CORRELATION AND REGRESSION ANALYSIS OF DEFERRED TAXES AND PROFITABILITY INDICATORS IN ARMENIAN ENERGY SECTOR COMPANIES

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Introduction

In modern financial reporting, deferred taxes are viewed not only as a technical outcome of tax accounting, but also as an important information indicator of future tax obligations, accounting estimates, and the quality of financial results. According to IAS 12 Income Taxes, deferred tax assets and liabilities arise from temporary differences between the carrying amounts of assets and liabilities and their tax bases. A deferred tax liability is recognized when the recovery of an asset or the settlement of a liability will lead to additional tax payments in future periods, while a deferred tax asset is recognized when a future reduction in the tax burden or a tax benefit is expected [IFRS Foundation, 2026, n.d.].

Deferred taxes are especially important in capital-intensive sectors where property, plant and equipment are among the main items in the financial statements. The energy sector is such a sector: power plants, transmission and distribution networks, substations, production facilities, and technological equipment have high value, long useful lives, and are often affected by revaluations, impairment, or different depreciation approaches [Baker & Clendon, n.d., n.p., Hanlon et al., 2014, 87–99]. Under these conditions, differences between financial accounting and tax accounting can significantly affect deferred tax liabilities, income tax expense, and profitability indicators.

International studies show that deferred taxes may have informational value for investors, analysts, and other users of financial statements. The systematic literature review by Görlitz and Dobler shows that empirical studies over the last three decades have mainly examined the value relevance of deferred taxes and their relationship with earnings management. The authors also note that research on deferred taxes has mostly focused on developed markets, especially the United States, while the experience of small and developing economies has received comparatively less attention [Görlitz & Dobler, 2023, 113–165]. This makes it relevant to examine the relationship between deferred taxes and financial results using the Armenian energy sector as an example.

The study of deferred taxes in Armenian energy sector companies is also important because these companies operate not only in a market environment but also in a regulated environment. The financial results of energy companies may depend on tariff regulation, investment programs, debt burden, exchange rate differences, accounting for property, plant and equipment, and state policy. In this context, assessing the relationship between deferred taxes and profitability indicators makes it possible to identify how temporary differences and their tax consequences are reflected in companies' financial results.

The aim of the article is to evaluate the relationship between deferred tax liabilities, deferred tax assets, deferred tax expense/income, and profitability and tax burden indicators in Armenian energy sector companies. The research objects are Armenian Nuclear Power Plant CJSC (ANPP), High Voltage Electric Networks CJSC (HVEN), and Yerevan Thermal Power Plant CJSC (YTPP). Pearson correlation analysis and simple linear regression models are used to determine the direction and strength of the relationship between changes in deferred taxes and profitability, income tax expense, tax burden, and property, plant and equipment.

Methodology

The research objects are three companies in the Armenian energy sector: Armenian Nuclear Power Plant CJSC (ANPP), High Voltage Electric Networks CJSC (HVEN), Yerevan Thermal Power Plant CJSC (YTPP).

The information base of the study consists of the published financial statements of the selected companies. The analysis includes the years for which the financial statements contained the necessary data. The total sample consists of 19 observations. Since data on deferred tax assets or liabilities were not complete for some companies and years, calculations were made only for paired observations where both the independent and dependent variables were available.

The following indicators are used in the study:

Table 1. Variables Used in the Study

Code	Variable name
DTL	Deferred tax liabilities
DTA	Deferred tax assets
DTE	Deferred tax expense/(income)
NP	Net profit/(loss)
ITE	Income tax expense/(benefit)
PPE	Property, plant and equipment

RE	Accumulated loss/retained earnings
NetDT	Net deferred tax
TaxBurden	Tax burden
ROA	Return on assets
ROE	Return on equity

Source: compiled by the author based on the database created from the financial statements.

