



Reforming State-Owned Enterprises in Central Asia: Challenges and Solutions

26–27 September 2019

Bishkek, Kyrgyz Republic

A Comprehensive Evaluation Framework on the Economic Performance of State-owned Enterprises

Farhad Taghizadeh-Hesary
*Assist. Professor of Economics,
Waseda University,
Tokyo, Japan*

Naoyuki Yoshino
*Dean and CEO, ADBI
Professor Emeritus
Keio University*

Chul Ju Kim
*Deputy Dean,
ADBI*

The views expressed in this presentation are the views of the authors and do not necessarily reflect the views or policies of the Asian Development Bank Institute (ADBI), the Asian Development Bank (ADB), its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

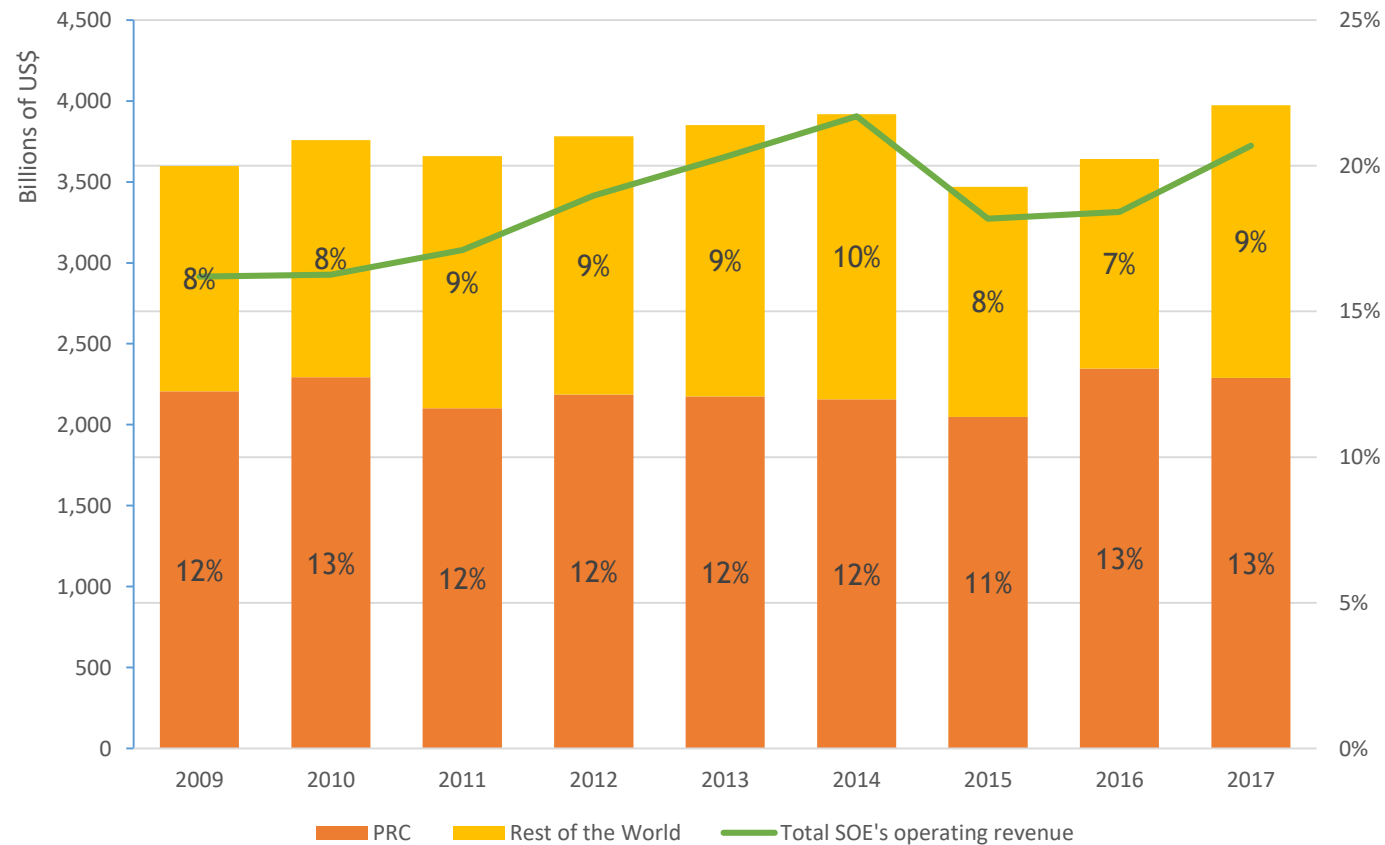
Outline

- 1- Introduction and Background
- 2- Variables and Data
- 3- Statistical Analysis Technique
- 4- Empirical Results
- 5- Conclusion and Policy implications

I. Introduction and Background

Importance of SOEs in global economy

Share of SOEs in top 200 companies (based on Orbis/BV)



