



## DOES REFORM PLAN REALLY WORKS? ASSESSING ENTITY DEVELOPMENT PLAN IN WASIT PROVINCE-IRAQ

Karrar Hameed Altaie\*  
kaltaie@uowasit.edu.iq  
Sabeeh Farhan Laftah  
drsabeeh@uowasit.edu.iq  
Hayat Jumaa Muhammed  
hjumaah@uowasit.edu.iq

### Article history:

**Received:** January 2<sup>nd</sup> 2022  
**Accepted:** February 2<sup>nd</sup> 2022  
**Published:** March 8<sup>th</sup> 2022

### Abstract:

This study aims to assess the effect of some production factors on the funds of entity development plan in Wasit province. Technical (TE) and scale efficiency (SE) were used, as a tools to measure the technical relationship prescribed earlier. This paper utilized a sample of Wasit province district in Iraq between 2006 and 2008. In order to measure this technical relationship, Non-parametric data envelopment analysis (DEA) were used . Results of this paper regarding technical efficiency (TE) has proved that this reform plan project was a big success. In all years of implementation, averages TE in 2006, 2007 and 2008 were 98, 89 and 89 respectively. For scale efficiency, SE scores approved that 25 percent of the studied sample were operating at the optimum Wasit province level. However, 60% of the sample could increase their technical efficiency by increasing their size. All in all, this reform plan approved its feasibility through the study period depending on TE and SE scores.

**Keywords:** Wasit province,

### INTRODUCTION

Within the framework of the powers delegated by the central government to local governments, the latter has set its development policy and identified its needs through the regional development plan. The Ministry of Finance, in cooperation with the Ministry of Planning and Development determine the governorate's needs for financial allocations based on the projects proposed by the governorate itself. In the years that lies between 2006 to 2008, budgets can be described as revolutionary in terms of the amounts that they got.

Because of previous mismanagement and lack of attention to the spatial distribution of allocation, the annual investment budget for the years 2006-2007-2008 paid much attention to this aspect and tried hard to distribute investment allocations according to specific economic and social factors (Mahayni & Salloum, 2008). However, we don't know if this investment budget did not achieve what it came for. By assessing the monetary distribution of this budgets, recommendations can be extracted in preparing future budgets.

### MATERIALS AND METHODS

#### Literature Review

In order to know which factor can affect the whole efficiency level, a Data Envelopment Analysis or

(DEA) need to be followed. This approach is non-parametric in which a distance function is estimated relative to hypothetical efficiency frontier. This approach had been used to explain technical efficiency variation. In order to do that, production and socioeconomic variables are implemented utilizing Farrell's approach. In Farrell (1957), DEA were characterized to discover the source of inefficiency. After Farrell's approach, Charnes et al., (1978), Banker et al., (1984), Coelli, (1995), Bravo-Ureta & Pinheiro, (1993) and Thiam et al., (2001) developed what we are calling now Data Envelopment Analysis (DEA). Based on Coelli, (1995), one of the drawback of DEA is that it is not assuming explicit functional form about the production function. However, DEA has a deterministic nature where all its deviation from the efficient frontier is due to optimization error. However, DEA is preferred because it has less restriction comparing to the other tools of estimating technical efficiency.

Literatures that studied Iraqi general budget and its allocation on different sectors were very limited. However, in terms of literatures that estimated technical efficiency of sectors utilizing this budget, (Mahayni & Salloum, 2008) showed a historical listing of how the budget developed overtime for Iraq as a whole. Also, (Zaya, 2022), (Al-Shamri & Al-Salem, 2022) studied what can affect fluctuations and shocks



in the Iraqi budget that depends entirely on oil sector. Other literatures took the “delay” issue in the Iraqi budget and its impact on different economics activities within Iraq such as (Ali, 2022) and (2013, خلف). In addition, Altaie (2019), studied the technical efficiency of agricultural activity in Wasit province. Also, Jasim et al. (2021), evaluated the urban structure of Al kut city but based on sustainability factor.

