

Diagnosing the Financial Health of
Belarusian Non-Financial Companies
2021–2024: What Is Happening Behind
the Curtain

Background and Motivation

- The financial health of non-financial companies is one of the traditional "bottlenecks" in the Belarusian economy.
- In 2021–2024, Belarus experienced large-scale disruptions in macroeconomic dynamics:

2021: post-COVID recovery growth and the "export miracle"

2022: a sharp downturn amid the war and sanctions + introduction of price regulation

2023–2024: rapid growth against the backdrop of structural changes

- Scarcity and inconsistency of aggregate data on the financial condition of firms:

Counterintuitive (inconsistent with the macro picture) dynamics of aggregate indicators (profitability, costs per 100 rubles of revenue, etc.) in 2021–2024

- Mass closure of data on the financial condition of firms since 2022

Research Questions in Focus

- What stylized facts characterize the financial condition of (sectors/groups of) non-financial companies in Belarus in 2021–2024?

What problems are inherent to them?

How have they changed over time?

To what extent do the problems differ across sectors/groups?

- In what "zone" of financial health do Belarusian non-financial companies (sectors/groups) operate?

Do companies have a "financial safety margin"?

How large is the dispersion in financial health indicators?

- How has the financial health of companies (sectors/groups) changed in 2021–2024?

Did the dynamics align with macro trends?

Were there differences in trends across sectors/groups?

This research

- Collects and aggregates all available financial reporting data for 2021–2024 among:

Systemically important enterprises

Industrial enterprises

Agricultural enterprises

Dairy Processing Enterprises

- Calculates for each company:

The real dynamics of 15 key gross/relative indicators

17 baseline financial condition ratios (liquidity, profitability, debt burden, cash flow)

An integral financial stability indicator (IPFU) and Altman Z-score

3 financial health indices based on the "let data speak freely" principle

- Aggregates data at the level of sectors/groups/companies and documents stylized facts
- Compares the identified stylized facts with macroeconomic dynamics

Data

- We collect all available data from the groups/sectors of companies in focus, available on the unified financial market portal for 2021–2024:

Systemically important companies (46)

Industry (96)

Agriculture (104)

Dairy Processing (14)

- Source data for each company:

Balance sheet

Income statement

Cash flow statement

Methodology (1): Primary Calculations

- Calculated gross indicators (in real terms):

Sales revenue, cash receipts, cost of goods sold, labor costs, profit from current operations, foreign exchange differences, EBITDA, EBIT, profit from investment activities, profit from financing activities, net profit, investments (flow), interest payments, free cash flow

- Financial health indicators:

Liquidity: current ratio, working capital adequacy ratio, quick ratio, (cash conversion cycle)

Profitability: operating profit margin, sales margin, ROA, ROE, ROI

Debt burden: financial autonomy, leverage, interest-bearing liabilities/EBITDA, EBIT/interest payments, asset coverage of liabilities

OCF: OCF/sales revenue, OCF/gross revenue, OCF/EBIT, -OCF from investing/non-current assets

Methodology (2): Levels and Zones of Financial Health

- Altman Z-score: traditional approach for private (non-public) companies:

$$Z = 0.717 * \frac{CA}{TA} + 0.847 * \frac{RP}{TA} + 3.107 * \frac{EBIT}{TA} + 0.42 * \frac{K}{TL} + 0.998 * \frac{TR}{TA}$$

CA – current assets, TA – total assets, RP – retained earnings, EBIT – EBIT, K – equity capital, TR – sales revenue.

$Z < 1.8$ — red zone (distress), $1.8 < Z < 3.0$ — grey zone, $Z > 3.0$ — green zone

- Integral Financial Stability Indicator (IPFU):

1. Based on the Ministry of Finance of the Republic of Belarus scale:

For many liquidity (L), debt sustainability (D), and profitability (P) indicators, a qualitative interpretation of 5 ranges of quantitative values is proposed

2. Converted to a universal scale from 0 to 100 (proportionally to the MoF scale)

Zones: 0–20: red, 20–40: orange, 40–60: grey, 60–80: yellow, 80–100: green

$$IPFU = 0.3 * L + 0.4 * D + 0.3 * P$$

$$L = \sum_i^n L_i; D = \sum_i^n D_i; P = \sum_i^n P_i$$

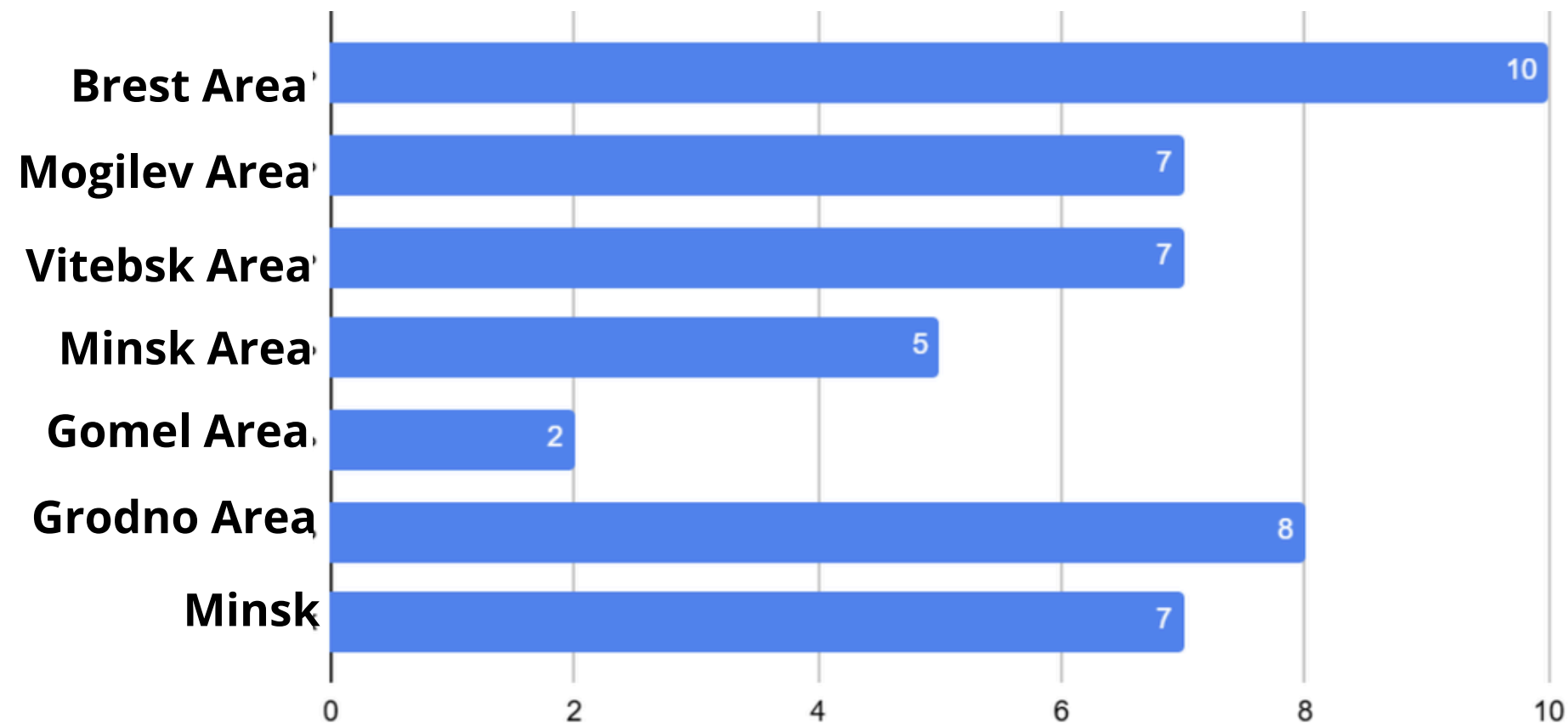
Methodology (3): The 'Let Data Speak Freely' Approach and Financial Health (FH) Indices

- Standardization of all indicators: $z_i = \frac{x_i - \bar{X}}{\sigma}$,
- "Hybrid" method:
 1. *Apply Principal Component Analysis (PCA) within the L, D, P, FCF groups*
 2. *Calculate a composite indicator N_{sp} for each group as the sum of principal components that explain more than 60% of within-group variance*
 3. **$Fin_health (1) = 0.25*(L_{sp} + D_{sp} + P_{sp} + FCF_{sp})$**
- "Purely free speaking data":
 1. *Combine all financial indicators into a single group*
 2. *Extract principal components for the full sample (The first three principal components explain more than 60% of total variation)*
 3. **$Fin_health (2) = Pc_1 + Pc_2 + Pc_3$**
- "Expert" method:
 1. *Average all available (standardized) indicators within the L, D, P, FCF groups to obtain composite indices L_s, D_s, P_s, FCF_s*
 2. **$Fin_health (3) = 0.25*(L_s + D_s + P_s + FCF_s)$**

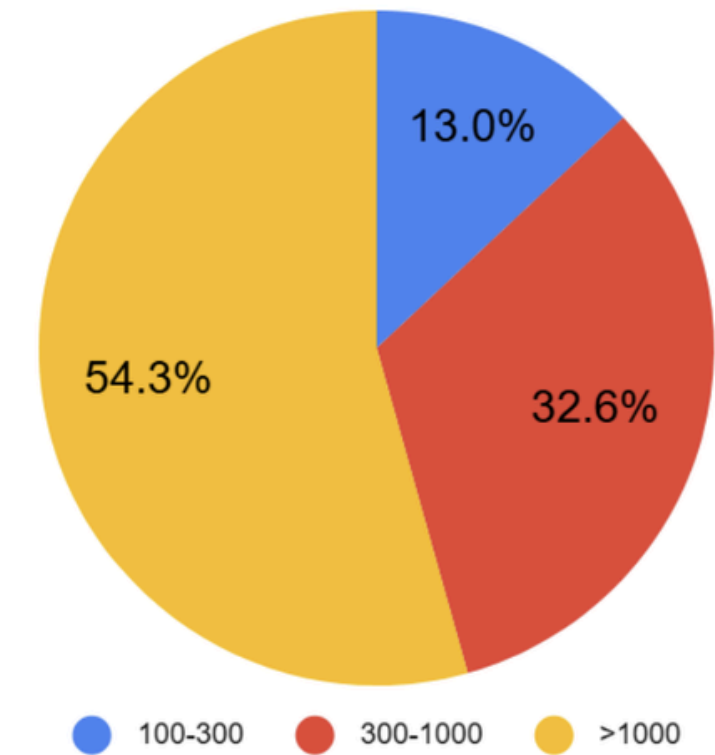
Systemically important enterprises

Sample Description

Distribution of the Studied Enterprises by Administrative Regions



Classification by Number of Employees of the Enterprise



Asset Size (thousand BYN)