Low productive SOEs negatively affect the GDP growth rate

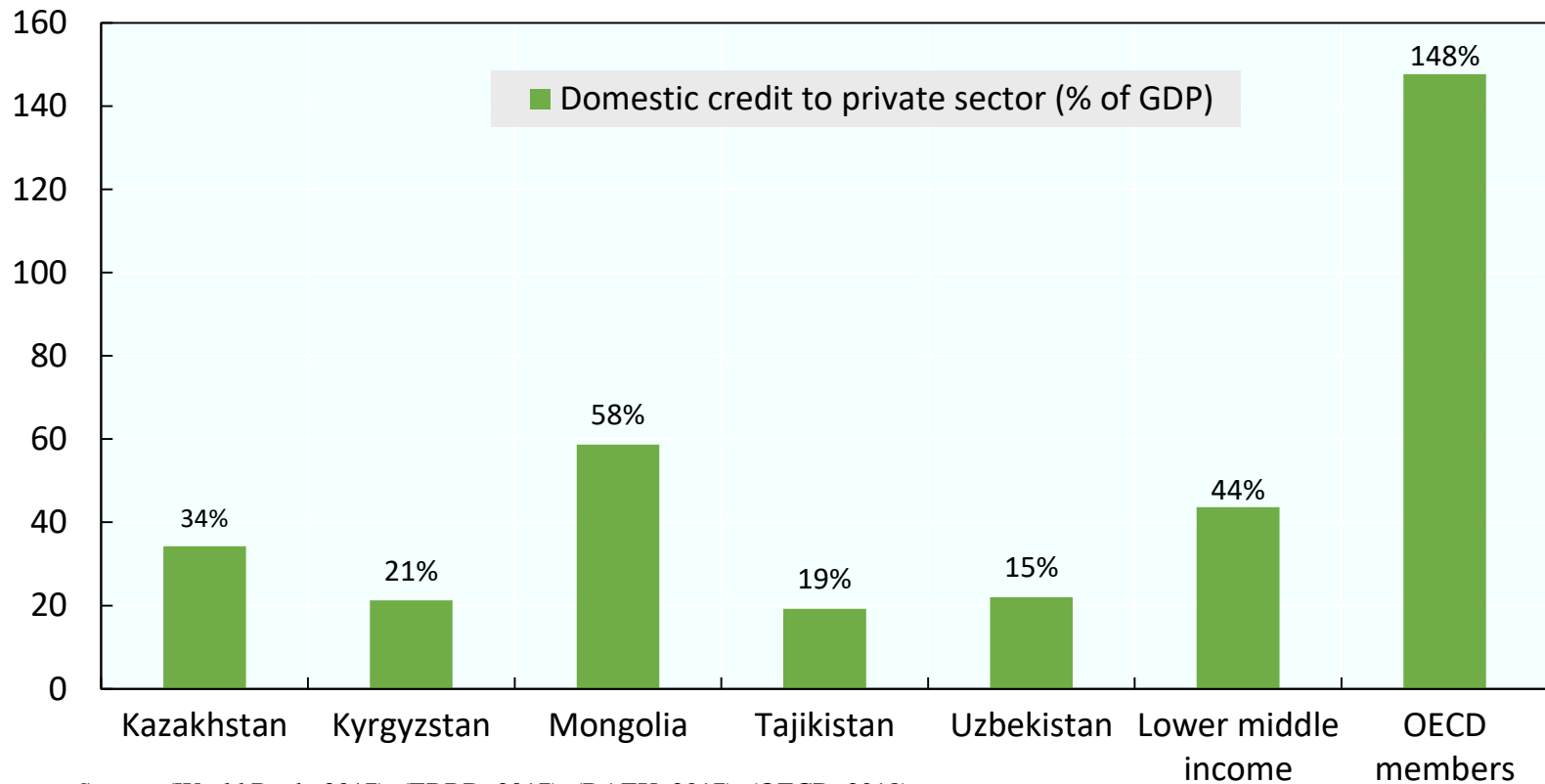
- In several Asian economies, SOEs have significant share in the economy.
- Studies show that, In some countries SOEs have lower productivity comparing to the private enterprises.
- Lower productive SOEs specially in those economics that SOEs are dominating the economy, negatively affect the economic output of the whole economy.
- It is important to evaluate the performance of SOEs using measureable and defendable tools.

