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THE IMPACT OF SUSTAINABLE EDUCATION ON ECONOMIC RESILIENCE IN IRAQ: HUMAN CAPITAL AS A MODERATING VARIABLE

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Abstract: Education is an important aspect in economic resilience. Iraq's educational and economic indicators reveal a compelling need to improve educational achievements in order to increase economic resilience. While previous studies have explored the relationships among education, human capital, and economic resilience in Iraq individually, this paper aims to empirically investigate the influence of sustainable education on economic resilience, considering the moderating role of human capital in Iraq from 1990 to 2022. Using the ARDL technique, the findings demonstrate that sustainable education has a positive and significant impact on economic resilience, with an increase in education by one year associated with an approximate 0.04% increase in economic resilience in the long run. Moreover, the impact of education on economic resilience in Iraq intensifies with higher levels of human capital. Specifically, the marginal effect of education on economic resilience ranges from 0.27 at the minimum level of human capital to 0.33 at the maximum level. Therefore, policymakers in Iraq should focus on improving education quality, promoting lifelong learning, and leveraging technology to enhance educational outcomes and human capital. To further develop human capital, policymakers should create and implement comprehensive programs encompassing education, health, and vocational training.

Keywords: Economic resilience, education, human capital, Iraq, ARDL model.

Introduction

Education is an essential factor to economic resilience, which is the capability of an economy to withstand, recuperate, and adjust to diverse economic shocks or disturbances (Bucci, Prettner, & Prskawetz, 2019; Pereira, Temouri, & Patel, 2020; Mora & Afriani, 2021; Widarni *et al*., 2022). The idea of economic resilience is well developed in economics literature, particularly concerning areas or countries that continually face economic hurdles. Several authors have illustrated the importance of education to economic resilience. For example, Li and Wang (2022) demonstrated that education has a positive influence on economic resilience. Du *et al*. (2019) further showed that human capital, particularly the number of employees with a high level of education is essential in fostering innovation and resilience.

Matanov (2009) also proposed that empowering women through education can lead to economic development, particularly in conflict-hit countries like Iraq. Education has been recommended as one of the strategies to improve economic resilience by developing adaptable social systems (Haider, 2021). This idea is also consistent with Huggins and Thompson (2015) argument that education improves adaptable skills and tolerance necessary for entrepreneurial resilience. Additionally, Jafar and Sabzalieva (2022) proposed the enhancement of local higher education opportunities to meet the demand for skilled workers in the Middle East to boost economic resilience. Iraq has been in turmoil, economically and politically, for some time in the last few decades.

Nonetheless, notwithstanding the obstacles, Iraq has good potential for economic expansion and progress, primarily thanks to the abundant natural resources and the strategic geographic position (Martin & Sunley, 2020; Asante, 2024). However, in order to realise its fulls, it is necessary for the country to address numerous shortages in education and human capital development (Shoib *et al*., 2022). Education and economic metrics of Iraq suggests the pressing need to improve educational outcomes to enhance economic resilience. Low- and middle-income countries such as Iraq, with literacy deficiencies also face health literacy problems. Moreover, the literacy rate in Iraq is relatively low compared to the regional and global averages, which implies the lack of quality primary education (Bucci, Prettner, & Prskawetz, 2019). Iraq has shockingly low rates of secondary and higher education attendance.

Human capital, which encompasses education, health, skills, and competencies is crucial for boosting economic resilience. It contributes to economic outcomes and it is particularly important in a time of uncertainty. Firms with strong human capital systems are more resilient to economic shocks because their workers have more complex and adaptive skills (Shoib *et al*., 2022). This is especially important for sectors that are easily affected by global economic trends. Moreover, human capital also enhances emotional resilience, helping people navigate through and bounce back from economic difficulties, which is particularly important for a country like Iraq, which has substantial economic and socio-economic disparities (Mora & Afriani, 2021; Widarni *et al*., 2022). Lastly, human capital is essential for adopting new technologies to promote economic development.

Human capital improves the connection between education and economic resilience through high productivity, creativity, and adaptive skills and mental resilience of the people. This supports the call that education should be well embedded in a country's human capital development for high and sustainable economic resilience (Mora & Afriani, 2021). Therefore, the current study aims to investigate the direct and the moderating effects of education on economic resilience in Iraq. The article will contribute to the literature in several ways. First, it provides evidence on Iraq, a country facing numerous economic issues. Second, the study contributes to the body of knowledge on the relationship between education and economic resilience by adding human capital as a moderating factor. Lastly, the findings will inform policymakers on how education and human capital can be utilised develop the country's economic resilience.

Literature Review

Education is a vital part of human capital, which involves acquiring basic information, talents, and skills that help develop both individuals and society (Asante, 2024). The role of this parameter in shaping economic outcomes is paramount since it ensures the optimal performance and adaptability of the workforce. Several indicators are used in assessing this factor, with one of the significant measures being the secondary school enrollment rate. This measure characterises how easy and common it is to pursue education at a critical stage in the growth of a human from birth to death. Asante (2024) describes the positive impact of the elimination of costs on the secondary school enrollment rate in Sub-Saharan Africa. According to the study, removing financial barriers can help increase enrollment rates, thereby markedly boosting education outcomes.

Maneejuk and Yamaka (2021) consider the influence of higher education on economic growth in ASEAN-5 states. The study emphasises the importance of secondary schools in developing students' skills before they pursue tertiary education and obtain economic benefits. The authors believe that combining secondary education with ICT training could improve educational and economic circumstances; thus, promoting more sustainable growth. Hence, increased enrollment in secondary school may indeed be a significant booster of both economic stability and social justice. Donou-

Adonsou (2019) explores the relationship between technology, education, and economic growth in the Sub-Saharan region. The authors' conclusions suggest that a combination of higher enrollment in secondary schools and benefits from technical innovation contribute to economic growth. Therefore, investing in secondary education is vital to harness technical progress and drive economic growth in the long run.

Economic resilience is defined as the extent to which an economy can survive, recover, and adjust to various economic shocks and disruptions. Martin and Sunley (2020) argue that the definition of resilience expanded to include immediate shock-absorbing capacities and subsequent recovery and adjustment. This indicator presents a clear measure of how disastrous economic disruptions are to overall economic activity and how quickly a steady state returns, as emphasised by Hallegatte (2014). Employment Resilience is measured by variations in the unemployment rate; for example, variations in the level of the labour market's ability to withstand and recover from disruptions (Simmie & Martin, 2010). A good labour market maintains or rapidly restores high employment levels, avoiding population-wide job loss. Structural Resilience is measured by trade openness, which is how integrated an economy is into global trade networks (Martin & Sunley, 2020).