This study came to cover a knowledge gap were, as far as authors know, there is no literature studied or analyzed TE and SE scores for each district within Wasit province and during the period between 2006 to 2008. These years are described as the years of heavy governmental expenditure toward building the country’s infrastructure.

In the coming part, the conceptual framework of DEA is shown.

### Conceptual Analysis of Data Envelopment Analysis (DEA)

DEA is a non-parametric method for analyzing factors that affect productivity and technical efficiency. Instead of the regression strategy utilized in SFA, a linear programming method is used to derive TE scores in the first step. There is no stochastic component indicated in the optimization, which is a significant difference between SFA and DEA. Any divergence in a district's outcomes is attributed to inefficiency in district-level decisions.

Charnes et al. (1978) proposed a linear programming approach such as:

$$\begin{aligned} & \max \theta_i^{VRS} \\ & \theta_i \lambda \\ & \text{Subject to} \\ & \theta_i^{VRS} y_i \geq \sum Y \lambda \end{aligned}$$

The DMU being evaluated is greater than or equal to the weighted sum of the outputs of the other Decision Making Units (DMUs).

$$x_i \leq \sum X \lambda$$

$$\begin{aligned} & \lambda \geq 0 \\ & \sum_{j=1}^n \lambda_j = 1 \\ & \text{VRS.} \end{aligned}$$

The inputs of the other DMUs' weighted total are less than or equal to the inputs of the DMU being evaluated.

weights that are non-negative a constraint that allows for

In the output-oriented model,  $\theta_i^{VRS}$ , is the weighted output to weighted input ratio. An optimal level of  $\theta_i^{VRS}$  is obtained by maximizing the weighted sum of output while maintaining the same weighted sum of inputs. The district's efficiency can be determined by comparing the best input allocation to the actual level of inputs. The district is considered to be on the wheat production frontier if the optimal allocation of inputs and the actual amount of inputs produce the same level of output.