Mean: 458,797

Standard deviation: 551,777

Coefficient of variation: 120%

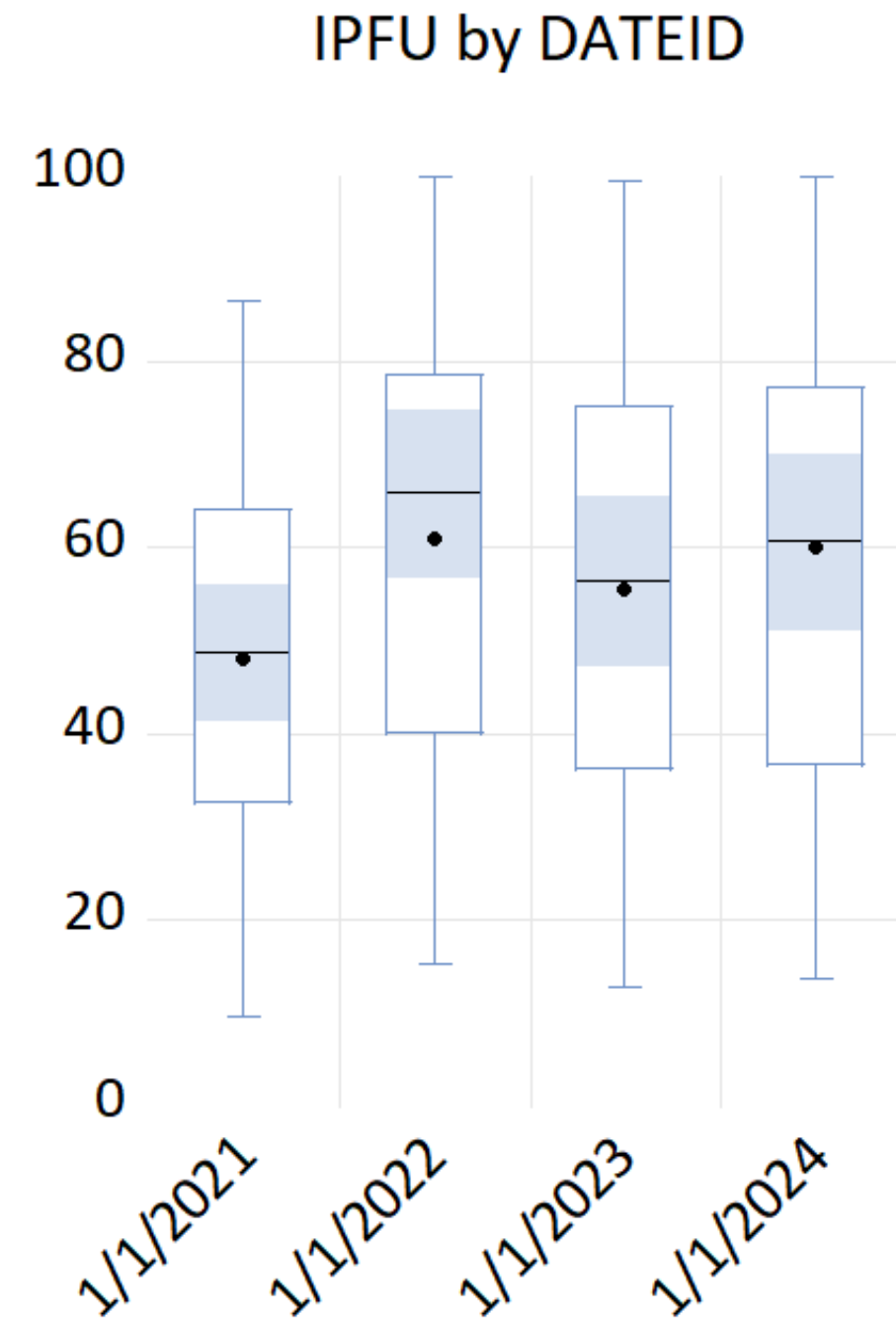
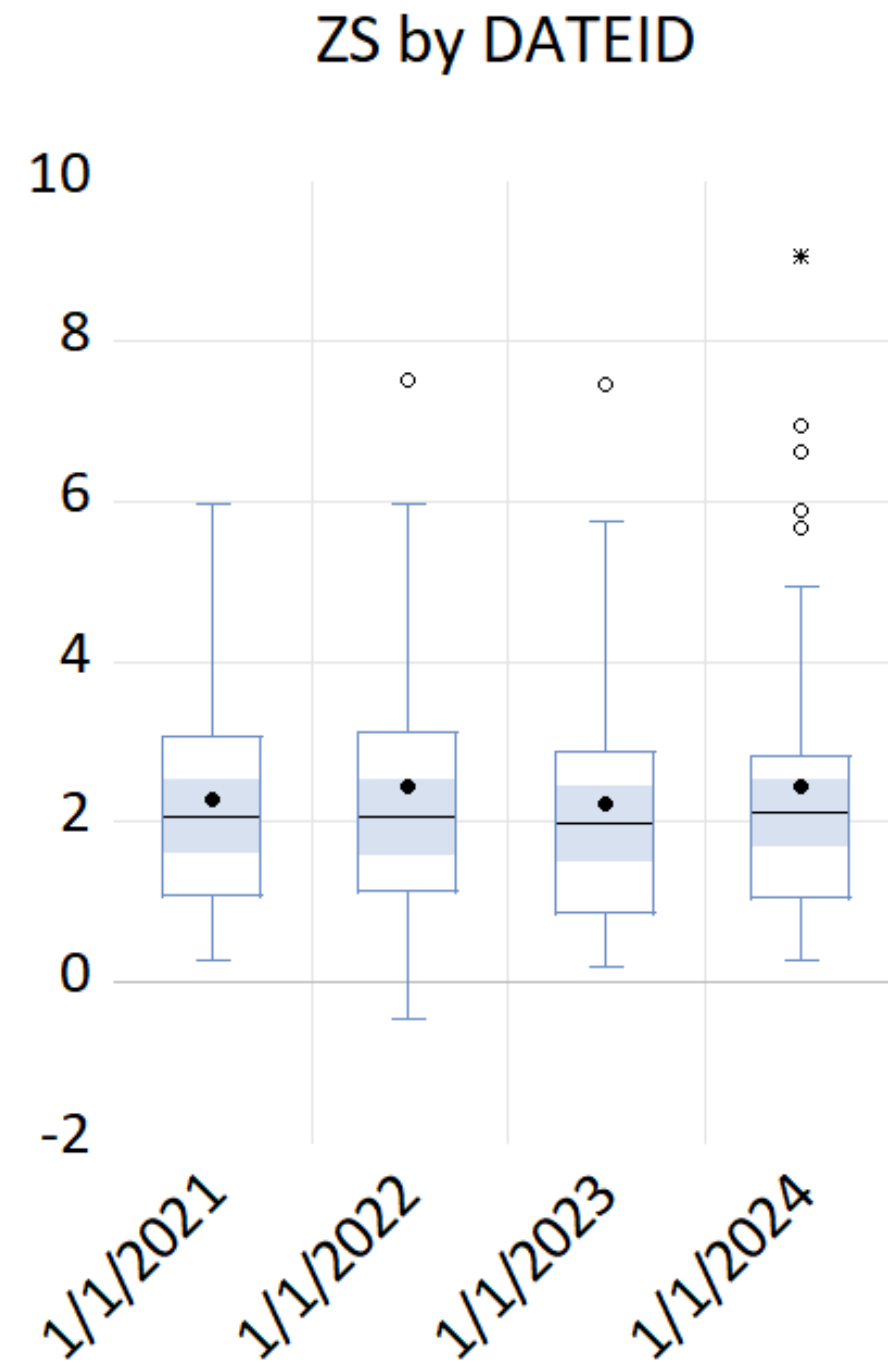
Authorized Capital (thousand BYN)

Mean: 90,635

Standard deviation: 214,268

Coefficient of variation: 266%

Bankruptcy ratios (Altman Z-score and IPFU)

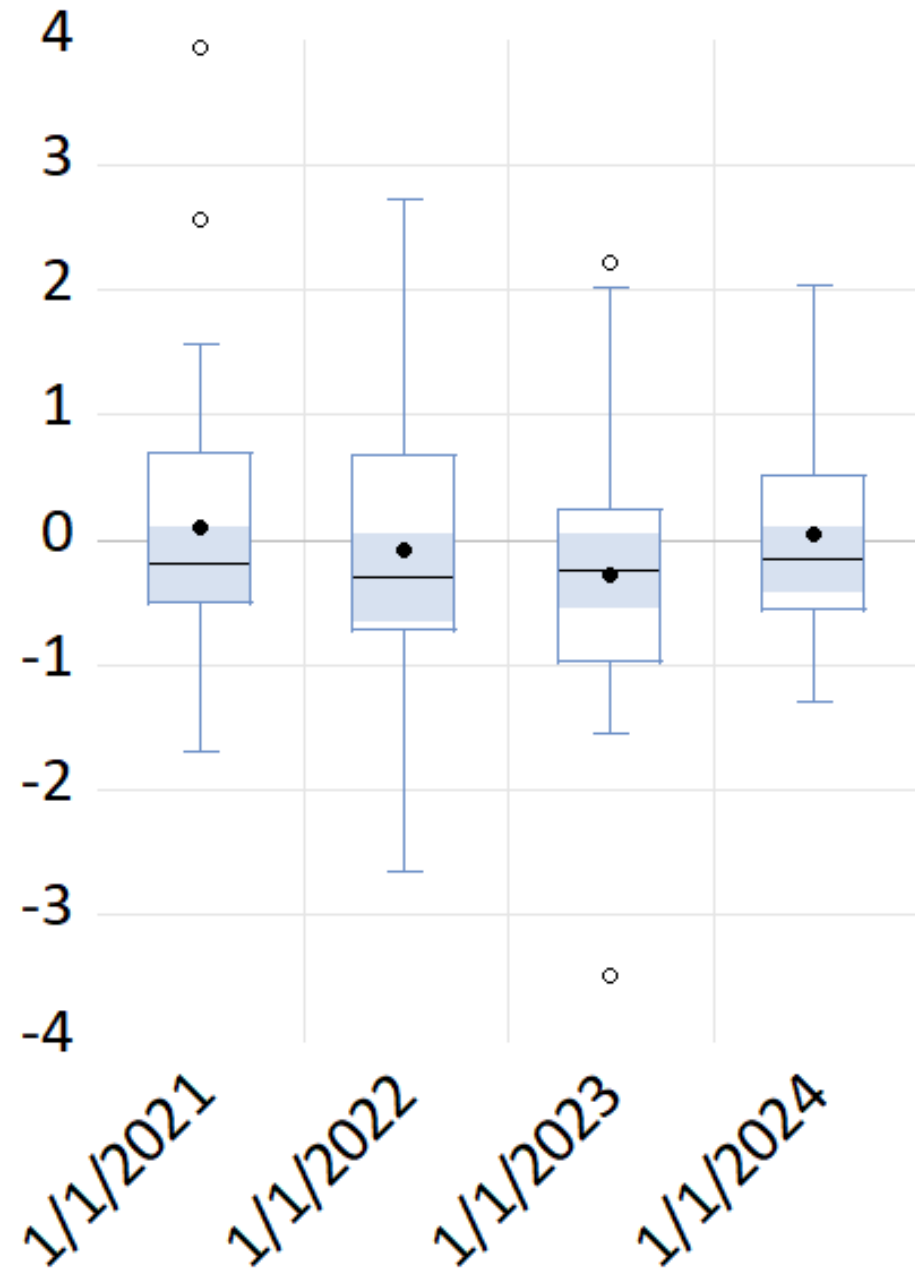


- Rising inequality in financial outcomes across enterprises
- A group with abnormally high indicators is emerging.
- The median remains relatively stable.

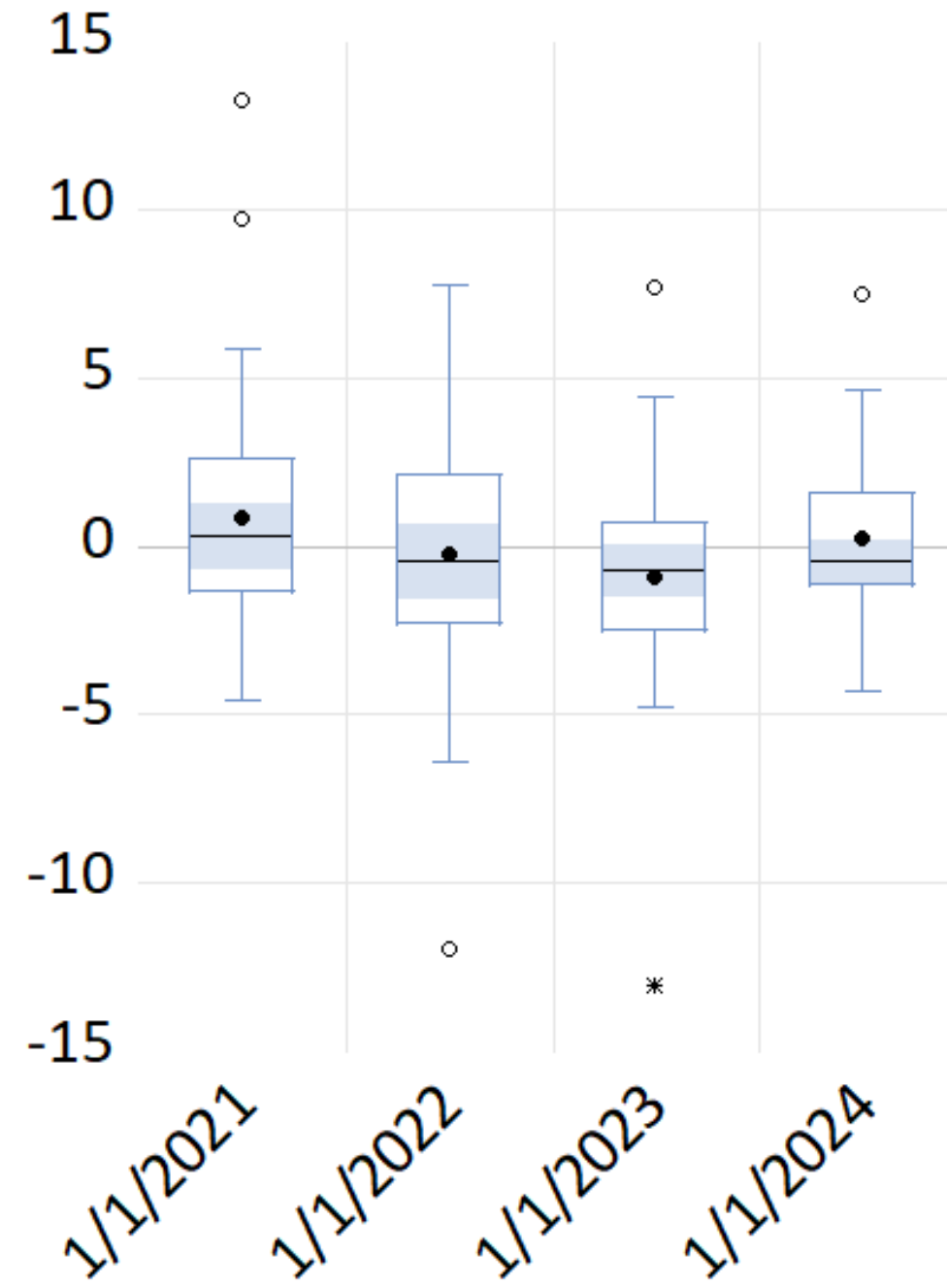
- The level of production and financial uncertainty increased significantly in 2022.
- Strong differentiation is observed.
- The median stabilized by 2024, while the dispersion remained high.