High levels of trade openness spread economic risks across broader populations, minimising the intensity of localised shock, as shown by Simmie and Martin (2010). Institutional Resilience is measured by governance indicators such as regulatory quality, rule of law, and corruption control. These indicators provide information on how effective an economy's institutions respond maximally to crises, promoting stability and consistent policy enforcement. Knowing these characteristics offers complete information on how to evaluate an economy's resilience to economic disruptions, as well as structural and institutional capacities for long-term adjustment and expansion. Policymakers and scholars should seek a comprehensive approach to build economies more resilient towards multiple dangers (Martin & Sunley, 2020).

Furthermore, human capital is crucial to driving economic growth and development. As Appiah, Amoasi, and Frowne (2019) assert, human capital entails the totality of skills, knowledge, and competencies of the workforce, and it helps in increasing productivity, promoting innovation, and strengthening economies. One of the reliable indicators of human capital includes the Human Development Index (HDI) developed by the United Nations Development Programme. The HDI seeks to measure critical aspects of human development such as health, education, and income. Specifically, the HDI combines indicators of life expectancy at birth, the average number of years of schooling expected for students, the average number of years of schooling received by those aged seven years and older, and per capita income. The index provides an invaluable framework to measure human development and the relationship between education and health on one hand, and economic outcomes on the other. The index provides a holistic view of human capital by combining health and educational achievement and economic circumstances (Tsaurai & Ndou, 2019).

Appiah, Amoasi, and Frowne (2019) studied the influence of human development on Economic growth and development in the various countries and found that high scores on human development are associated with high economic productivity and quality of life. Thus, it is important to invest in human capital for economic growth and development in the future. Tsaurai and Ndou (2019) researched the relationship between infrastructure, human capital development and economic growth in transitional economies, and found that strong human capital as measured by the HDI was critical to enabling countries to use infrastructure investments to boost economic growth. Therefore, investing in human development will enhance the benefits of improved infrastructure, which will foster a more vibrant economy.

Rahim *et al.* (2021) used the resource-curse framework to look at the impact of human capital development on economic growth in the Next Eleven countries. They found that human capital can mitigate the adverse consequences of natural resource dependency on economic growth; therefore, demonstrating the potential of human capital development in the transformation of resource-rich economies by diversification and innovation. Jahanger *et al*. (2022) investigated the relationships between natural resources, human capital, globalisation, economic growth, and financial development, considering the implications of moderating technical breakthroughs. The study postulates that higher levels of human development proxied by the human development index are essential to realising benefits from globalisation and technical progress. Therefore, human resources are vital in solving the challenges of global economic interdependency and advancements in technology.

There is widespread agreement that education at all levels contributes greatly to economic growth by training a competent and flexible workforce. Researchers also agree on the need of investing in human capital to boost economic productivity and quality of life. Furthermore, the research literature agrees on the necessity for a holistic strategy for economic resilience that includes immediate the ability to absorb, recuperate, and adjust to long-term shocks. However, researchers such as Simmie and Martin (2010) and Martin and Sunley (2020) may use different metrics and indicators of resilience. Another point of contention is the extent to which human capital can offset the negative consequences of natural resource reliance. Rahim *et al*. (2021) and other researchers hold opposing viewpoints on this subject.

In short, the literature on economic resilience and human capital emphasises the importance of education, human development, and comprehensive resilience methods in fostering long-term economic success. Researchers believe that these characteristics are important, although they may disagree on their precise assessments and approaches to creating economic resilience and leveraging human capital.

Theoretical Background and Hypothesis Development

Effect of Education on Economic Resilience

According to human capital theory that underlies the term "investing" in people, the relationship between economic resilience and education is clear. It implies that the knowledge, skills, and competencies learned in the course of education help employees and employers adjust and respond to changing economic parameters and unexpected changes (Lee *et al*., 2022). This conceptual framework can be further developed using the theory of economic growth and the theory of social capital, which provide additional angles on how education affects economic resilience. The theory of economic growth posits that education improves productivity by providing producers with relevant knowledge and skills, thereby expanding total output and resilience of the economy. The latter is due to various reasons such as a higher likelihood of educated people to innovate or start new companies and contribute to the economic development (Martin & Sunley, 2020). These aspects are particularly needed in times of unexpected changes. For example, areas where more people have a degree recover faster from economic shocks since well-educated people regain their place in high-diversity industries rather than low-diversity ones (Romer, 1990). Social capital theory, in the context of education, presents a more sophisticated understanding of how education helps develop networks, trust, and norms for people sharing knowledge and helping each other.

In the face of economic troubles, social capital is a powerful framework because it allows people to collaborate across different social and economic levels, thereby adding to the overall economic resilience of a community. Giannakis and Bruggeman (2020) provide an example of

a research study, which dealt with economic resilience from the perspective of educational attainment levels (Lucas, 1988). Their study shows that differences in educational attainment between urban and rural areas translate into economic resilience differences. Indeed, places with many educated residents can more easily cope and recover from economic shocks because they have a more skilled and adaptive workforce (Putnam, 1995). In a closely related example, Tan *et al*. (2020) provide empirical linkages between industrial adaptability and the level of education of the workforce in resource-based cities. In economies experiencing structural transition or shock to a particular sector, education becomes necessary for teaching the workforce to switch sectors. The hypothesis of the current research on Iraq can be formulated as follows, drawing on different theoretical and empirical evidence.

H1: Higher levels of educational attainment in Iraq are positively associated with increased economic resilience.

Moderating Effect of Human Capital

Human capital, which is defined as education, health, skills, and competencies is important to a nation's economic resilience. Moreover, the impact of human capital on economic outcomes might be considerable, especially during economic shocks and instabilities. Indeed, human capital is central to the resilience or otherwise of the labour force in adjusting to economic shortfalls. It should be noted that human capital is more than purely educational attainment and it includes the quality and relevance of education, health, and capacity to put skills into use, commensurate with economic changes. According to Bucci *et al.* (2019): "Investments in human capital have two effects: They increase the productive potential of an economy and they increase the resilience of populations to economic shocks by leading to innovation and technological adoption".

