

COMPARABILITY OF ECONOMIC AND FINANCIAL DATA IN THE THEORY AND PRACTICE OF FINANCIAL ANALYSIS

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Purpose: The aim of this article is to provide an overview of the distortions in the comparability of economic and financial data that may occur in the course of economic analyses.

Design/methodology/approach: The theoretical considerations presented in this publication are based on a critical analysis of the financial analysis literature. The problems presented are supported by numerous empirical examples (case studies).

Findings: A properly prepared economic and financial analysis is most often based on a comparative analysis of the financial data under consideration. When conducting such an analysis, however, it should be taken into account that the data used in it may not be comparable. The ability to identify distortions (from different areas) may, nevertheless, allow correct conclusions to be drawn regarding the economic condition of the analysed economic entity.

Originality/value: The originality of this publication results from the multi-faceted approach to the issue of economic analysis. The considerations combine aspects of accounting, finance or legal issues. In addition, both micro- and macroeconomic aspects are included in the course of the argument.

Keywords: comparability of financial data, methodological, financial, organizational and substantive distortions, inflation, valuation, IFRS/IAS.

Category of the paper: Viewpoint, Case study.

1. Introduction

This article presents an important and significant aspect of economic and financial analysis concerning distortions in the comparability of data that are subject to analysis. Four areas of distortion can be distinguished: methodological, financial, organisational and material. The most common problems observed during the analysis are distortions in the first two areas mentioned above, i.e. methodological and financial. Taking the above into consideration, a significant part of the theoretical considerations presented in the article, supported by analysis of case studies taken from the economic environment, concerns methodological and financial distortions.

2. Literature review

In the economics and finance literature, various accounting definitions can be identified. For the purposes of the present paper, accounting can be defined, on the one hand, as an information system (Andrzejewski, 2012, pp. 32-36; Hołda, 2012, pp. 125-140; Walińska, 2014, pp. 509-523), and on the other hand as the voice of business (Turyna, 2014, pp. 8-10; Świdorska, Więclaw, 2016, pp. 19-20). Accounting as an information system focuses on the assessment of the economic condition of an entity and the outcomes of its business activities. Information about an entity's resources and sources of financing is expressed in the balance sheet, while the effects of its operations are found in the profit and loss statement and in the cash flow statement. Subsequently, accounting as an information system provides stakeholders (both internal and external) with information about the economic and financial condition of the business entity. Thus, accounting as the language of business provides information used by management in making both short and long-term decisions. Information from the accounting system is also used by external stakeholders, for instance, when deciding whether or not to invest capital in a given business entity.

The information generated in the accounting system is reported to external audiences in the form of financial statements. Thus, a financial statement can be defined as a product of accounting (Micherda, 2003, pp. 465-479; Zieniuk, 2020, pp. 15-29) that helps to shape the picture of an economic entity and is, further down the line, communicated to stakeholders. According to Micherda (2003, pp. 465-479), an integral part of accounting is financial analysis, used when reading and interpreting financial statements. Thus, according to the literature, financial analysis performs one of the functions of accounting (Stępień, 2019, pp. 24-36), that is, the analytical function. In order to be able to perform this function efficiently and effectively, the data that are subject to analysis, mainly in the form of financial statements of business entities, need to be comparable. This is due to the fact that in the course of analysis, in order to draw valid conclusions about both the present and the future, multidirectional comparisons are made on many levels. In this respect, we can distinguish comparisons over time, comparisons with the plan (budget) or comparisons across an entire field (that is, with other units or industry averages) (Waśniewski, Skoczylas, 2002, pp. 32-34). The possibility of valid conclusions about the financial condition and the state of the assets of the entity and its financial results is conditioned by the quality and comparability of the analysed data. It should be noted, however, that in economic practice there may be many factors that will interfere with this comparability. As indicated by Waśniewski and Skoczylas (2002, p. 29), distortions can be divided into:

- methodological,
- financial (pricing),
- organizational, and
- substantive.

In addition to these, Nowak (2008, p. 39) points to time-related distortions in comparability, resulting for instance, from the analysis of financial data covering different reporting periods. This may occur, for example, when an entity changes the financial year, affecting such categories as revenues, expenses and the financial results of the entity.

