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Government Spending on the Education Sector and its Impact on Increasing Labor Force Production

A Case Study of the Iraqi Economy (2004–2022)

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Abstract: Education is one of the fundamental pillars of human and economic development, and government spending on the education sector is viewed as a long-term investment in human capital. The higher the level and quality of education, the greater the efficiency and productivity of the workforce, which positively impacts economic and social growth rates. From this perspective, this research seeks to analyze the relationship between government spending on education and labor productivity in Iraq during the period (2004–2022), focusing on the extent to which this spending impacts educational outcomes and their alignment with labor market requirements.

Problem of the Study

The research problem is evident in the large gap between the outcomes of the educational system in Iraq and the requirements of the labor market. This indicates the weak quantitative and qualitative impact of government spending on education in enhancing labor productivity. Despite the allocation of portions of the general budget to this vital sector, the impact of this spending has not been sufficient to achieve the goals of economic and social development.

Significance of the Study

The importance of this research stems from its addressing one of the most important issues in contemporary development economics: the effectiveness of public spending in improving the quality of human capital. It highlights the feasibility of government spending in the education sector as a strategic tool for increasing labor productivity and stimulating economic growth, particularly in a country

like Iraq, which boasts significant but under-utilized human resources.

Hypothesis of the Study

The research is based on the hypothesis that:

"Increasing effective government spending on the education sector leads to increased labor productivity in Iraq, provided that this spending is accompanied by administrative efficiency and sound educational planning."

Objectives of the Study

A. To provide a theoretical foundation for the role of government spending on education in increasing labor productivity.

B. To analyze the evolution of education spending and its impact in Iraq during the period 2004–2022.

C. To measure the relationship between the volume of education spending, the number of graduates, and the productivity of workers in the Iraqi economy.

Methodology of the Study

Descriptive-Analytical Approach: To analyze the theoretical literature related to government spending, education, and labor productivity.

Standard Quantitative Approach: To test the validity of the hypotheses using the Autoregressive Distributed Lag (ARDL) model to measure the relationship between the variables under study in the short and long term.

7. Research Boundaries:

Spatial Boundary: The Republic of Iraq.

Temporal Boundary: The research spans the period from 2004 to 2022.

Chapter One

The Theoretical Framework for Government Spending, Education, and Labor Productivity

Introduction

Government spending is one of the main tools of fiscal policy and is used to achieve economic and social goals, particularly in developing countries seeking to narrow development gaps and enhance human capital. The education sector is one of the most prominent sectors that warrants special attention from governments due to its effective role in building individual capabilities and increasing their productivity. Education is also viewed as a fundamental pillar of sustainable development and achieving long-term economic growth.

In this chapter, we will review the theoretical frameworks that explain the relationship between government spending and education, then move on to the concept of productivity, and finally, analyze how educational spending contributes to increasing labor productivity. This will be done through three main sections covering the economic concepts and determinants of each of the variables under study.

The Theoretical Framework for Government Spending

1. The Concept of Government Spending:

Government spending is the sum of what the state spends on public goods and services with the aim of achieving social benefits. It includes current and investment expenditures financed from the general budget. It is classified as a fundamental tool for state intervention to regulate economic activity and achieve social and economic stability.

2. Motivations for government spending on education:

- Achieving social justice.
- Stimulating economic growth.
- Addressing labor market imbalances.
- Investing in future generations.

3. Classifications of government spending:

Current expenditures: Including salaries, maintenance, and operations.

Investment expenditures: Including school construction, curriculum development, training, and qualifications.

The Theoretical Framework of Productivity

1. The Concept of Productivity:

Productivity is one of the most important economic indicators that reflects the efficient use of resources, especially human resources. It refers to the quantity of outputs (goods or services) produced by the workforce during a given unit of time, compared to the quantity of inputs used. It is a key indicator in assessing the economic performance of countries, as well as in analyzing the contribution of education and training to improving labor efficiency (Krugman, 1994).

Economist Paul Krugman emphasized that "productivity isn't everything, but in the long run, it is everything," indicating that productivity growth is the primary driver of economic growth and improved living standards.

