***	
		(0.003)			(0.004)	
FDI		0.012**			0.036**	

		(0.004)			(0.006)	
Bayesian Corruption Index		-0.017			-0.094**	
		(0.010)			(0.015)	
Interaction Term						
ICRG*HDI (ln)					-0.512*	
					(0.157)	
D. ICRG*HDI (ln)						-4.413
						(2.107)
Short Run						
LD. GDPPC (ln)			0.876**			3.194*
			(0.214)			(0.992)
D. GFCF (% GDP)			0.060***			0.192*
			(0.013)			(0.054)
LD. GFCF (% GDP)			0.047**			0.229*
			(0.014)			(0.076)
D. HDI (ln)			-5.156*			-5.364*
			(1.970)			(1.691)
LD. HDI (ln)			2.527			
			(1.845)			
D. ICRG			-0.791			1.542
			(0.440)			(1.080)
LD. ICRG			2.524**			11.884*
			(0.719)			(3.986)
D. Trade (%GDP)			0.010**			0.026*
			(0.002)			(0.007)
LD. Trade (%GDP)			0.009**			0.035*
			(0.002)			(0.012)
D. Gov. Spending (% GDP)			0.041**			0.188*
			(0.012)			(0.061)
LD. Gov. Spending (% GDP)			0.007			0.054
			(0.004)			(0.020)
D.FDI			-0.040**			-0.253
			(0.014)			(0.095)
D. Bayesian Corruption Index			-0.240***			-0.221**
			(0.035)			(0.031)
LD. FDI						-0.036
						(0.019)
Constant			39.633***			109.510*
			(6.078)			(29.023)
Observations	26	26	26	26	26	26
R-squared	0.989	0.989	0.989	0.997	0.997	0.997

Note 1: Optimal maximum lag selection was attained by Akaike Information Criteria through Stata's "varsoc" routine.

Note 2: (L.) stands for lags and (D.) stands for differencing of variable. Therefore, (LD.) is the lag of the first difference of the given variabble.

Note 3: All variables have been averaged for all countries (except Iraq) by year.

*Note 4: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

We now turn to comparisons for our model, in table 10 below, with an interaction estimated by using liberal democracy as a variable for human capital. The story does not mainly change for the interaction effect, which may be strong testimony to the suitability of liberal democracy as a human capital variable. However, a primary observation is that the strong convergence pace is not perceived when using the liberal democracy indicator in the presence of the interaction effect but is present without an interaction effect. The initial idea would be that when reforms are set in motion on a regional level—possibly even reforms by frontier countries would present benefits, further research can corroborate this—in both economic institutions and human capital (mainly education) we can have a strong convergence dynamic present.

Our interaction effect is not significant in the long run and negatively significant in the short run even with a first difference. However, the liberal democracy variable shows promising positivity in the short run when an interaction is included—without an interaction it is highly significant. Short run spurt of democratic growth, in the form of better elections, freedoms, and the rule of law, can be promising in converging growth of economies in the MENA.

Interesting shifts from the previous model of the MENA are the changes of the signs of government spending, trade, and FDI while corruption does not turn significant anywhere. In the presence of an interaction FDI does not have any effect (not even included by the ARDL model) but trade is positive in the long and short term with the short being significant. Moreover, government spending becomes significantly positive in the short term. Such analysis would shed light on the improvements that more democracy would bring (human capital augmenting): governments would be more efficient in allocating spending, and trade (mainly oil revenues) would be channeled into non-oil production that drives growth. As Agnani & Iza (2011) have shown and our analysis corroborates, in times where there is economic expansion—which coincides with liberal democracy expansion—and the better use of physical capital. However, our physical capital variable is either negatively significant or non-significant. Nevertheless, this can be explained by the fact that much of physical capital

in the MENA region are government owned—the UAE is an anomaly to this trend, but its effect may have been overshadowed by the averaging conducted for the variables. We see a shift from negatively significant effect in government spending to significantly positive in the short term in the MENA region. This is not different from the dynamics at play in Iraq. Iraq and the MENA can benefit from an interaction effect which combines improvements in human capital, liberal democracy, and economic institutions together. Another result to discuss is the insignificance of corruption. We assume that the democracy variable has absorbed the effect of corruption rendering it insignificant: in comparison to the previous table where democracy index is not used.

