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## Article

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## Article

# Subsidies and Economic and Financial Performance of Enterprises

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**Abstract:** The aim of this article is to analyze the economic and financial performance of Slovenian enterprises, as a European Union (EU) member state case study. A favorable economic and financial performance is crucial for long-term sustainable enterprise growth and survival. Eight economic and financial performance indicators are used to evaluate the sustainability in the growth of enterprises: seven of them are financial indicators—assets, revenues from sales, equity, net profits, operating efficiency, return on equity, and value added per employee—while the eighth variable is the economic indicator for the number of employees. A distinction is made between enterprises that did and that did not receive subsidies from national and EU funds. Three enterprise-level data sources are combined in the empirical analysis: balance sheet data from enterprise accounts, own surveys data, and government data on public subsidies to enterprises. The mean values and standard deviations of economic and financial indicators based on balance sheet data for the years in two financial periods are estimated. The summary statistics for economic and financial indicators and correlation analysis are conducted and the results of the economic and financial indicators are compared using the parametric paired sample two-tailed t-test that allows comparison between the enterprises in the two financial periods. An increase in the economic and financial indicators is investigated by comparing the enterprises that did receive subsidies with the enterprises that did not receive subsidies in the two financial periods. The empirical results confirm that the value added per employee is the only financial indicator where a positive link is found between the financial indicator and subsidies. The results suggest that subsidies can be important for cash flow into enterprises, but entrepreneurial activities are crucial for favorable economic and financial performance and long-term sustainable growth in a competitive market environment.



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**Keywords:** economic performance; financial performance; economic indicator; financial indicators; enterprises; sustainable growth; subsidies; comparative analysis; Slovenia; European Union

## 1. Introduction

In order to achieve sustainable economic growth and optimal business performance within an enterprise, there needs to be coherence between economic, environmental, societal, and other objectives (Tomšič et al. 2015). Sustainable development goals vary in their implementation between enterprises (O’Gorman 2001; Šebestová and Sroka 2020). The pervasive issue of how to achieve sustainable economic growth while simultaneously operationalize efficiency within an enterprise has remained unsolved (Batrancea et al. 2020). There are different theoretical approaches related to the role of the economic and financial performance in a more sustainable paradigm of development, corporate social responsibility, and corporate sustainability (Bojnec and Tomšič 2021). We focus on the sustainable enterprise growth investigating the economic and financial performance indicators for enterprises.

The purpose of the study is an investigation of the Slovenian enterprise performance as a European Union (EU) member state case study. The enterprise performance is measured

with eight financial and economic indicators: seven of them are financial indicators—assets, revenues from sales, equity, net profits, operating efficiency, return on equity, and value added per employee—while the eighth variable is the economic indicator for the number of employees. These eight economic and financial performance indicators are linked to subsidies received by enterprises from national and EU funds.

With the accession of Slovenia to EU on 1 May 2004, the Slovenian enterprises have had the possibility of obtaining subsidies for various projects (European Commission 2021), importantly in the field of research, development, and innovation (RDI). The question arises whether the subsidies have contributed to the long-term objectives in the field of RDI, economic, and financial performance and sustainable orientation and sustainable growth, which are identified as priorities in various strategic documents.

The previous studies have given mixed results regarding the relationship between subsidies and the performance of enterprises (Girma et al. 2009; Bergström 2000; Bernini and Pellegrini 2011; Žampa and Bojnec 2017). Therefore, we want to investigate the economic and financial performance of Slovenian enterprises in association with subsidies with special focus on the sustainable growth of enterprises, which is important in broad research, policy, and practice contexts.

The rest of the article is structured as follows. In Section 2, the materials and methods are presented, focusing on explanation of performance measures, economic and financial performance indicators, and how these are measured for the analyzed enterprises using statistical methods and data. Section 3 presents and explains the results. Section 4 provides a discussion of the findings. Finally, Section 5 highlights the principal conclusions.

## 2. Materials and Methods

Economic and financial performance indicators are estimated based on balance sheet data of enterprises and are analyzed by statistical methods. This section is divided in five parts. In the first and second parts, enterprise performance and enterprise economic and financial performance indicators are explained. In the third part, measures are presented that are used to calculate the economic and financial performance of enterprises. In the fourth part, statistical measures and statistical tests are explained that are applied to test the calculated economic and financial indicators. The fifth part explains what data were used.

### 2.1. Enterprise Performance

Measuring enterprise performance is important for corporate finance, management, and decision-making (Jeston and Nelis 2008; Gherghina 2021). Previous research shows that in addition to economic and financial performance, it is useful to include the number of factors in terms of social performance (Freeman 1984 or Hillman et al. 2001), diversification performance, and innovation performance (Balkin et al. 2000). Turnover or enterprise revenue from sales can be influenced by the perception of organizational culture by employees (Sheridan 1992). Therefore, the economic and financial performance of enterprises could be driven by various enterprise-specific factors and exogenous factors of sectorial and macro-economic environments (Batrancea et al. 2020).

Previous research has shown that the long-term survival of enterprises depends on the enterprise's ability to meet the needs of all its stakeholders (Clarkson 1995). Enterprises are most effective when all their stakeholders reach maximum value (Donaldson and Preston 1995). Allouche and Laroche (2005) found that enterprises that are more socially successful have better financial indicators of performance. Waddock and Graves (1997) also found a positive relationship between corporate social performance and financial indicators. Tomšič et al. (2015) and Bojnec and Tomšič (2021) argued that corporate sustainability improves enterprise performance.