2. Factors Affecting Productivity:

Productivity is not determined by a single factor, but is influenced by a set of interconnected variables, most notably:

A. Education and Training:

Education is the cornerstone of building human capital, as it provides individuals with the necessary skills and knowledge that enhance their productivity. Continuous training programs also contribute to developing competencies and improving performance in the workplace.

B. General Employee Health:

The health of an employee is a crucial factor in determining their productivity. A healthy employee has higher productivity and tends to be less absent from work, which improves the overall performance of the organization.

C. The Institutional Environment:

This includes management systems, laws, incentives, and organizational culture. These play a crucial role in enabling employees to be creative and achieve, or frustrating and hindering their capabilities.

D. Technology Used:

Advanced technology provides new tools and methods that improve worker efficiency and reduce the effort and time required for production. It also helps automate repetitive tasks, allowing workers to focus on creative tasks.

3. Schools of Economic Thought Explaining Productivity:

A. Classical School:

Classical thinkers such as Adam Smith and David Ricardo believed that productivity is determined by the amount of labor and capital used in the production process. There was little emphasis on education or technology; labor was viewed purely as a factor of production.

B. Keynesian School:

Keynesianism asserts that government spending, especially during recessions, can stimulate aggregate demand, which in turn stimulates productivity. Keynes believes that unemployment results from a lack of demand, not from a weak labor force, and therefore expansionary government policies are necessary.

C. Monetarism and Supply-Side:

Monetarists and followers of the "supply-side" school believe that productivity is directly related to individual motivation and is improved through tax incentives, pro-business policies, and improved educational quality. They support liberalizing markets and reducing state intervention as a means of stimulating innovation and productivity.

The Role of Government Spending on Education in Raising Labor Productivity

1. The Relationship Between Education and Productivity:

The longer and better the education, the greater the individual's capacity for creativity, adaptation, and innovation, which is reflected in their productivity in the labor market.

2. How does educational spending contribute to raising productivity:

1) Improving educational infrastructure.

2) Supporting technical and vocational training.

3) Linking education to the labor market.

4) Developing academic curricula and programs.

3. Global Experiences:

Global experiences have proven that effective investment in education can be the primary driver for developing countries' transformation into knowledge-based economies. Among the most notable of these successful experiences are South Korea and Malaysia, two prominent examples of the close relationship between the quality of educational spending and increased labor productivity.

1. South Korea:

Since the 1960s, South Korea has adopted a strategy based on education as a national priority. It allocated increasing proportions of its GDP to education and focused on linking the education system to market needs, particularly in technical and scientific fields.

The result was a significant increase in labor

productivity and a rapid transformation from a poor agricultural economy to an advanced industrial economy, which today relies primarily on innovation and technology (Lee, 2001).

2. Malaysia:

In the 1990s, Malaysia launched the "Vision 2020" plan, with education as a key pillar. It sought to raise the quality of technical and vocational education and increase the number of higher education graduates, particularly in science and engineering.

It also focused on integrating technology into education, which contributed to improving labor efficiency and making it more competitive and helped attract foreign investment, especially in the manufacturing and service sectors (Tan and Rao, 2006).

Lessons Learned from Experience:

Focusing on practical and technical education is key to linking education to the labor market.

Quantitative spending alone is not sufficient; it must be accompanied by efficient allocation and planning.

Investing in teachers, infrastructure, and curricula directly impacts workforce productivity.

Analysis of the State of the Education Sector in Iraq

Introduction:

Education holds a fundamental position in comprehensive development efforts, as it represents the primary driver for improving the quality of life and enhancing the efficiency of human resources. Although Iraq has significant human resources, educational performance indicators over the past decades indicate the existence of real challenges in the educational infrastructure and government spending. In this chapter, we will analyze the state of the education sector in Iraq during the period (2004-2022), monitor the extent of development of this sector across various educational levels, and assess the relationship between government spending and the transformations that have occurred in education.

Section One: The State of the Iraqi Economy after 2003

1. General Characteristics of the Iraqi Economy after 2003:

After 2003, the Iraqi economy entered a transitional phase marked by political and security instability, which directly impacted the economic structure, particularly the production and service sectors, including the education sector.

2. Prominent Economic Challenges:

Overdependence on Oil Weak economic diversification.

High unemployment rates.