*Table 10:Interaction for the MENA region (ICRG*HDI). Dep. Var: GDPPC (ln)*

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ECM Adjustment	Long-Run	Short-Run	ECM Adjustment	Long-Run	Short-Run
			Error Correction Term			
L. GDPPC (ln)	-1.007***			-0.463		
	(0.198)			(0.312)		
			Long Run			
GFCF (% GDP)		-0.014			0.082	
		(0.010)			(0.071)	
Liberal Democracy Index		15.289***			-41.821	
		(1.557)			(36.461)	
ICRG		-0.369			-6.195*	
		(0.402)			(3.105)	
Trade (%GDP)		0.012***			0.008	
		(0.004)			(0.007)	
Gov. Spending (% GDP)		0.014			-0.115	
		(0.010)			(0.082)	
FDI		-0.039**			0.081	
		(0.016)			(0.048)	
Bayesian Corruption Index		0.001			-0.188	
		(0.019)			(0.104)	
			Interaction Term			
ICRG* Liberal Democracy Index					34.479	
					(22.722)	
D. ICRG* Liberal Democracy Index						-8.777***
						(2.112)
LD. ICRG* Liberal Democracy						-2.383*

Index						
						(1.091)
			Short Run			
LD. GDPPC (ln)			-0.321**			-0.489**
			(0.140)			(0.162)
D. GFCF (% GDP)			0.042***			-0.024**
			(0.009)			(0.008)
D.Liberal Democracy Index			-16.000***			19.561***
			(4.640)			(4.729)
LD. Liberal Democracy Index			-12.995***			6.203*
			(3.107)			(3.072)
D. Trade (%GDP)			-0.003			0.003
			(0.003)			(0.003)
D. Gov. Spending (% GDP)			-0.045***			0.035***
			(0.013)			(0.008)
LD. Gov. Spending (% GDP)			-0.020**			0.040***
			(0.008)			(0.008)
D. FDI			0.058***			-0.014
			(0.014)			(0.010)
LD. FDI			0.024**			
			(0.010)			
D. Bayesian Corruption Index			-0.254***			
			(0.058)			
LD. Bayesian Corruption Index			0.050			
			(0.041)			
LD. GFCF (% GDP)						-0.030***
						(0.008)
D. ICRG						0.349
						(0.683)
LD. ICRG						1.443*
						(0.712)
LD. Trade (%GDP)						0.006*
						(0.003)
Constant			6.702**			10.409**
			(2.272)			(3.398)
Observations	31	31	31	31	31	31
R-squared	0.891	0.891	0.891	0.969	0.969	0.969

Note 1: Optimal maximum lag selection was attained by Akaike Information Criteria through Stata's "varsoc" routine.

Note 2: (L.) stands for lags and (D.) stands for differencing of variable. Therefore, (LD.) is the lag of the first difference of the given variabble.

Note 3: All variables have been averaged for all countries (except Iraq) by year.

*Note 4: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

8. Policy Recommendations & Conclusion

Over the past two decades, Iraq has been the focus of many international actors – from states to multilateral organizations. The visible recent are mainly geared towards liberalizing its market, encouraging entrepreneurship, and diverting its economy from oil-dependency. However, a major blind spot of the economy is its education system that is tasked with building the country's human capital. Many development organizations are trying to bypass this reality by providing funding for short-span skills building programs that may not endure or create its intended impact in the long term. The results of this research have shown that without major structural change in the education system coupled with extensive economic institutions' reforms, the path to economic growth is uncertain. The rapid expansion of the country's population, climate change effects, political insecurity and mercuriality of oil prices are major hurdles in front of securing a bright path towards growth. Economic growth for Iraq, that is non-oil-dependent, would benefit its poverty and inequality alleviation efforts.