Pereira *et al.* (2020) explore human capital as a vital trait of strong and resilient companies. They find that firms with strong human capital are more likely to have a high capacity to bear economic shocks. The level of this trait is seen in the advanced skills and colour of the employees. This finding underscores the importance of human capital in both organisational and economic resilience, especially in industries that are very sensitive to the putting into practice of global economic dynamics.

Mora and Afriani (2021) provide a psychologically related perspective of human capital by highlighting the role of human capital in building students' resilience against education and economic imbalances. They found that investment in human capital not only eases economic challenges but also makes people psychologically resilient in facing socio-economic imbalances. This perspective is important, especially in countries like Iraq, which have stark economic and social divides. Widarni *et al*. (2022) explore the impact that human capital and internet literacy has on economic improvement in Indonesia. This perspective gives an indication of a society's capacity to use new technological tools and resources to gain economic stability. In summary, from the above-mentioned insights, the following hypothesis is proposed for this study:

H2: The moderating effect of human capital significantly strengthens the relationship between educational attainment and economic resilience in Iraq (Figure 1).

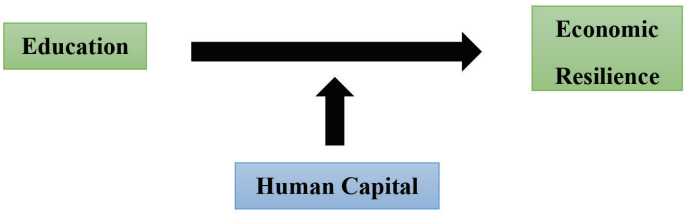

Figure 1: Proposed conceptual framework of the study

Methodology

Method of Estimation

In order to assess the influence of education on economic resilience in Iraq, we employed the ARDL technique and limit testing to the cointegration framework developed by Pesaran *et al.* (2001). This analysis also considered the moderating effect of human capital. The ARDL(p, q) model may be expressed using the generic formula as described by Goh *et al*. (2017).

$$y_t = \alpha_0 + \delta t + \sum_{i=1}^{p} \alpha_i y_{t-i} + \sum_{j=0}^{q} \beta_j x_{t-j} + \varepsilon_t \quad (1)$$

The variables are indicated by the lags i and j, where i ranges from 1 to p and j ranges from 0 to q. The regress variable is denoted as yt while y_{t-i} and x_t represent the explanatory variables. The lagged values of the regress variable are included as regressors. The parameters for the lagged regressors are αi and βj. The intercept and trend are denoted as αi and δ, respectively. The error term is represented as ε_t. Equation (1) may be transformed into an unconstrained error correction model (UECM) to analyse both the short-term dynamics and long-term equilibrium route.

$$\begin{aligned} \Delta ERI_t = {} & \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta ERI_{t-i} + \sum_{n=0}^{k} \alpha_2 \Delta SEC_{t-n} + \sum_{c=0}^{s} \alpha_3 \Delta GDPPC_{t-c} + \\ & \sum_{l=0}^{r} \alpha_4 \Delta HC_{t-l} + \sum_{j=0}^{q} \alpha_5 \Delta PS_{t-j} + \sum_{j=0}^{q} \alpha_6 \Delta LURB\_P_{t-j} + \beta_1 ERI_{t-1} + \beta_2 SEC_t + \\ & \beta_3 GDPPC_t + \beta_4 HC_t + \beta_5 PS_t + \beta_6 LURB\_P_t + \varepsilon_t \end{aligned} \quad (2)$$

The symbol Δ represents the first-difference operator. The symbols i, n, c, l, j, and b represent the lags taken for each variable. α_1, . . ., α_6 represent the short-run parameters, whereas β_1, . . ., β_6 represent the long-run parameters. α_0 represents the intercept while ε_t represents the error term. Given the presence of a cointegration relationship, we may calculate short-run elasticities by creating an Error Correction Model (ECM) in the following manner:

$$\begin{aligned} \Delta ERI_t = {} & \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta ERI_{t-i} + \sum_{n=0}^{k} \alpha_2 \Delta SEC_{t-n} + \sum_{c=0}^{s} \alpha_3 \Delta GDPPC_{t-c} + \\ & \sum_{l=0}^{r} \alpha_4 \Delta HC_{t-l} + \sum_{j=0}^{q} \alpha_5 \Delta PS_{t-j} + \sum_{j=0}^{q} \alpha_5 \Delta LURB\_P_{t-b} + \varphi ECM_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

where φ is the parameter of the ECM_(t-1). The phrase refers to the rate at which a system returns to its stable state over a lengthy period of time following a sudden disturbance in the short term.The ARDL approach yields superior outcomes for small sample sizes compared to other cointegration strategies due to the presence of a greater bias commonly observed in predictive modelling but not in explanatory modelling.

Econometric Model

Following the theoretical foundations and empirical studies (Al-Ani & Al-Attabi, 2016; Mohammed & Abdullah, 2017; Abbas & Al-Dajani, 2018; Salih & Mohammed, 2019; Al-Qudsi & Al-Ameedi, 2020), among others, we define the functional form of our model as follows:

$$ERI = f\,(SEC, GDPPC, HC, PS, LURB\_P) \quad (4)$$

According to Equation 4, the dependent variable is the Economic Resilience Index (ERI) while independent variables are secondary school enrollment (SEC), GDP per capita growth (GDPPC), human capital (HC), political stability (PS), and urban population (LURB_P). It means that a change in Economic Resilience is brought by changes in education, GDP per capita growth, human capital, political stability, and urban population. Accordingly, the model specification for this objective shall take the following form:

$$ERI_{it} = \beta_0 + \beta_1 ERI_{it-1} + \beta_2 SEC_{it} + \beta_3 GDPPC_{it} + \beta_4 HC_{it} + \beta_5 PS_{it} + \beta_6 LURB\_P_{it} + \mu_{it} \quad (5)$$

The variable ERI_(t-1) represents the lagged value of Economic Resilience with an order of 1. The term μ represents the residual term. The index i represents a nation, with i ranging from 1 to n. The index t represents time, with t ranging from 1 to n. The coefficient β_0 represents the constant term while β_1, β_2, β_3, β_4, β_5, and β_6 represent the coefficients of the regressors that need to be estimated.