## 2.2. Subsidies, Economic, and Financial Performance of Enterprises

A successful economic and financial performance is one of the most important tasks of an enterprise (Chakravarthy 1986). Measuring economic and financial performance is one of the most critical challenges faced by enterprises and plays a key role in preparing strategic plans, assessing the achievement of enterprise goals, and rewarding managers (Venanzi 2012). Measuring economic and financial performance is often equated with profit, sometimes with market power (Tzelepis and Skuras 2004).

Glancey (1988) found that large enterprises have higher asset growth than small ones. The former encourages investment and, thus, increases the enterprise's assets. On a percentage basis, even a small absolute increase can represent a high relative increase for small enterprises. Investments and related technology improvements are one of the main sources of productivity growth (Griliches 1998), which suggests that large enterprises can more easily carry out investment and RDI activities.

There are studies suggesting that cash flow is sensitive to investment in research, especially in the case of start-up, small, and technological enterprises (Hall 1992; Hao and Jaffe 1993; Himmelberg and Petersen 1994; Bond et al. 2005). Small and new technological-based enterprises can increase investment through subsidies contributing to cash inflow as a grant that improves liquidity. Subsidies could reduce sensitivity to investment and cash flow (Colombo et al. 2013). Subsidies to small and medium enterprises (SMEs) could facilitate access to finance, which makes it more likely to obtain long-term funding (Meuleman and Maeseneire 2012).

Brachert et al. (2018) found mixed results regarding the impact of public investment subsidies on firm performance in eastern Germany: investment subsidies were found to have a positive impact on enterprise employment and to a lesser extent on enterprise turnover, but did not affect enterprise competitiveness and labor productivity.

Domadenik et al. (2018) found that in Slovenia, the diversification of the distribution of subsidies by individual sectors affects higher productivity. They point out that enterprises that received a higher share of subsidies were less productive compared to enterprises in the same sector that received a lower share of subsidies or did not receive subsidies.

Bergström (2000) reported that subsidies affect enterprise growth, and there is insufficient evidence to confirm that subsidies affect the productivity of enterprises.

Cerqua and Pellegrini (2014) found that subsidies have a positive effect on an enterprise's employment, investment, and revenue, and the effect on productivity is mostly negligible. Bernini et al. (2017) confirmed the statistically significant positive impact of public subsidies on total factor productivity and efficiency.

Negligible or negative effects of subsidies on efficiency and productivity are reported by Lee (1996), Harris and Trainor (2005), and Criscuolo et al. (2012). Koski and Pajarinen (2015) confirmed these findings by arguing that no type of subsidy has statistically significant short- and long-term associations with labor productivity in enterprises. Gosc and Nehrebecka (2019) did not find a significant effect of subsidies on productivity of the subsidized enterprises, growth rate of assets, or profitability in Polish enterprises.

Park (2014) noted that national research institutions and large enterprises received higher amounts of subsidies, but efficiency and productivity were not better than others. Irwin and Klenow (1996) also found that the impact of subsidies in high-tech enterprises in the United States on productivity was negligible. There is also no evidence that subsidies affect productivity in the United Kingdom (Criscuolo et al. 2012) or Italy (Bernini and Pellegrini 2011; Cerqua and Pellegrini 2014).

Karhunen and Huovari (2015) showed that in enterprises, one to two years after receiving subsidies, productivity falls by 2–4% compared to enterprises that did not receive subsidies. The decline in productivity is statistically significant in the industrial sector, but not in the service sector. Subsidies in the field of R&D have a positive impact on the growth of employees in the enterprise, which was also confirmed by Girma et al. (2008), who argued that subsidies affect additional employment.

Durst and Gerstlberger (2021) provided an overview of policies and support programs financing sustainable SMEs. They argue that the primary focus was on the environmental dimension of energy-related sustainability, while the social dimension was neglected. Wang et al. (2021) found a significant negative effect of government subsidies on firms' financial performance in China's new energy vehicle industry, with heterogeneity of results and findings according to enterprise business characteristics, geographical location, and ownership structure.

Subsidies play an important role for farms and agricultural enterprises as a reason that several studies have investigated their impacts on farms' economic and financial performance and efficiency (Bojnec and Latruffe 2013) and on different components of farms' total factor productivity (Baráth et al. 2020).

Dvouletý et al. (2021), based on a systematic review of the literature and empirical evidence regarding subsidies and grants to SMEs in the EU, summarized the positive outcomes of subsidies on enterprise survival, employment, tangible/fixed assets, and sales/turnover, and the mixed findings for labor productivity and total factor productivity.

### 2.3. Measuring Economic and Financial Performance Indicators for Enterprises

The economic and financial performance of enterprises is represented by eight balance sheet and financial indicators: revenues (R), equity (E), assets (A), number of employees (NE), net profit (NP), value added per employee (VAP), return on equity (ROE), and operating efficiency (OE). The financial indicators data used are defined according to the Slovenian Accounting Standards (2017).

*Revenues (R)* are increases in economic benefits in a given accounting period in the form of increases in assets or reductions in debts resulting in capital increases, other than those related to new payments by owners.

*Equity (E)* is the balance of assets after deducting all debts. It is formally broken down into share capital. It is supplemented by paid-in capital surplus, retained and net profit for the financial year, and revaluation surplus. Transferred losses and losses of the financial year and acquired treasury shares or own business shares contribute to the reduction of capital.