3. Methods of research

The starting point for the considerations presented in this article is a critical analysis of the literature on financial analysis, taking into account the issue of distortions in data comparability. Referring to the aforementioned publications by B. Micherda (2003, pp. 465-479), T. Waśniewski and W. Skoczylas (2002, pp. 29-34), within the identified areas of distortions, examples of problems were identified and analysed in the form of case studies.

The research concerns financial statements of selected economic entities prepared in accordance with different accounting standards (the research referred to selected companies preparing statements in accordance with the Polish Accounting Act, as well as in accordance with IAS/IFRS and USGAAP).

The considerations refer to balance sheets, profit and loss accounts and cash flow statements. Information contained in other elements of the financial statements (i.e. in the additional information) and in the auditors' reports on the financial statements was also analysed.

4. Methodological distortions

In terms of the comparability of economic and financial data, methodological distortions may, for example, result from changes that take place in financial reporting, different accounting standards, or even different definitions of indicators used in the analysis.

Some examples of changes in financial statements that may have caused a problem in data comparability include:

- a requirement for the balance sheet as to the categorization of assets, prepared in accordance with the Accounting Act of 2016, to show: "Owner's equity (shares)" and "Called-up contributions to share capital",
- the introduction in 2016 of an international standardization (with mandatory compliance for reporting periods from January 1, 2019), namely IFRS 16, concerning the recognition and presentation in the financial statements of leases (IFRS 16).

The change that has taken place in Polish regulations for balance sheets regarding the presentation of “Owner's equity (shares)” and “Called-up contributions to share capital” has the effect of artificially inflating the balance sheet's total and the value of equity. Thus, the structure of liabilities has also changed: the share of equity has increased, while the level of debt has decreased, which could imply that the financial condition of the analysed business entity is better than in reality. Of course, this problem will not occur if (which happens quite often) the values of these items in the balance sheet amount to “zero”. At the same time, it should be added that such solutions are not commonly used in other accounting systems. For example, IAS 32, paragraph 33 indicates that “if an entity acquires its own equity instruments, these instruments (acquired stakes/own shares) are deducted from equity” (IAS 32, § 33). This factor can result in an overstatement of the value of assets and the value of equity when making comparisons with businesses producing financial statements under different accounting standards.

The second example mentioned concerns the recognition of leases in financial statements prepared in accordance with IFRS/IAS. The introduced standard eliminated the concept of operating leases, and thus the off-balance sheet presentation of assets used under such principles (https://www.inglease.pl/_files/it/item/1500275). In the case of business entities which, prior to the implementation of above standards, used assets under operating leases, such solutions resulted in, among other things (*MSSF 16 „Leasing”. Całkowicie nowa koncepcja...*): an increase in the value and share of payables among liabilities, an increase in the value of fixed assets, an increase in depreciation, and financial expenses (in the form of interest) with a corresponding decrease in the value of third-party services. The above changes resulted in an increase in EBITDA. Adjustments are also visible in the cash flow: the net operating cash flow increases, while net cash flow from financing activities is decreasing.

According to Hońko (2016, pp. 41-51), referring to publications prepared by the IASB, the introduction of the above standard had its greatest impact on the value of liabilities of companies in retail, airlines, hospitality and leisure, and transportation industries. In the case of retail and airlines, as a result of implementation of IFRS 16, an estimated increase of the amount of long-term liabilities has more than doubled.

As indicated earlier, the cause of methodological distortions in the comparability of economic and financial data may also be the dissimilarity of accounting standards applied in the preparation of financial statements. Of course, different standards do not necessarily result in significant differences in the key items presented in the financial statements and the analytical ratios based on them, but on the other hand, the differences between reports prepared using different accounting standards can be significant. This publication will take a closer look at the examples of two business entities where financial data prepared using different accounting standards are made available. These will include:

- Dadelo SA - an entity engaged in the sale (both in-store and online) of bicycles and bicycle accessories, listed on the Warsaw Stock Exchange as of 2020. The comparison will focus on the entity's financial figures as of December 31, 2020, prepared according to the Accounting Act versus International Accounting Standards¹.
- ASML Holding NV - a Dutch company specializing in the production of photolithographic machines used in the manufacture of semiconductors, with shares listed on the Amsterdam and New York stock exchanges. The entity prepares its financial statements based on International Accounting Standards and using US GAAP² - the comparison will include data as of December 31, 2023.