Iraq's education system needs to do the following to make it competitive in the regional market.

Improve the quality of education, through:

a. Expanding quality of educators,
b. Setting up competitive pay and career guidance frameworks for educators,
c. Reskilling of educators to comply with international educational standards,
d. Reformulating the curriculum and study materials to can attain international recognition, and
e. Enrolling in the PISA tests with targets to arrive at median rank in the next 10 years.

A major point of this research has also been to show that education is the starting point. To increase educational quality and quantity in Iraq means that other institutions have to follow suit to accommodate for the expanding skills accumulation.

Augment the economic institutions of the country, including through:

a. Opening Iraq to international capital flow by reducing taxes for international investors and providing physical and property rights security,
b. Reducing the risk of investment by providing guarantees through an independent judiciary,
c. Partially reallocating oil revenues to non-oil GDP by creating a national fund where part of it is allocated for education investment that can achieve the goals stated above, and
d. Embarking on an import-substitution structural change policy that exploits Iraq's resource endowments and gains from the above education reforms.

The model developed in this paper shows the presence of the interaction between human capital and institutional quality's effect on growth in Iraq. Institutions turn out to be enablers of the accumulated human capital for productivity. This in turn incentivizes lower-educated people to invest more in education and in better quality education. The aim is to show that the reforms made both in increasing quality and quantity of HC should be made in tandem. Economic development needs to be guided by how economic freedom and education work together to improve growth.

We also use two indicators of human capital which takes the quality of education into account in addition to the years of education coupled with health measures. The two indicators are interactively included where in many instances they have a positive significant effect.

The empirical analysis of this paper shows that economic institutions and human capital have an interactive effect on growth in Iraq, where individually they have either a nonsignificant or a negatively significant effect. The results also show that when human capital and institutions are improved, they have a contemporaneous positive effect and positive lagged effect. Such results show the essential effect of institutions improvement and how well human capital can be fostered when the facilitative institutions exist in Iraq and the MENA. Such results also indicate that the dormant skills and knowledge not in the production cycle due to low-quality institutions will be enabled to produce goods and services that would boost productivity. The main implication for policy is that economic institutions and the accumulation and quality of human capital should be developed in tandem for growth to yield the most. First, better education should be sustained in terms of quality and quantity then institutional quality follows. Governments should regulate markets to the point where it does not stifle the

investment of HC. New technologies and inventions should be a sign that institutions change regulations to increase the capacity of the economy.

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Appendix I

Table 11. Overview of studies on institutions and economic growth

Author(s)	Data	Dependent variable	Independent variables	Source of Institutions Variables	Results
Mauro (1995)	Cross section of 68 countries. Period: 1960-1985	Per capita GDP growth	GDP in 1960, secondary education in 1960, population growth, primary education in 1960, Government expenditure, revolution and coups, assassinations, investment deflator, political instability index, investments, bureaucratic efficiency index, corruption Index .	The Economist Intelligence Unit (1980-1983)	1. A one-standard-deviation improvement in the bureaucratic efficiency index is associated with a 1.3 percentage point increase in the annual growth rate of GDP per capita. 2. A one-standard-deviation improvement in the corruption indicator is associated with a 0.8 absolute increase in the annual growth rate of GDP per capita.

Barro (1996)	Panel data for 100 countries. Period: 1960-1990	Per capita growth rate	Log GDP, male secondary and higher schooling, log of life expectancy, log GDP*male schooling, log of fertility rate, government consumption ratio, rule of law index, terms of trade change, democracy index, democracy index squared, inflation rate, Sub Saharan Africa dummy, Latin America dummy, East Asia dummy.	International Country Risk Guide	A rise by 0.167 in the rule of law variable is estimated to raise the growth rate in 0.5 percentage points.
Acemoglu et al. (2001)	Cross section data for the whole world and a small sample of 64countries. Year: 1995	Log GDP per capita	Average protection against expropriation, Asia dummy, Africa dummy, Other continent dummy.	Political Risk Services (average value between 1985 and 1995), Polity III data set of Ted Robert Gurr and associates.	**1. A strong correlation between the measure of institutions and income per capita.** **2. Protection against expropriation on income per capita is highly significant, with a coefficient of 0.71** **3. Over 50% of the variation in income per capita is associated with variation in the institutions' index.**
Dollar & Kraay (2003)	Cross section data for 168 countries. Year: 1995	Log of GDP per capita in 1995	Rule of law, log trade/GDP, landlock, distance from equator, log of population.	Kaufmann et al. (2002)	**1. Simple OLS regression of log per capita GDP on rule of law gives a coefficient of 1.01, a very strong correlation between per capita income and institutional quality. However, problems as endogeneity measurement error and omitted variables arise.** **2. In a large cross-section of**