Change in the financial health rating coefficient under different methods

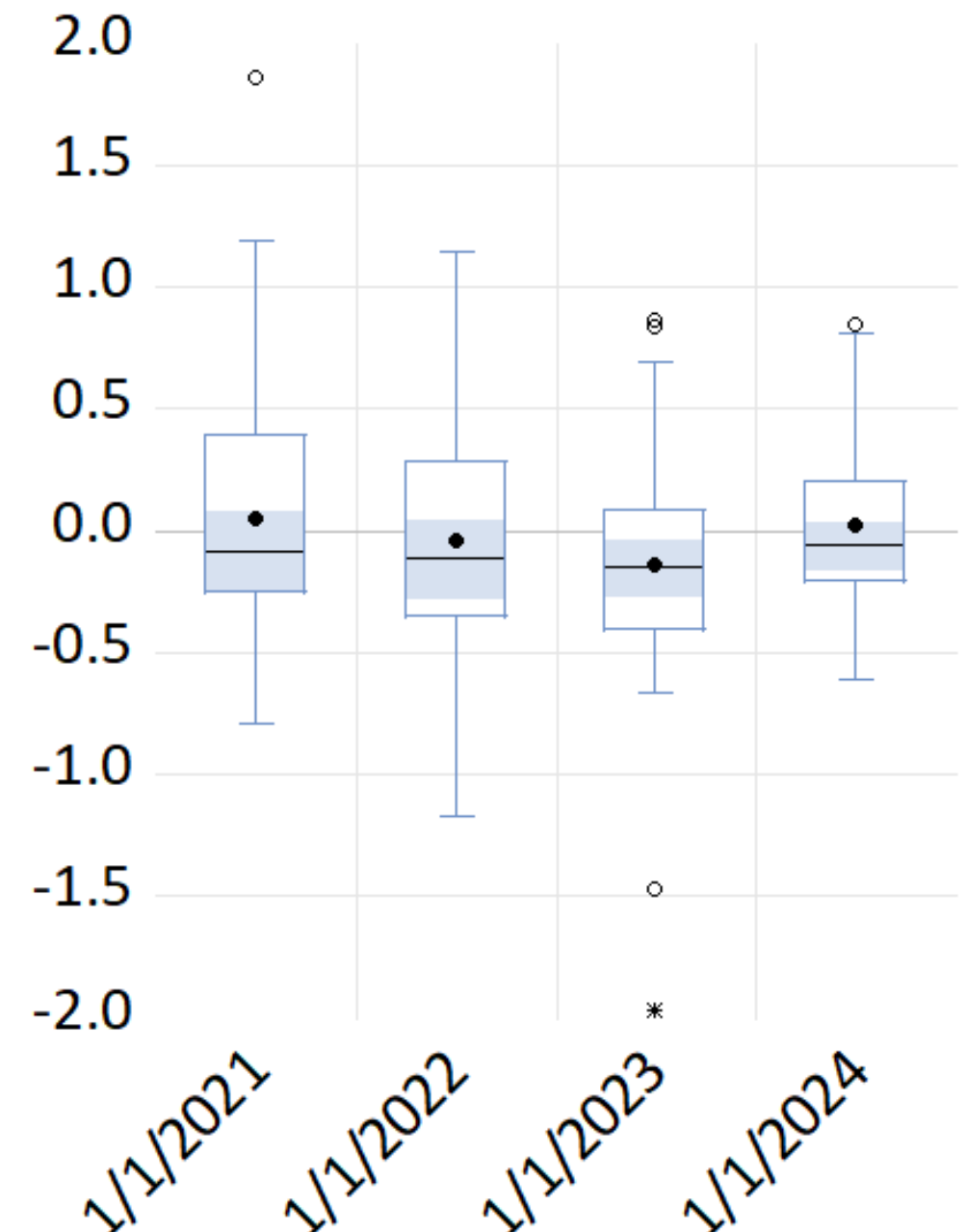
Hybrid



Principal components



Expert



Industry Features

- Strong dispersion in 2022-2023, more homogeneity in 2021, 2024
- More stable indicators:

Sales revenue.

Labor expenses.

- Most volatile:

Exchange differences.

Investments.

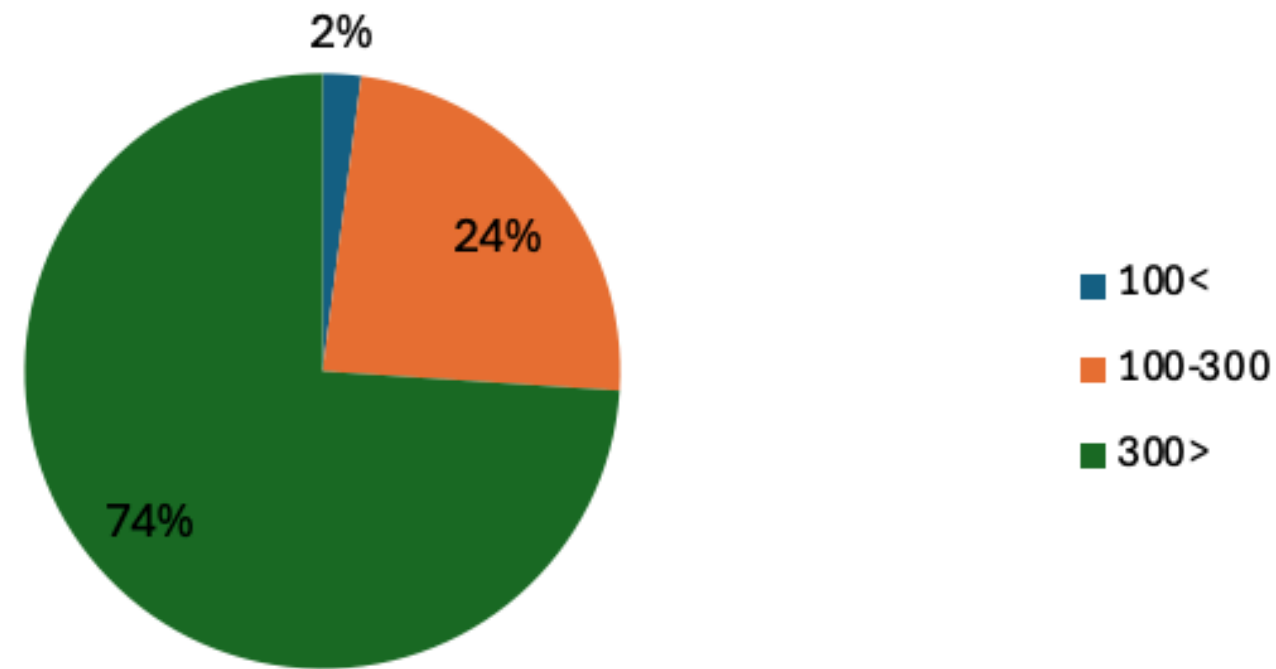
Profit from financial operations.

- EBITDA and net profit show steady growth, but with a wide gap between companies
- ROA and ROE were highly volatile in 2021–2023.
- There was a partial recovery in ROA, ROE and cash flow in 2024, but dispersion remained relatively high.

Industrial Enterprises

Sample Description

Classification by Number of Employees of the Enterprise



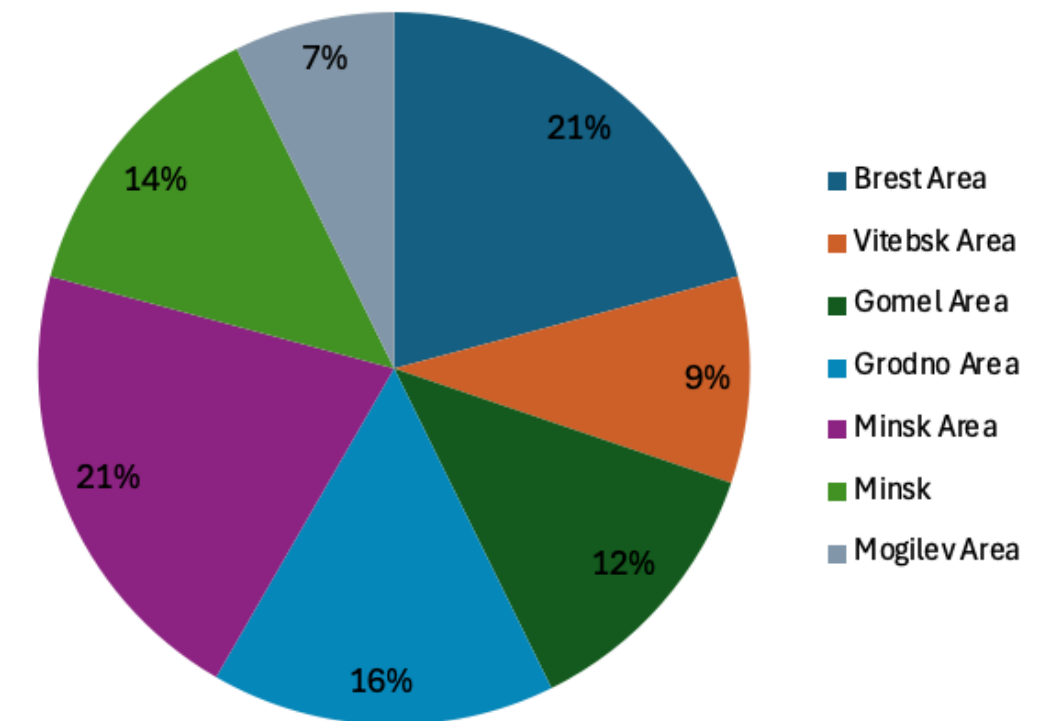
Asset Size (thousand BYN)

Mean: 74,159

Standard deviation: 132,560

Coefficient of variation: 178.7%

Distribution of the Studied Enterprises by Administrative Regions



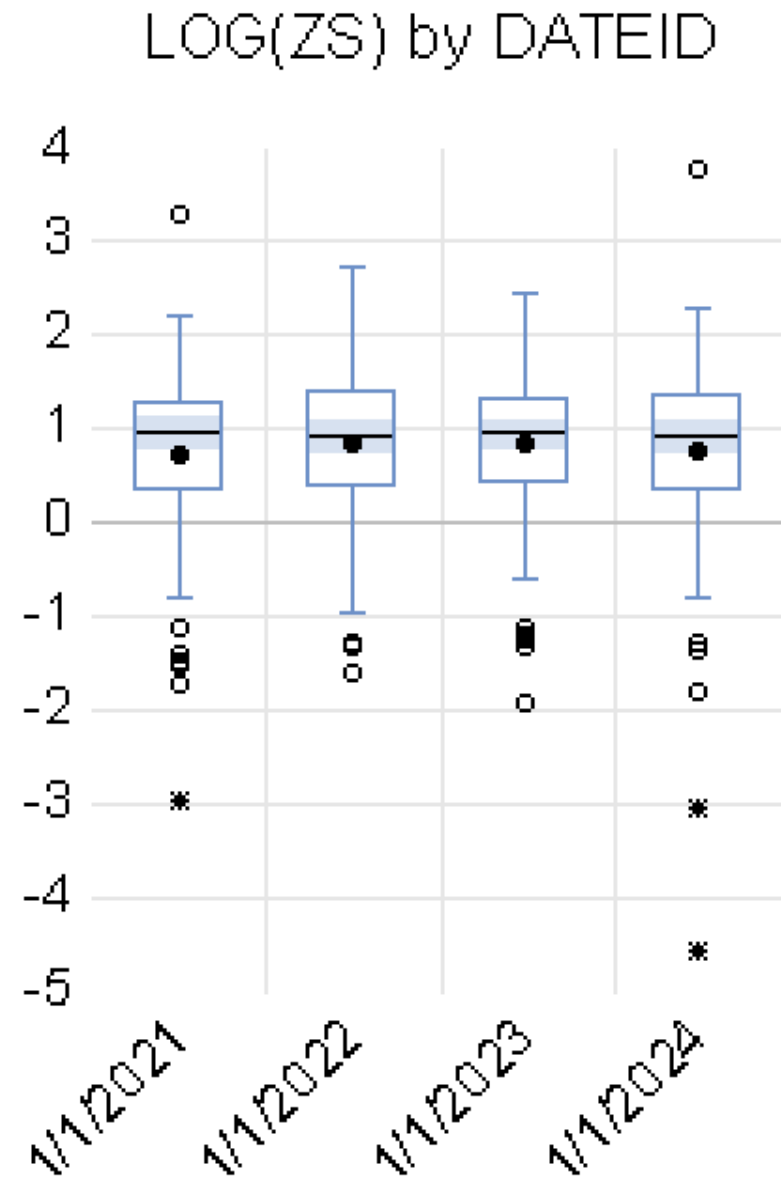
Authorized Capital (thousand BYN)