Table 1.

Selected financial figures of Dadelo SA as of December 31, 2020, based on the Accounting Act and using IFRS/IAS (in thousands of PLN)

Specifications	Figures as of 31.12.2020 based on the Accounting Act (Financial statement as of 31.12.2020)	Figures as of 31.12.2020 based on IFRS/IAS (Financial statement as of 31.12.2021)
Fixed assets	5,175	11,312
Current assets	20,142	20,142
Total assets	25,317	31,454
Equity	16,836	19,605
Liabilities	8,482	11,850
Sales revenues	64,521	64,521
EBIT	5,746	6,272
Net financial result	4,554	5,061

Source: own compilation based on Dadelo SA Financial Statements as of 31.12.2020 and as of 31.12.2021.

In the case of Dadelo SA, the change in accounting standards can be observed. It has significantly affected the information contained in the entity's financial statements. The most significant change takes place for fixed assets - an increase of 119% in their value can be observed. These differences are mainly attributable to the lack of depreciation in IFRS/IAS of company value (in accordance with IAS 36 Impairment of Assets) and the disclosure (in accordance with IFRS 16 Leases) in the financial statements of the long-term lease agreement. These differences between accounting standards also affected the observed changes in the structure and value of liabilities, as well as the level of financial results (both operating results and net financial results).

The next table presents selected financial data of ASML Holding NV as of 31.12.2023, based on US GAAP and IFRS/IAS. The biggest discrepancies that can be identified relate to the value of fixed assets. The notes to the entity's financial statements indicate that the variation is mainly due to the different recognition of R&D expenses, in statements prepared in accordance with IFRS/IAS.

¹ Example of a comparative analysis (Accounting Act vs. IFRS/IAS) of accounting solutions for financial instruments, see publication: (Rówińska, 2015, pp. 181-188).

² The differences between the referred standards (that is, IFRS/IAS and US GAAP) are exemplified in the publication: (Gierusz, 2023, pp. 9-36).

Table 2.

Selected financial figures of ASML Holding NV as of 31.12.2023, based on US GAAP and using IFRS/IAS (in million Euros)

Specifications	Figures as of 31.12.2023 based on US GAAP	Figures as of 31.12.2023 based on IFRS/IAS
Fixed assets	15,564	19,009
Current assets	24,394	24,069
Total assets	39,958	43,079
Equity	13,452	16,210
Liabilities	26,505	26,869
Sales revenues	27,559	27,559
EBIT	9,042	9,512
Net financial result	7,839	8,115

Source: own compilation based on ASML Holding NV Financial Statements as of 31.12.2023.

In the process of financial analysis, another problem of methodological distortions is the commonly divergent definitions of the analytical indicators used. This problem can apply to most indicators, but for the purposes of this paper, two will be examined:

- current liquidity ratio and
- inventory cycle in days.

The first of these indicators bears information about the entity's ability to pay its short-term liabilities on time. It is used in the day-to-day management of the enterprise, but is also a very good tool in predicting any threats to the continuity of the business. The concept of the definition of current liquidity ratio was extensively presented in earlier publications of Maślanka (2013, pp. 255-264; 2019, pp. 31-36). In this respect, the publications of the following authors can also be cited: Krzeczewski, Krzeczewska, Pastusiak (2017, pp. 63-80), and Kuciński (2022, pp. 180-191).

