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APPLICATION OF THE STRUCTURAL-GEOGRAPHIC SHIFT-SHARE ANALYSIS TO ASSESS CHANGES IN TANGIBLE CURRENT ASSETS IN THE PUBLIC AND PRIVATE SECTORS

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Purpose: The aim of this research is to apply the structural-geographic shift-share analysis to assess changes in tangible current assets in both public and private sectors, providing insights into the factors influencing these changes across different regions.
Design/methodology/approach: The research employs the shift-share analysis method, which decomposes changes in tangible current assets into national growth, industrial mix, and regional shift effects. The study uses empirical data from various voivodeships in Poland over the period 2018-2023.
Findings: The findings indicate significant regional and sectoral variations in tangible current asset management. In the public sector, certain regions, such as Lubelskie and Śląskie, showed inefficiencies with increasing asset levels, while regions like Pomorskie and Małopolskie demonstrated improved management. The private sector exhibited more effective resource management in several regions, with Kujawsko-Pomorskie and Świętokrzyskie experiencing declines in current assets.
Research limitations/implications: The results suggest the need for region-specific policies to enhance resource management efficiency, especially in the public sector. Future research should explore integrating additional economic indicators to refine the analysis further.
Originality/value: This study is one of the few to apply structural-geographic shift-share analysis to the assessment of tangible current assets, providing a comprehensive understanding of the factors driving changes in asset levels in different regions and sectors.
Keywords: Shift-share analysis, tangible current assets, public and private sectors, regional analysis.
Category of the paper: Research paper.

1. Introduction

The analysis of tangible current assets is a key element in resource management for both the public and private sectors. Tangible current assets, which include inventories, materials, and work-in-progress products, constitute a significant portion of the assets of enterprises and institutions, impacting their financial liquidity and ability to carry out ongoing economic

operations. Understanding the changes in the structure of these assets enables more effective planning and resource allocation. In the context of the dynamic economic transformations observed over recent decades, there is an increasing need for precise and complex analyses that facilitate a deeper understanding of the mechanisms driving changes in current assets. In particular, in an era of economic globalization and regionalization, it becomes essential to consider both geographical and structural factors when analysing these changes. Previous studies have mainly focused on one of these perspectives, which does not provide a complete picture of the situation. There is a lack of analytical tools that integrate structural and geographical aspects, thereby allowing for a more accurate assessment of changes in current assets. Given the above, there is a need to apply the structural-geographical shift-share method, which enables a comprehensive analysis of tangible current assets in both the private and public ownership sectors. The purpose of this article is to present and apply the shift-share method for assessing changes in tangible current assets within the public and private sectors. This method, which combines structural and geographical approaches, provides useful insights that can be applied in both academic research and practical resource management for enterprises. The article will discuss the theoretical foundations of the method, the process of its implementation, and the results of an empirical analysis conducted on data from selected regions.

2. Role of Tangible Current Assets in the Public and Private Ownership Sectors

Tangible current assets are a key component of a company's balance sheet, encompassing material resources expected to be converted into cash, sold, or consumed within one operating cycle, typically lasting a year. The primary elements of tangible current assets include inventories, raw materials, and work-in-progress products. Effective management of these assets is an essential aspect of organizational operations in both the public and private sectors. The Accounting Act defines assets as resources controlled by an entity that have a reliably determined value, arising from past events, and expected to generate economic benefits for the entity in the future, as stated in Article 3(1)(12). Assets are classified into fixed assets and current assets, with their definitions also provided in Article 3(1)(18) of the Accounting Act.

Current assets include:

- tangible assets,
- financial assets,
- receivables and short-term investments,
- prepaid expenses.

Tangible current assets of an entity primarily include:

- Inventories– materials acquired for internal use, which include items purchased from other enterprises for consumption within the company. Examples of such materials are cleaning supplies, office materials, and any related stock.
- Finished goods or services– products or services manufactured or processed by the entity that are ready for sale.
- Work-in-progress – products and services being manufactured or produced by the entity that are incomplete as of a given date, i.e., still in the production process.
- Semi-finished products – items that have undergone specific stages of production and are intended for use in subsequent production phases.
- Goods purchased for resale in their unaltered state – items acquired from other enterprises for resale, which may be repackaged, portioned, etc., before sale.