*Assets (A)* or fixed assets are divided into tangible fixed assets and intangible fixed assets. Tangible fixed assets are land, buildings, production equipment, other equipment, and biological assets. Intangible fixed assets are concessions, patents, licenses, trademarks and similar rights, and advances for intangible fixed assets.

*Number of employees (NE)*. In the balance sheet data, the number of employees is reported as the average number of employees based on working hours in the accounting period.

*Net profit (NP)* is the difference between generated revenues and expenses. Net profit is then reduced by accrued income tax and receivables and deferred tax assets liabilities. Profit can be considered from different aspects, e.g., from an ownership point of view, a management point of view, an economic point of view, a financial point of view, a creditor point of view, the point of view of business partners of buyers and suppliers, the point of view of competitors, the point of view of employees, a tax point of view, and a social point of view. Accounting profit is defined by accounting standards and is presented in the financial statements.

*Value added per employee (VAP)* is one of the most important economic and financial indicators monitored to achieve the objectives of EU programs. In almost all EU programs, VAP is a key economic and financial indicator for monitoring the performance of an individual enterprise that has received a subsidy (Republic of Slovenia 2017). If enterprises achieve high added value, they create opportunities for further investments that can improve performance. Value added is an important means of measuring the results of an enterprise and other organizations.

VAP is calculated as follows:  $VAP = (GOI - CVI - CGMS - OPE) / NE$ , under the condition that  $NE > 0$ . GOI represents the gross operating income, CVI represents the



change in value of inventories of products and unfinished production, CGMS represents the costs of goods, materials, and services, OPE represents the other operating expenses, and NE represents the average number of employees based on working hours in the accounting period.

*Return on equity (ROE)* is calculated as follows:  $ROE = \text{Net Profit} / \text{Equity}$ . ROE represents the starting point of economic and financial analysis from both the perspective of an existing and a potential investor. Value added for the owner is created only when the ROE is greater than the cost of capital. For this reason, return on capital is one of the most used and most important measures of profitability from the point of view of the owner. ROE explains the effectiveness of the management with an owner's assets.

The ROE ratio shows the level of profit or loss compared to fixed capital. If we want to calculate the net profitability of fixed capital, then only the net profit is taken into account. If we want to ensure greater comparability of profitability over time, it is useful to exclude the impact of changes in the effective tax rate. Then, in the above calculation, the total profit and not the net profit is used.

*Operating efficiency (OE)* is the ability to handle elements of the business process prudently. It shows the relationship between the business effects and the costs of the business process, which can be calculated at the level of enterprise, production, cost places, and business effects. An operating efficiency (OE) indicator at the enterprise level was used:  $OE = \text{Operating revenues} / \text{operating expenses}$ .

As part of the economic and financial performance analysis, the above eight balance sheet data and financial indicators are analyzed. The EU places the greatest emphasis on the economic and financial indicators of VAP and NE.

#### 2.4. Statistical Methods to Test the Hypothesis

The empirical analysis of the impact of subsidies on the economic and financial performance indicators is investigated using descriptive statistics and a correlation analysis of the economic and financial indicators. The results of the economic and financial indicators are compared using the parametric paired sample two-tailed *t*-test that allows a comparison between enterprises that did and did not receive subsidies in the two financial periods. Particularly, we investigate whether the mean difference of the observations in the two periods is zero (Ross and Willson 2017). In this way, we evaluate the set hypothesis on the effectiveness of an enterprise economic and financial performance in the two financial periods before and after completing the financial program, and analyze the differences using the parametric paired sample two-tailed *t*-test. The statistical methods were applied using IBM Statistical Package for the Social Sciences (SPSS) software (IBM SPSS Software 2020; SPSS 2020).

#### 2.5. Data

The empirical analysis of the impact of subsidies on economic and financial performance of enterprises was conducted with a combination of the enterprise accountancy data, data collected with the own conducted survey using a questionnaire in the Slovenian enterprises, and data on subsidies received by enterprises obtained from the Ministry of Finance (MoF). A combination of enterprise accountancy data, primary sample data of 396 Slovenian SMEs, and data on research and development (R&D) subsidies received by enterprises have been used in the empirical analysis.

The economic and financial performance indicators are calculated based on the secondary enterprise accountancy data for the entire population of the 6190 Slovenian enterprises that were established before the year 2000, were active at the end of the year 2014, and had at least five employees. The nominal values over time were deflated by the statistical price indices with the constant base year.

The amount of subsidy received, and the number of subsidies received were calculated for the period 2000–2013, and the sub-periods 2000–2006 and 2007–2013. The time sub-periods are the same as the financial periods 2000–2006 and 2007–2013.

The mean values and the average growth of indices for economic and financial performance indicators are calculated for the period 2000–2014 with two sub-periods: before the EU financial period in Slovenia, i.e., 2000–2006, and during the first EU financial period in Slovenia, i.e., 2007–2014. The reason that the economic and financial performance indicators were calculated for the period 2000–2014 can be explained by the fact that it was assumed that not only current year subsidies but also one-year lagged subsidies affect the economic and financial performance indicator indices. In addition, some subsidies for the period 2007–2013 were also implemented and paid not only in the year 2013 but also in the year 2014.

We compare enterprises that have received subsidies with enterprises which have not received subsidies.