Referring to the terminology taken directly from accounting, this ratio should be defined as current assets divided by short-term liabilities. However, referring to the terminology of management, this ratio should be defined as: short-term assets divided by current liabilities. Most often, current assets are defined in the literature as follows:

$$\text{Short-term assets} = \text{current assets} - \text{trade receivables over 12 months}$$

Dudycz (2011, p. 64) defines the indicator in question differently, namely:

$$\text{Short-term assets} = \text{inventories} + \text{short-term receivables} - \text{trade receivables over 12 months} - \text{receivables claimed through court}$$

Other aspects are pointed out by Wędzki (2009, pp. 112-113):

$$\text{Short-term assets} = \text{current assets} - \text{trade receivables over 12 months} + \text{short-term positive company value} + \text{short-term asset component of deferred tax}$$

Similar definitional problems may arise with this indicator's denominator. Here we find short-term liabilities, or using managerial terminology, current liabilities. In this case, it should be remembered that among current liabilities we may also find trade payables of more than 12 months. Additionally, from the perspective of the entity's management, it should also be considered that among liabilities one can find economic categories very similar to short-term payables - for example short-term accruals.

The second of these indicators is the inventory cycle, which is used in the day-to-day management of the enterprise, especially in the management of working capital. For this indicator, the definition is as follows:

$$\text{Inventory cycle in days} = (\text{average inventory} \times \text{number of days in the period}) / \text{cost of sales}$$

In this case, each of the three economic categories indicated in the definition can be determined differently. For example, the average inventory is most often determined based on data taken from the opening balance sheet and the closing balance sheet of the business. However, in a situation where we are dealing with an enterprise that is growing dynamically or an entity whose activities are characterized by seasonality, it may be more appropriate to use data from shorter periods, from several consecutive observations or simply from the end of the period.

The second in terms of size or magnitude is the number of days in a period, most often referring to calendar days in a year (we can consider 360 or 365 days). However, in some analyses, you can find information on working days in the referred period (year), which varies significantly from calendar days.

Referring to the denominator of the inventory cycle indicator, here we find information about the cost of sales, that is, the value taken from the income statement in the calculation method. The question remains unanswered whether the costs of goods sold should be increased by the costs of the period, that is, costs of sales and overheads? How should this problem be approached if the entity prepares the income statement only in the comparative version based on costs by type? On the other hand, it should be noted that in some publications dealing with financial analysis, this ratio is estimated using the stream of revenues from the sale of products, commodities and materials (Waśniewski, Skoczylas, 2002, p. 176) the items of which may differ significantly from the incurred costs associated with the operating activities of the business.

A separate problem in methodological comparisons encountered when making comparisons with a plan or budget of an economic entity may be the fact that planned (forecast) financial statements are most often prepared with a greater or lesser degree of simplification (Gryko, 2007, pp. 510-519). They reflect the average values of various economic categories, excluding the so-called one-time (non-recurring) events. However, it should also be remembered that the presented plans or forecasts primarily approximate the effects of the entity's operational activities. Thus, the existing deviations from the plan (budget) may be a result of non-operational activities, that most often will not be repeated.

5. Financial distortions

Another type of distortion in financial analysis is that arising from the financial area. Here we can talk about problems related to inflation, valuation and the system of value recognition.

For a number of years, inflation may have been marginalized in the course of financial analyses, both short-term and those involving longer time periods. However, recent years (average annual inflation in 2022 was 14.4%, in 2023, 11.4%, and in February 2023, December-to-December inflation was 18.4%) ([https://stat.gov.pl/...](https://stat.gov.pl/)) have shown that the impact of inflation on the analysis can be significant. The inflation we have experienced in recent years has caused a significant problem when comparing data over time, especially when analysing multi-year data (a good analysis should cover a minimum of three consecutive time frames, that is, when analysing annual data it will cover three consecutive years). Interpretation problems will occur, particularly when analysing stream values, that is, revenues, costs or financial results obtained by the entity.

The issue of inflation will be all the more important when analysing the effectiveness of the investment. When forecasting cash flows related to an investment project, a problem will arise: should the forecasts be made in constant prices or current prices? If at current prices, what rate of inflation should be taken into account when adjusting the projected revenues and costs? A separate issue is how to estimate the discount rate in inflationary conditions, and which one to assume: real or nominal?