Tangible current assets play a crucial role in corporate financial management, directly impacting a company's ability to meet its current liabilities and maintain operational liquidity. Effective management of current assets is essential to achieving a balance between liquidity and profitability. Companies must strive to optimize inventory levels and the collection of receivables to ensure sufficient resources are available to cover current obligations and finance operational activities. In the public sector, managing tangible current assets presents unique challenges due to budgetary constraints, legal regulations, and the need to maintain transparency and accountability. Efficient management of these assets is vital for delivering public services and ensuring operational effectiveness.

Changes in tangible current assets in the public and private sectors have been the focus of numerous studies, shedding light on various aspects of management and the efficiency of resource utilization. Notably, as early as 2019, the European Commission highlighted a correlation between investments in intangible assets in the private sector and co-investments in the public sector, which may influence changes in the structure of tangible assets (Lampel, Edler, Gadepalli, 2020). Similarly, Lim, Macias, and Moeller (2020) analysed the impact of intangible assets on capital structure, comparing bank debt, private debt, and public debt, with implications for managing tangible assets. The UK government, in studies conducted in 2018, examined how investments in intangible assets in the public sector generate value streams comparable to tangible assets (HM Treasury, 2018). Netsuite's 2022 research outlined various asset types, including tangible and intangible assets, and their importance in corporate accounting (Beaver, 2022). Furthermore, in analysing changes in tangible assets in the public sector, Demirkan and Platt (2009) explored accounting principles for intangible assets in the public sector, impacting the management of tangible assets. Bartel and Harrison (2005) addressed inefficiency sources in the public sector, critical for understanding tangible asset management. Private-sector studies have also extensively investigated changes in tangible assets, emphasizing the role of information technology, managerial ownership, and economic growth in optimizing operating assets. Brynjolfsson and Hitt (2000) analysed the influence of

information technology on organizational transformation and business performance. Himmelberg, Hubbard, and Palia (1999) explored the determinants of managerial ownership and its relationship with performance, shedding light on the role of tangible assets. Raghuram and Zingales (1996) examined the link between financial dependence and economic growth, relevant for managing tangible assets in the private sector. Kaplan and Norton (2004) discussed measuring the strategic readiness of intangible assets and their indirect importance to tangible assets, while Bharadwaj (2000) investigated firms' informational capabilities and their impact on outcomes, critical for managing tangible assets. Black and Lynch (2001) emphasized the influence of workplace practices and technology on productivity, which can translate into the efficient management of tangible current assets.

In summary, the significance and role of tangible current assets in both public and private sectors underline that effective management involves optimizing inventory levels. Maintaining appropriate inventory levels is crucial to avoiding costs associated with excess storage while ensuring that enterprises do not experience shortages that could disrupt production.

3. Shift-Share Method: Introduction, Assumptions, and Adopted Research Methodology

The shift-share method is an analytical technique primarily used in regional economics to decompose changes in employment, production, or other economic indicators at the regional level. It enables an understanding of the extent to which these changes result from general national trends, industry-specific trends, and unique regional competitive factors. This approach helps identify the sources of growth or decline in a given region and the factors influencing regional development. The literature includes studies highlighting the utility of the shift-share method in analysing changes in capital structure (Crouzet, Eberly, 2023), examining regional competitive advantage and its impact on the labour market (Haynes, 2023), analyzing economic behaviour at the regional level with a decomposition of changes in employment or production (Prats, Armrnta, 2013), and decomposing growth in Metropolitan Statistical Areas (MSAs) into three components: national, industrial, and competitive growth (Ferri et al., 2022). However, it is worth noting the lack of studies exploring the application of the shift-share method in the analysis of corporate current assets.

The shift-share analysis calculates absolute changes by measuring sectoral changes in the analysed region and at the national level between the beginning and the end of a given period. These changes are divided into three components: the National Growth Effect (NGE), the Industrial Mix Effect (IME), and the Regional Shift Effect (RSE).