This study contends that the influence of education on economic resilience in Iraq is contingent upon the effects it has on human capital, which earlier research on education and economic resilience failed to consider. Consequently, our study included an interaction term in the model to investigate the effects of education and human capital on economic resilience, as seen below:

$$ERI_{it} = \beta_0 + \beta_1 ERI_{it-1} + \beta_2 SEC_{it} + \beta_3 GDPPC_{it} + \beta_4 HC_{it} + \beta_5 PS_{it} + \beta_6 LURB\_P_{it} + \beta_7 INTER(SEC * HC)_{it} + \mu_{it} \quad (6)$$

INTER (SEC*HC) refers to the intersection of education and human capital. The β_2 coefficient represents the impact of education on economic resilience, excluding the influence of human capital. The β_4 coefficient represents the impact of human capital on economic resilience in the absence of any schooling. Subsequently, the marginal effects of the interaction term are calculated. Brambor *et al*. (2006) provide an equation that represents the marginal impact.

$$\frac{\delta ERI}{\delta SEC} = \beta_2 + \beta_7 HC_{it} \quad (7)$$

Source and Measurement of Variables

This paper employs annual data from Iraq from 1990 to 2022 and the period is chosen based on the available data. This study utilised Economic Resilience Index to measure Economic Resilience as a dependent variable.

To calculate this index, the author chose indicators that represent different aspects of economic resilience such as GDP growth, unemployment rates, government spending, domestic credit, trade openness, and institutional quality. Each indicator was then converted to a common scale (typically from 0 to 1) using a method like min-max normalisation. This step makes different indicators comparable by eliminating scale differences. Then, each indicator was assessed how much it should contribute to the overall resilience index. For each aspect of resilience (like output, employment, and fiscal), we combined the normalised indicators into a sub-index. Lastly, sub-indices were combined to form the overall Economic Resilience Index. This aggregation is typically a weighted average of the sub-indices.

Moreover, this study uses secondary school enrollment (SEC), GDP per capita growth (GDPPC), human capital (HC), political stability (PS), and urban population (LURB_P) as regressors, and we constructed their data from the indicators of the world development indicators (WDI) of the World Bank Group database, as indicated in Table 1.

Table 1: Summary of the variables and data

Variable	Measurement	Data Source
Economic resilience	Economic Resilience Index (ERI) (0-1)	Indicators of World Development (WDI), World Bank
Education	Urban population (LURB_P)	Indicators of World Development (WDI), World Bank
Political stability	Political stability index (-2.5: +2.5)	Indicators of World Development (WDI), World Bank
Economic development	GDP per capita growth (GDPPC)	Indicators of World Development (WDI), World Bank
Human capital	Human capital index (HC)	Indicators of World Development (WDI), World Bank
Education	Percentage of gross secondary school enrolment	Indicators of World Development (WDI), World Bank

Empirical Results and Discussion

Descriptive Statistics and Correlation Matrix

Table 2 provides summary statistics for the variables used in the analysis. That is, it reports the mean, median, maximum, minimum, and standard deviation for each variable across the 31 observations. The means and standard deviations provide an overview of the central tendency and dispersion of the data. For example, the ERI has a relatively low standard deviation compared to GDP per capita growth, indicating less variability in economic resilience across observations.

Table 3 shows the correlation coefficients between the variables. ERI has a positive correlation with SEC, HC, PS, and LURB_P, suggesting that higher levels of these variables are associated with greater economic resilience. For example, there is a significant positive correlation between Human Capital (HC) and Economic Resilience (ERI), suggesting that higher human capital is associated with higher economic resilience. Similarly, urban population is also positively correlated with ERI, indicating that urbanisation may contribute to economic resilience. Furthermore, SEC has a strong positive correlation with HC and LURB_P, indicating that countries with higher secondary school enrollment tend to have higher human capital and urbanisation levels. However, GDPPC has a negative correlation with HC, SEC, and LURB_P, which seems counter-intuitive and may require further investigation.

Table 2: Descriptive statistics

	ERI	SEC	GDPPC	HC	PS	LURB_P
Mean	0.663691	52.41179	5.397419	2.037874	-2.204355	16.82008
Median	0.689908	50.49810	3.040000	2.103900	-2.260000	16.80586
Maximum	0.985082	76.81600	55.89000	2.328113	-1.530000	17.27340
Minimum	0.126364	34.13835	-38.56000	1.581104	-2.830000	16.32584
Std. Dev.	0.248431	13.51286	15.77881	0.229293	0.376892	0.285368
Obs.	31	31	31	31	31	31

Table 3: Correlation matrix

	ERI	SEC	GDPPC	HC	PS	LURB_P
ERI	1					
SEC	0.1988159	1				
GDPPC	-0.0767312	-0.242810	1			
HC	0.5373403	0.7550629	-0.511319	1		
PS	0.1577953	-0.5247481	0.0752911	-0.337457	1	
LURB_P	0.4329873	0.7115283	-0.472910	0.7785721	-0.345230	1

Unit Root Tests

The results of two unit root tests, Phillips-Perron and Augmented Dickey-Fuller are reported in Table 4 to check the non-stationarity properties of the variables. The results reveal that most of the variables are non-stationary at equal levels but stationary after first differencing. This is common in macroeconomic and socioeconomic variables, as inferred from different empirical

Table 4: Unit root tests

PP Test							
At level							
		ERI	**SEC**	**GDPPC**	**HC**	**PS**	**LURB_P**
With constant & trend	t-statistic	-1.0719	-2.5715	-12.1193	0.3170	-2.4952	-1.9498
	Prob.	**0.9162**	**0.2947**	**0.0000**	**0.9979**	**0.3281**	**0.6055**
At first difference							
		d(ERI)	**d(SEC)**	**d(GDPPC)**	**d(HC)**	**d(PS)**	**d(LURB_P)**
With constant & trend	t-statistic	-4.0183	-3.0768	-39.8912	-2.2205	-4.8669	-3.3669
	Prob.	**0.0209**	**0.0292**	**0.0000**	**0.0062**	**0.0024**	**0.0545**
ADF Test							
At level							
		ERI	**SEC**	**GDPPC**	**HC**	**PS**	**LURB_P**
With constant & trend	t-statistic	-1.6270	-4.1033	-9.2489	-1.2959	-3.6978	-3.5888
	Prob.	**0.7515**	**0.0164**	**0.0000**	**0.8664**	**0.0393**	**0.0485**
At first difference							
		d(ERI)	**d(SEC)**	**d(GDPPC)**	**d(HC)**	**d(PS)**	**d(LURB_P)**
With constant & trend	t-statistic	-4.9067	-2.4382	-3.5393	-2.4205	-4.8653	-3.1223
	Prob.	**0.0033**	**0.0531**	**0.0558**	**0.0361**	**0.0024**	**0.0207**

Notes: (*), (**), and (***) significant at the 10%, 5%, 1%, and (no) not significant.

studies (Gujarati & Porter, 2009; Asteriou & Hall, 2011). The unit root tests confirmed that GDPPC and HC are stationary at level when other variables are integrated at order one, 1, meaning that they are stationary after first differencing. This is essential for the validity of an ARDL model since it has the capability of addressing variables of mix Integrations 10 and 11.