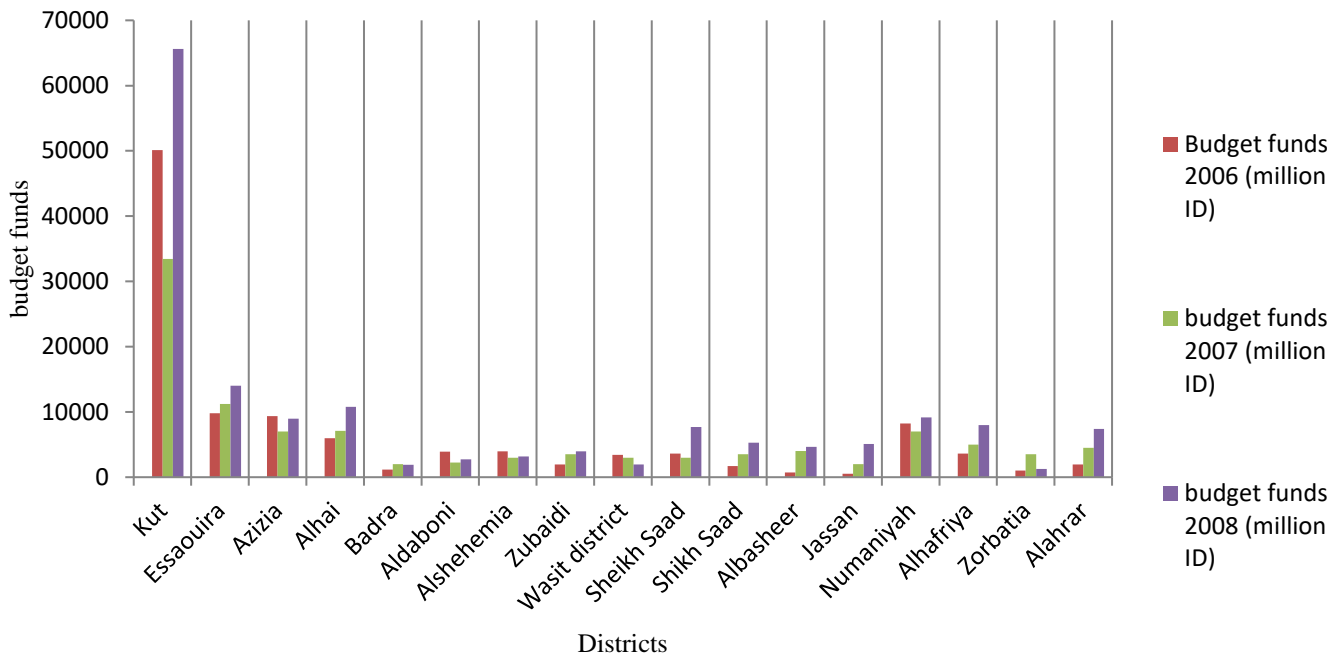
### Data

The aim of this piece is to know the level of technical efficiency (TE) related to the distribution of funds between different districts in Wasit province. In other words, we are trying to understand how efficient was the distribution process of funds. This is important since this study can come up with a recommendations for the future budget preparation.

In this study, three years were examined. Those years are 2006, 2007 and 2008. Reason behind choosing those years is that those years recorded the highest in terms of funds comparing to other years. Also, the price of oil in those years recorded the highest. In addition, exchange rate of Iraqi dinar comparing to the US dollar was relatively stable.

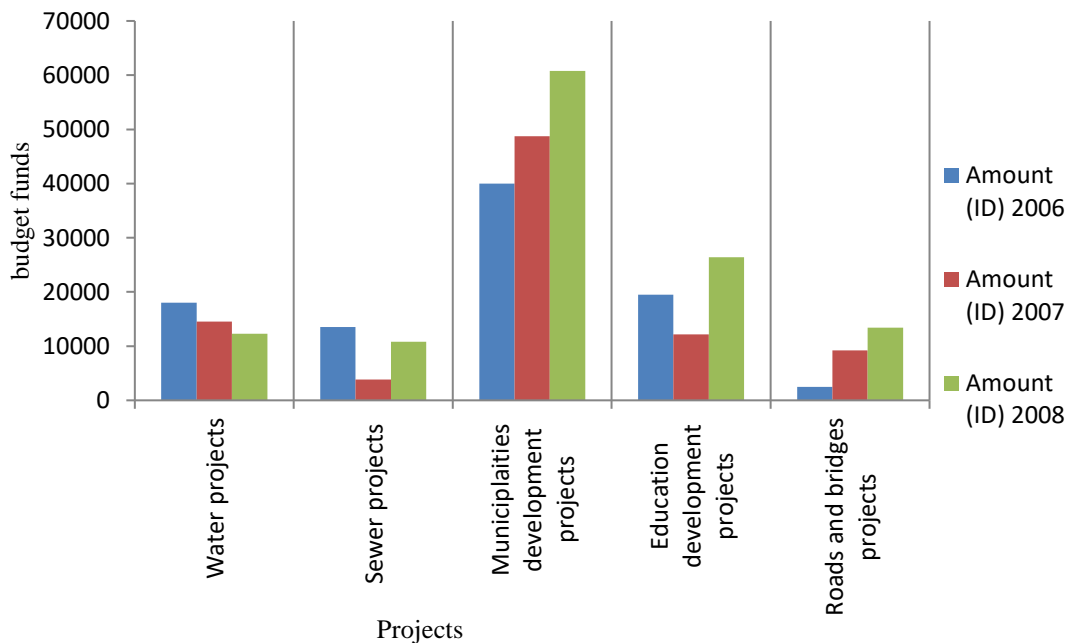
The current data set is related only to Wasit province. Sectors that got its fair share if fund distribution are roads, education, water, sewer, and municipalities services. Figure 1 is showing the distribution of budget funds for districts in Wasit province.