Mean: 11,814

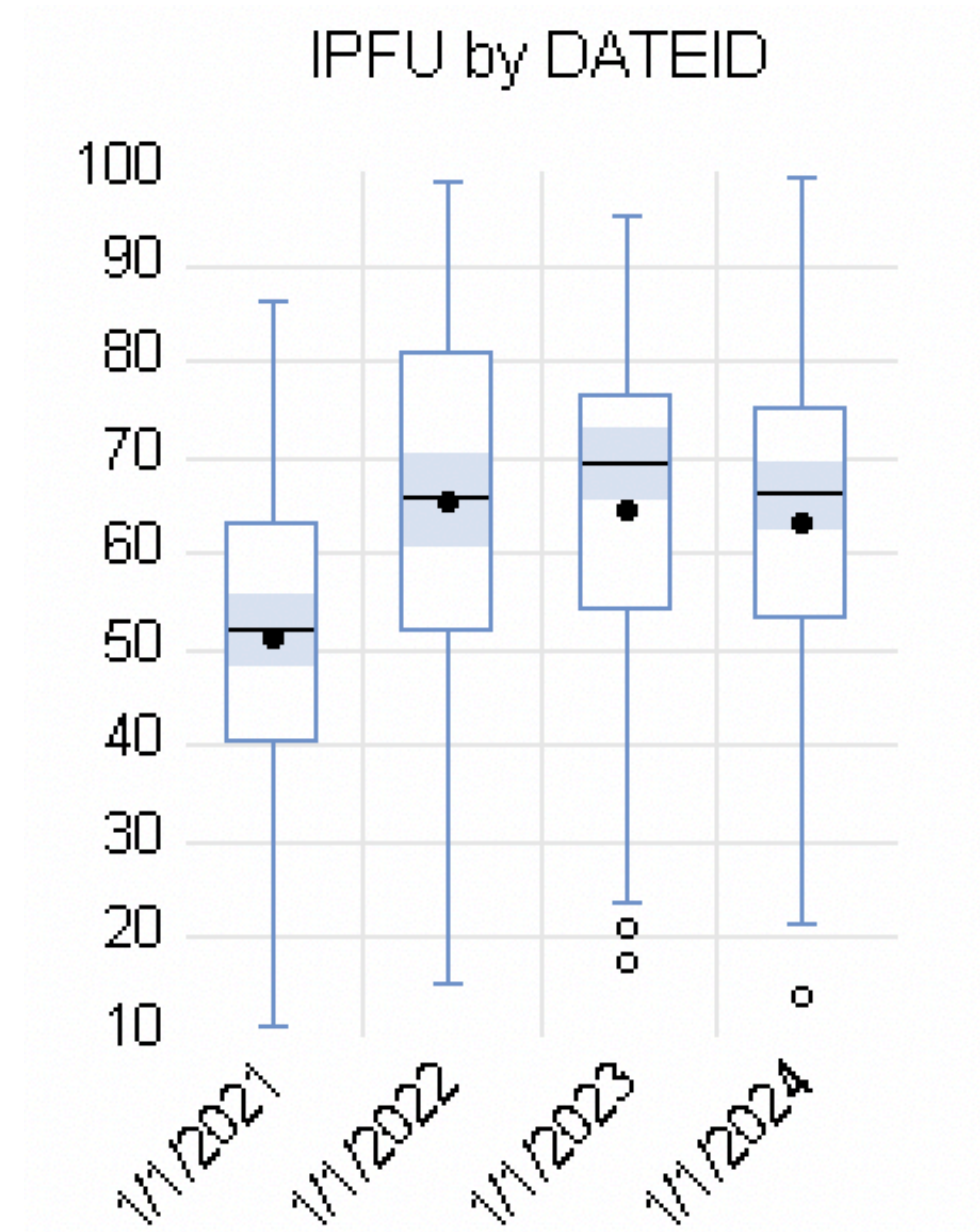
Standard deviation: 38,182

Coefficient of variation: 323.2%

Bankruptcy ratios (Altman Z-score and IPFU)



DATEID	Mean	Median	Std. Dev.
1/1/2021	2.768650	2.603319	3.102854
1/1/2022	3.141596	2.529357	2.608372
1/1/2023	3.079389	2.529872	2.375533
1/1/2024	3.380257	2.473805	4.813515

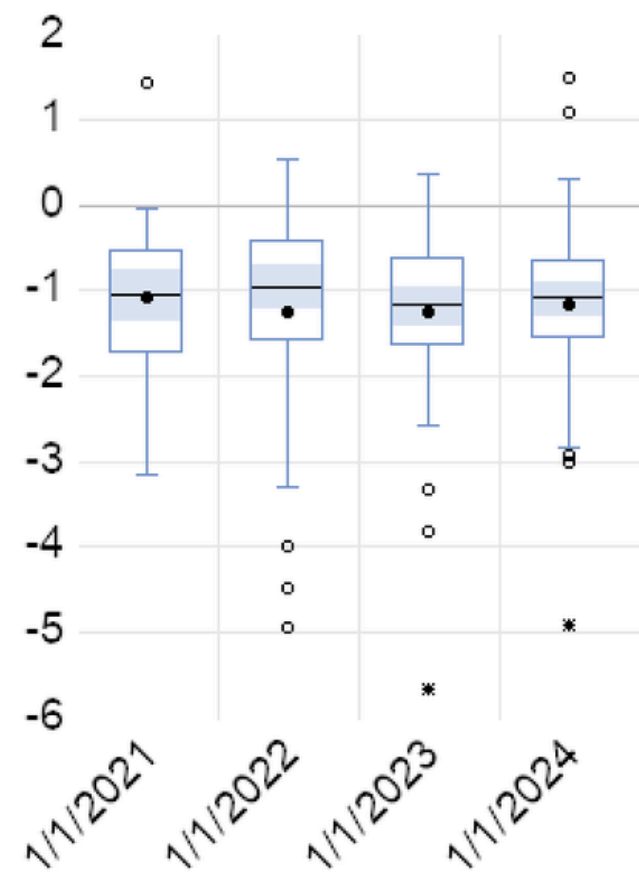


DATEID	Mean	Median	Std. Dev.
1/1/2021	51.58047	52.42296	17.15607
1/1/2022	65.66098	66.05572	18.68011
1/1/2023	64.98361	69.69599	17.75609
1/1/2024	63.55827	66.36251	18.20057

Change in the financial health rating coefficient under different methods

Hybrid

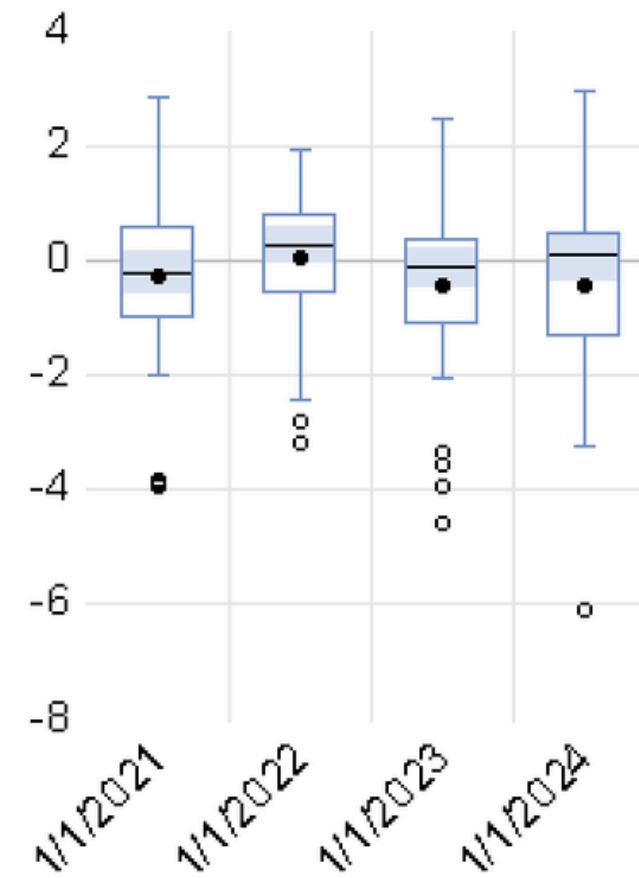
LOG(F_HEALTH_1) by DATEID



DATEID	Mean	Median	Std. Dev.
1/1/2021	-0.103872	-0.032844	0.833892
1/1/2022	0.053168	0.080462	0.623201
1/1/2023	0.012675	0.057082	0.586254
1/1/2024	0.047068	0.054974	0.786439

Principal components

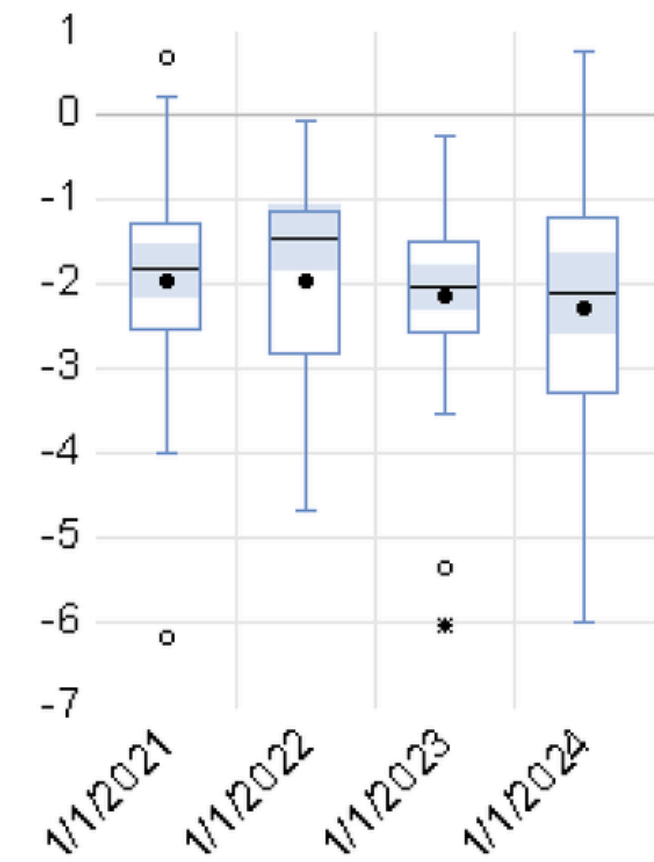
LOG(F_HEALTH_2) by DATEID



DATEID	Mean	Median	Std. Dev.
1/1/2021	-0.230622	0.081368	3.083184
1/1/2022	0.399506	0.305601	1.979164
1/1/2023	0.041794	0.082658	2.406047
1/1/2024	-0.208230	-0.126674	3.272529

Expert

LOG(F_HEALTH_3) by DATEID



DATEID	Mean	Median	Std. Dev.
1/1/2021	-0.029638	-0.041411	0.417629
1/1/2022	0.007453	-0.000896	0.317058
1/1/2023	-0.004038	-0.001030	0.265965
1/1/2024	0.024208	0.002470	0.391048

Chronic shortage of liquidity and working capital.

Persistently high polarization of financial condition.

Industry Features

High polarization in working capital indicators for 2021–2024.