Low productive SOEs makes the business environment severe for the private sector

- SOEs usually do not have difficulty for accessing to finance
- In several central Asian countries, majority of the credit is allocating to the public sector including SOEs.
- Private sectors have several difficulties for accessing to finance in the region (high collateral, high interest rate...)
- Low productive SOEs needs more capital therefore more finance for each unit of their production, hence this makes the business environment and access to finance severe for private enterprises.

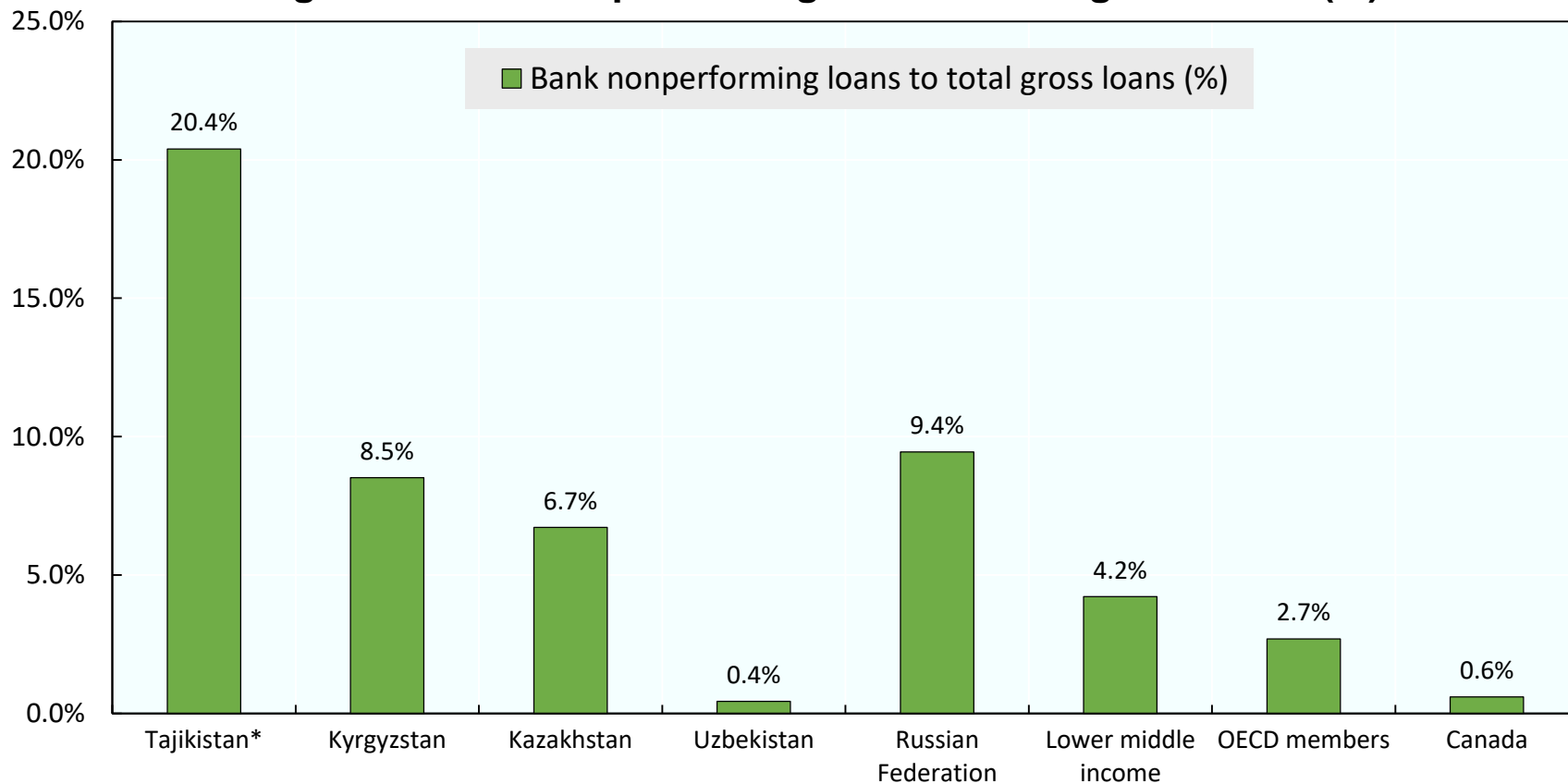
Credit to the private sector in Central Asia remains comparatively modest