As part of the preparation of the deflation of financial indicators, we first calculated the average growth of indices for individual activities (according to the standard classification of activities) by individual years (from 2000 to 2014) for which data were available. These activities were: A—Agriculture, forestry, and fishing, B—Mining and quarrying, and C—Manufacturing.

The collected balance sheet data and financial indicators R, E, A, NP, and VAP for the Slovenian population of enterprises were deflated and set to the same denominator (per employee), which means that the balance sheet data became financial indicators (except for NE).

For the service activity, the statistical index of inflation as a deflator was available since 2007. For the years 2000–2006, it was estimated based on the statistical index inflation for other activities in this period and using their ratio with service activity in the period 2007–2014. This was followed by the calculation of the average inflation growth for the service activity and other activities, respectively, in the years 2007–2014, to obtain the price index for the deflation of service activities.

The growth of the economic indicator and financial indicator indices per year, excluding the upper and lower 5%, was calculated as the average growth of an index per year for the period 2000–2014, and sub-periods 2000–2007, 2008–2014, and 2008–2014C. The latter period means that the economic and financial crisis years of 2009–2011 were excluded.

### 3. Results

This section is divided in four parts: the first section presents the average (arithmetic mean value) growth of indices for economic and financial indicators. The second presents the results and explains the analysis of statistical properties of economic and financial indicators. The third part provides the results of testing the statistical significance of economic and financial indicators in the two financial periods. The fourth part investigates the impact of subsidies on the economic and financial indicators for the studied enterprises in the two financial periods.

#### 3.1. Analysis of the Economic and Financial Indicators

We have conducted a basic analysis of the average growth of indices of eight economic and financial indicators. We have deflated the data for R, E, A, NP, and VAP, and then placed the data on a single item per employee for R, E, A, and NP. Thus, we transformed the balance sheet data into financial indicators, and then calculated the growth of the indices per year and the average growth index for each indicator, for individual financial time periods, within which the samples were divided into the following four comparisons:

- Population (P) of enterprises,
- Enterprises that replied to the questionnaire (VP sample),
- Enterprises that replied to the questionnaire and received public funding (PS sample),
- and
- Enterprises from the MoF database (MoF sample) that received a subsidy.

For the analysis of the financial period 2000–2006, we used the obtained economic and financial indicators for the periods 2000–2007 due to the expected lagged effect of subsidies

from the year 2006 to the year 2007. The first EU financial period consisted of the years 2007–2013. The first results of the EU financial period can be seen from 2008 onwards, with the inclusion of the year 2014, as we anticipate that the impact of subsidies on the economic and financial indicators started in 2008 and beyond from the year 2013 to the year 2014.

Table 1 presents economic and financial indicators indices for the Slovenian population of enterprises, and for the VP sample, the PS sample, and the MoF sample, respectively.

**Table 1.** Economic and financial indicators indices for the population of enterprises and sample groups of enterprises in different periods.

Indicator	Population/Sample	2000–2014	2000–2007	2008–2014	2008–2014C
Assets (A)	P—population	1.390	1.784	1.064	1.053
	VP—sample	1.388	1.768	1.061	1.051
	PS—sample	1.383	1.750	1.079	1.056
	MoF—sample	1.371	1.711	1.066	1.052
	Average	1.38	1.75	1.07	1.05
Revenue (R)	P—population	1.383	1.768	1.060	1.059
	VP—sample	1.377	1.729	1.058	1.058
	PS—sample	1.378	1.728	1.064	1.054
	MoF—sample	1.365	1.713	1.063	1.060
	Average	1.38	1.73	1.06	1.06
Equity (E)	P—population	1.410	1.769	1.104	1.084
	VP—sample	1.407	1.772	1.101	1.094
	PS—sample	1.393	1.78	1.104	1.096
	MoF—sample	1.391	1.721	1.101	1.081
	Average	1.40	1.77	1.10	1.09
Net profit (NP)	P—population	1.072	1.103	1.010	1.008
	VP—sample	1.054	1.088	1.005	1.006
	PS—sample	1.047	1.047	1.006	1.006
	MoF—sample	1.038	1.053	1.004	1.004
	Average	1.05	1.07	1.01	1.01
Number of employees (NE)	P—population	1.062	1.090	1.022	1.029
	VP—sample	1.056	1.087	1.022	1.028
	PS—sample	1.060	1.087	1.021	1.033
	MoF—sample	1.051	1.071	1.010	1.015
	Average	1.06	1.08	1.02	1.03
Operating efficiency (OE)	P—population	1.050	1.061	1.039	1.041
	VP—sample	1.055	1.065	1.046	1.047
	PS—sample	1.053	1.060	1.048	1.048
	MoF—sample	1.049	1.055	1.043	1.045
	Average	1.07	1.19	1.02	1.08
Return on equity (ROE)	P—population	1.207	1.531	0.944	1.176
	VP—sample	1.110	1.585	0.934	1.202
	PS—sample	1.250	1.549	1.183	1.360
	MoF—sample	1.261	1.477	1.058	1.265
	Average	1.21	1.54	1.03	1.25
Value added per employee (VAP)	P—population	1.354	1.686	1.051	1.052
	VP—sample	1.360	1.675	1.055	1.056
	PS—sample	1.356	1.659	1.063	1.059
	MoF—sample	1.348	1.641	1.059	1.060
	Average	1.35	1.67	1.06	1.06

Source: authors' estimations.