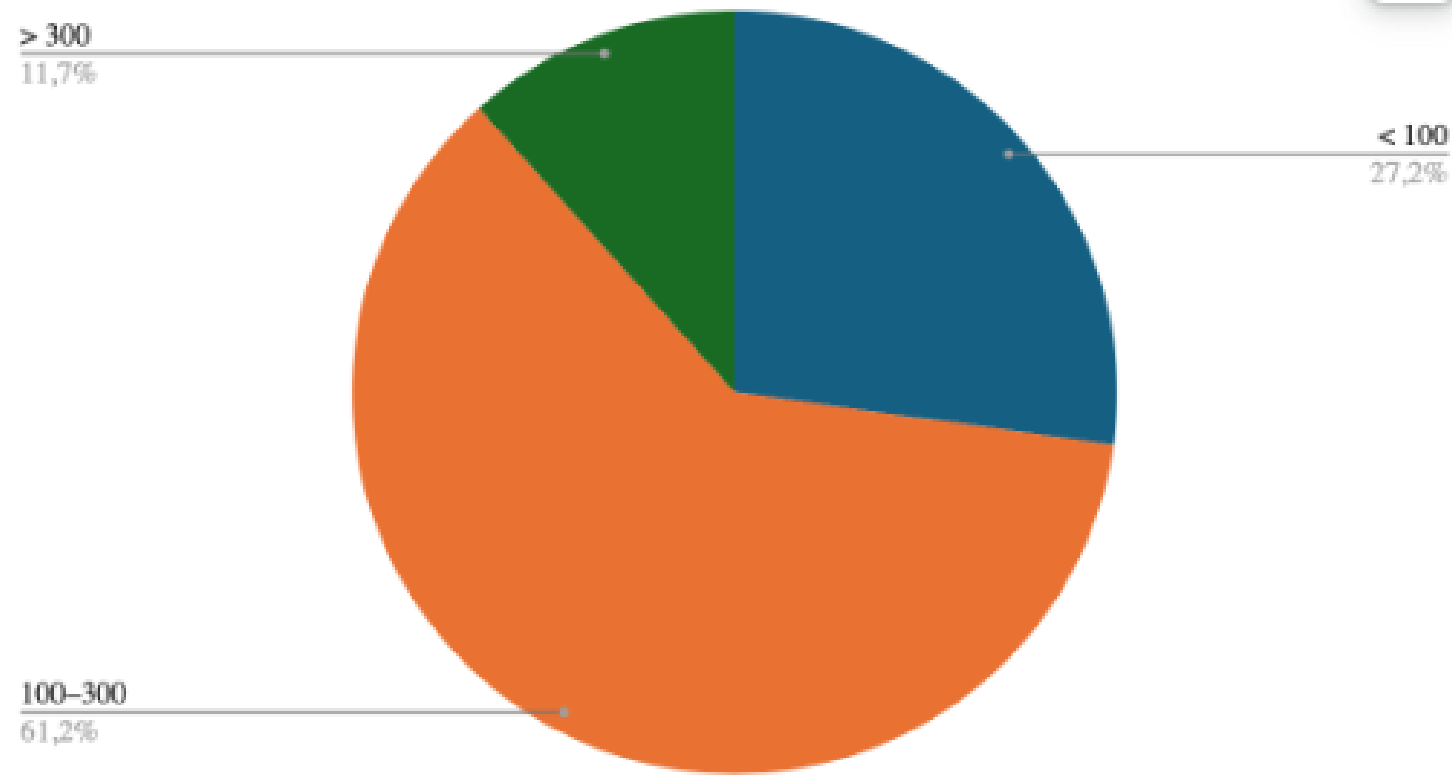
Sustained growth in costs in real terms for raw materials and labor.

Stable but high debt burden.

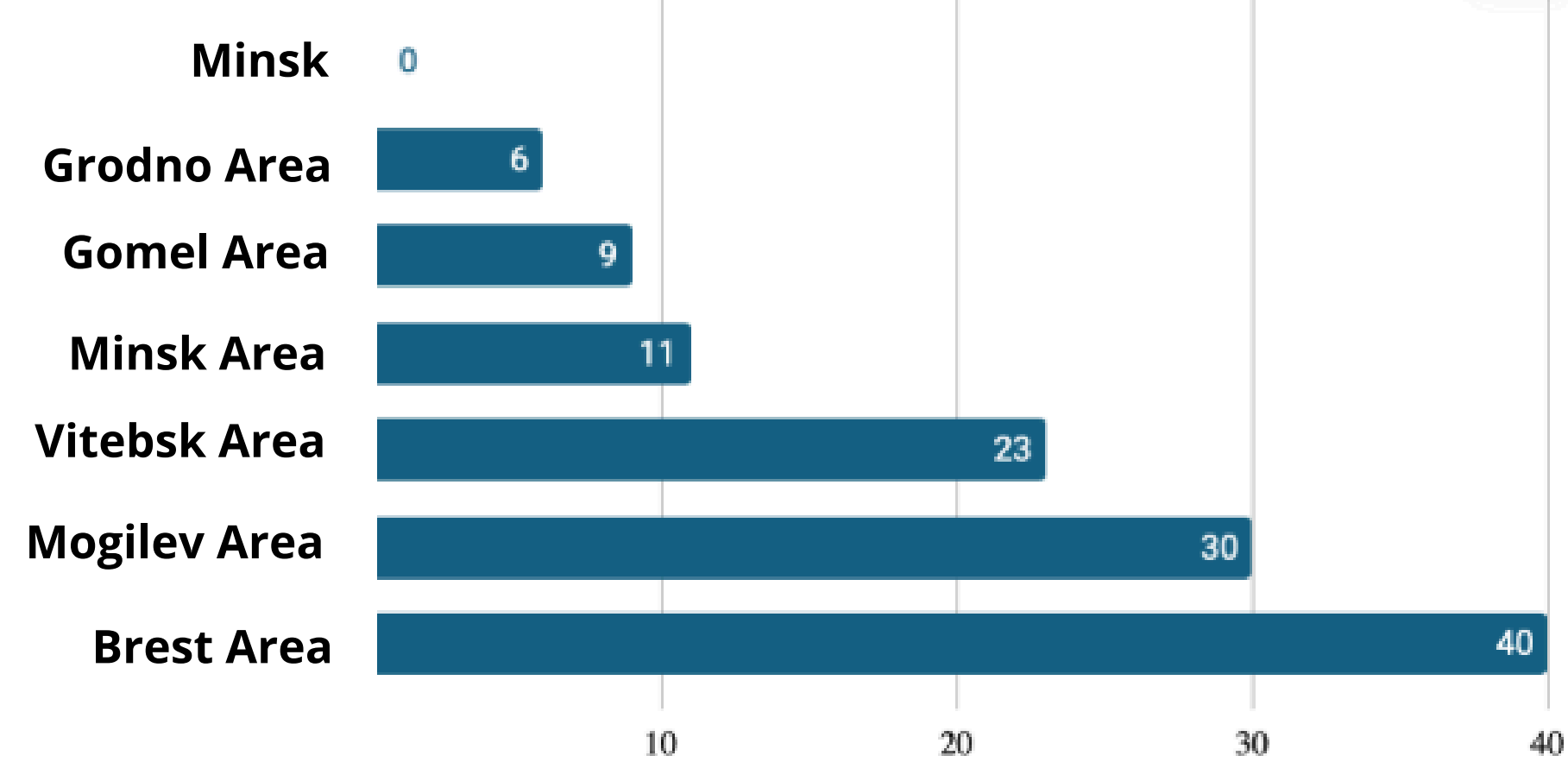
Agricultural Enterprises

Sample Description

Classification by Number of Employees of the Enterprise



Distribution of the Studied Enterprises by Administrative Regions



Asset Size (thousand BYN)

Mean: 71,005

Standard deviation: 224,897

Coefficient of variation: 3.17

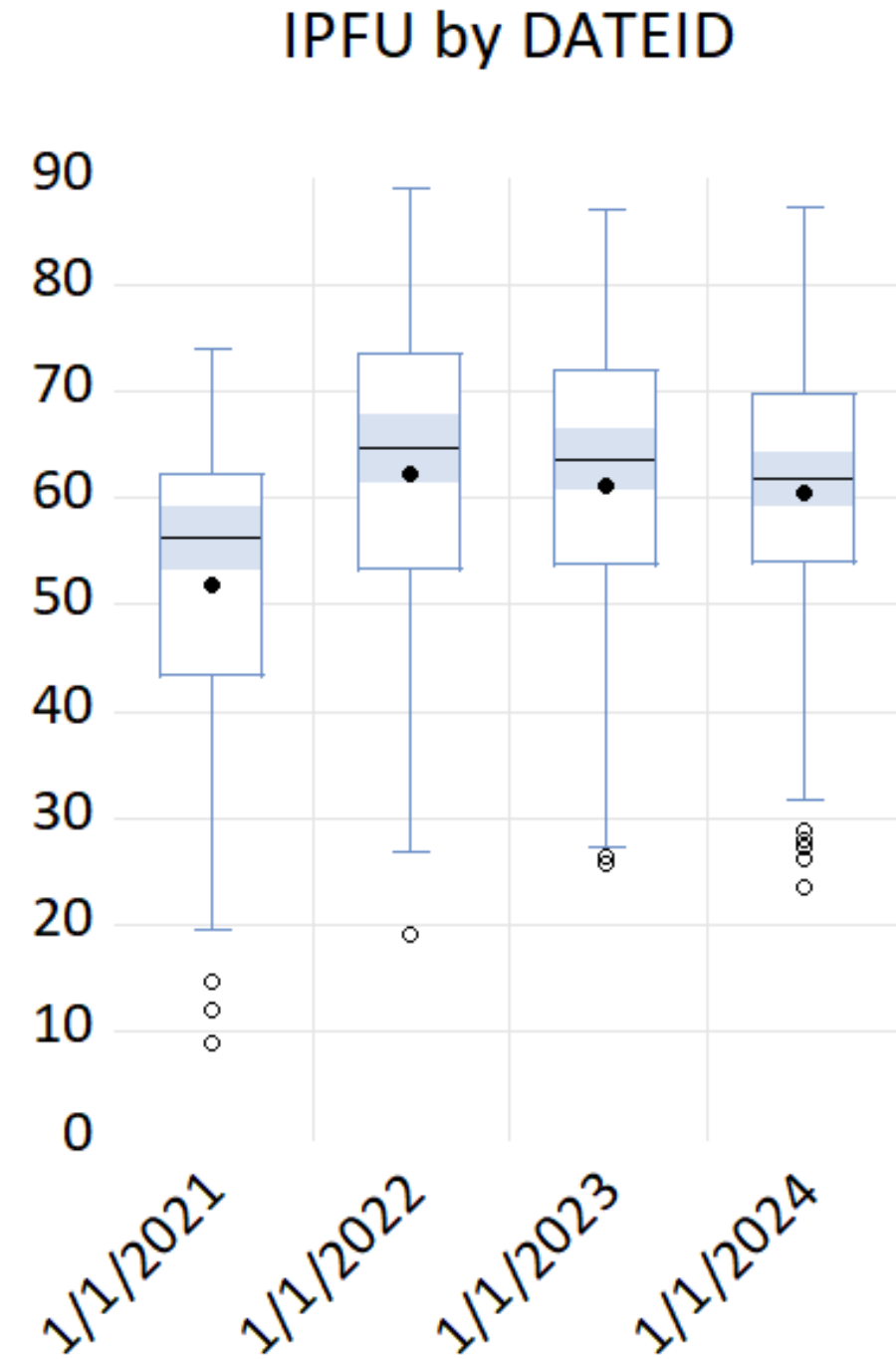
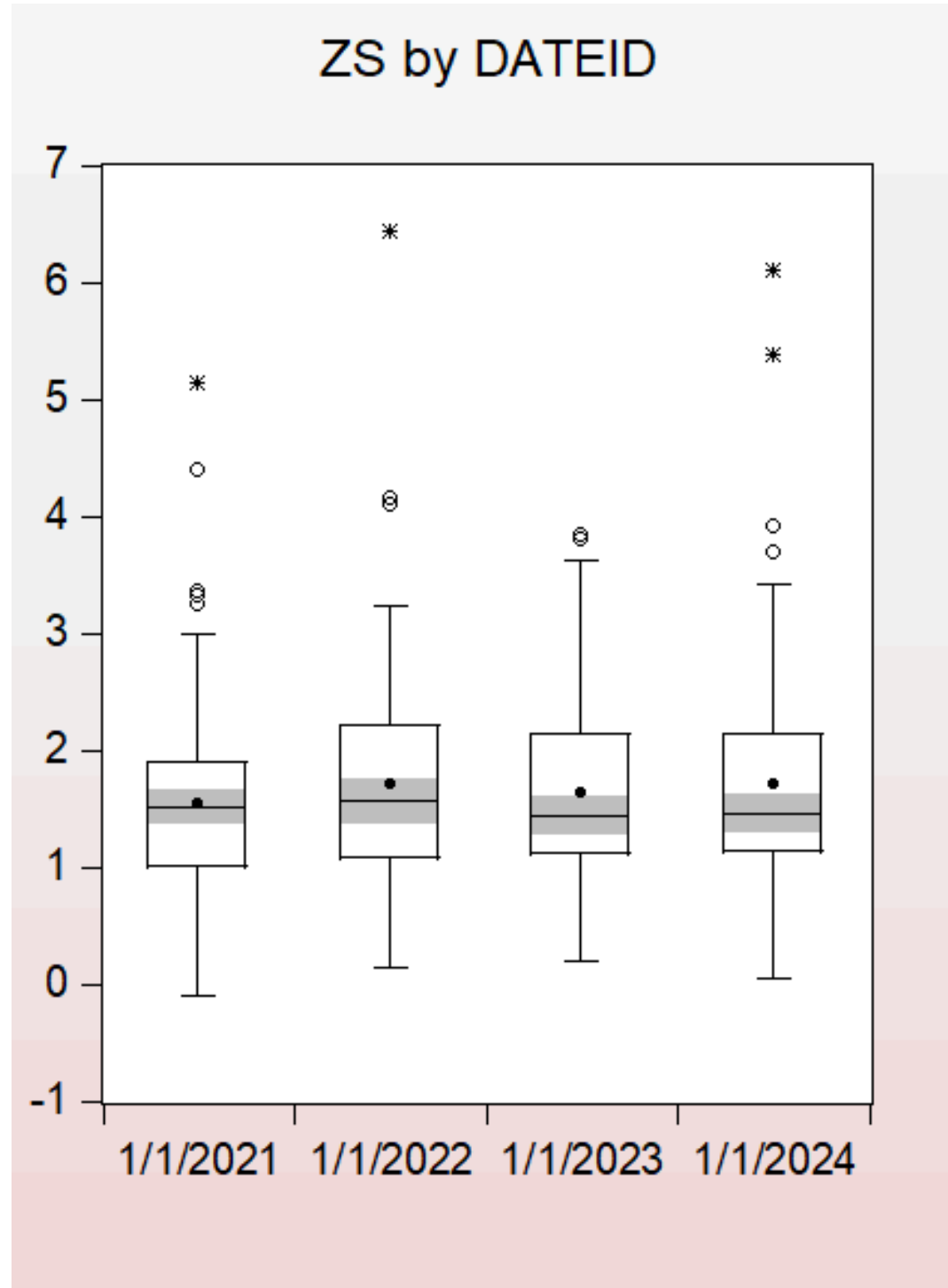
Authorized Capital (thousand BYN)