**Figure 1. Distribution of budget funds devoted to each district in Wasit province for the years 2006, 2007 and 2008**



From figure 1 showed above, we can realize that Alkut, which is the center of Wasit province, got the highest share in all years. However, Badra, which is a rich district in terms of natural resources, got the lowest share.

Figure 2 is showing funds devoted to each sector for all districts in Wasit province





**Figure 2. Entity development funds distributed over targeted projects in 2006, 2007, and 2008**

What can be inferred from figure 2 is that the focus of the entity development plan is toward developing municipality development projects over sewer projects. Also, some projects recorded increasing funds over years (i.e. municipality development projects). However, drinking water projects were exactly the opposite.

**Model specification**

$$y_t = f(pop_t, emp_t, imp_t, rtu_t, wat_t, agna_t)$$

Where:

$y_t$  is Entity Development Plan funding in Wasit in time  $t$ .

$pop_t$  is population in Wasit province in Wasit in time  $t$ .

$emp_t$  is the employment rate for both males and females in time  $t$ .

$exp_t$  is the amount of imports in time  $t$ .

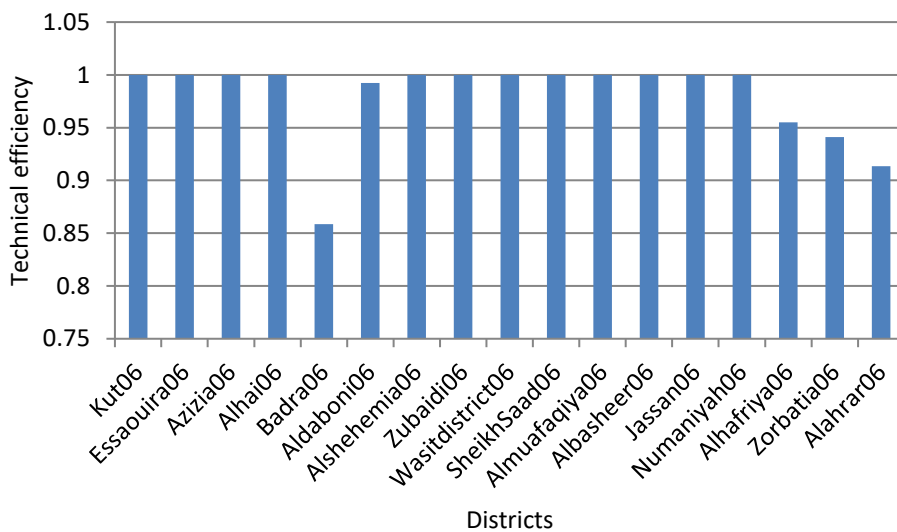
$rtu_t$  is the rate of rural to urban population in time  $t$ .

$pols_t$  is the level of political stability in time  $t$ .