Estimation Results Without Interaction

Table 5 presents the long-run coefficients from the Autoregressive Distributed Lag (ARDL) model without considering the interaction effect between SEC and HC. The results show that SEC, GDPPC, and HC have a statistically significant positive impact on ERI in the long run while PS and LURB_P are not significant. This suggests that improvements in human capital and secondary school enrolment significantly enhance economic resilience. That is, an increase in SEC by one year is associated with an increase in ERI by approximately 0.04% in the long run.

The results of this research are consistent with earlier studies that have identified a correlation between education, economic growth, and economic resilience (Briguglio *et al*., 2009; Caldera Sánchez *et al*., 2016). Nevertheless, several researches have emphasised the significance of political stability and urbanisation for economic resilience, which challenges the notion of their insignificance (Noy, 2009; Naude *et al*., 2009).

Table 5 displays the short-term estimates derived from the Error Correction Model (ECM) without considering the interaction effect. The error correction term coefficient (CointEq(-1)) is both negative and statistically significant, suggesting the existence of a long-term equilibrium relationship. This means that deviations from the long-term equilibrium are corrected relatively quickly. These findings are consistent with the results obtained from the F-Bounds test, as shown in Table 5. The short-term dynamics demonstrate that the previous change in ERI, as well as the changes in HC and LURB_P have substantial effects on the present change in ERI. The R-squared score of 0.7652 indicates that the model accounts for a significant amount of the variability in the dependent variable. The results align with the current body of research on the immediate-term behaviour of economic resilience and the factors

Table 5: Long-run and short-run estimates (without interaction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPPC	0.005666	0.002067	2.740973	0.0145
HC	2.293705	0.450620	5.090112	0.0001
SEC	0.039812	0.007526	5.289924	0.0001
PS	0.067792	0.121998	0.555683	0.5861
LURB_P	0.317616	0.492055	0.645488	0.5278
Constant	-7.320236	7.369949	-0.993255	0.3354
D(ERI(-1))	0.412524	0.098552	4.185856	0.0007
D(HC)	-11.10066	2.141136	-5.184469	0.0001
D(LURB_P)	5.118904	1.271212	4.026789	0.0010
CointEq(-1)*	-1.058563	0.128065	-8.265843	0.0000
Adjusted R-squared			0.7652	
F-statistic			7.0986	
Signif.			I(0)	I(1)
1%			4.134	5.761

that influence it (Briguglio *et al*., 2009; Caldera Sánchez *et al*., 2016). For instance, the strong connection between urban population and economic resilience aligns with the findings of Glaeser *et al*. (1995), who explore the economic benefits of urban agglomerations.

The F-bounds test results are presented in Table 5. This test is utilised to determine the presence of a long-term link between the variables in the ARDL model, excluding the interaction effect. The F-statistic (7.0986) surpasses the critical values at all significant levels, indicating the existence of a long-term cointegrating link among the variables. This conclusion aligns with the theoretical frameworks and empirical findings that substantiate the presence of enduring connections between economic resilience and its factors such as education, economic growth, and human capital (Briguglio *et al*., 2009; Caldera Sánchez *et al*., 2016).

Estimation Results with Interaction

Table 6 presents the long-term coefficients from the ARDL model with the interaction effect between SEC and HC. As shown in Table 6, the SEC, GDPPC, HC, the interaction term, PS, and LURB_P positively and significantly impact ERI. The positive and significant coefficient of the Interaction term (SECHC) implies that the impact of secondary education on economic resilience is moderated by the increase in levels of people possessing formal skills. Both the individual effects of SEC and HC were 0.0398 and 0.1040, respectively. When the interaction effect (SECHC) is considered, the total effect on ERI increases to 0.1444, showing that the combined effort of school enrollment and possessing formal skills is higher than their individual effects. Therefore, secondary education cannot in isolation promote economic resilience; it must be supported by the human capital for full economic resilience. The finding is consistent with the literature, which shows the relationship between two dimensions of education in complementing economic resilience and sustainable development (Hanushek & Woessmann, 2008; Suri *et al*., 2011). For example, Hanushek and Woessmann (2012) show that cognitive skills play a significant role in economic growth and Barro (1991) describes the role of human capital in promoting economic development.

Table 6 also reports the short-run estimates from the ECM with the interaction effect. Similar to Table 5, the coefficient of the error correction term is negative and statistically significant, confirming the long-run equilibrium relationship. This shows that the short-run dynamics indicate significant adjustments towards long-run equilibrium, with the error correction term showing rapid adjustment. In the short run, the lagged change in ERI is the only significant variable influencing the current change in ERI.

The R-squared value (0.7813) is slightly higher than in the model without the interaction effect, indicating a good fit. While the short-run dynamics differ slightly between the two models, the overall findings are generally consistent with the existing literature on the short-term determinants of economic resilience (Briguglio *et al*., 2009; Caldera Sánchez *et al*., 2016). This result reinforces the findings from Table 5 and supports the theoretical and empirical evidence that suggests the existence of a long-term equilibrium relationship between economic resilience and its determinants, including the interaction between education and human capital (Briguglio *et al*., 2009; Suri *et al*., 2011). The F-statistic (6.9282) exceeds the upper bound critical values at all significance levels, indicating the presence of a long-term cointegrating relationship among the variables when the interaction effect is considered.