Mean: 7,988

Standard deviation: 8,102

Coefficient of variation: 1.01

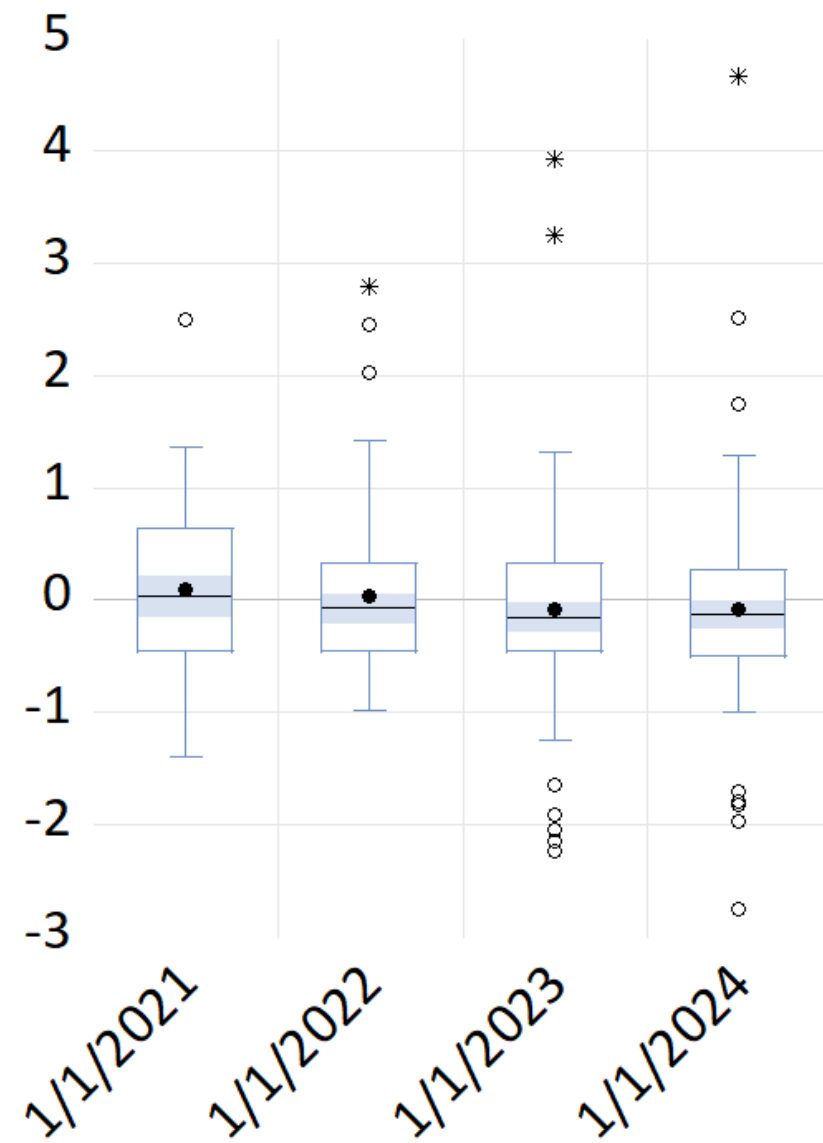
Bankruptcy ratios (Altman Z-score and IPFU)