Pearson's correlation coefficient is used for the correlation analysis:

$r = cov(X, Y)/\sigma x \sigma y$ (1)

where

r is the correlation coefficient,

X is an independent variable related to deferred taxes,

Y is a profitability or tax burden indicator.

In the main model, DTE is selected as the independent variable, while ITE is selected as the dependent variable.

For the regression analysis, a simple linear model is used:

$Y = a + bX$ (2)

where

Y is the dependent variable,

X is the independent variable, a is the intercept,

b is the regression coefficient.

Literature

The theoretical basis for accounting for deferred taxes is IAS 12 Income Taxes. The standard applies a balance sheet approach, according to which deferred tax is determined based on temporary differences between the carrying amounts of assets and liabilities and their tax bases. According to the IFRS Foundation, a deferred tax liability arises when an entity will pay tax in the future as a result of recovering the carrying amount of an asset or settling a liability, while a deferred tax asset arises when future tax payments will decrease or when the entity has unused tax losses or tax credits [IFRS Foundation, 2026, n.d.]. This approach links deferred taxes not only to the current year tax calculation, but also to the entity's financial position and future tax consequences.

According to the Deloitte IAS Plus explanation, deferred tax assets and liabilities are measured using the tax rates expected to apply when the asset is realized or the liability is settled. They are not discounted, which means that deferred tax amounts presented in financial statements reflect future tax consequences without considering the time value of money [Deloitte, n.d.]. This is important for the present study because, in the case of long-term assets in the energy sector, the reversal of temporary differences may take place over a long period.

From the ACCA methodological perspective, a deferred tax liability can be understood as a tax payable in the future that arises when an entity receives a tax benefit in the current period, but this benefit will reverse later. Baker and Clendon present a classic example of deferred tax through the accounting for depreciable non-current assets, where accounting depreciation and tax depreciation are calculated using different rates or methods. If tax depreciation exceeds accounting depreciation in the early years, the entity receives an early tax benefit, but the difference reverses later and creates an additional tax burden [Baker & Clendon, n.d.]. This explanation is particularly relevant to the energy sector, where the high value of property, plant and equipment may create significant temporary differences.

One important direction of empirical research on deferred taxes is the study of their value relevance. Chludek examined the effect of deferred taxes on firm value in an IFRS environment and showed that investors do not always perceive deferred taxes as a clear indicator of future tax cash flows. Her study indicates that different components of deferred tax assets and liabilities may have different informational value, and in some cases their value relevance is limited [Chludek, 2011, 1–25]. This approach is important because the results of the present study also show that the relationships between deferred taxes and fi-nancial indicators are not uniform across all companies.

Hanlon, Navissi, and Soepriyanto studied the value relevance of deferred taxes arising from asset revaluations. Their research is important in the context of the energy sector because revaluations of property, plant and equipment in capital-intensive companies may create large, deferred tax liabilities. The authors show that deferred tax information related to asset revaluations may provide additional value to users of financial statements, because it reflects the future tax consequences of differences between the accounting value and the tax base of assets [Hanlon et al., 2014, 87–99].

In their systematic review of empirical literature on deferred taxes, Görlitz and Dobler identify two main research directions: value relevance and earnings management. They note that deferred tax studies often examine whether deferred tax assets and liabilities can explain market value, future earnings, or earnings-smoothing behavior by management [Görlitz & Dobler, 2023, 113–165]. Their study also emphasizes that deferred taxes may contain both useful information and subjective estimates, because the recognition of deferred tax assets often depends on forecasts of future taxable profit.

In the context of earnings management, Schrand and Wong examined the use of valuation allowances for deferred tax assets in the banking sector and showed that this tool may be used for earnings management purposes [Schrand & Wong, 2003, 579–611]. Although that study concerns another sector, its logic is also important for energy companies, because recognizing deferred tax assets requires management estimates about future taxable profit. Therefore, analysis of deferred taxes can reveal not only tax consequences, but also the quality of accounting estimates.