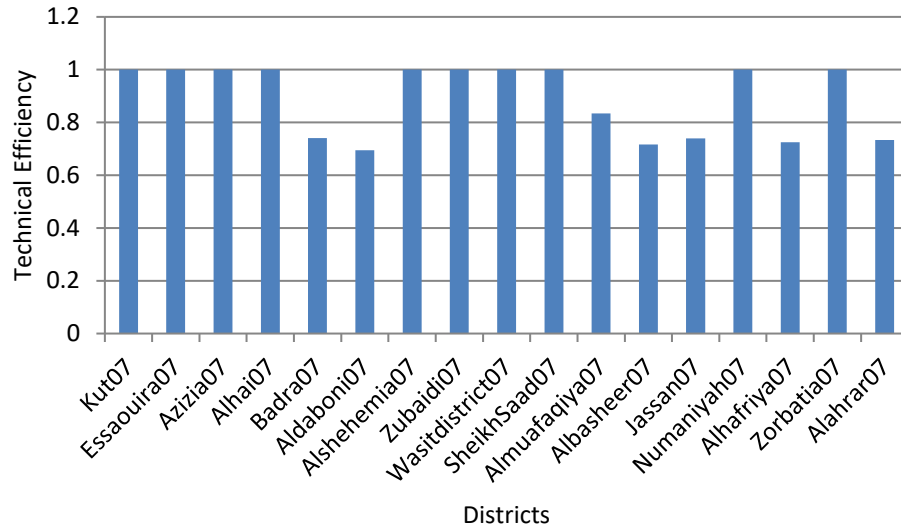
**RESULT AND DISCUSSION**

Input- oriented model was used by utilizing Data Envelopment Analysis (DEA). DEA was used in calculating efficiency scores. This was done assuming constant return to scale (CRS) and variable return to scale (VRS). Distribution of technical efficiency and scale efficiency using VRS is presented in figures (3, 4, 5, 6, 7, and 8).

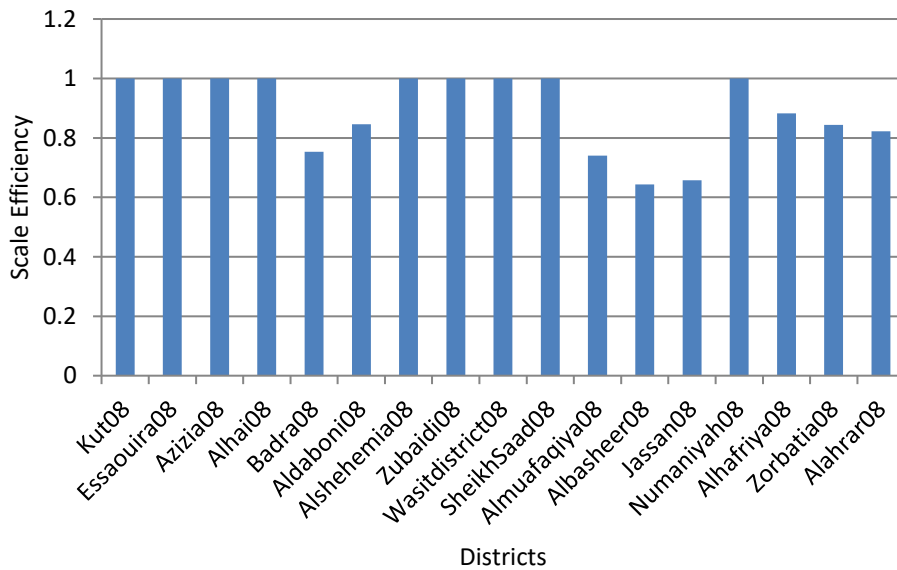
Figure 3, 4 and 5 are showing that the majority of districts Wasit province reach an efficient level between 95 and 100 percent. The mean in 2006, 2007 and 2008 reached 98, 89 and 89 percent respectively.



**Figure 3. Technical Efficiency scores of Wasit province districts in 2006**



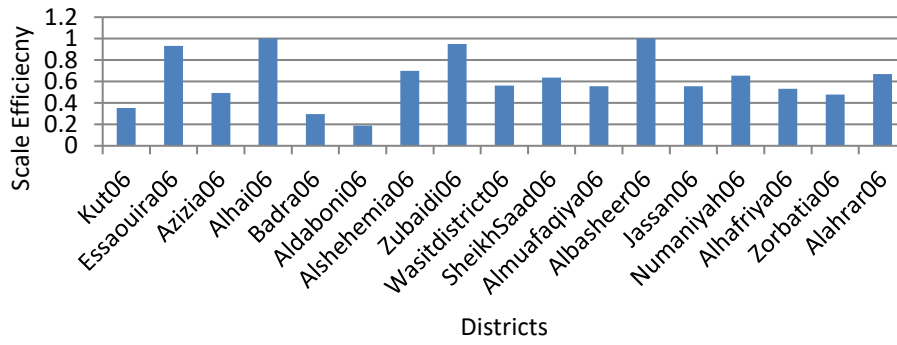
**Figure 4. Technical Efficiency scores of Wasit province districts in 2007**