Change in the financial health rating coefficient under different methods

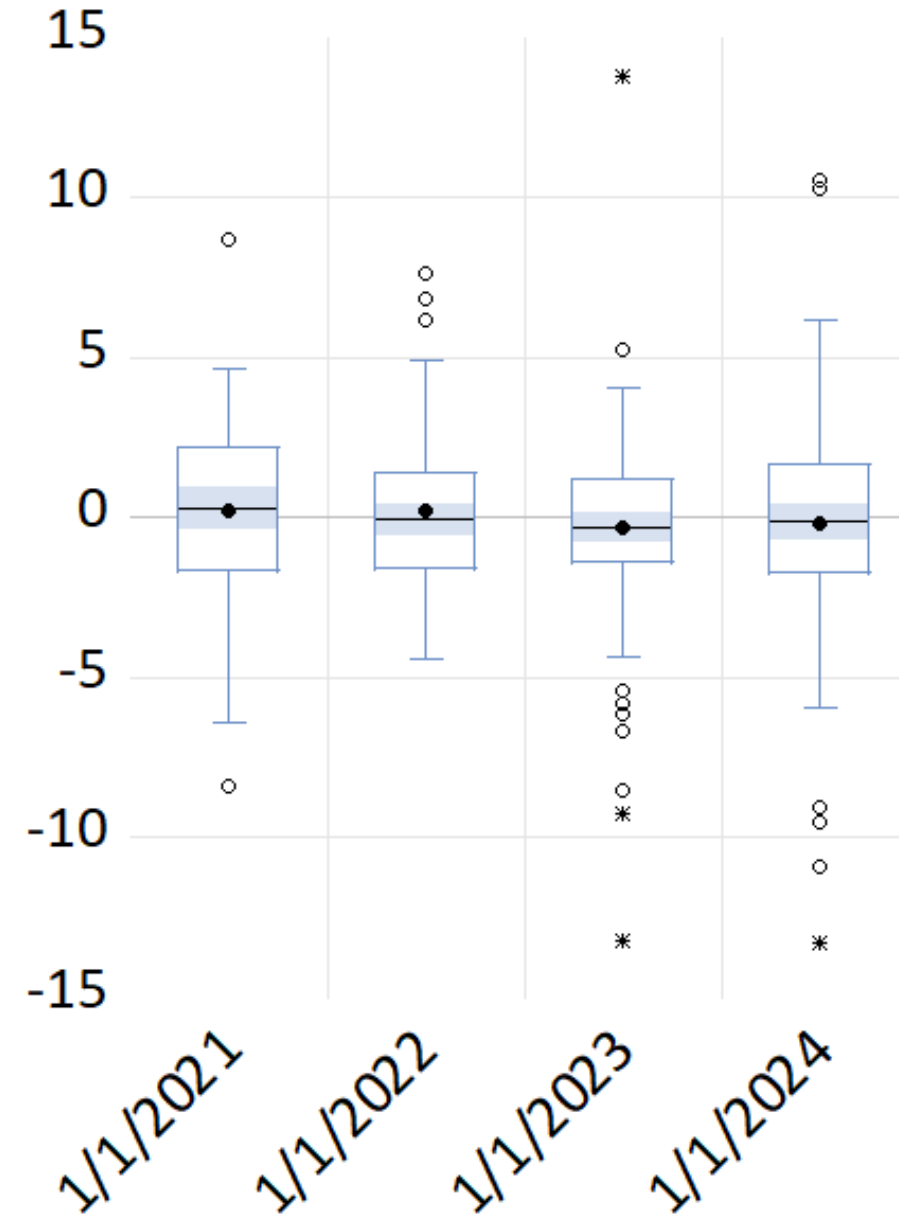
Hybrid

F_HEALTH_1 by DATEID



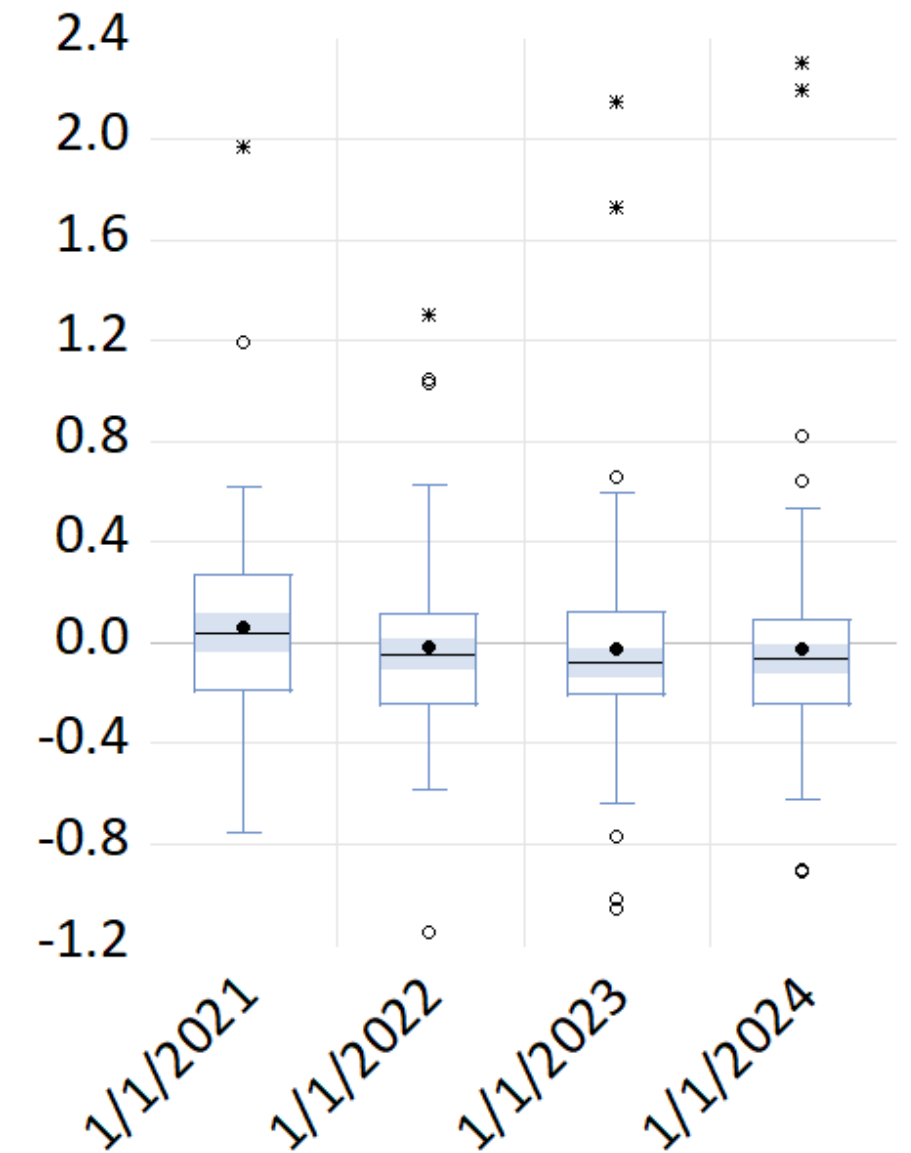
Principal components

F_HEALTH_2 by DATEID



Expert

F_HEALTH_3 by DATEID



The center of profitability shifts downward

A liquidity phenomenon “in inventories

Industry Features

High and stable
polarization

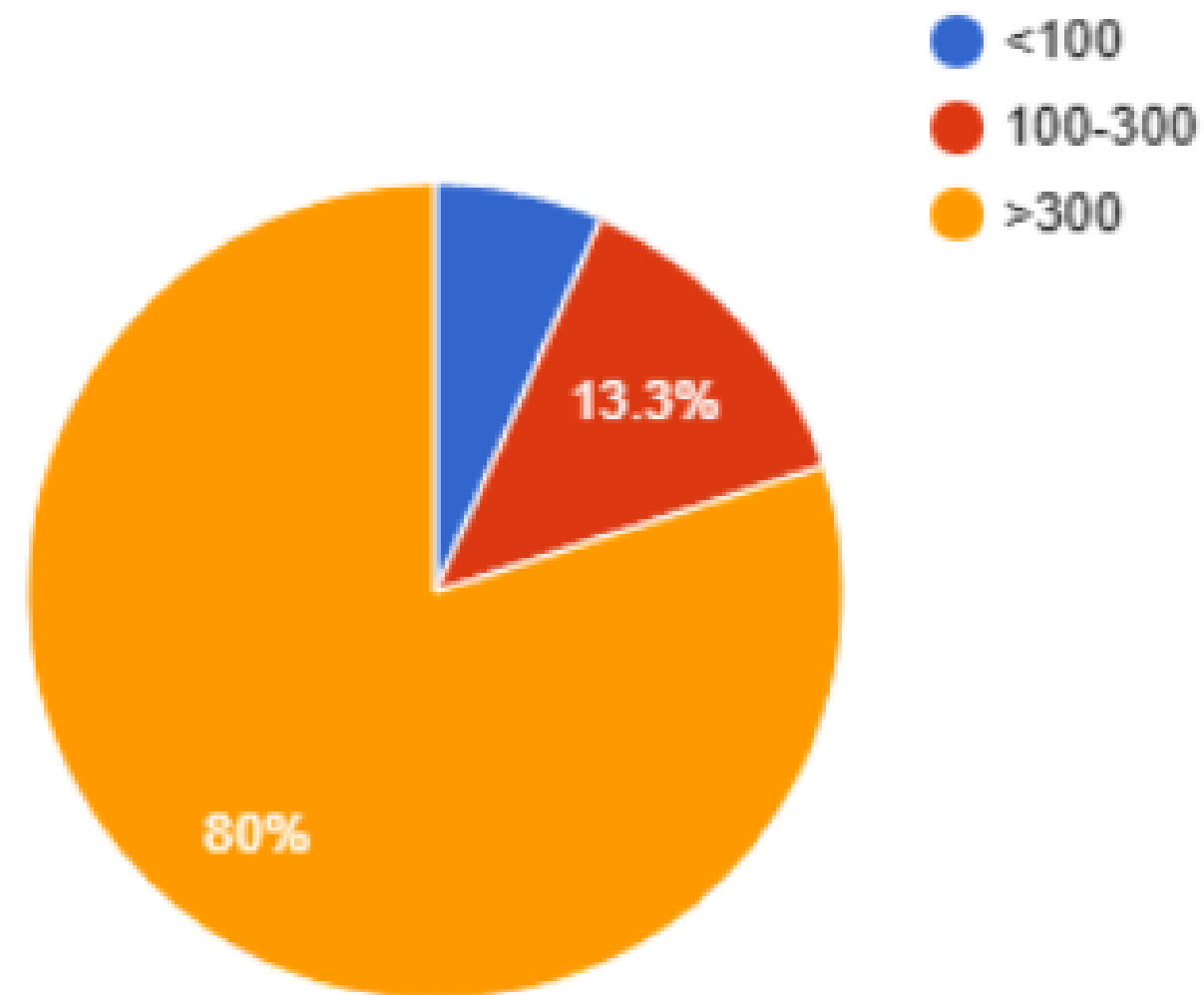
Shifted distribution to the
left

Cycle 2022–2024

Dairy Processing

Sample Description

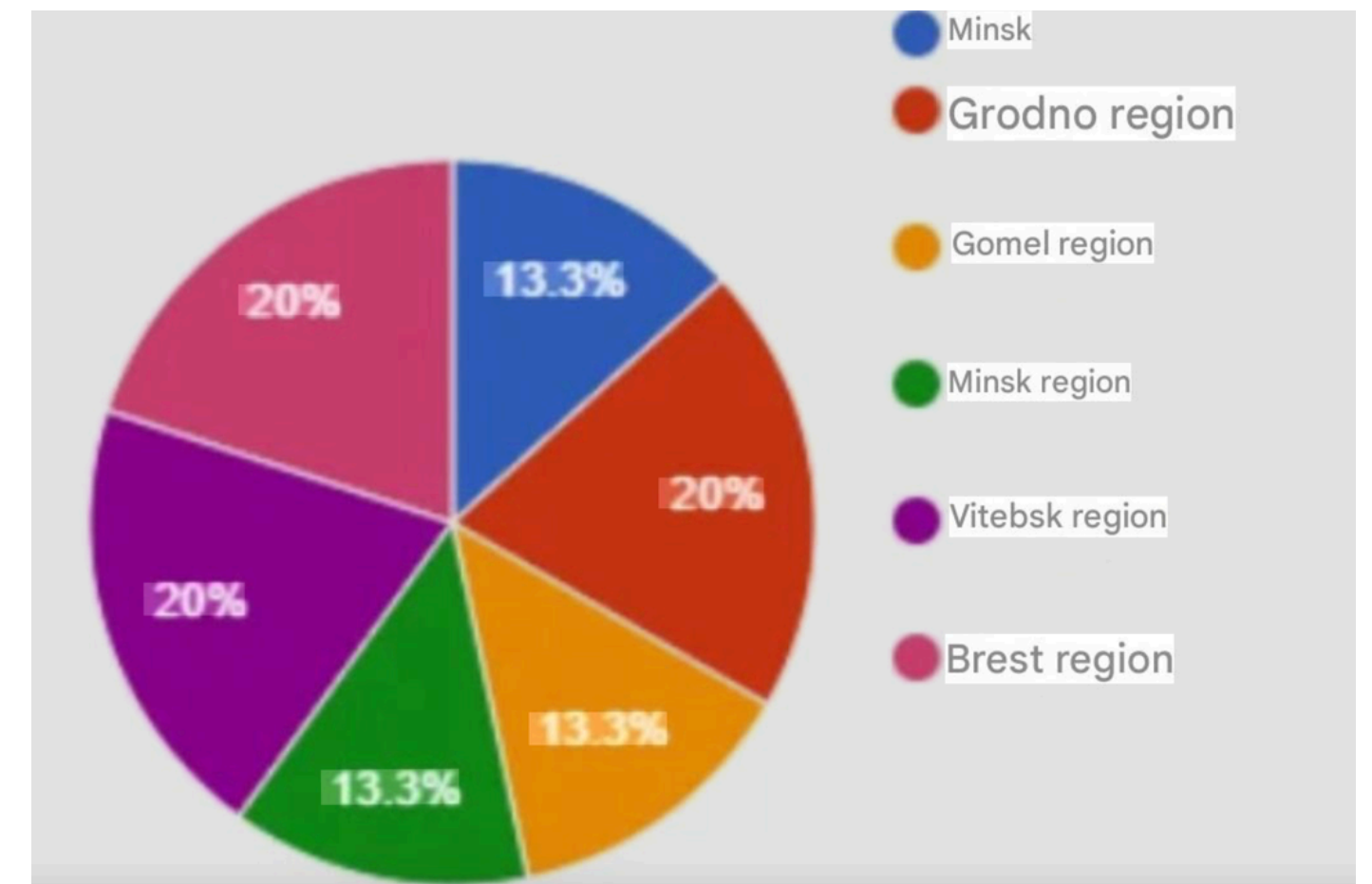
Classification by Number of Employees of the Enterprise



Authorized Capital

Arithmetic mean: 44,027
Standard deviation: 56,103
Coefficient of variation: 127%

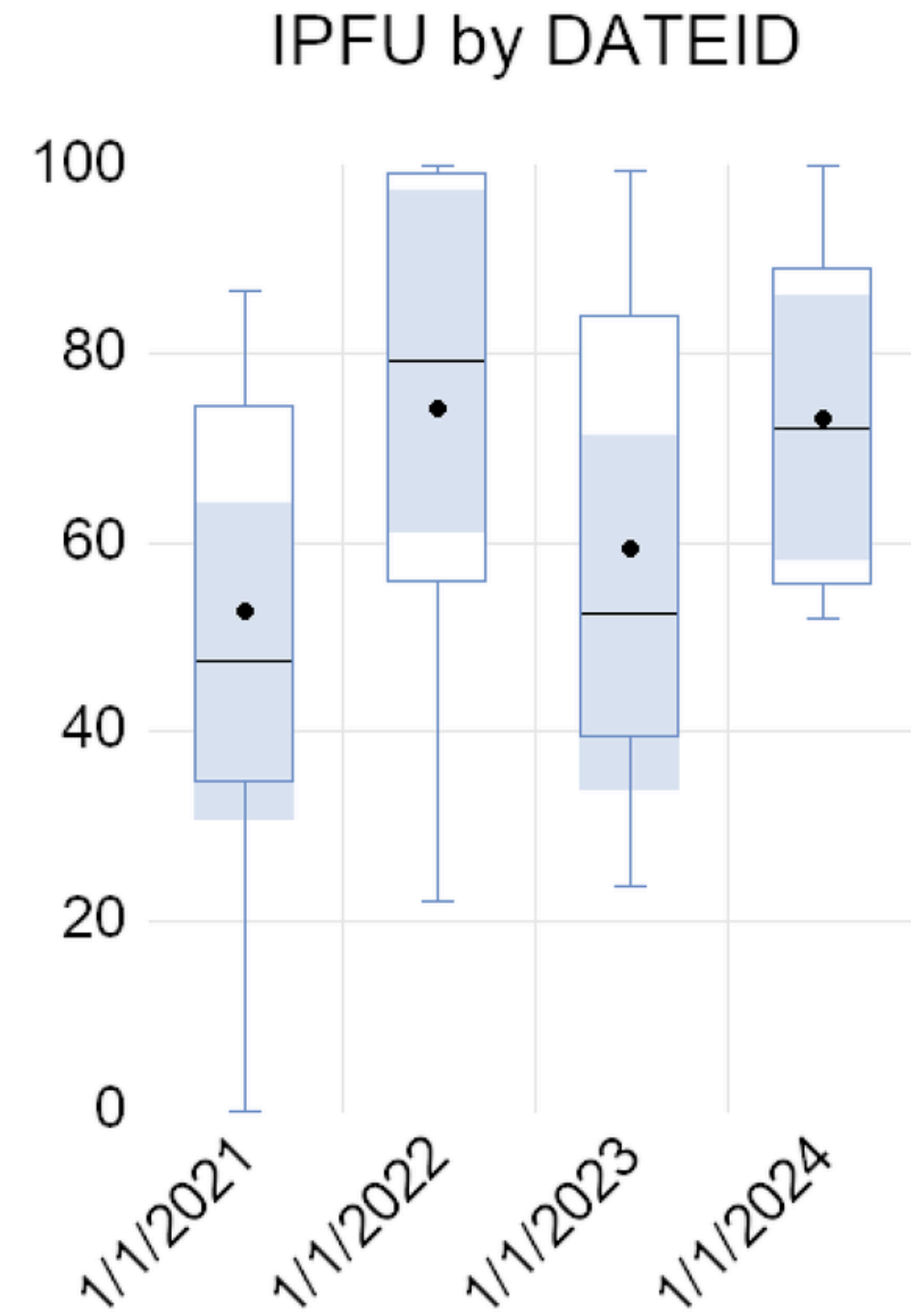
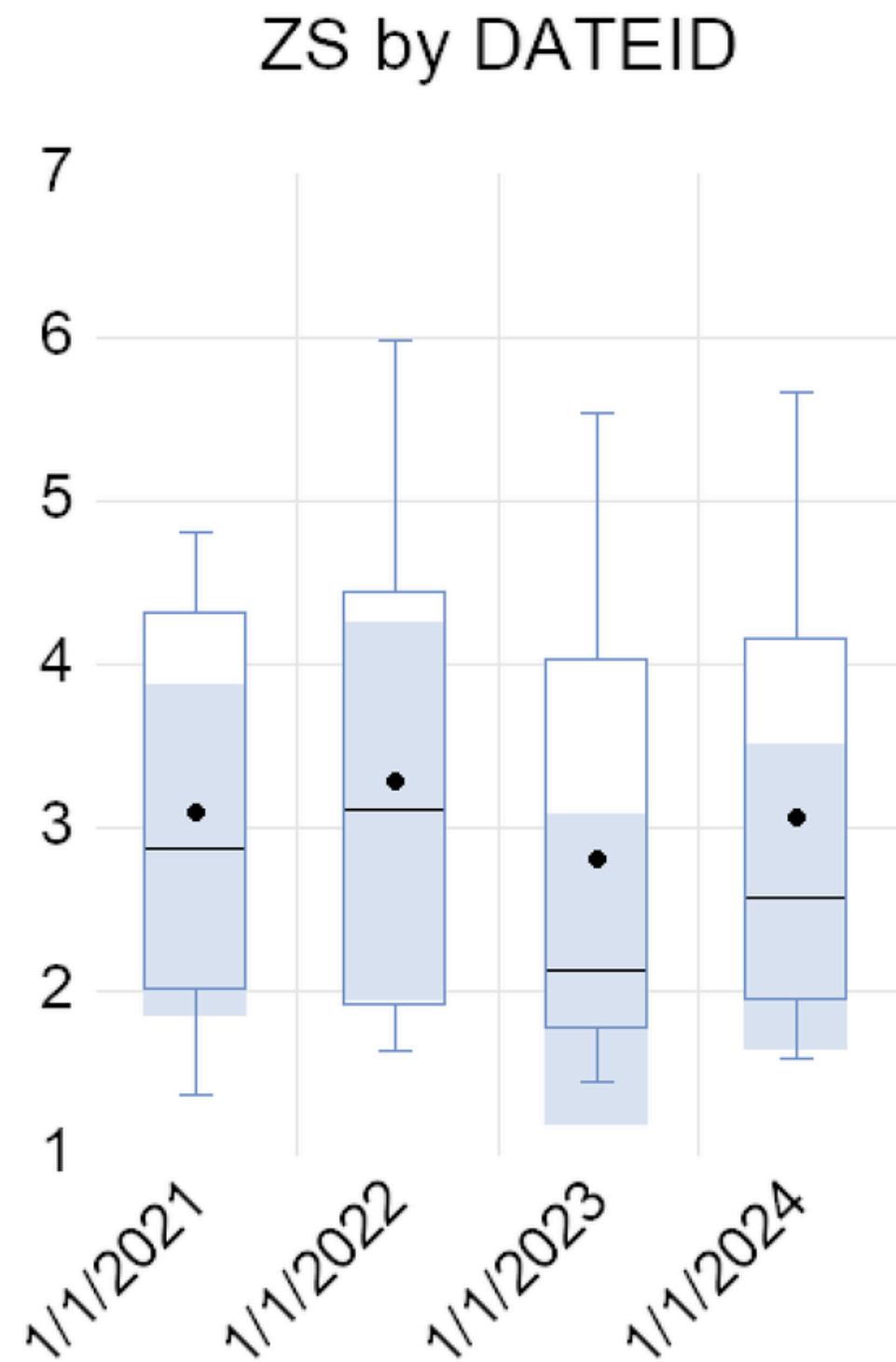
Distribution of the Studied Enterprises by Administrative Regions