Modern studies continue to discuss the value relevance of deferred tax assets. A study based on German HDAX companies shows that the informational value of deferred tax assets for investors may be limited or not uniform, depending on the reporting environment and company-specific characteristics [Zimmermann, 2024, 82–92]. This again indicates that the impact of deferred taxes should be assessed within the conditions of a specific sector and market.

In summary, the international literature considers deferred taxes from three main perspectives. First, they are an accounting category regulated by IAS 12 and arising from temporary differences. Second, they form part of the informational content of financial statements, because they may affect income tax expense, future tax payments, and the assessment of firm value. Third, they may reflect management estimates and the influence of accounting policy on earnings quality. This theoretical basis makes it possible to view the relationship between deferred taxes and profitability indicators in the Armenian energy sector as an important and relevant research issue [Chludek, 2011, 1–25; Görlitz & Dobler, 2023, 113–165; Schrand & Wong, 2003, 579–611].

Scientific novelty

The scientific novelty of the article is that the relationship between deferred taxes and profitability indicators in the Armenian energy sector is considered not only theoretically but also empirically, using data from publicly available financial statements. The study may be useful for financial statement analysts, auditors, tax consultants, and financial management specialists in the energy sector.

The article is also novel because it focuses on Armenian energy sector companies, which operate in a capital-intensive and regulated environment. In this sector, property, plant and equipment, depreciation differences, investment programs, and tariff regulation may have an important influence on deferred taxes. Therefore, the study provides sector-specific evidence and can be useful for financial statement analysts, auditors, tax consultants, and financial management specialists.

Research Aim, Objectives, Hypotheses

The aim of the study is to empirically assess the relationships between deferred taxes and financial results in Armenian energy sector companies by combining the theoretical app-

roach of IAS 12 with actual data from company financial statements. The objectives of the study are to create a comparable database, calculate profitability and tax burden indicators, conduct Pearson correlation analysis, build simple linear regression models, and interpret the results in the context of the international literature.

Based on the literature review, the following research hypotheses are formulated:

Hypothesis 1. There is a positive relationship between deferred tax expense/income and total income tax expense. This hypothesis follows from the logic of IAS 12, because income tax expense is formed from current and deferred tax components. If deferred tax expense increases, total income tax expense is also expected to increase.

Hypothesis 2. There is a positive relationship between deferred tax liabilities and the value of property, plant and equipment. This hypothesis is supported by Baker and Clendon's example of depreciable non-current assets, as well as by the study of Hanlon, Navissi, and Soepriyanto, where deferred taxes arising from asset revaluations are treated as value-relevant information in financial reporting.

Hypothesis 3. The relationship between deferred tax assets and profitability indicators may be non-uniform. The studies by Chludek and by Görlitz and Dobler show that the informational value of deferred tax assets depends on the probability of future taxable profit, accounting estimates, and market conditions. Therefore, in the Armenian energy sector this relationship may differ across companies.

Hypothesis 4. In capital-intensive energy companies, deferred taxes may be more strongly related to property, plant and equipment and the tax burden than directly to ROA or ROE profitability indicators. This is because, in the energy sector, the main source of temporary differences is often not current operating profit, but the difference between the accounting value and the tax base of long-term assets.

Analysis

The correlation analysis results show that the relationships between deferred taxes and financial indicators differ by company in terms of strength and direction.

The tables below are prepared in the logic of SPSS Correlations output and include Pearson r, Sig. (2-tailed), and the number of observations.

For ANPP, the explanatory power of the model between deferred tax expense/income and income tax expense is very high: $R^2 = 0.995$. This means that about 99.5% of the variation in income tax expense in this model is explained by changes in deferred tax expense / income. This result shows that the deferred tax component plays an important role in the formation of ANPP's tax result.