Diagnostics Tests

The diagnostic tests confirm the reliability of the model as testing shows no significant issues with autocorrelation, heteroscedasticity, or misspecification. Table 6 demonstrates the results of the diagnostic tests of the model with the interaction term. The Breusch-Godfrey serial correlation LM Test is a statistical test

used to detect serial correlation of any order in the residuals of a regression model. Given the fact that the p-value of the F-statistic is 0.2640, which is greater than the standard thresholds, the null hypothesis that there is no serial correlation for the given lags, in our case, 2 cannot be rejected. This result indicates that no autocorrelation is present in this model, which is important for accurate statistical inference. This result is consistent with the requirements and assumptions of the ARDL modelling Pesaran *et al*. (2001) technique.

Moreover, Table 6 also demonstrates the results of the Breusch-Pagan-Godfrey heteroscedasticity test. It tests the null hypothesis of the homoscedasticity of the model. Since the p-value of the F-statistic is 0.1108, which is greater than the standard thresholds, the results indicate that no heteroscedasticity is present in this model. This result suggests that statistical inference would be accurate and parameter estimation would be effective. Furthermore, the outcomes of the Ramsey RESET test, which is used to check the specification of the regression model cannot reject the null hypothesis of no misspecification with the p-value of the F-statistic of 0.9901. This result suggests that the model describes the reality properly and no issues with the form of the function or the omitted variable bias is present. Therefore, the coefficients are reliable and the conclusion is accurate. Finally, the residuals of our econometric model have normal distribution with a Jarque-Bera statistic of 0.77 and p-value of 0.705, which cannot reject the null hypothesis of normality of the residuals.

Marginal Effect

The marginal effects are calculated using the coefficients of SEC and the interaction term (INTER) from the long-term estimates with the interaction effect (Table 6). The marginal effect of SEC on ERI increases as the level of HC increases, ranging from 0.2717 (0.1444+0.0805*1.5811) at the minimum level of HC to 0.3319 (0.1444+0.0805*2.3281) at the maximum level of HC. This finding reinforces the complementary roles of education and human capital in promoting economic resilience, as suggested by the existing literature (Hanushek & Woessmann, 2008; Suri *et al*., 2011). In other words, such a marginal effect of SEC on ERI indicates that the impact of secondary education on economic resilience is amplified when human capital is higher, as can be seen from the representation below:

$$\textit{Marginal Effect (ME)} = \frac{\delta ERI}{\delta SEC} = \beta_2 + \beta_7 HC$$

$$\text{At Minimum } (HC) = 1.5811, \text{ Marginal Effect (ME)} = \frac{\delta ERI}{\delta SEC} = 0.1444 + 0.0805\,(1.5811) = 0.2717.$$

$$\text{At Mean } (HC) = 2.0379, \text{ Marginal Effect (ME)} = \frac{\delta ERI}{\delta SEC} = 0.1444 + 0.0805\,(2.0379) = 0.3085.$$

$$\text{At Maximum } (HC) = 2.3281, \text{ Marginal Effect (ME)} = \frac{\delta ERI}{\delta SEC} = 0.1444 + 0.0805\,(2.3281) = 0.3319.$$

Both figures (Figure 2) show that the cumulative sum of recursive residuals is within the two critical lines. Thus, the regression coefficients are stable within the sample range. It implies that the estimated coefficients are suitable for making inferences about the sample data and can be used to infer policy. As shown in the diagram, there is no evidence for the existence of significant changes or signs of instability. In general, all the econometric tests and checks in this research indicate that the ARDL regression model is adequately specified, valid assumptions assumed, and inferences to be drawn from the model estimates are reliable and generalisable. This study's findings mainly concur with existing literature, even though some variations were observed, including some variables not significant in some model specifications such as political stability and urbanisation.

Table 6: Long-run and short-run estimates (with interaction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPPC	0.006118	0.001673	3.657536	0.0019
HC	4.131107	0.369258	11.18759	0.0000
SEC	0.144415	0.036698	3.935186	0.0011
INTER	0.080524	0.017393	4.629716	0.0002
PS	0.142769	0.069249	2.061692	0.0549
LURB_P	1.817444	0.568425	3.197336	0.0053
Constant	-36.82675	9.765599	-3.771069	0.0015
D(ERI(-1))	0.470070	0.094911	4.952729	0.0001
CointEq(-1)*	-0.998392	0.112866	-8.845808	0.0000
Adjusted R-squared				0.7813
Breusch-Godfrey serial correlation LM (P-value)				0.2640
Breusch-Pagan-Godfrey Heteroscedasticity (P-value)				0.1108
Ramsey RESET (P-value)				0.9901
Jarque-Bera statistic (P-value)				0.7051
F-statistic				6.9282
Signif.	**I(0)**	**I(1)**		
5%	2.794	4.148		

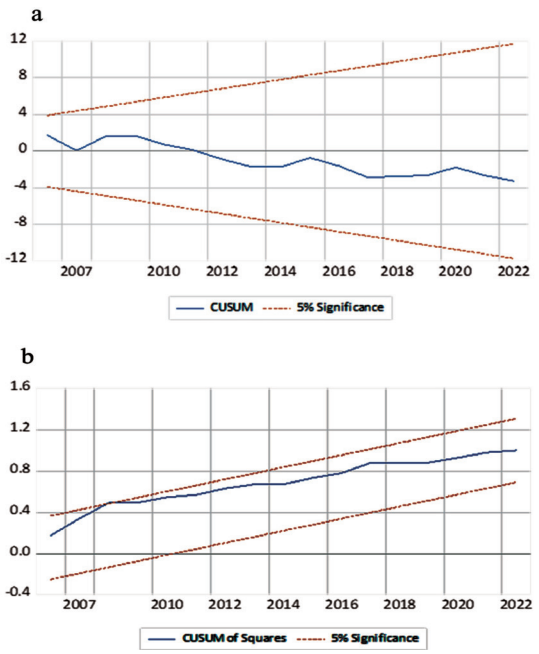

Figure 2: (a) CUSUM and (b) CUSUMSQ plots

Note: CUSUM is the Cumulative Sum of Recursive Residuals and CUSUMSQ is the Cumulative Sum of Squares of Recursive Residuals

In a nutshell, the ARDL analysis robustly supports the hypothesis that human capital and secondary school enrolment significantly contribute to economic resilience. The interaction effect further emphasises that the combined impact of education and human capital is substantial. These findings are consistent with existing literature, suggesting a consensus on the pivotal role of human capital and education in economic resilience. The diagnostic tests further validate the model, ensuring the reliability of the results.