Asset Size

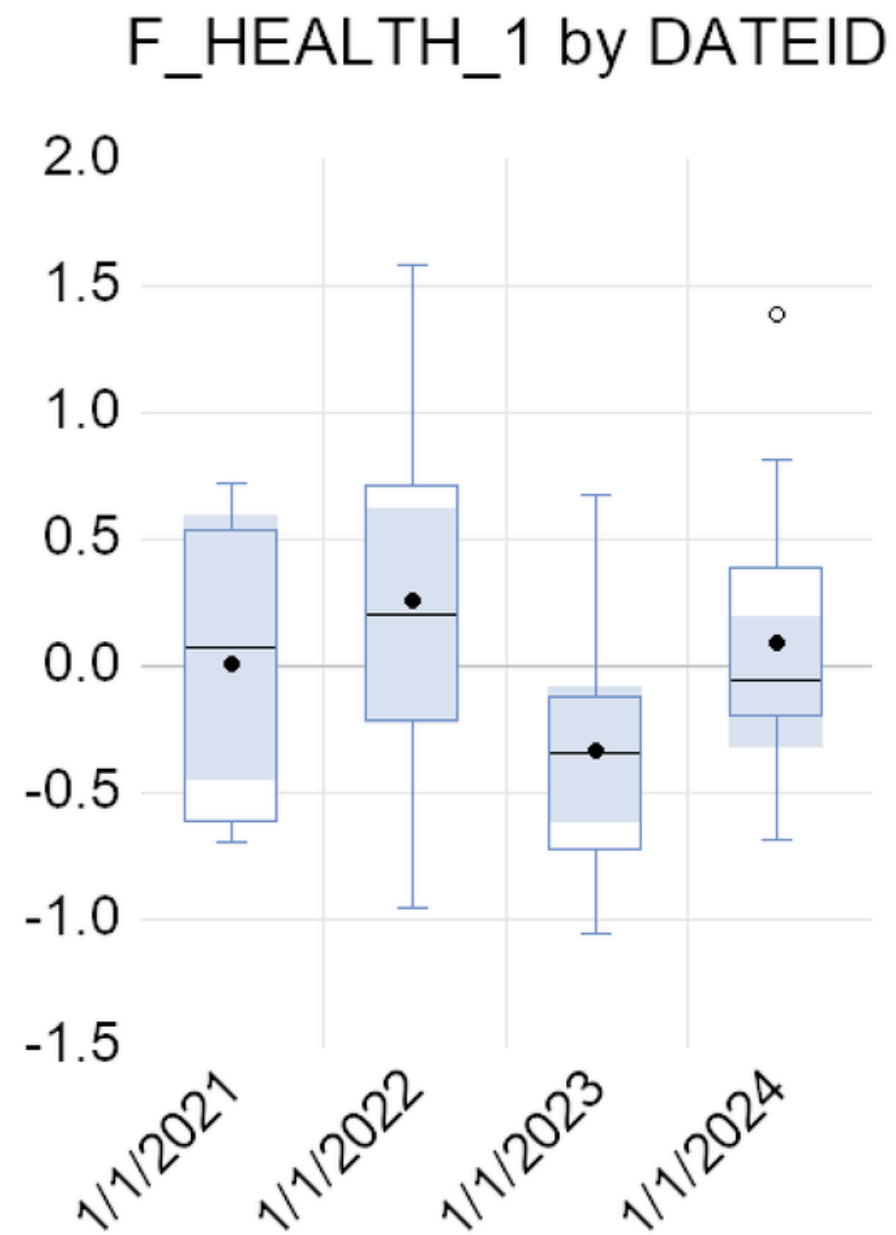
Arithmetic mean: 971,945
Standard deviation: 1,900,336
Coefficient of variation: 196%

Bankruptcy ratios (Altman Z-score and IPFU)

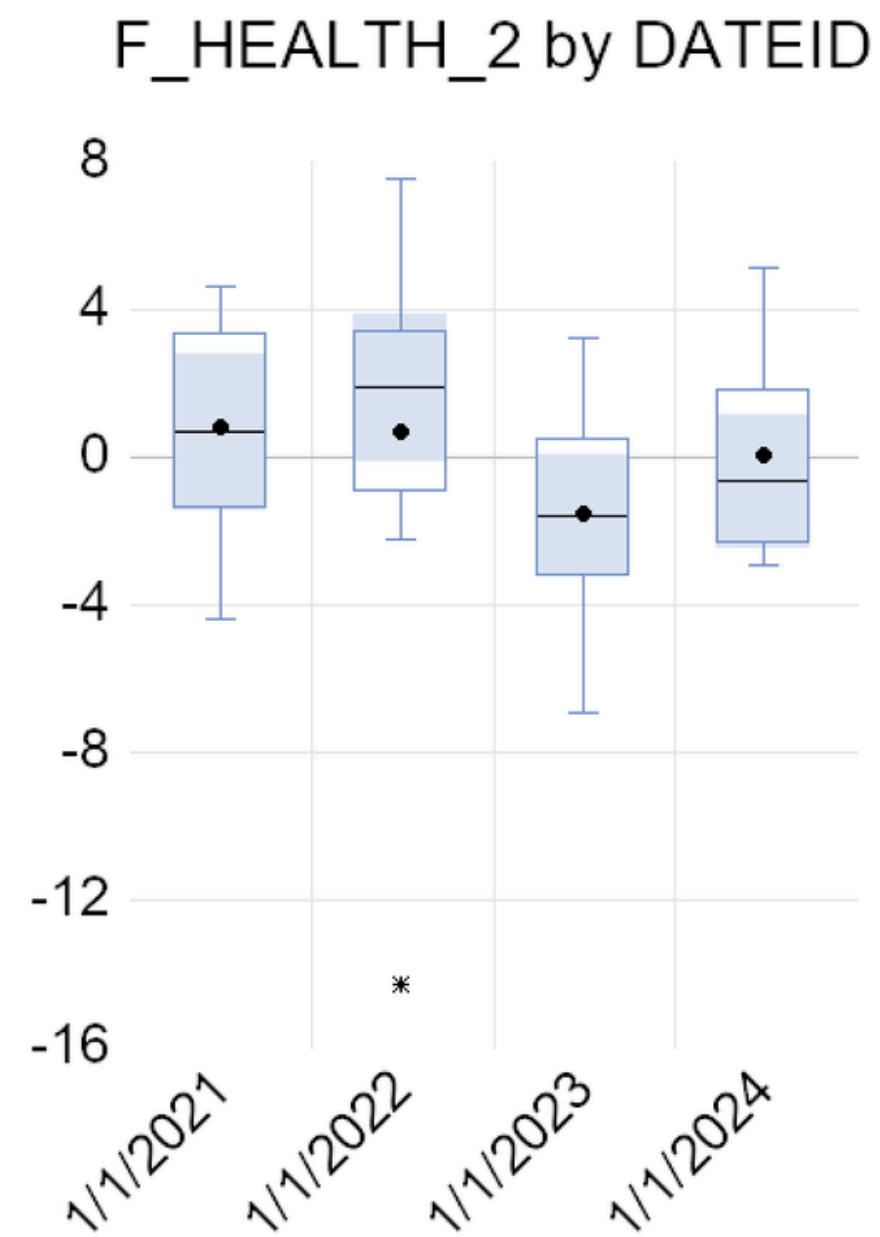


Change in the financial health rating coefficient under different methods

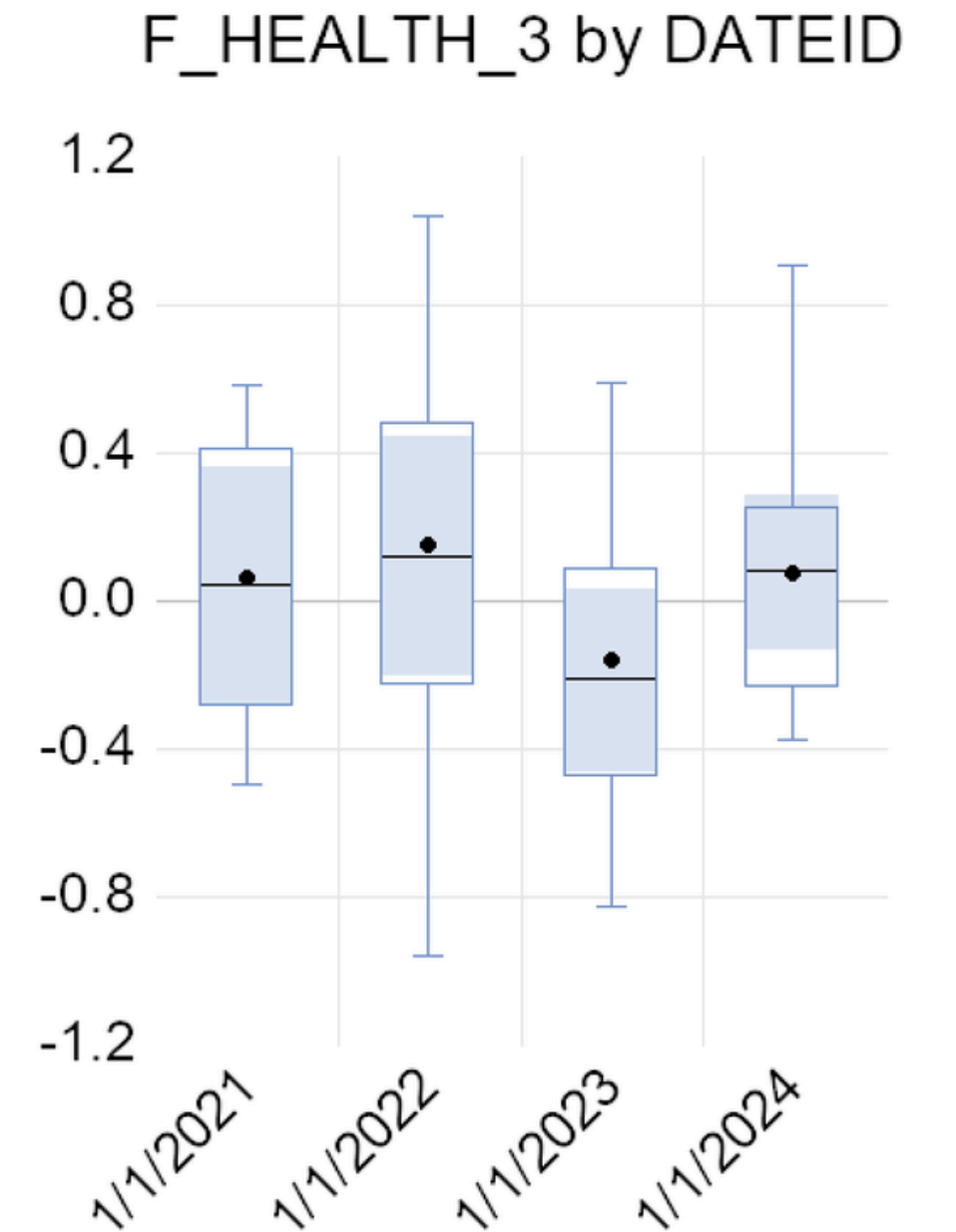
Hybrid



Principal components



Expert



Industry Features

- Non-monotonic 2022–2024 cycle in financial health: improvement in 2022, downturn in 2023, partial recovery in 2024 (all three methods).
- Bankruptcy ratios (Altman Z-score and IPFU) mirror this pattern: peak values in 2022, deterioration in 2023, incomplete rebound by 2024.
- High and persistent polarization of financial health and bankruptcy risk (wide interquartile ranges, long tails).
- Pronounced outliers indicating a small group of enterprises with extremely weak or, conversely, relatively strong positions.

Conclusion

Conclusion

- The dynamics of firms' financial condition across all groups/sectors are broadly similar, but they are asynchronous with macroeconomic trends.
- The absolute values of financial health indicators are mostly in the grey zone throughout 2021–2024.
- The “freely speaking data” approach identifies a dominant negative trend in firms' financial health in 2021–2024.
- All groups/sectors exhibit high polarization of financial indicators and a left-skewed distribution.