Table 2. Correlations (Pearson) - ANPP

Company	X	Y	N	Pearson r	Sig. (2-tailed)	Interpretation
ANPP	DTL	NP	7	0.090	0.848	very weak positive
ANPP	DTA	ROA	0	-	-	insufficient data
ANPP	DTL	ROE	7	0.154	0.742	very weak positive
ANPP	DTE	ITE	7	0.998	< .001	very strong positive
ANPP	DTL	PPE	7	0.722	0.067	strong positive
ANPP	DTA	RE	0	-	-	insufficient data
ANPP	NetDT	TaxBurden	7	-0.963	< .001	very strong negative

Sig. < .05 values are interpreted as statistically significant.

At the total sample level, R^2 for the same relationship is 0.709, which is also a high value. This means that changes in deferred tax expense/income explain about 70.9% of the variation in income tax expense. This result confirms that deferred taxes can be considered an important component in the analysis of income tax expense.

Table 3. Correlations (Pearson) - HVEN

Company	X	Y	N	Pearson r	Sig. (2-tailed)	Interpretation
HVEN	DTL	NP	3	-0.860	0.341	strong negative
HVEN	DTA	ROA	5	0.712	0.177	strong positive
HVEN	DTL	ROE	3	-0.914	0.266	very strong negative
HVEN	DTE	ITE	6	0.265	0.612	very weak positive
HVEN	DTL	PPE	3	0.971	0.153	very strong positive

HVEN	DTA	RE	5	0.803	0.101	strong positive
HVEN	NetDT	TaxBurden	6	0.165	0.754	very weak positive

Relationships with small n should be interpreted with caution.

For HVEN, the R^2 of the regression model between deferred tax liabilities and property, plant and equipment is 0.943. This indicates that changes in deferred tax liabilities are strongly associated with changes in the value of property, plant and equipment. Such a result is economically logical for the energy sector because differences between accounting depreciation and tax depreciation of property, plant and equipment can create significant temporary differences.

Table 4. Correlations (Pearson) - YTPP

Company	X	Y	N	Pearson r	Sig. (2-tailed)	Interpretation
YTPP	DTL	NP	0	-	-	insufficient data
YTPP	DTA	ROA	6	-0.027	0.959	very weak negative
YTPP	DTL	ROE	0	-	-	insufficient data
YTPP	DTE	ITE	6	0.915	0.011	very strong positive
YTPP	DTL	PPE	0	-	-	insufficient data
YTPP	DTA	RE	6	0.181	0.731	very weak positive
YTPP	NetDT	TaxBurden	6	0.909	0.012	very strong positive

Where data are missing, no coefficient was calculated.

For YTPP, the R^2 between net deferred tax and the tax burden is 0.827, showing high explanatory power. However, this result should be interpreted with limitations, because the tax burden indicator is sensitive to profit before tax, and in a small sample individual year fluctuations may have a strong influence on the results.

Table 5. Correlations (Pearson) - Total Sample

Company	X	Y	N	Pearson r	Sig. (2-tailed)	Interpretation
Total	DTL	NP	10	-0.355	0.314	L
Total	DTA	ROA	11	0.266	0.429	very weak positive
Total	DTL	ROE	10	-0.331	0.350	weak negative
Total	DTE	ITE	19	0.842	< .001	strong positive
Total	DTL	PPE	10	0.576	0.081	moderate positive
Total	DTA	RE	11	0.203	0.549	very weak positive
Total	NetDT	TaxBurden	19	0.225	0.355	very weak positive

The main statistically significant relationship in the total sample is the DTE-ITE relationship.

The correlation results show that, at the total sample level, the relationship between DTE and ITE is strong and statistically significant: $r = 0.842$, $p < .001$. This confirms Hypothesis 1. The same relationship is also strong and significant for ANPP and YTPP. In the case of HVEN, the relationship between DTL and PPE is $r = 0.971$, but $p = 0.153$, which is not statistically significant due to the small number of observations.

The main regression model is constructed for the total sample, where the dependent variable is income tax expense and the independent variable is deferred as a tax expense/income.

Table 6. Model Summary - Total Sample

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.842	0.709	0.692	470,330.0

Dependent variable: ITE; independent variable: DTE.