The National Growth Effect (NGE) represents the portion of change attributed to the general growth or decline trends in the national economy:

$$\mathrm{NGE_{ri}} = \mathrm{E_{ri,0}} \times \frac{\mathrm{E_{n,t}}}{\mathrm{E_{n,0}}}$$

where:

$E_{ri,0}$ – initial production value in sector i within region r),

$E_{n,t}$ – total national production value at the end of the period,

$E_{n,0}$ – total national production value at the beginning of the period,

$\frac{E_{n,t}}{E_{n,0}}$ – national growth rate of production value.

The Industrial Mix Effect (IME) represents the portion of change resulting from the difference in the sectoral composition of the region compared to the national sectoral structure:

$$\mathrm{IME}_{ri} = E_{ri,0} \times \left(\frac{E_{i,t}}{E_{i,0}} - \frac{E_{n,t}}{E_{n,0}}\right)$$

where:

$E_{i,t}$ – production value in sector i at the national level at the end of the period,

$E_{i,0}$ – production value in sector i at the national level at the beginning of the period,

$\frac{E_{i,t}}{E_{i,0}}$ – growth rate of production in sector i at the national level,

$\left(\frac{E_{i,t}}{E_{i,0}} - \frac{E_{n,t}}{E_{n,0}}\right)$ – difference between the growth rate of sector i and the overall national growth rate.

The Regional Shift Effect (RSE) represents the portion of change attributed to local factors specific to the given region.

$$\mathrm{RSE}_{ri} = E_{ri,0} \times \left(\frac{E_{ri,t}}{E_{ri,0}} - \frac{E_{i,t}}{E_{i,0}}\right);$$

where $E_{ri,t}$ – the production value in sector i within region r at the end of the period.

Analysing each component (i.e., NGE, IME, RSE) helps determine whether changes are driven by overall national trends, structural differences between the region and the country, or unique local factors. Based on the results, conclusions can be drawn regarding strategies for regional economic development, employment policies, or other intervention measures.

4. Identifying the Potential of Tangible Current Assets in Individual Voivodeships – Results of the Applied Shift-Share Analysis

The identification of potential in the area of tangible current assets within the voivodeships was first conducted on a nationwide scale, and then differentiated by the public and private sectors. For the purposes of this study, current assets were defined as inventories, specifically materials, semi-finished and work-in-progress products, finished goods, and merchandise. Given that higher levels of tangible current assets reduce operational flexibility, the values obtained in the research were classified as destimulants. Consequently, in interpreting the results, lower values indicate a more positive impact on a company's operations.

Data for the study was obtained from the databases of the Central Statistical Office. Data was obtained for 16 voivodeships. The data is expressed in value in thousand PLN. Data was collected for individual enterprises by province for two periods, i.e. for 2018 and 2023.

1.1. Poland: An Overview

In Poland, over the studied period from 2018 to 2023, all identified areas exhibited a positive rate of change. Overall, the growth of current assets amounted to 70.7%, while in the public and private sectors, the growth rates were 47.0% and 72.6%, respectively. Table 1 presents the growth rates of tangible current assets broken down into materials, semi-finished and work-in-progress products, finished products, and goods. The most favourable situation in the public sector can be observed in the categories of materials (a growth of 27.5%) and semi-finished and work-in-progress products (a growth of 431.8%). It is important to emphasize once again that, for interpretative purposes, the lowest values in the table indicate a favourable outcome. To identify the components contributing to national growth, Table 2 shows the average rates of change for each voivodeship. In the public sector, three negative values — considered desirable — can be observed. The Pomeranian Voivodeship recorded a decrease of 22% in current assets, while the Małopolskie and Wielkopolskie Voivodeships reported declines of 2% and 1%, respectively. The highest growth in current assets in the public sector was recorded in the Śląskie Voivodeship. Table 3 summarizes the analysis results for Poland as a whole. This table shows the structural growth rate, i.e., the rate of change balanced by the average growth in Poland. From the results in Table 3, a favourable trend can be seen in the public sector for materials (-19.5%) and semi-finished and work-in-progress products (15.2%). In the private sector, improvements in current asset indicators were observed for finished products (-1.5%) and goods (-10.2%).