					countries, economic growth, in the long run, high levels of trade, and good institutions go together.
Easterly & Levine (2003)	Cross section data for 72 countries. Year: 1995	Log of GDP per capita in 1995	Institutions index, French legal origin, religion, ethnolinguistic oil diversity, settler mortality, latitude, landlocked, crops/minerals.	Kaufman et al. (1999)	A strong positive impact of institutional development on economic development was found. The coefficient of the institution's index is between 2.10 and 2.22.
Glaeser et al. (2004)	Panel data for 50 countries. Period: 196-2000	Per capita income growth	Initial income per capita, initial education, the share of a country's population in temperate zones, and institutional variables as executive constraints, expropriation risk, autocracy, Liberal Democracy, judicial independence. Constitutional review, plurality, proportional representation.	International Country Risk Guide, Aggregated index of Kaufmann et al. (2003), Polity IV Dataset.	**1. The initial level of education is a strong predictor of subsequent economic growth.** **2. A strong correlation between economic growth over a period and the average assessments of institutional quality over that period, including constraints on the executive, risk of expropriation, Liberal Democracy, and autocracy.** **3. The coefficient of expropriation risk on per capita GDP growth is 0.0040, significant at a 1% level.** **4. The coefficient of Autocracy on per capita GDP growth is -0.0060, significant at a 10% level.** **5. The coefficient of Liberal Democracy on per capita GDP is 0.0075, significant at a 1% level.**

					6. No relationship between growth and constitutional measures of institutions such as judicial independence, constitutional review, plurality, and proportional representation. **7. Exploring the causal link between institutions and growth has been extremely difficult because of conceptual problems to measure institutions and the limitations of econometric techniques.** **8. Institutions play only a secondary role in economic performance. Human capital and social capital have the main role and shape both the institutional and productive capacities of a country.**
Rodrik et al. (2004)	Cross section data for three samples of countries (64, 79 and 137). Year: 1995	Log of GDP per capita in 1995	Geography (latitude of the country), Institutions (Rule of law), Openness or integration (ration of nominal trade to nominal GDP).	Kaufmann et al. (2002)	**1. The signs of institution, openness, and geography are statistically significant. Countries with stronger institutions, more open economies, and more distant from the equator are likely to have higher levels of income.** **2. A unit shock to the institutional quality equation ultimately**

					produces an increase in log incomes of 1.85. **3. Institutions is a stock variable. The cumulative outcome of past policies. Then, it is inappropriate to regress income levels on institutional quality. This could be addressed by taking long-term averages.**
Dias & Tebaldi (2012)	Panel data for 61 countries. Period:1965-2005	GDP per capita growth	Lagged growth of real GDP per capita, human capital growth (t, t-1, t-2), physical capital growth (t, t-1), structural institutions (t, t-1, t-2), Polity IV index, human capital level, physical capital level.	Polity IV Project	**1. Structural institutions positively affect long-term economic performance.** **2. The coefficient of current structural institutions on per capita GDP growth is mainly negative but not significant.** **3. The coefficient of the first lag of structural institutions on growth is positive, between 0.0266 and 0.0323, and significant.** **4. Political institutions are not correlated with productivity and long-term growth.**
Hall et al. (2010)	Cross section of 96 countries. Period: 1980-2000	Growth of output per worker	Independent: growth of schooling per worker, growth of physical capital per worker, growth of schooling per worker*Risk of expropriation, Growth of physical capital per worker*Risk of expropriation, Percentage of population within	International Country Risk Guide	**1. For countries with a risk of expropriation scores below 4.90 (bad institutional quality), increases in the stock of both human and physical capital have a negative effect on the growth of output per worker. For**