Figure 1. Domestic credit to private sector in Central Asia



Non-performing loans remain high in the region

Figure 2. Bank nonperforming loans to total gross loans (%)

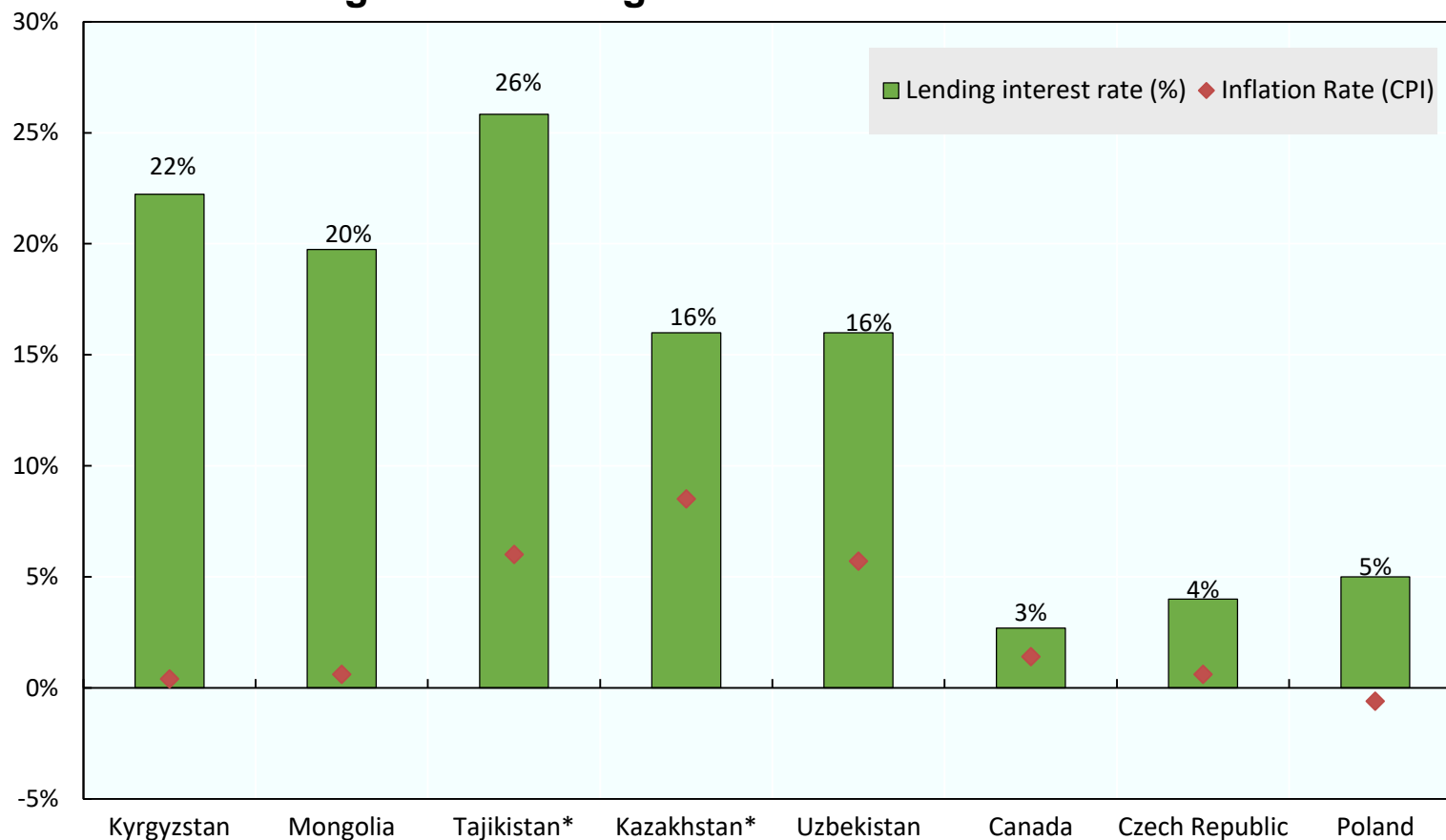


Note: * Data for Tajikistan is from 2014

Sources: (World Bank, 2017; Bank of Mongolia, 2016; OECD, 2018)