Table 1.
Growth Rate in Poland from 2018 to 2023 – Ownership Sector: Overall, Public, Private

Tangible Current Assets – Inventories	National Growth Rate from 2018 to 2023		
	Overall	Public	Private
Materials	79.8%	27.5%	87.2%
Semi-finished and Work-in-Progress Products	70.4%	31.8%	72.7%
Finished Products	71.4%	79.8%	71.1%
Goods	63.2%	89.7%	62.4%

Table 2.
Average Rate of Change in Individual Voivodeships in the Analysed Areas

Voivodeship	Overall	Public	Private
Dolnośląskie	8.2%	2.3%	8.6%
Kujawsko-pomorskie	1.7%	3.3%	1.6%
Lubelskie	1.9%	7.3%	1.5%
Lubuskie	1.6%	0.0%	1.8%
Łódzkie	3.0%	0.4%	3.2%
Małopolskie	4.0%	-2.0%	4.4%
Mazowieckie	21.8%	16.6%	22.2%
Opolskie	1.1%	0.5%	1.1%
Podkarpackie	2.3%	2.8%	2.3%
Podlaskie	1.3%	0.6%	1.4%
Pomorskie	2.8%	-22.4%	4.1%
Śląskie	8.7%	28.8%	7.9%
Świętokrzyskie	1.4%	9.3%	0.7%
Warmińsko-mazurskie	1.0%	0.2%	1.0%
Wielkopolskie	8.4%	-1.0%	9.2%
Zachodniopomorskie	1.6%	0.1%	1.7%

Table 3.
Structural (Sectoral) Growth Rate in Poland from 2018 to 2023 – Ownership Sector: Overall, Public, Private

Tangible Current Assets – Inventories	Average Growth Rate (2018-2023)		
	Overall	Public	Private
Materials	9.1%	-19.5%	14.6%
Semi-finished and Work-in-Progress Products	-0.4%	-15.2%	0.1%
Finished Products	0.7%	32.8%	-1.5%
Goods	-7.6%	42.7%	-10.2%

1.2. Sector: An Overview

Table 4 presents the results of the Shift-Share Analysis, detailing changes in terms of sectoral competitiveness (structural effect) and the development of potential at the regional level. It should be noted that the overall change in a voivodeship's potential, whether an increase or decrease, is influenced by the growth or decline in sectoral competitiveness (structural effect) and the growth or decline in potential relative to other voivodeships (geographic effect). Kujawsko-pomorskie and Pomorskie Voivodeships demonstrated the most favourable changes, with total effect values of -37.14% and -32.73%, respectively. A negative total effect indicates a decline in current assets, which benefits businesses by suggesting that companies in these regions have improved resource management, leading to greater operational

efficiency. The local geographic effect is the primary driver of the decline in current assets. This may result from favourable local conditions, such as supportive regional policies, good market conditions, or other factors enabling firms to manage their resources more effectively. In contrast, the Lubuskie Voivodeship shows the least favourable outcome, with a total effect of 32.51%. The significant increase in current assets indicates a negative impact on businesses. Companies in this region may struggle with efficient resource management or face other factors that inflate their current assets, potentially straining their financial liquidity.

Table 4.
Shift-Share Analysis in the Sector: Overall

Voivodeship	Total	Structural	Geographic
Dolnośląskie	31.94%	0.10%	31.83%
Kujawsko-pomorskie	-37.14%	-0.40%	-36.74%
Lubelskie	24.91%	0.04%	24.87%
Lubuskie	32.51%	2.59%	29.91%
Łódzkie	-13.25%	0.43%	-13.68%
Małopolskie	-8.41%	-0.10%	-8.32%
Mazowieckie	10.36%	-0.80%	11.16%
Opolskie	-8.75%	1.06%	-9.81%
Podkarpackie	-5.46%	0.61%	-6.07%
Podlaskie	12.27%	0.14%	12.13%
Pomorskie	-32.73%	0.21%	-32.94%
Śląskie	-3,8.%	0.98%	-4.85%
Świętokrzyskie	1.54%	0.83%	0.71%
Warmińsko-mazurskie	-13.39%	1.00%	-14.38%
Wielkopolskie	1.38%	-0.83%	2.22%
Zachodniopomorskie	-5.79%	2.01%	-7.80%

1.3. Sector: Public

Table 5 presents the detailed results of the Shift-Share Analysis for enterprises operating in the public sector. The voivodeships with the highest total effect values (Lubelskie and Śląskie) experienced a significant increase in current assets, which is unfavourable and indicates a deterioration in inventory management during the analysed period. In both cases, the primary factor driving this increase is local geographic conditions. In contrast, the voivodeships with the lowest total effect values (Pomorskie and Małopolskie) recorded a significant decrease in current assets, which is favourable and suggests improved resource management. In both instances, local geographic conditions play a crucial role in facilitating this reduction.