Another issue that should be recalled in the context of distortions of the analysis of the economic and financial situation of an entity is the issue of the valuation of the assets, liabilities, streams of income, and operating expenses. It should be remembered that in many areas, accounting allows the application of different bookkeeping policies, and valuation is certainly such an area. For example, when analysing assets, it should be recognized that they should be valued at the time of use, at the balance sheet date, as well as at the time of sale or when the asset is used up. Ultimately, the decisions about the type of accounting policy adopted by the entity will probably have the greatest impact on financial results, revealed in the financial statements. This topic was discussed in Maślanka (2007, pp. 520-530), as well as Grabiński (2016), Hernik (2001, pp. 21-32), Luty (2001, pp. 116-121) and Stępień (2019).

When discussing the problem of how different methods of valuation affect the findings of a financial analysis, one can consider the example of valuation of inventory outflows by the Orlen Group (see also: Zarzycka, Klimczak, 2011, pp. 163-178). In its financial statements, prepared in accordance with IFRS/IAS, the company values inventories using a weighted average production cost or cost of purchase method. At the same time, however, the company reports to investors the values of its financial performance using the LIFO approach to inventory valuation, eliminating the impact of changes in oil prices on the Group's performance

(<https://www.orlen.pl/...>). A comparison of the performance of EBITDA for 2020-2023, as reported in the financial statements, and determined using LIFO inventory valuation, is presented in the table below. As can be seen in the reports for 2022-2023, the differences in EBITDA values oscillated within +/-2%. In the previous period (2020-2021) they were many times higher. Similar discrepancies would appear when comparing the rates of return determined using the EBITDA value, which could distort the conclusions of a profitability analysis of the business under investigation.

To summarize the discussion, we can quote Luty (2001, pp. 116-121): “What does a profit achieved mean? According to the current rules, it means as much as crediting real or hypothetical consumption of resources that can be coextensively offset to income, in compliance with current conventions”.

Table 3.

Development of EBITDA and EBITDA with consideration of inventory valuation, according to the LIFO method- Orlen Group for 2020-2023 (financial data in PLN million)

Specification	2023	2022	2021	2020
EBITDA	42,256	56,074	19,211	8,465
EBITDA (correction LIFO)	43,155	54,977	14,965	10,839
Variation (%)	-2.1	2.0	22.1	-28.0

Source: own compilation based on Orlen Group and Orlen SA Board of Directors' Report 2023, p. 365 (<https://www.orlen.pl/...>).

Another problem that should be noted when referring to methodological distortions is the presentation in financial statements of values. This problem will be presented using the example of different depreciation rates of similar assets that can be applied in different business entities. For example, two business entities from the same industry acquired production machinery for the amount of PLN 1 million. In line with the depreciation policy applied in entity A, the depreciation period of the acquired asset was set at 4 years (a rate of 25% per year), while in entity B it was 5 years (a rate of 20% per year). Both entities generated comparable revenues from the sale of goods (approximately PLN 1.5 million annually). The analyses need to look at the efficiency of fixed assets utilized, as measured by the productivity index. Selected calculations over the first 3 years are presented in table below. In analysing the data, two things should be emphasized: the successive increase in the productivity ratios in both entities and the increasingly favourable level of the considered indicator in entity A compared to entity B. At the same time, it is likely that the obtained rates of return (measured by net or gross financial result) in entity B would be at a more favourable level compared to entity A. Are the conclusions presented really indicative of such changes in the financial condition of the entities? It seems that this question can be left unanswered.

An analogous problem can be observed in the case of small-value fixed assets: business entities have the right to choose that the expense incurred for the acquisition of such assets be fully recognized as current-period expense or in accordance with the expected economic life of the assets to determine their depreciation period.

Table 4.*Evaluation of the productivity of fixed assets in companies A and B*

Specification	Year 1	Year 2	Year 3
Net fixed assets (company A) (in PLN)	750,000	500,000	250,000
Net fixed assets (company B) (in PLN)	800,000	600,000	400,000
Sales revenue in the year (in PLN)	1,500,000	1,500,000	1,500,000
Fixed assets productivity ratio (A)	2.00	3.00	6.00
Fixed assets productivity ratio (B)	1.88	2.50	3.75

Source: own compilation

As a comment to the considerations presented here, consider the statement by Brealey and Myers (1999, p. 1086): “The true value of assets may be lower, so a low rate of income from assets does not necessarily mean that a company's assets could be put to better use. Similarly, a high rate of income does not mean that you could acquire the same assets today and get an equally high rate of income from them”.