			100km of coast, air distance from major trading centers, percentage of land are located in tropics.		**countries with a risk of expropriation between 4.90 and 7.33 (better institutional quality), increases in physical capital per worker have a positive impact.** **2. Physical and human capital increases only have a positive impact on growth once a break-even level of institutional quality has been reached.**
Flachaire et al. (2014)	Panel of 79 countries. Period: 1975 - 2005. Observations are averaged over 5-year periods.	Output growth	Log of initial real GDP per capita, Log of population growth, Log of investment rate, Log of initial average years of education, Index of political institutions, Index of economic institutions.	Economic Institutions: Index of Economic Freedom of the World (EFW) from the Fraser Institute. Political Institutions: Polity IV.	**1. The data evidence the existence of two growth regimes. The first one with slightly higher growth rates (averaging 1.8%) while the second with lower and dispersed growth rates (mean of 1.2%).** **2. Political institutions are key determinants for membership in regime 1 or 2, but when focusing on the determinants of growth rates, economic institutions rather than political institutions play a role.** **3. The coefficient of economic institutions on growth is positive and between 0.735 and 0.830, significant at a 1% level.**

Alfonso & Jalles (2016)	Unbalanced panel of 140 countries. Period: 1970 - 2010. Periods of 5-year average.	Log of real GDP per capita	Physical capital (gross fixed capital formation), human capital, public consumption, institutions (civil lberties, political rights, polity, democracy index, regime durability, Vanhanen democracy, government fractionalization, governance).	Freedom House's Political Rights, Civil Liberties. Polity 2 index, Polity's 4 Database, Index of democratizati on of Vanhanen (2005), World Bank Governance Indicators, Quality of Government Dataset, KOF indices of economic, political and social dimensions of globalization, World Bank's Database on Political Institutions.	**1. Bigger governments tend to hamper economic activity.** **2. Institutional quality has a positive impact on the level of real GDP per capita.** **3. The coefficient of institutions on the log of per capita GDP, when institutions are measured using civil, political rights, polity, democracy index, or regime durability as proxies, is always positive and between 0.119 and 0.465.** **4. The negative effect of government size on real GDP per capita is stronger at lower levels of institutional quality.** **5. The positive effect of institutional quality on GDP per capita is stronger at smaller levels of government size.**
Saramasinghe (2018)	Panel data for 145 countries. Period: 2002-2014	Log of real GDP per capita	Control of corruption, political stability and absence of violence, voice and accountability, foreign direct investments, gross capital formation, trade openness, government consumption.	World Bank Governance Indicators Database	Governance quality affects economic growth significantly. Corruption control is the most important determinant. A one-unit increase in control of corruption raises the real GDP per capita growth on average by 6.9%.

Ayal & Karras	Cross-section for 58 countries. Period: 1975-90	Mean of growth of GDP per capita in the period	Population Growth, Investment rate, money growth, inflation, Freedom to own foreign currency, freedom to maintain a bank account abroad, government enterprises role, negative real interest rates, subsidies, top marginal tax rate, conscription in military, taxes on trade, black market exchange rate, freedom of foreign capital transactions.	Economic Freedom Index	All economic freedom variables have a positive effect on economic growth. However, only some of them present significantly robust effects. Namely, Trade, foreign capital, black market exchange rate. This means that the better these indicators, the more growth-inducing they are.
Easton & Walker (1997)	Cross-section for 57 countries. Period: 1960-85	Log of 1985 GDP per capita	Investment rate, population growth, and freedom of institutions	Economic Freedom Index	The summary index is positivitely significat at 1% with 1% of increase in quality of institutions grade, making 0.61% increase in growth.

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