Table 7. ANOVA - Total Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	9,156,182,942,784.1	1	9,156,182,942,784.1	41.391	< .001
Residual	3,760,575,848,013.6	17	221,210,344,000.8		
Total	12,916,758,790,797.7	18			

F = 41.391, p < .001, which shows the statistical significance of the model.

Table 8. Coefficients - Total Regression Model

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
(Constant)	269,650.5	108,050.6		2.496	0.023
DTE	1.041296	0.161853	0.842	6.434	< .001

Regression equation: ITE = 269,650.5 + 1.041296 × DTE.

Regression analysis makes it possible not only to assess the direction and strength of the relationship, but also to determine the extent to which changes in the independent variable explain variation in the dependent variable.

The results of the analysis show that the impact of deferred taxes on financial indicators in Armenian energy sector companies is not uniform. In some companies, deferred tax liabilities are related to the value of property, plant and equipment, while in other cases the strongest relationship is observed between deferred tax expense and income tax expense.

The results confirm that deferred taxes are an important component of financial statement analysis for Armenian energy sector companies. At the total sample level, the high r and R^2 values for the DTE-ITE relationship are logical because income tax expense consists of current and deferred tax components, which is consistent with the balance sheet approach of IAS 12 [IFRS Foundation, 2026, n.d., Deloitte, n.d.] Therefore, changes in deferred tax expense/income may significantly affect the reported income tax expense for the reporting year.

Table 9. Regression Summary by Company and for the Total Sample

Company	Model	N	r	Sig.	R^2	F	Equation
ANPP	DTE -> ITE	7	0.998	< .001	0.995	1,076.7	Y = 21,387.6 + 1.007929X
ANPP	NetDT -> TaxBurden	7	-0.963	< .001	0.927	63.271	Y = 0.286 - 0.000000X
ANPP	DTL -> PPE	7	0.722	0.067	0.522	5.460	Y = 72,063,490.3 + 30.053184X
HVEN	DTL -> PPE	3	0.971	0.153	0.943	16.602	Y = 107,759,367.8 + 3.712452X
HVEN	DTL -> ROE	3	-0.914	0.266	0.835	5.058	Y = 0.504 - 0.000000X
HVEN	DTA -> RE	5	0.803	0.101	0.645	5.462	Y = 219,889.6 + 16.455102X
YTPP	DTE -> ITE	6	0.915	0.011	0.837	20.596	Y = 462,089.7 + 1.235673X
YTPP	NetDT -> TaxBurden	6	0.909	0.012	0.827	19.063	Y = 1.235 + 0.000001X
Total	DTE -> ITE	19	0.842	< .001	0.709	41.391	Y = 269,650.5 + 1.041296X

The table includes the most interpretable models.

For ANPP, the DTE-ITE relationship is almost complete: r = 0.998, R^2 = 0.995. This shows that, during the period observed, changes in the company's income tax expense were largely driven by the deferred tax component. For HVEN, the DTL-PPE relationship is very strong, r = 0.971, although it is not statistically significant because of the small number of observations. Nevertheless, this result is economically understandable because high-voltage electric networks are capital-intensive infrastructure, and differences between the accounting and tax values of property, plant and equipment are among the main sources of deferred taxes [Baker & Clendon, n.d., n.p.; Hanlon et al., 2014, 87–99].

For YTPP, the DTE-ITE relationship is also statistically significant: r = 0.915, p = 0.011. This shows that deferred tax items also play a significant role in the formation of income tax expense in the case of a thermal power plant. The high value of the NetDT - TaxBurden relationship, r = 0.909, may indicate that changes in net deferred tax were accompanied by changes in the tax burden.

In the context of international literature, the results are consistent with the view that deferred taxes may have informational value for users of financial statements. They reflect future tax consequences that arise from assets, liabilities, income, and expenses recognized in current financial statements.