First, it shows that the Slovenian population of enterprises (P-population) achieved the highest index growth for financial indicator equity (E) in all analyzed years. In the period from 2000 to 2007, the highest increase was in financial indicator E; the period from 2008 to 2014 also shows the highest increase in financial indicator E. If we exclude the years



with the financial crisis (2008–2014C period), then the highest increase was in the ROE indicator.

Second, it shows that the enterprises that replied to the questionnaire (the VP sample) achieved the highest index growth for financial indicator E in all analyzed years. In the period from 2000 to 2007, the highest increase was in the financial indicator assets (A), while in the period from 2008 to 2014, the highest increase was for financial indicator E. With the exception of the financial crisis years, the highest increase was in the financial indicator ROE.

Third, it shows that the enterprises that replied to the questionnaire and received subsidies (the PS sample) achieved the highest index growth for financial indicator E in all analyzed years. In the period from 2000 to 2007, the highest increase was in financial indicator A, while in the period from 2008 to 2014, the highest increase was in the financial indicator ROE. If the financial crisis years are excluded, then the highest increase was in the financial indicator ROE.

Fourth, it shows that the enterprises that received subsidies and were in the MoF dataset (the MoF sample) achieved the highest index growth for financial indicator E in all analyzed years. In the period from 2000 to 2007, the highest increase was in financial indicator E; in the period from 2008 to 2014, the highest increase was also in financial indicator E. If the financial crisis years are excluded, then the highest increase was in the financial indicator ROE.

Finally, to facilitate the comparison between the population of enterprises and the samples of individual groups of enterprises in different studied periods, we can summarize that the population of enterprises and sample groups of enterprises achieved approximately similar increases in individual economic and financial indicators indices by the predetermined studied periods. Only the financial indicator ROE achieved an uneven increase in index growth.

### 3.2. Summary Statistics of Economic and Financial Indicators Indices

The descriptive statistics of economic and financial indicators indices are indicated by the skewness coefficients of asymmetry and kurtosis of flatness. We were also interested in the lowest and highest values of economic and financial indicators indices, arithmetic mean values, median, and standard deviation. We did not consider ROE in the analysis, as shown in Table 2, as the values of this financial indicator fluctuated considerably. We were also careful to generalize the results of the net profit (NP) financial indicator, while the balance sheet data for employment (NE) economic indicator is somewhat acceptable.

**Table 2.** Normality distribution for economic and financial indicators indices by different time periods.

Indicator	Period	N	Mean Value	Median	SD	Skewness	Kurtosis	Minimum	Maximum
Assets (A)	2000–2014	396	1.39	1.37	0.17	0.883	0.499		1.928
	2000–2007	396	1.77	1.74	0.34	1.417	2.450	1.291	3.113
	2008–2014	396	1.06	1.06	0.10	0.419	0.079	0.867	1.362
	2008–2014C	396	1.05	1.05	0.12	0.480	−0.093	0.827	1.416
Revenue (R)	2000–2014	396	1.38	1.35	0.16	1.136	1.650	1.095	1.964
	2000–2007	396	1.73	1.70	0.28	1.381	2.567	1.278	2.943
	2008–2014	396	1.06	1.06	0.10	0.577	0.416	0.863	1.368
	2008–2014C	396	1.06	1.05	0.13	0.720	0.683	0.812	1.445
Equity (E)	2000–2014	396	1.41	1.39	0.22	0.982	1.884	0.905	2.231
	2000–2007	396	1.77	1.73	0.37	1.464	2.971	1.037	3.381
	2008–2014	396	1.10	1.10	0.14	0.661	1.567	0.754	1.623
	2008–2014C	396	1.09	1.08	0.16	0.700	1.382	0.701	1.636

Table 2. Cont.

Indicator	Period	N	Mean Value	Median	SD	Skewness	Kurtosis	Minimum	Maximum
Net profit (NP)	2000–2014	396	1.06	1.01	0.18	6.373	49.100	0.918	2.794
	2000–2007	396	1.09	1.01	0.24	5.093	31.196	0.983	3.269
	2008–2014	396	1.01	1.00	0.02	3.812	24.510	0.940	1.186
	2008–2014C	396	1.01	1.00	0.02	4.689	26.221	0.977	1.156
Number of employees (NE)	2000–2014	396	1.06	1.05	0.07	1.444	2.945	0.952	1.365
	2000–2007	396	1.09	1.07	0.10	1.506	3.175	0.926	1.505
	2008–2014	396	1.02	1.02	0.06	1.037	1.525	0.916	1.264
	2008–2014C	396	1.03	1.03	0.07	0.761	1.010	0.907	1.272
Operating efficiency (OE)	2000–2014	396	1.05	1.05	0.04	0.873	0.844	0.964	1.193
	2000–2007	396	1.07	1.06	0.06	1.013	1.049	0.953	1.232
	2008–2014	396	1.05	1.04	0.04	0.815	0.616	0.955	1.173
	2008–2014C	396	1.05	1.04	0.04	0.583	0.377	0.946	1.178
Return on equity (ROE)	2000–2014	396	1.12	1.21	1.74	−0.996	5.233	−6.545	7.539
	2000–2007	396	1.59	1.35	1.66	0.432	9.237	−9.977	8.258
	2008–2014	396	0.93	1.05	1.68	−1.701	7.699	−7.830	5.478
	2008–2014C	396	1.20	1.18	1.53	−0.661	4.165	−5.329	6.145
Value added per employee (VAP)	2000–2014	396	1.36	1.35	0.09	1.029	1.718	1.101	1.689
	2000–2007	396	1.68	1.65	0.18	1.290	2.247	1.333	2.343
	2008–2014	396	1.05	1.05	0.05	0.846	1.649	0.941	1.243
	2008–2014C	396	1.06	1.05	0.07	0.227	0.717	0.869	1.301

N—number of observations and SD—standard deviation. Source: authors' estimations.