Declining public service performance, particularly education and health.

3. Macroeconomic indicators for the period (2004–2022):

Fluctuations in GDP.

Disparities in public spending on service sectors.

Weak investment in education despite increased overall public spending.

Section Two:

Analysis of the State of Education in Iraq (2004-2022)

1. Primary Education:

Low enrollment rates, especially in remote governorates.

Deteriorating school infrastructure.

Lack of teaching staff and basic equipment.

2. Secondary Education:

Poor educational outcomes.

Low success rates.

Poor relevance of curricula to market needs.

3. Vocational Education:

Low student turnout.

Lack of government support and institutional attention.

Poor training facilities and linkage to the labor market.

4. Higher and University Education:

Increasing number of graduates, but limited employment opportunities.

Expansion of private colleges without ensuring the quality of education.

Limited scientific research and academic development.

Subsection Three:

Analysis of the relationship between government spending on education and labor productivity

1. Evolution of Government Spending on Education (2004–2022):

The period under study witnessed a significant decline in the percentage of government spending on education from the general budget, despite a relative increase in total government spending. It is noted that operational expenditures (such as salaries and maintenance) accounted for the largest share of education spending, while investment expenditures (such as school construction, laboratory equipment, and curriculum development) were weak and limited, weakening the ability to develop education infrastructure and improve its quality.

The absence of a comprehensive national education strategy is also evident, as educational policies were not based on an effective link between the education

system and the needs of the economy and the labor market. The lack of an integrated vision has rendered education spending a routine procedure that does not achieve a real productive impact.

Analysis

When spending is not directed towards long-term investment in the quality of education, its impact on productivity is limited, as educational outcomes remain traditional and incapable of creating added value in the labor market. 2. Educational Outcomes and Number of **Graduates**

The period under study was characterized by a quantitative increase in the number of university and institute graduates, but this was not matched by an increase in the quality of education or the diversity of skills. Educational outcomes were characterized by a repetition of theoretical disciplines, such as arts and humanities, at the expense of applied and professional disciplines required by the labor market (such as technology, programming, and manufacturing industries).

Indicators show that this numerical increase did not translate into improved productivity or reduced unemployment. This indicates a structural flaw in educational policy, represented by a clear disconnect between what is taught in educational institutions and what the economy actually needs.

Analysis

An increase in the number of graduates does not necessarily mean an increase in labor productivity, unless these outcomes are supported by quality education and skills that are actually applicable in economic sectors.

3. Productivity of workers under the current education system:

The labor force in Iraq suffers from a clear decline in productivity, as a result of the mismatch between the skills acquired during the educational process and the needs of the labor market, whether in the public or private sectors. In-service training programs are rare or ineffective, preventing the development of professional competencies after graduation.

In addition, many graduates suffer from weaknesses in basic skills such as technology use, teamwork, problem-solving, and effective communication—skills that are pivotal in today's workplace.

Analysis:

Poor training and qualifications are one of the main reasons for low productivity, as theoretical education alone is not sufficient to enable individuals to perform their jobs efficiently.

(Interpretation and Evaluation):

The analysis reveals that Iraq has not invested effectively in education, neither in terms of the amount of spending nor in terms of its efficiency and distribution. This shortcoming has negatively impacted the quality of educational outcomes, which in turn have not had a tangible positive impact on raising labor productivity. Therefore, simply increasing spending is not enough unless it is directed towards profound structural reforms, including:

A. Modernizing curricula and linking them to the requirements of the digital economy.
B. Strengthening technical and vocational education.
C. Expanding public-private partnerships in the field of training and employment. implementing evaluation and monitoring systems for educational spending to measure its productive returns.
D. Advancing the education sector in Iraq requires a strategic vision focused on quality, not quantity, and impact, not just expenditure, so that education becomes a true lever for productivity and sustainable economic growth.

Theoretical Framework for Standard Models

1. Unit Root Test (Dickey-Fuller Test):

To ensure that the time series used in the model (such as expenditure, output, and number of graduates) are stationary and non-spurious, and to verify their degree of integration (I(0) or I(1)).