6. Organizational and substantive distortions

Organizational distortions in the comparability of economic and financial data may occur when the organizational structure of the enterprise in question changes, for example, resulting from a merger with another entity, the acquisition of another entity, or the division into several enterprises. Moreover, distortions of this type will most often occur when there is a need to restructure the entity, resulting from the poor financial condition of the entity under consideration.

One example of an entity that has grown dynamically over the past few years is the Orlen Group. In this case, the entity's growth is mainly attributed to external developments involving the acquisition of other entities, both with similar business profiles and those operating in completely different areas. Over the past few years, the Orlen Group has acquired, among others: ENERGA Group (2019), RUCH SA (2020), LOTOS Group (2022) and PGNiG SA (2022). Thus, when analysing all areas of activity of this entity, one needs to bear in mind that a significant part of the changes that have taken place over the past few years are due to this policy of mergers and acquisitions. Omission of this factor when analysing liquidity, debt, profitability or the efficiency of operations may result in incorrect conclusions regarding the effectiveness of this enterprise.

A different situation occurred in Selvita SA, which for organizational and financial reasons, in 2019 split into two capital companies (<https://strefainwestorow.pl/...>): Ryvu Therapeutics SA and Selvita SA. As a result, the existing entity was divided into two bodies: Ryvu Therapeutics, a company which will continue to develop innovative oncology therapies, and Selvita, rendering research services to other pharmaceutical, chemical or biotechnology companies, providing qualified research teams in the form of outsourcing (<https://ryvu.com/wp-content/...>).

In this case, due to the organizational changes, it will be impossible to carry out a proper analysis in time.

Substantive distortions (in other words, business related) (Nowak, 2008, p. 40) can occur when the technology of the entity's manufactured products changes. It should be remembered, however, that avoiding such problems in the current turbulent times, with dynamic technological progress is practically impossible, and therefore, especially when conducting an analysis over time, this factor should be kept in mind as one of the causes of such changes.

Going further, substantive disruptions also occur when an entity's business profile changes, not only due to the withdrawal of deteriorating products or the introduction of a new offering, but as a result of change in the entity's business model. For example, this type of fundamental change in business profile took place in 2010 in a company listed on the NewConnect stock exchange since 2008, namely Blu Pre IPO SA (formerly: Carbon Design SA and Carbon Invest SA). This company in the 2009-2010 operating period engaged, among other things, in the production of bicycles, then in the production of chassis for sports and racing cars (<https://newconnect.pl/ebi/files/1661-raport.iii.kw.pdf>). In 2010, the company withdrew from its existing businesses and completely re-formulated its business model. Since 2010, the company's business focus has been "the acquisition of shares of companies classified as small and medium-sized enterprises, including companies in the early stages of development or just starting up" (<https://newconnect.pl/ebi/...>). Thus, any analysis of the financial data over time of the described entity covering the years 2009-2011 is impossible, since these figures describe a completely different business profile of the company.

7. Summary

Correctly prepared economic and financial analysis will be largely based on a comparative analysis of the financial data. When making such analysis, however, it should be remembered that the data used in it are characterized by greater or lesser comparability. The ability to identify distortions (of different types) may, nevertheless, allow drawing valid conclusions about the economic condition of the investigated business. On the contrary, in certain situations, looking for example at the problem of different accounting standards or the differences between real and nominal terms, can help to better understand the processes taking place in the economic entity under scrutiny.

In summary, it should be emphasised that a correct in-depth analysis of an entity's financial situation requires a simultaneous overview of the economic entity from different perspectives. Thus, correct conclusions can be drawn by analysing of the problem simultaneously through the prism of the balance sheet, profit and loss account and cash flow statement. Furthermore, correct conclusions should take into account external, i.e. macroeconomic factors.

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