### 3.3. Testing the Statistical Significance of Economic and Financial Indicators Indices in the Two Financial Periods

Using the paired sample two-tailed t-test, we were able to test and compare the significance of economic and financial indicators indices in the two financial periods.

Table 3 shows the mean values, standard deviations, and standard errors of the economic and financial indicators indices for the before-EU financial period (2000–2007) and during the first EU financial period (2008–2014). In addition, it presents the calculated difference in the mean values of the economic and financial indicators indices in the two financial periods and the paired sample two-tailed t-test statistics.

The difference in the economic and financial indicators indices in the periods 2000–2007 and the period 2008–2014 is statistically significant ( $p$ -value < 0.001), and each of the economic and financial indicators indices show a decline in value in the period 2008–2014. These results suggest that the hypothesis on the improvements in economic and financial performance of enterprises between the two financial periods can be rejected.

Table 4 shows the correlation coefficients between the economic and financial indicators indices in these two financial periods. The association is statistically significant (at a statistical significance less than 1%) for R, NE, and OE (sig < 0.001). The correlation coefficient in the periods for VAP (sig < 0.06), which has a level of significance of 5.6%, suggests that the hypothesis on the improvements of this performance indicator in the two financial periods can be rejected. The correlation coefficients are positive, except for VAP. The higher the VAP in the period 2000–2007, the lower it was in the period 2008–2014. For other economic and financial indicators, they are positively correlated in the two financial periods, i.e., the higher the indicator was in the period 2000–2007, the higher it was in the period 2008–2014. However, for A, E, and NP indicators, the correlation coefficients are not statistically significant.

**Table 3.** Comparisons of the mean values and their differences for the economic and financial indicators indices in the two financial periods.

Indicator	Period	Mean Value	N	Standard Deviation	Standard Error
Assets (A)	2000–2007	1.770	396	0.336	0.017
	2008–2014	1.061	396	0.101	0.005
	Difference	0.709	396	0.345	0.017
Revenue (R)	2000–2007	1.735	396	0.285	0.014
	2008–2014	1.058	396	0.105	0.005
	Difference	0.676	396	0.282	0.014
Equity (E)	2000–2007	1.772	396	0.373	0.019
	2008–2014	1.102	396	0.138	0.007
	Difference	0.670	396	0.390	0.020
Net profit (NP)	2000–2007	1.090	396	0.241	0.012
	2008–2014	1.006	396	0.021	0.001
	Difference	0.084	396	0.240	0.012
Number of employees (NE)	2000–2007	1.088	396	0.099	0.005
	2008–2014	1.023	396	0.063	0.003
	Difference	0.065	396	0.103	0.005
Operating efficiency (OE)	2000–2007	1.066	396	0.055	0.003
	2008–2014	1.045	396	0.041	0.002
	Difference	0.020	396	0.055	0.003
Value added per employee (VAP)	2000–2007	1.677	396	0.177	0.009
	2008–2014	1.055	396	0.054	0.003
	Difference	0.622	396	0.190	0.010

Note: N—number of observations and Standard error—Standard error of the arithmetic mean. The difference between the two financial periods at the 95% confidence interval in difference values: for A, lower 0.675 and upper 0.743, *t*-test 40.88; for R, lower 0.649 and upper 0.704, *t*-test 47.73; for E, lower 0.631 and upper 0.708, *t*-test 34.17; for NP, lower 0.060 and upper 0.108, *t*-test 6.95; for NE, lower 0.055 and upper 0.075, *t*-test 12.53; for OE, lower 0.015 and upper 0.026, *t*-test 7.32; and for VAP, lower 0.603 and upper 0.640, *t*-test 65.10. For each reported *t*-test, the degree of freedom = 395, and significance (two-tailed) is 0.000. Source: authors' estimations.

**Table 4.** Correlation coefficients for the economic and financial indicators indices in the two financial periods.

Indicator	N	Coefficient of Correlation	<i>p</i> -Value
Assets (A)	396	0.057	0.259
Revenue (R)	396	0.207	0.000
Equity (E)	396	0.057	0.260
Net profit (NP)	396	0.061	0.228
Number of employees (NE)	396	0.252	0.000
Operating efficiency (OE)	396	0.386	0.000
Value added per employee (VAP)	396	−0.096	0.057

Source: authors' estimations.

### 3.4. Impact of Subsidies on Economic and Financial Indicators

We determined whether there were differences in the mean values of economic and financial indicators indices in the periods 2000–2007 and 2008–2014, depending on whether or not enterprises received subsidies. Table 5 shows the mean values of the economic and financial indicators indices according to whether or not the enterprises received a subsidy in the periods 2000–2007 and 2008–2014, as well as the calculated difference between the two periods.

**Table 5.** Differences in mean values of the economic and financial indicators indices in the two financial periods for enterprises that did and did not receive subsidies.