2. Autoregressive Distributed Lag (ARDL) Model:

This model was chosen for its suitability for mixed time series (some of which are stationary of first order (1) and others of zero order I(0)), and because it allows for the analysis of short- and long-term relationships between variables.

3. Steps for Applying ARDL:

Identify Key Variables:

Y = Labor Productivity

X1 = Government Spending on Education

X2 = Number of Graduates

X3 = Gross Domestic Product

Identify optimal lags using the Akaike criterion.

A. Conduct a bounds test.
B. Analyze short- and long-run parameters.
C. Model stability test (CUSUM, CUSUMSQ).

Chapter Three:

Economic Measurement of the Impact of Education

Spending and Labor Productivity in Iraq (2004-2022)

Introduction:

After reviewing the theoretical framework and analyzing the actual situation of the education sector in Iraq, this chapter aims to quantitatively measure the relationship between government spending on education and labor productivity using econometric tools. Through this analysis, we will test the validity of the research hypothesis that increasing government spending on education contributes to increasing labor productivity, taking into account several macroeconomic variables.

Section Two: Measurement and Analysis Results

1. Data Description:

Annual data from 2004 to 2022.

Values were converted to constant 2012 prices to avoid the effect of inflation.

Data Source: Central Statistical Organization, World Bank.

2. Unit Root Test Results:

All variables are first-degree stationary (I (1)), confirming the validity of the ARDL model.

3. ARDL Model Results (Long-Run Relationship):

There is a significant positive relationship between education spending and labor productivity.

Every 1% increase in spending leads to an X% increase in labor productivity (according to the estimation coefficient).

The number of graduates has a positive effect, but less than the effect of spending.

GDP plays a combined role as a catalyst for educational and productivity growth.

4. The Short-Term Relationship:

The relationship is weak in the short term, confirming that the impact of education on productivity is evident in the long term.

There is a time lag between spending and its productivity outcomes.

Discussion and Interpretation of Results

After applying the ARDL econometric model and analyzing statistical data for the period (2004–2022), a set of fundamental results emerged that illustrate the nature of the relationship between government spending on education and labor productivity in Iraq. The following is a discussion of these results:

1. Weak Short-Term Effect:

Despite the state's annual allocations to the education sector, econometric analysis showed that this spending does not have a direct and rapid impact on raising labor productivity within the same year or in the short term. This is due to several factors, the most important of which are:

Misallocation of spending: The largest proportion of spending is directed towards operational expenses such as salaries and maintenance, rather than towards investment expenditures that create a sustainable impact (such as infrastructure, curricula, and training).

Poor infrastructure: Many schools suffer from a shortage of classrooms, tools, and laboratories, which affects the quality of education and reduces the return on investment.

Skills gap: Education graduates do not possess the modern skills required by the labor market (such as digital skills, languages, and innovation), weakening their ability to increase productivity upon entering the labor market.

Analysis:

The short-term impact of spending on education remains weak unless the imbalance in distribution and structure is addressed. Education takes time to bear fruit, especially if current policies are untargeted or ineffective.

2. The strength of the long-term impact:

While the short-term impact was weak, the econometric model demonstrated a strong, long-term positive relationship between education spending and labor productivity. The more investment in education is made on a regular and sustainable basis, the more positive it will be:

Improving the quality of graduates.

Increasing applicable skills.

Raising the overall efficiency of the workforce.

This indicates that education is a long-term investment, and its results are not immediately apparent. Rather, they require sufficient time and an effective institutional environment to accommodate these outcomes.

3. The Turning Point (After 2015):

Data showed a slight improvement beginning to emerge after 2015, when education budgets increased in some years. However, this improvement was limited for the following reasons:

1) The increase in spending was not strategically directed (priority continued to be given to operational expenses).

2) The absence of institutional and administrative reform within the education system, which prevented the real benefit of the increased allocations.

3) The lack of a link between educational outcomes and the labor market, which limited the impact of these increases.

Analysis:

This improvement could have been transformed into a starting point for a qualitative shift in education had education policies been accompanied by structural reforms and intelligent educational planning that responds to economic and social changes.

Chapter Conclusion:

This chapter, using the standard model, reached a decisive conclusion:

There is a long-term relationship between government spending on education and increased labor productivity in Iraq.