Conclusions and Limitations

The objective of this research was to investigate the effect of education on economic resilience in Iraq with the moderating factor of human capital. This study contributes to the body of empirical research on a country plagued with varying economic problems using the ARDL methodology. This research is pertinent to the literature since it demonstrates a nuanced understanding of the impact of education on economic resilience and adds a moderating factor to the analysis. However, the findings could not have been feasible without merging human capital as an effect modifier into the analysis, as it showed the subtle connection arising at lower levels of education.

Specifically, they show that economic resilience increases significantly with the level of education and even more, human capital increases the level of economic resilience. Education and human capital interact in an amplified manner when the two are analysed together. Though they are separable factors, they working hand in hand to increase economic resilience due to the novelty, adaptiveness and psychological resilience that both factors bring to bear in responding to scenarios. Additionally, the results of this analysis are consistent with previous studies that show increasing education and human capital increases economic stability and growth. The findings highlight the need for comprehensive human capital strategies to preserve economic stability and long-term growth in Iraq. The implications for policy are improved plans to invest in learning, improving the quality and relevance of instruction, and creating scenarios for education and training that will allow employees to develop proficiency as their job evolves according to economic conditions. Future research could build on this investigation of the factors influencing economic resilience and research various areas on a different scale. Moreover, the work could use additional data on each component influencing economic resilience to understand each facet's significance to the overall outcome. Complementary research could also use more sophisticated econometric techniques or data and analyse more nations to achieve a better cultivated grasp of what makes economic resilience.

Despite the useful insights offered by this study, a few limitations should be mentioned. First, the study is based on the ARDL technique, which, while robust may not capture all of the dynamic linkages between education, human capital, and economic resilience. Second, the analysis is limited to Iraq, restricting the applicability of the findings to other countries with differing economic, social, and educational circumstances. Furthermore, the study focuses on secondary and higher education, which may miss the effects of elementary school and informal learning systems. Future study should look at a larger range of educational levels and approaches to confirm and build on these findings.

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Conflict of Interest Statement

The authors declare that they have no conflict of interest.

References

Abbas, H. H., & Al-Dajani, A. (2018). The role of human capital in economic development: A study applied on Iraq for the period (1980-2016). *International Journal of Economics, Commerce and Management*, *6*(9), 10-26.

Al-Ani, M. A., & Al-Attabi, A. M. (2016). The effect of education on economic growth in Iraq: An empirical study (1970-2014). *International Journal of Economics, Commerce and Management, 4*(8), 55-72.

Al-Jumaili, A., Al-Rekabi, M., & Sorofman, B. (2015). Evaluation of instruments to assess health literacy in arabic language among iraqis. *Research in Social and Administrative Pharmacy, 11*(6), 803-813.

Al-Qudsi, S. A., & Al-Ameedi, S. A. (2020). The impact of education on economic growth in Iraq: An empirical study for the period 2004-2019. *International Journal of Business and Management*, *15*(5), 1-14.

Appiah, M., Amoasi, R., & Frowne, D. I. (2019). Human development and its effects on economic growth and development. *International Research Journal of Business Studies, 12*(2), 101-109.

Asante, G. (2024). The effects of cost elimination on secondary school enrolment in Sub-Saharan Africa. *Educational Review*, *76*(3), 561-585.

Asteriou, D., & Hall, S. G. (2011). *Applied econometrics* (3rd ed.). Palgrave Macmillan.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, *106*(2), 407-443.

Brambor, T., Clark, W. R., & Golder, M. (2006). Understanding interaction models: Improving empirical analyses. *Political Analysis*, *14*(1), 63-82.

Briguglio, L., Cordina, G., Farrugia, N., & Vella, S. (2009). Economic vulnerability and resilience: Concepts and measurements. *Oxford Development Studies*, *37*(3), 229-247.

Bucci, A., Prettner, K., & Prskawetz, A. (2019). *Human capital and economic growth: The impact of health, education and demographic change*. Milano: Springer. 10, 978-3.

Bui, T. N. (2020). Impacts of interest rate on housing prices: Evidence from Ho Chi Minh City, Vietnam. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, *11*(5), 1-7.

Caldera Sánchez, A., Rasmussen, M., & Woodworth, O. R. (2016). How resilient were OECD health care systems during the "refugee crisis"? *OECD Economics Department Working Papers*, No. 1386.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*, 1057-1072.

Donou-Adonsou, F. (2019). Technology, education, and economic growth in Sub-Saharan Africa. *Telecommunications Policy*, *43*(4), 353-360.

Du, J., Yao, X., & You, L. (2019). Human capital, regional innovation, and economic resilience. *Economic Modelling*, *81*, 324-336.

Elliott, J., Das, D., Cavailler, P., Schneider, F., Shah, M., Ravaud, A., Lightowler, A., & Boulle, P. (2018). A cross-sectional assessment of diabetes self-management, education and support needs of syrian refugee patients living with diabetes in Bekaa Valley Lebanon. *Conflict and Health, 12*(1).

GENÇ, M. C. (2015). The impact of external debt on economic growth in Turkey: An ARDL Bounds Testing Approach. *Paradoks: The Journal of Economics, Sociology & Politics*, *11*(1).

Giannakis, E., & Bruggeman, A. (2020). Regional disparities in economic resilience in the European Union across the urban–

rural divide. *Regional Studies*, *54*(9), 1200-1213.

Glaeser, E. L., Scheinkman, J., & Shleifer, A. (1995). Economic growth in a cross-section of cities. *Journal of Monetary Economics*, *36*(1), 117-143.

Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics*. McGraw-hill.

Haider, M. (2021). Education and economic resilience: Developing adaptable social systems. *Journal of Development Studies*, *57*(4), 567-589.

Hallegatte, S. (2014). Economic resilience: Definition and measurement. *World Bank Policy Research Working Paper*, (6852).

Hanushek, E. A., & Woessmann, L. (2008). The role of cognitive skills in economic development. *Journal of Economic Literature*, *46*(3), 607-668.

Hanzaei, R., & Tafti, M. D. (2016). Analysis of the dynamics of housing prices in Iran using ARDL Approach. *Journal of Administrative Management, Education and Training*, *12*(2), 77-88.

Huew, R., Waterhouse, P., Moynihan, P., & Maguire, A. (2011). Prevalence and severity of dental caries in Libyan schoolchildren. *International Dental Journal*, *61*(4), 217-223.

Huggins, R., & Thompson, P. (2015). Entrepreneurship, innovation, and regional growth: Network effects on economic resilience. *Regional Studies*, *49*(5), 833-855.