Indicator	Period	Received a Subsidy	Did Not Receive a Subsidy
Assets (A)	2000–2007	1.755	1.778
	2008–2014	1.078	1.053
	Difference	0.678	0.725
Revenue (R)	2000–2007	1.734	1.735
	2008–2014	1.065	1.055
	Difference	0.670	0.680
Equity (E)	2000–2007	1.795	1.760
	2008–2014	1.105	1.101
	Difference	0.690	0.660
Net profit (NP)	2000–2007	1.056	1.107
	2008–2014	1.007	1.006
	Difference	0.049	0.102
Number of employees (NE)	2000–2007	1.087	1.088
	2008–2014	1.021	1.023
	Difference	0.066	0.064
Operating efficiency (OE)	2000–2007	1.060	1.068
	2008–2014	1.048	1.044
	Difference	0.013	0.024
Value added per employee (VAP)	2000–2007	1.662	1.684
	2008–2014	1.063	1.051
	Difference	0.600	0.633

Note: The difference between the mean values in economic and financial indicators indices for enterprises that did receive subsidies and those that did not receive subsidies was calculated for two financial periods: the period 2008–2014 and the period 2000–2007. Source: authors' estimations.

Based on the results, shown in Table 5, of the mean values of the economic and financial indicators indices and the differences between the financial periods for enterprises that did and that did not receive subsidies, we can summarize the impact of subsidies on each economic and financial indicator as a measure of enterprise performance.

For the financial indicators A, R, and E, there are no significant differences in the mean value of the financial indicators, depending on whether the enterprise received a subsidy or not. The higher mean value for E in the period 2000–2007 for enterprises that received a subsidy is negligible. It seems as if the subsidy was received by enterprises that had a higher mean value for E and a lower mean value for A. The differences are obvious between the financial periods. All three financial indicators show approximately the same decline in the mean value of indices in the period 2008–2014.

Regarding the financial indicator NP, there is a difference in mean value between the enterprises that did and that did not receive a subsidy. In the period 2000–2007, the mean value for NP was lower for those enterprises that did receive a subsidy than for those that did not receive it, while in the period 2008–2014, this is offset. Thus, for enterprises that did receive a subsidy, the mean value for NP increases to the level of those that did not receive it. Due to the volatility in distribution by individual years, this financial indicator requires careful interpretation before drawing any final conclusions.

There is no difference in the mean value for the economic indicator NE between enterprises that did or did not receive a subsidy.

There are minor differences in the mean value for the financial indicator OE. It is indicated that the enterprises that did receive the subsidy had a slightly lower mean OE ratio in the period 2000–2007, after which it equaled with the enterprises that did not receive the subsidy (while it is generally considered to have fallen after the financial crisis).

There are differences in the mean value for the financial indicator ROE, but it also turned out to have oscillated in enterprises over the years. When reviewing the mean value for an individual enterprise, we found that this financial indicator fluctuates greatly in most

enterprises. The mean value for the financial indicator ROE shows that the enterprises that received subsidies showed a lower ROE in the period 2000–2007, and after the financial crisis, there was a lower decline for the ROE compared to the enterprises that did not receive subsidies. Due to the large fluctuations in different years in this financial indicator, we are cautious to draw conclusions regarding this financial indicator.

The financial indicator VAP had the slightly lower mean value in the period 2000–2007 for enterprises that received a subsidy, but the differential was almost eliminated in the period 2008–2014. Regardless of whether the enterprises received a subsidy or not, the fall in the mean value for VAP in the period 2008–2014 is large (but not as large as in A, R, and E).

Finally, the calculated differences in the decline in the mean values of financial indicators in the two financial periods in a way that the mean value of indices in the period 2000–2007 is subtracted from the period 2008–2014 are higher for enterprises that did not receive subsidies in the case of financial indicators for A, R, NP, OE, and VAP. The calculated differences in the decline in mean value of indices in the two financial periods are higher (compared to enterprises that did not receive subsidies) for enterprises that received subsidies for financial indicator E and for economic indicator NE. Enterprises that did not receive subsidies had a smaller decline for E and NE. The VAP is the only indicator with a positive link between the financial indicator and subsidies. A decline in index growth for VAP was present in both cases, but was lower for those enterprises that did receive subsidies than for those that did not receive subsidies.

#### 4. Discussion

The eight economic and financial indicators for the entire population of the Slovenian enterprises and three subsamples have been investigated between enterprises that did and did not receive subsidies with their economic and financial performances in the two financial periods. While the literature on the impact of subsidies on economic and financial performance is mixed, the tests conducted aimed to establish a link between subsidies and economic and financial performance indicators in the two financial periods.

Different driving factors can explain dynamics and market selection processes of enterprises (Bojnec and Xavier 2004, 2007) and strategies of their survival (Bojnec and Knific 2021), economic and financial performances of enterprises, such as corporate governance (Bhagat and Bolton 2008; Koji et al. 2020), state aid, the effectiveness of investment incentives (Cedidlová 2013; Fabuš and Csabay 2018; Musil and Hedija 2020), a macro-economic enabling environment with greater economic freedom, investment cost subsidy, and tax reduction incentives for investment that enhance the increases in inflow of FDI (Sambharya and Rasheed 2015; Munongo et al. 2017; Tian 2018), and the availability of working capital and its management (Akgun and Karatas 2021; Anton and Nucu 2021).

Our focus was on the economic and financial performances of enterprises and the role of subsidies in this process. Eight indicators (one economic and seven financial indicators) were used to calculate the economic and financial performance of enterprises during the two financial periods, i.e., before and during the first EU programming period, in Slovenia. The results and findings could be interpreted from the perspective of previous studies and our working hypotheses related to the evaluation and monitoring of economic and financial performances of enterprises that did receive subsidies compared to those that did not receive subsidies.