Credit conditions are tight with high interest rates in the region

Figure 3. Lending interest rate and inflation rate

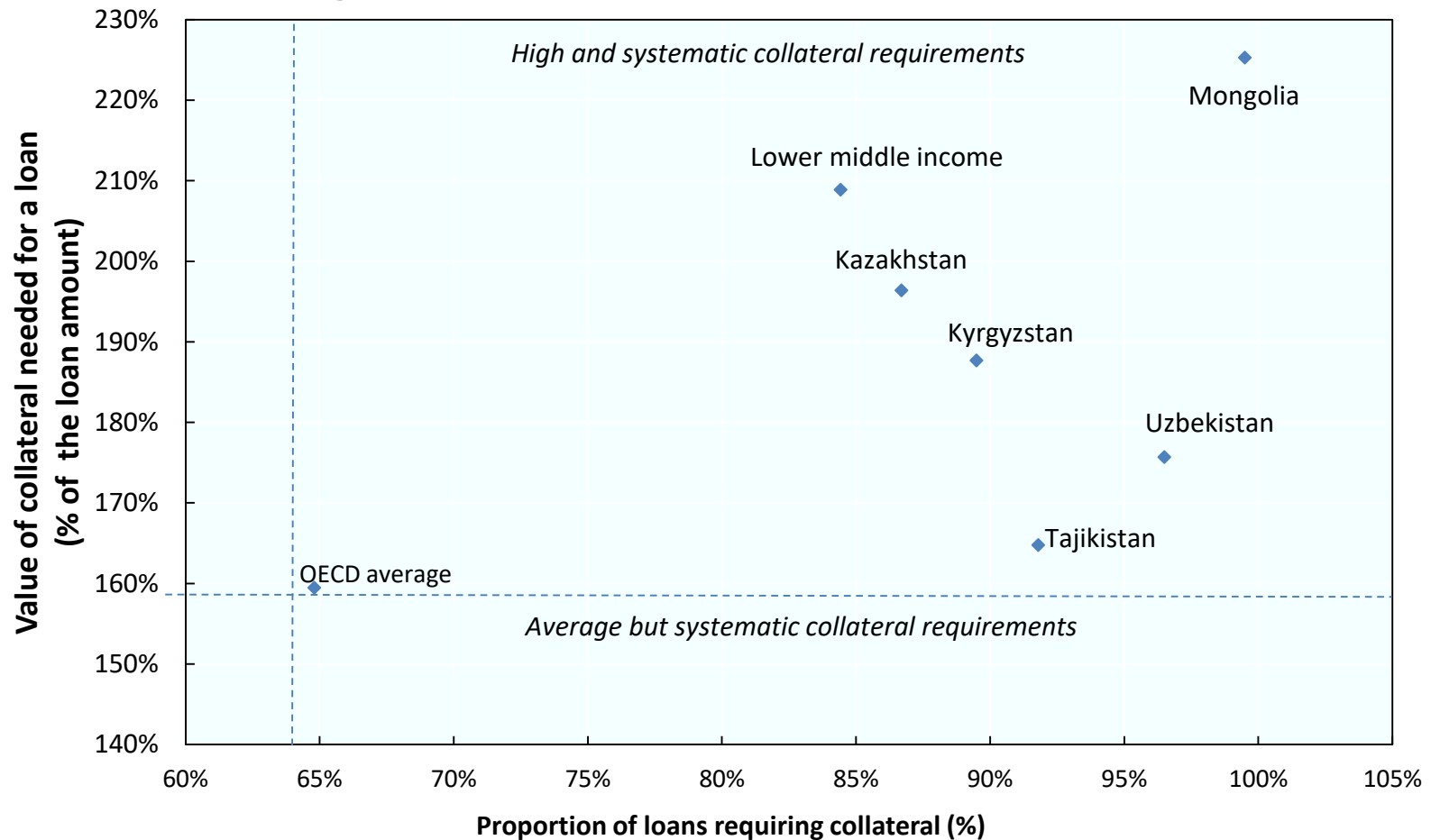


Note: *lending interest rates for Kazakhstan and Tajikistan (2015)

Source: (World Bank, 2017; CIA, 2018; State Committee of Uzbekistan on Statistics, 2018; Ministry of National Economy of Kazakhstan, 2017; OECD, 2018)

High and systematic collateral requirements limit access to finance for SMEs

Figure 4. Collateral requirements in Central Asia



Source: (EBRD, 2017; World Bank, 2017; OECD, 2018)

A comprehensive evaluation of SOEs is needed in order to improve the productivity of the public capital