Limitations

The main limitations of the study are the small sample size and missing data for some variables. The correlation and regression results show the strength and direction of relationships, but they do not prove causality. In addition, the models do not include the possible effects of tariff regulation, debt burden, exchange rate differences, investment programs, and state support.

Conclusion

The results of the study show that deferred taxes in Armenian energy sector companies have not only accounting and technical significance, but also analytical significance. They reflect the effect of temporary differences between financial accounting and tax accounting on tax expense, financial results, and the accounting for capital-intensive assets. This is consistent with the balance sheet approach of IAS 12 [IFRS Foundation, 2026, n.d., Deloitte, n.d.].

The correlation and regression analysis shows that, at the total sample level, there is a strong positive relationship between deferred tax expense/income and income tax expense: $r = 0.8419$, while the explanatory power of the regression model is $R^2 = 0.7089$. This means that the deferred tax component plays a significant role in the formation of total income tax expense and can explain a substantial part of its variation.

The results at the individual company level also confirm the importance of deferred taxes. For ANPP, the relationship between deferred tax expense/income and income tax expense is almost complete: $r = 0.998$, $R^2 = 0.995$, indicating that the deferred tax component has a decisive influence on the formation of tax expense in that company. For HVEN, the very strong positive relationship between deferred tax liabilities and property, plant and equipment, $r = 0.971$, shows that in capital-intensive companies the accounting features of property, plant and equipment may create significant temporary differences and, as a result, deferred tax liabilities. For YTPP, the strong positive relationship between net deferred tax and the tax burden, $r = 0.909$, indicates that deferred taxes may also affect the relative assessment of the tax burden.

The findings are consistent with the logic of IAS 12 Income Taxes, according to which deferred taxes arise from temporary differences between the carrying amounts of assets and liabilities and their tax bases. In the energy sector, such differences are especially expected because the sector is characterized by a large volume of property, plant and equipment, long-term assets, specific depreciation practices, and large investment programs.

The study shows that deferred tax analysis can be used as a tool for deeper assessment of financial statements, which is consistent with international research suggesting that deferred tax items may have value relevance and informational significance [Chludek,

2011, 1–25; Görlitz & Dobler, 2023, 113–165; Hanlon et al., 2014, 87–99]. It makes it possible to identify not only the current tax burden of an entity, but also future tax consequences, differences between financial and tax accounting, and the effect of accounting for property, plant and equipment on income tax expense.

Overall, deferred taxes can be considered an important informational element in the financial statements of Armenian energy sector companies. At the same time, when interpreting them, it should be taken into account that the recognition of deferred tax assets may depend on management estimates of future taxable profit and, therefore, may in some cases be associated with subjectivity in accounting estimates. Their analysis makes it possible to assess more fully companies' tax position, the structure of income tax expense, the effect of accounting for property, plant and equipment, and the possible risks of future tax obligations.

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Correlation and regression analysis of deferred taxes and profitability indicators in Armenian energy sector companies

Key words: deferred taxes, temporary differences, profitability, ROA, ROE, tax burden, correlation analysis, regression analysis, energy sector

The purpose of this article is to study and assess the relationship between deferred tax assets, deferred tax liabilities, deferred tax expense/income, and the indicators of profitability, income tax expense, tax burden, and property, plant and equipment in Armenian energy sector companies. The theoretical basis of the study is the balance sheet approach of IAS 12 Income Taxes, while the empirical basis is the financial statement data of Armenian Nuclear Power Plant CJSC (ANPP), High Voltage Electric Networks CJSC (HVEN), and Yerevan Thermal Power Plant CJSC (YTPP). Pearson correlation coefficients and simple linear regression models are used for the analysis, and the results are presented in an SPSS-style format. The results show a strong positive relationship between deferred tax expense/income and income tax expense. At the company level, deferred tax liabilities may also be closely related to property, plant and equipment and the tax burden. The findings suggest that deferred taxes can be used as an important tool for deeper financial statement analysis in capital-intensive and regulated sectors.