**Figure 5. Technical Efficiency scores of Wasit province districts in 2007**

Now. In order to calculate scale efficiency, which is the ratio of TE obtained by CRS to the ratio of TE obtained by VRS. Results of scale efficiency in 2006, 2007, and 2008 are shown in figures 6, 7, and 8 respectively. Figure 6 is showing that 25 percent of the sample of Wasit's districts in 2006 are operating at the optimal scale. Average scale efficiency in 2006 is about 62 percent. In figure 7, scale efficiency increased on average. It reached about 0.72 percent. Scale efficiency in 2008 reached about 50 percent recording a drastic drop comparing to 2007.

What we can see below is the existence of sub optimal districts with decreasing returns to scale. Those districts formed 60 percent of the studied sample. This means that 60 percent of districts can increase their productivity or technical efficiency by increasing their sizes using the same endowed funds devoted by the reform plan. However, 40 percent of the studied sample can increase their technical efficiency by decreasing their sizes.



**Figure 6. Scale Efficiency scores of Wasit province districts in 2006**

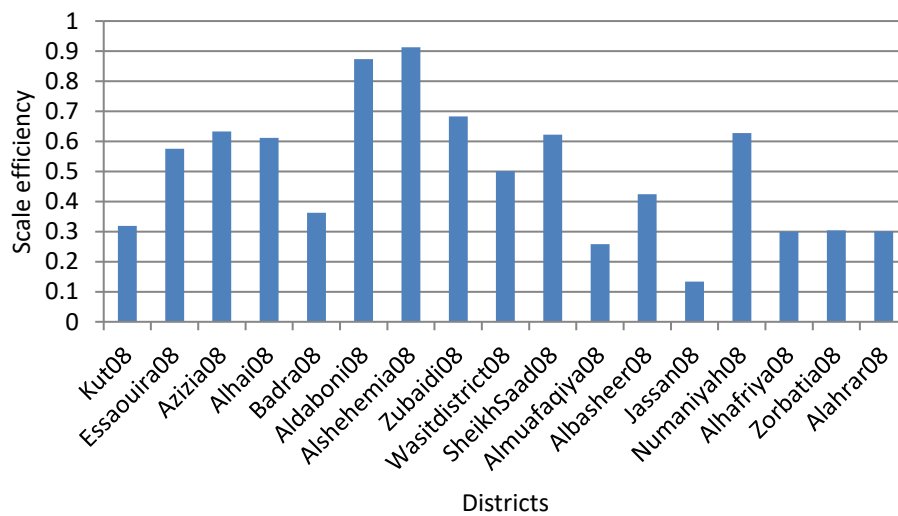
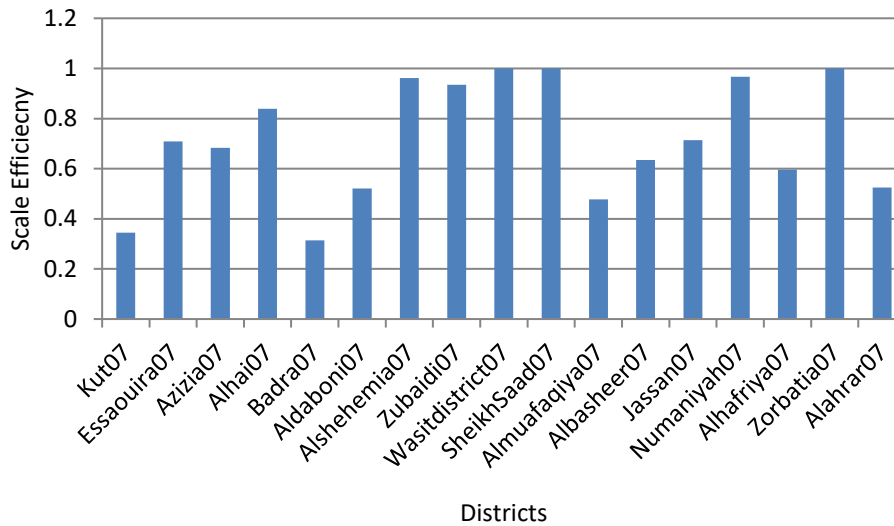