Table 5.
Shift-Share Analysis in the Sector: Public

Voivodeship	Total	Structural	Geographic
Dolnośląskie	93.76%	-5.88%	99.64%
Kujawsko-pomorskie	14.35%	14.72%	-0.37%
Lubelskie	260.28%	4.50%	255.78%
Lubuskie	-37.58%	3.68%	-41.26%
Łódzkie	3.56%	-14.71%	18.27%
Małopolskie	-87.08%	11.07%	-98.15%
Mazowieckie	2.07%	-8.05%	10.12%

Cont. table 5.

Opolskie	118.75%	-8.06%	126.82%
Podkarpackie	168.35%	-13.26%	181.61%
Podlaskie	52.97%	-1.96%	54.93%
Pomorskie	-135.86%	0.69%	-136.56%
Śląskie	181.13%	7.43%	173.70%
Świętokrzyskie	127.70%	2.66%	125.04%
Warmińsko-mazurskie	7.12%	-1.49%	8.60%
Wielkopolskie	-69.84%	12.81%	-82.66%
Zachodniopomorskie	-26.45%	-14.90%	-11.55%

1.4. Sector: Private

In the shift-share analysis for the private sector, significant differences in the values of the total, structural, and geographic effects across voivodeships are noticeable, indicating diverse regional conditions that influence how enterprises manage their current assets (see Table 6). The Lubuskie and Dolnośląskie Voivodeships show the highest total effect values, at 32,63% and 29,51%, respectively. This result suggests a significant increase in current assets, which is unfavourable for companies as it may point to challenges in efficient resource management, leading to excessive accumulation. In Lubuskie, a moderately positive industry mix effect (3,94%) indicates that certain economic sectors may contribute to the accumulation of current assets, though the primary driver of this increase remains local geographic conditions (28,69%). Similarly, in Dolnośląskie, the industry mix effect has a minor impact (0,46%), while local geographic factors play a crucial role (29,05%). In contrast, the Kujawsko-Pomorskie and Świętokrzyskie Voivodeships display the lowest total effect values, at -41,61% and -28,26%, respectively. The decline in current assets in these regions benefits the private sector, suggesting improved operational efficiency and better resource management by companies. In Kujawsko-Pomorskie, a minimal negative industry mix effect (-0,34%) shows that the region's economic structure is not the primary factor driving the decrease in assets, while local geographic conditions play a decisive role (-41,28%). In Świętokrzyskie, there is a slight positive industry mix effect (0,75%), whereas local geographic conditions are the main factor supporting the reduction of current assets (-29,01%).

In summary, the shift-share analysis reveals that in regions with the highest total effect values, local geographic conditions are the main factor driving the increase in current assets, suggesting a need for better resource management in these voivodeships. Conversely, in regions with the lowest total effect values, local conditions facilitate the reduction of assets, positively impacting firms' operational efficiency.

Table 6.
Shift-Share Analysis in the Sector: Private

Voivodeship	Total	Structural	Geographic
Dolnośląskie	29.51%	0.46%	29.05%
Kujawsko-pomorskie	-41.61%	-0.34%	-41.28%
Lubelskie	2.25%	0.05%	2.19%
Lubuskie	32.63%	3.94%	28.69%
Łódzkie	-15.05%	0.86%	-15.91%
Małopolskie	-4.88%	0.21%	-5.09%
Mazowieckie	11.51%	-1.62%	13.13%
Opolskie	-11.89%	1.96%	-13.85%
Podkarpackie	-10.70%	1.06%	-11.76%
Podlaskie	10.72%	0.22%	10.50%
Pomorskie	-3.40%	-1.07%	-2.34%
Śląskie	-11.93%	1.79%	-13.72%
Świętokrzyskie	-28.26%	0.75%	-29.01%
Warmińsko-mazurskie	-14.92%	1.63%	-16.55%
Wielkopolskie	2.09%	-0.76%	2.85%
Zachodniopomorskie	-6.73%	3.06%	-9.78%