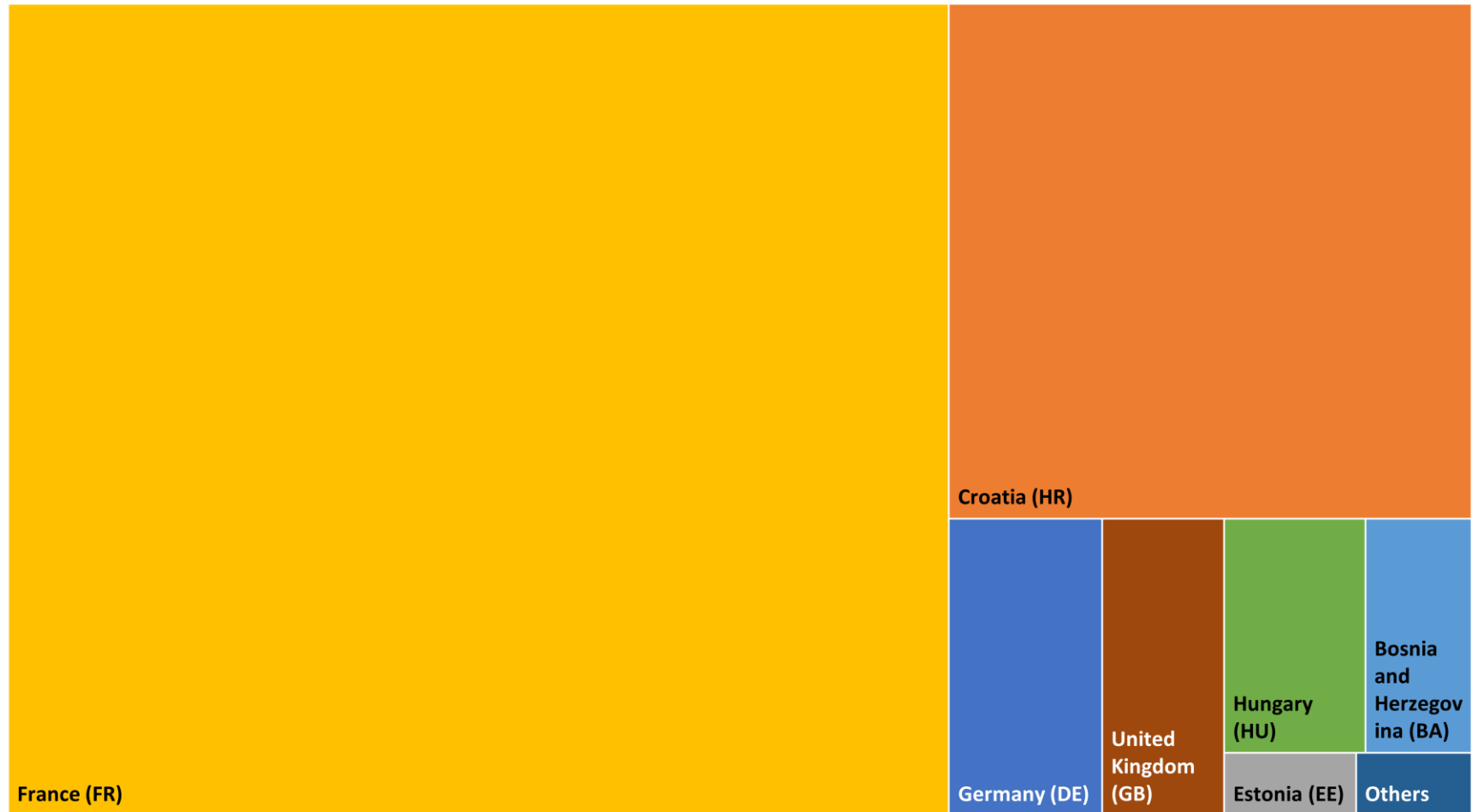
- Many SOEs established in order to provide public services and their objective is to increase the social welfare and not profit making.
- However, without relying on a concrete and comprehensive criteria, it is not possible for the central government to evaluate the SOEs as it is not easy to calculate the social welfare measured by the SOEs.
- Its important to have a many-sided evaluation of SOEs' performance, in order to improve the productivity of the public budget.