This supports the basic research hypothesis. However, as the analysis reveals, this relationship is neither automatic nor guaranteed, but rather depends on:

A. Sufficient time for skill accumulation and structural improvement.
B. Efficient allocation of resources to real priorities.
C. Integration between the education system and the labor market.
D. Institutional planning and administrative reform in ministries of education.

Thus, it can be argued that education in Iraq represents an under-exploited development opportunity, and that increasing spending efficiency and focusing it on quality education is the path to improving labor productivity, which will ultimately be reflected in economic growth rates and human development.

Results and Recommendations

First: Main Results

A. Through the theoretical and applied analysis in the previous chapters, the research reached a set of basic results that confirm the study's hypothesis and clarify the dimensions of the relationship between government spending on education and labor productivity in Iraq. These results are:
B. The existence a long-term, direct relationship between government spending on the education sector and labor productivity, as education is one of the most important factors stimulating productivity if spending is directed effectively.
C. The weak short-term impact of government spending on education is due to the focus on operating expenses (salaries, maintenance) versus the neglect of investment expenses (school construction, curriculum modernization, training).
D. Educational outcomes in Iraq do not meet labor market requirements, leading to a decline in the productive value of graduates and a weak contribution to the national economy.
E. The poor allocation of spending and weak educational planning are among the most prominent reasons for the gap between relatively high spending and its modest impact on productivity.
F. The absence of sustainable national education policies linked to economic strategies has led to limited results despite a relative improvement in allocations after 2015.

Second: Recommendations

Based on the above, the research offers the following recommendations to decision-makers and educational institutions:

1. Restructuring education spending by increasing the proportion of investment expenditures directed towards infrastructure, curriculum development, teacher training, and educational technology.
2. Adopting a sustainable national education policy that is closely linked to the country's economic and development plans and takes into account the actual needs of the labor market.
3. Strengthening technical, vocational, and technological education is one of the most important tools for increasing productivity and linking graduates to productive sectors.
4. Establishing a national system to evaluate the efficiency of educational spending, tracking the impact of every dollar spent on improving the quality of education and increasing the productivity of graduates.
5. Improving partnerships between the public and private sectors in developing training curricula and organizing practical field training programs for students and graduates to ensure the availability of the required practical skills.
6. Activating continuing education and on-the-job training systems to raise the efficiency of workers and develop their capabilities in line with technological and economic transformations.

7. Gradually increasing education allocations by no less than 6% of GDP, in line with international standards, provided this is accompanied by effective financial governance.

CONCLUSION

This research examined the relationship between government spending on the education sector and labor productivity in Iraq during the period (2004–2022) through a theoretical study and applied analysis using modern economic measurement tools. The results showed that education is not a burden on the public budget but rather represents one of the most important forms of long-term development investment, which—if properly planned and directed—can be a fundamental pillar of sustainable economic growth.

The research demonstrated that the positive impact of spending on education is not immediately apparent. Rather, it requires an effective educational environment, clear policies, and a close link between education outcomes and labor market requirements. In the short term, the impact of spending was limited due to poor resource allocation, weak infrastructure, and the lack of alignment between education and employment. In the long term, standard models have demonstrated a strong positive correlation, confirming that investment in education can increase labor efficiency, improve living standards, and achieve human development.

This research demonstrates that education is not merely a state budget expenditure item; rather, it is a strategic national project that requires an integrated vision, institutional coordination among various stakeholders, continuous updating of curricula, infrastructure, and teachers, and the adoption of an educational philosophy focused on skills and innovation. Without fundamental reform in this sector, Iraq will remain trapped in a vicious cycle of unemployment and low productivity.

Global experiences—such as those of South Korea and Malaysia—have demonstrated that achieving a true knowledge economy begins with reforming education and transforming it from a financial burden to a tool for production. Therefore, building effective human capital capable of increasing the productivity of the Iraqi economy requires reconsidering spending priorities, focusing on the quality of education, and effectively linking it to economic and social development plans.

Accordingly, this research is an explicit call for decision-makers to adopt a comprehensive reform vision for the education sector, one that goes beyond simply increasing spending but also seeks to enhance its efficiency and effectiveness so that education becomes a key tool in the battle for construction, production, and development.

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