Jafar, A., & Sabzalieva, E. (2022). Higher education in the Middle East: Expanding opportunities for economic resilience. *International Journal of Educational Development, 86*, 102450.

Jahanger, A., Usman, M., Murshed, M., Mahmood, H., & Balsalobre-Lorente, D. (2022). The linkages between natural resources, human capital, globalisation, economic growth, financial development, and ecological footprint: The moderating role of technological innovations. *Resources Policy*, *76*, 102569.

Lee, C. T., Hu, J. L., & Kung, M. H. (2022). Economic resilience in the early stage of the COVID-19 pandemic: An across-economy comparison. *Sustainability*, *14*(8), 4609.

Li, X., & Wang, Y. (2022). Education and regional economic resilience: Evidence from China. *Growth and Change*, *53*(2), 201-220.

Loh, L. H., Khoo, M. R., Lee, Y. Z., Tan, J. M., & Wong, P. K. (2017). *The determinants of house prices from macroeconomics perspective in Malaysia* [Doctoral dissertation, UTAR].

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3-42.

Maneejuk, P., & Yamaka, W. (2021). The impact of higher education on economic growth in ASEAN-5 countries. *Sustainability*, *13*(2), 520.

Martin, R., & Sunley, P. (2020). Regional economic resilience: Evolution and evaluation. In *Handbook on regional economic resilience* (pp. 10-35). Edward Elgar Publishing.

Matanov, P. (2009). Women's education and economic resilience in post-conflict societies. *Development Policy Review*, *27*(5), 565-584.

Mohammed, H. H., & Abdullah, Z. M. (2017). The impact of human capital on economic growth: The case of Iraq (1980-2016). *Journal of Economics, Finance and Administrative Science*, *22*(42), 77-87.

Mora, A. G. O., & Afriani, I. A. H. (2021). Increasing the resilience of students in educational and economic inequalities from a psychological and human capital point of view: English. *Tamansiswa Management Journal International*, *1*(1), 41-44.

Nabi, N. T., & Mostefa, A. M. (2022). Risk factors associated with overweight and obesity among primary school children in Duhok. *Journal of Duhok University*, *25*(2), 346-354.

Naudé, W., Santos-Paulino, A., & McGillivray, M. (2009). *Vulnerability in developing countries: Implications and conclusions*. Deakin University.

Njaramba, S. G., Gachanja, P., & Mugendi, C. (2018). The sources of housing prices growth in Kenya. *International Journal of Economics*, *3*(1), 7-29.

Noy, I. (2009). The macroeconomic consequences of disasters. *Journal of Development Economics*, *88*(2), 221-231.

Ong, S. E., & Sing, T. F. (2002). Price discovery between private and public housing markets. *Urban Studies*, *39*(1), 57-67.

Pereira, V., Temouri, Y., & Patel, C. (2020). Exploring the role and importance of human capital in resilient high performing organisations: Evidence from business clusters. *Applied Psychology*, *69*(3), 769-804.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289-326.

Phillips, P. (1988). Testing for unit roots in time series regression. *Biometrika*, *71*, 599-607.

Putnam, R. D. (1995). Tuning in, tuning out: The strange disappearance of social capital in America. *PS: Political Science & Politics*, *28*(4), 664-683.

Rahim, S., Murshed, M., Umarbeyli, S., Kirikkaleli, D., Ahmad, M., Tufail, M., & Wahab, S. (2021). Do natural resources abundance and human capital development promote economic growth? A study on the resource curse hypothesis in next eleven countries. *Resources, Environment and Sustainability*, *4*, 100018.

Romer, P. M. (1990). Capital, labor, and productivity. Brookings papers on economic activity. *Microeconomics*, *1990*, 337-367.

Salih, A. A. M., & Mohammed, M. T. (2019). The impact of education on economic growth in Iraq (1990-2017). *International Journal of Management, Accounting and Economics*, *6*(11), 759-776.

Shabila, N., Al-Tawil, N., Al-Hadithi, T., & Sondorp, E. (2010). Assessing the health system in Iraq: Challenges and opportunities. *Global Public Health*, *5*(6), 585-594.

Shoib, S., Lodi, A., Saleem, A., Armiya'u, A. Y. U., Turan, S., & Philip, S. (2022). Public health literacy unsold during panic buying. *Annals of Medicine and Surgery*, *80*, 104156.

Simmie, J., & Martin, R. (2010). The economic resilience of regions: Towards an evolutionary approach. *Cambridge Journal of Regions, Economy and Society*, *3*(1), 27-43.

Sulaiman, S. J., & AlAni, M. H. (2020). Prevalence of obesity and physical activity among primary school children in Erbil City/Iraq. *Mosul Journal of Nursing*, *8*(1), 6-17.

Summerfield, J., & Regan, L. (2021). How can we achieve sustainable development goal-5: Gender equality for all by 2030? *Clinical Obstetrics and Gynecology*, *64*(3), 415-421.

Suri, T., Boozer, M. A., Ranis, G., & Stewart, F. (2011). Paths to success: The relationship between human development and economic growth. *World Development*, *39*(4), 506-522.

Tan, J., Hu, X., Hassink, R., & Ni, J. (2020). Industrial structure or agency: What affects regional economic resilience? Evidence from resource-based cities in China. *Cities*, *106*, 102906.

Tchamyou, V. S., Asongu, S. A., & Odhiambo, N. M. (2019). The role of ICT in modulating the effect of education and lifelong learning on income inequality and economic growth in Africa. *African Development Review*, *31*(3), 261-274.

Theisen-Gandara, H. L. (2018). *Understanding the cultural, academic, and social adjustment of Iraqi exchange students in the United States* (Doctoral dissertation).

Tsaurai, K., & Ndou, A. (2019). Infrastructure, human capital development and economic growth in transitional countries. *Comparative Economic Research. Central and Eastern Europe*, *22*(1), 33-52.

Widarni, E. L., Irawan, C. B., Harnani, S., Rusminingsih, D., & Alim, M. B. (2022). Human capital and internet literacy impact on economic growth in Indonesia. *Journal of Management, Economics and Industrial Organisation*, *6*(3), 101-112.

Worthington, A., & Higgs, H. (2013). Macro drivers of Australian housing affordability, 1985-2010: An autoregressive distributed lag approach. *Studies in Economics and Finance*, *30*(4), 347-369.