2. Discussion and Conclusions

The conducted shift-share analysis for the public, private, and total sectors across various voivodeships provides valuable insights into the variability of data and its impact on the economy and business conditions in specific regions. The analysis considered the total, structural, and geographical effects, which help identify the main factors shaping the level of current assets. The results of the total effect analysis revealed significant variability across sectors and regions. In the public sector, substantial increases in current assets were observed, potentially indicating inefficiencies in resource management. In contrast, the private sector exhibited both increases and decreases in current assets, suggesting that enterprises in some regions manage their resources more effectively than others. Voivodeships such as Lubelskie and Śląskie recorded the highest total effect values in the public sector, implying excessive asset accumulation, while Kujawsko-Pomorskie and Świętokrzyskie showed the lowest values, indicating improved resource management efficiency. It is also worth noting that the structural effect, which reflects the influence of the sectoral composition on changes in current asset levels, had a relatively minor impact on the outcomes. In most cases, the structural effect was low, suggesting that a region's economic structure (e.g., dominant industries) is not the main factor driving changes in current assets. The third calculated component — the geographical effect — pertains to the influence of region-specific local conditions and plays a key role in shaping current asset levels. In many voivodeships, especially those with high total effect values, the primary drivers of current asset growth were local conditions such as regional policies, infrastructure, or market access.

The study also highlighted sectoral differences. The public sector tends to accumulate larger volumes of current assets, which may result from the lack of effective management mechanisms or other public administration-related factors. Conversely, the private sector in some regions demonstrates a greater capacity for efficient resource management, though there are also areas where the opposite is true.

Diverging results across voivodeships may stem from several key institutional, socio-economic, and historical factors. Regions with high total and geographical effect values, such as Lubelskie and Śląskie, often feature a strongly developed public administration, a high share of budgetary units, and a traditional approach to resource management. This may lead to conservative fund accumulation and lower flexibility in adapting to changing market conditions. In the case of Śląsk, an additional factor may be the historical structure of the economy based on heavy industry and large public entities.

In contrast, regions with low total effect values, such as Kujawsko-Pomorskie or Świętokrzyskie, may benefit from a more dynamic development of the private sector, better cooperation with academia and local governments, and more effective resource management strategies. This could be the result of active local policies supporting entrepreneurship, investments in human capital, and the digitalization of public administration. A relatively smaller number of large public institutions may also contribute to a more flexible, market-oriented asset management approach.

It is also important to note that regions attracting foreign investments or having a strong position in modern technology industries often exhibit higher efficiency in the private sector — a result of stronger competition, pressure for efficiency, and better access to knowledge and capital. On the other hand, voivodeships with higher unemployment rates, lower labor mobility, or limited infrastructure availability may show reduced capacity for efficient asset management, regardless of the sector.

The findings highlight the need for a differentiated approach to regional economic policy. In regions with high geographical effect values, particularly in the public sector, interventions may be necessary to improve resource management efficiency — for example, through administrative process modernization, implementation of performance assessment mechanisms, and increased transparency of public finances. Meanwhile, regions with low total effect values can serve as benchmarks, offering best practices in resource management and acting as natural partners for knowledge and experience transfer.

The shift-share analysis reveals significant differences in the efficiency of current asset management between sectors and regions, which directly affect the economic situation and business climate in Poland. Understanding these differences and their territorial determinants is crucial for making informed economic and policy decisions. Effective regional economic policy should be based on a thorough diagnosis of local resources, barriers, and development potential.

It is also important to acknowledge certain limitations related to the quality and availability of regional data, which may affect the accuracy and interpretation of the results. In some voivodeships, data on current assets, particularly in the public sector, may be incomplete, aggregated in a way that limits comparability, or reported with delays. Furthermore, differences in reporting methodologies between public and private sector entities may compromise the consistency of input data. Therefore, the results should be treated as indicative and supportive for diagnosis rather than a definitive picture of the situation. Further in-depth research and the standardization of reporting practices at the regional level could enhance the precision and informational value of future analyses of this kind.

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