Figure 8. Scale Efficiency scores of Wasit province districts in 2008



## CONCLUSION

In this piece, a data set of 17 districts in 2006, 2007 and 2008 of a reform fund plan had been put together. The goal of this piece is to assess the feasibility of this fund plan. Those years were considered as the highest in financial allocation in a budgets that called "revolutionary". Results showed that a big portion of Wasit's districts fully utilized the funds devoted by the reform plan. This indicate that those funds were used "efficiently" in those years. In the case of scale efficiency, a big portion of districts across the three years were either at the full utilization at their sizes or pretty close to that. Again, this is an indication on the management factor that was planning in those years.

## REFERENCES

1. Ali, D. D. A. (2022). The impact of the delay in approving the general budget on state institutions and their employees. *Tikrit University Journal for Rights - مجلة جامعة تكريت للحقوق*, 6(1), 410–386. <https://doi.org/10.25130/rights.v6i1.688>
2. Al-Shamri, A. H. J., & Al-Salem, D. R. A. I. (2022). SPECIAL OIL SHOCKS AND THEIR ECONOMIC EFFECTS (IRAQI OIL SHOCKS AS A MODEL). *World Economics and Finance Bulletin*, 7, 62–80.
3. Altaie, K. (2019). *Three essays on wheat production efficiency in Iraq: Comparison between MENA countries and internal comparison of districts*. Colorado State University.
4. Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis. *Management Science*, 30(9), 1078–1092. <https://doi.org/10.1287/mnsc.30.9.1078>
5. Bravo-Ureta, B. E., & Pinheiro, A. E. (1993). Efficiency Analysis of Developing Country Agriculture: A Review of the Frontier Function Literature. *Agricultural and Resource Economics Review*, 22(1), 88–101. <https://doi.org/10.1017/S1068280500000320>
6. Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2(6), 429–444. [https://doi.org/10.1016/0377-2217\(78\)90138-8](https://doi.org/10.1016/0377-2217(78)90138-8)
7. Coelli, T. J. (1995). Recent Developments in Frontier Modelling and Efficiency Measurement. *Australian Journal of Agricultural Economics*, 39(3), 219–245. <https://doi.org/10.1111/j.1467-8489.1995.tb00552.x>
8. Farrell, M. J. (1957). The Measurement of Productive Efficiency. *Journal of the Royal Statistical Society: Series A (General)*, 120(3), 253–281. <https://doi.org/10.2307/2343100>
9. Jasim, I. A., Hasan, H. M., Farhan, S. L., & Bahat, K. H. (2021). Evaluating the urban structure of Al-Kut city according to sustainability. *IOP Conference Series: Earth and Environmental Science*, 779(1), 012021.
10. Mahayni, A. D. M. K., & Salloum, A. A. K. H. (2008). The federal budget for Iraq Trends and growth rates of spending and revenue For the period from 2004 to 2007. *Journal of Administration and Economics*, 68. <https://www.iasj.net/iasj/article/26077>
11. Thiam, A., Bravo-Ureta, B. E., & Rivas, T. E. (2001). Technical efficiency in developing country agriculture: A meta-analysis. *Agricultural Economics*, 25(2–3), 235–243. <https://doi.org/10.1111/j.1574-0862.2001.tb00204.x>
12. Zaya, D. A. S. (2022). Fiscal Discipline in Iraq for the Period (2003-2020). *International Journal of Development and Public Policy*, 1(8), 132–141.
13. خلف, ت. م. (2013). دور وزارة المالية في مراحل الموازنة العامة للدولة: دراسة مقارنة Ministry of finance role in the preparation of public budget: Comparative study. <https://iqdr.iq/search?view=ec87899795ac28c9ecc2279b61781de5>