The analyzed enterprises were divided and compared in the two financial periods. The enterprises were further divided in those that did receive subsidies during the analyzed two financial periods and those that did not. In most analyzed economic and financial indicators, we did not find significant differences in the economic and financial performance between enterprises that did and did not receive subsidies in the two financial periods.

Regarding the monitoring of economic and financial indicators, the impact of subsidies on economic and financial indicators would suggest a greater emphasis on the preparation of programs and the monitoring of economic and financial indicators. It is proposed to

increase the monitoring and achievement of the financial indicator VAP and the economic indicator NE, which are also listed as the most important economic and financial indicators in the monitoring of the objectives of EU programs. Based on the empirical analysis, we can conclude that it would make sense to additionally include the financial indicator R in financial monitoring.

Subsidies could affect the economic and financial performance of enterprises, which should be considered in the preparation of programs. As [Glancey \(1988\)](#) found, large enterprises grow more easily than small ones. Thus, smaller enterprises should have a higher rate of project co-financing. In the financial period 2007–2013, large enterprises already had a lower rate of project co-financing.

Cash flow is sensitive to RDI investment, especially in the case of start-up, small, and technological enterprises ([Hall 1992](#); [Hao and Jaffe 1993](#); [Colombo et al. 2013](#); [Himmelberg and Petersen 1994](#); [Bond et al. 2005](#)). It would be desirable that the programs would be designed in such a way as to allow SMEs to pre-finance projects as part of the project for which the enterprise has received a grant. SMEs could also apply several times within certain longer-term projects. In this way, they would reduce the liquidity problems of enterprises in the context of projects for which they received subsidies.

[Cerqua and Pellegrini \(2014\)](#) found that subsidies could have a positive effect on an enterprise's employment, investment, and revenue. From this point of view, it would, therefore, be suggested that economic and financial indicators, such as an increase in employment, an increase in own resources in investment, and an increase in the enterprise's revenue, are developed within the programs for the subsidy application.

The findings and their implications are relevant in the broadest context of the economic and financial performances of enterprises in relation to public support policies and their application, evaluation, and monitoring ([Šipikal et al. 2013](#)). The increasing role of subsidies during the COVID-19 global crisis could have an effect on the economic and financial performance and working capital management of enterprises, which is important for policy and practice ([Zimon and Tarighi 2021](#)). As the role of subsidies might increase during the post-COVID-19 crisis with the Recovery and Resilience Plans for the EU member states, enterprises will also be eligible for newly introduced subsidy schemes, which would require a careful evaluation and monitoring to avoid their less efficient use or even possible misuse of this rapidly increasing public supports.

The advantage of our study is to combine three sources of enterprise-level data from the entire population of enterprises, secondary government data of subsidies to enterprises, and sub-samples of surveyed enterprises that did and did not receive subsidies.

This study also has some limitations, namely, the applied statistical test is based on parametric paired sample two-tailed *t*-test, which compares the means of two related groups in the two financial periods. This has been the main aim and focus of our study and analysis. Related groups indicate that the same enterprises are present in both groups in the two different financial periods. Our study contains two groups of enterprises: one that did receive subsidies and another that did not receive subsidies.

However, there are some other possible research opportunities in the future. One issue for further research would be to apply also a non-parametric *t*-test that can be applied for small samples or sub-samples to investigate some other possible comparisons. Regarding the subsidy received, the magnitude of the subsidy and its relative importance to the size of the enterprise are also important. Moreover, we have not investigated possible other drivers or control variables for the economic and financial performances of enterprises. Therefore, one future research direction could be to use panel data analysis to include additional explanatory variables for economic and financial performances of enterprises. Another direction could be to investigate the last EU financial program period 2014–2020, which has recently completed.



## 5. Conclusions

This article provides in-depth results on the economic and financial performances of enterprises in Slovenia in association with subsidies. The results respond to the main research hypothesis of whether subsidies improved enterprise economic and financial performance. The economic and financial indicators for the entire population of enterprises and samples of the Slovenian enterprises have been investigated with the following two main comparisons: first, between enterprises that did and did not receive subsidies, and second, their economic and financial performances in the two financial periods.

While subsidies provide cash flow in an enterprise, their effects on economic and financial performances are more complex and less straightforward. This calls for a regular evaluation and a careful monitoring of the effects of subsidies on an enterprise's economic and financial performances as well as other performances, such as compliance with environmental and social objectives, which have not been investigated in our study.

Our results confirmed the significant positive effects of subsidies on the gross value added per employee, but less on the other seven investigated economic and financial indicators. The decline in index growth for gross value added per employee in the two financial periods was also lower for those enterprises that did receive subsidies vis-à-vis those that did not receive subsidies.

As the role of subsidies in the EU economies as well as in other developed and emerging market economies during the most recent COVID-19 crisis has increased rapidly and is likely to continue to increase in the next years, it is a crucial to assure transparent and efficient use of subsidies to avoid their possible misuse, which would be inconsistent with good governance, corporate social responsibility, and sustainable growth of enterprises. These subjects can be an important issue for research in the future, particularly regarding the investigation of the most recent financial period and impacts of national and EU subsidies on the economic and financial performance of enterprises. Finally, a special challenge can be the investigation of the impacts of the ongoing Recovery and Resilience Plans for the EU member states as well as the impacts of other similar public subsidy programs globally.

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