II. Variables and Data

Variables

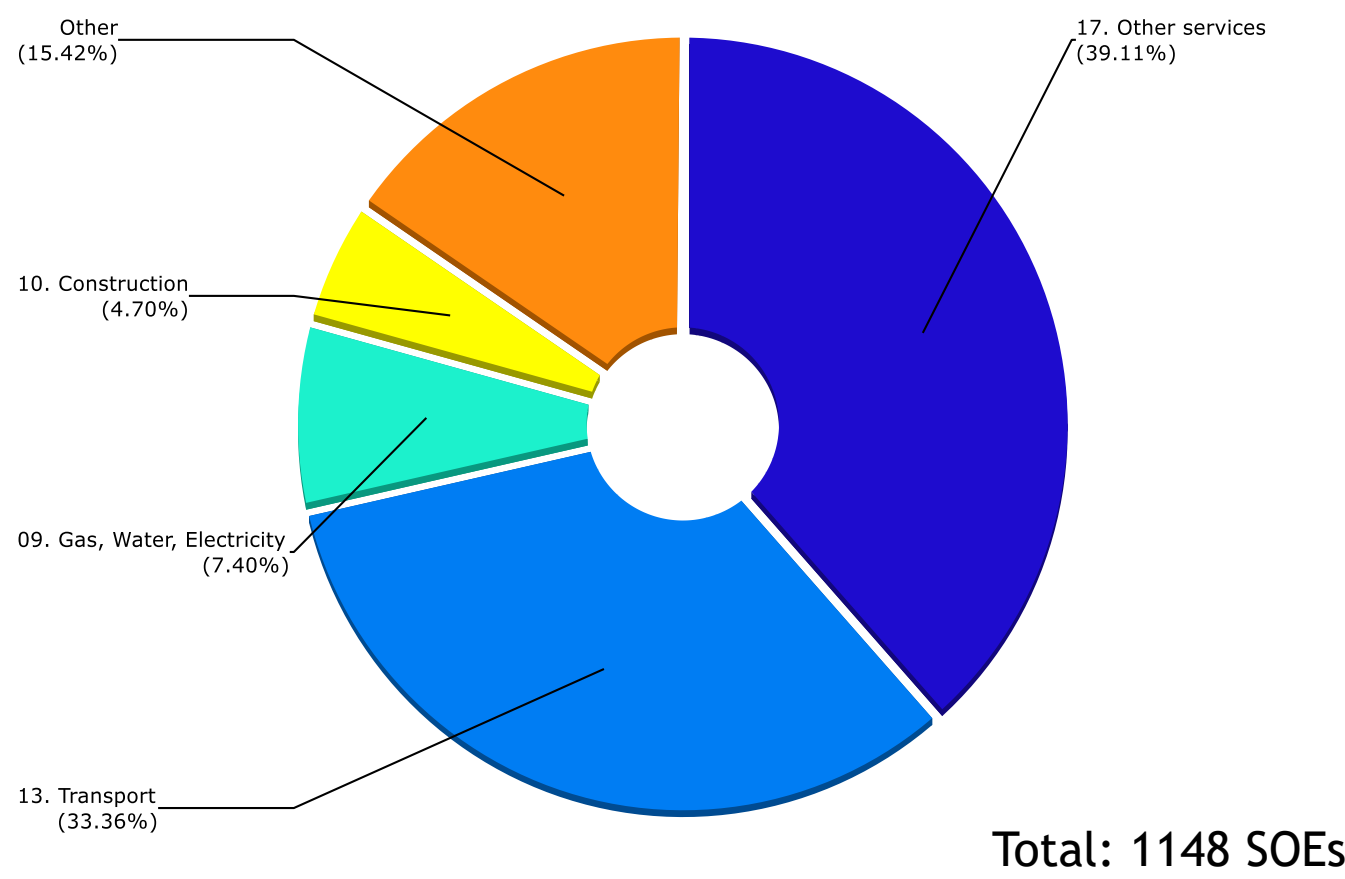
Notation	Definition	Group
Var 1	ROE using P/L before tax %	Profitability
Var 2	ROA using P/L before tax %	Profitability
Var 3	Profit margin %	Profitability
Var 4	Cash flow / Operating revenue %	Profitability
Var 5	Credit due dates	Operational
Var 6	Export revenue / Operating revenue %	Operational
Var 7	Liquidity ratio	Structure
Var 8	Solvency ratio (Asset based) %	Structure
Var 9	Solvency ratio (Liability based) %	Structure
Var 10	Profit per employee in USD	Per Employee
Var 11	Operating revenue per employee in USD	Per Employee
Var 12	Costs of employees / Operating revenue %	Per Employee
Var 13	Average cost of employee in USD	Per Employee
Var 14	Working capital per employee in USD	Per Employee
Var 15	Total assets per employee in USD	Per Employee

Data: 1148 SOEs

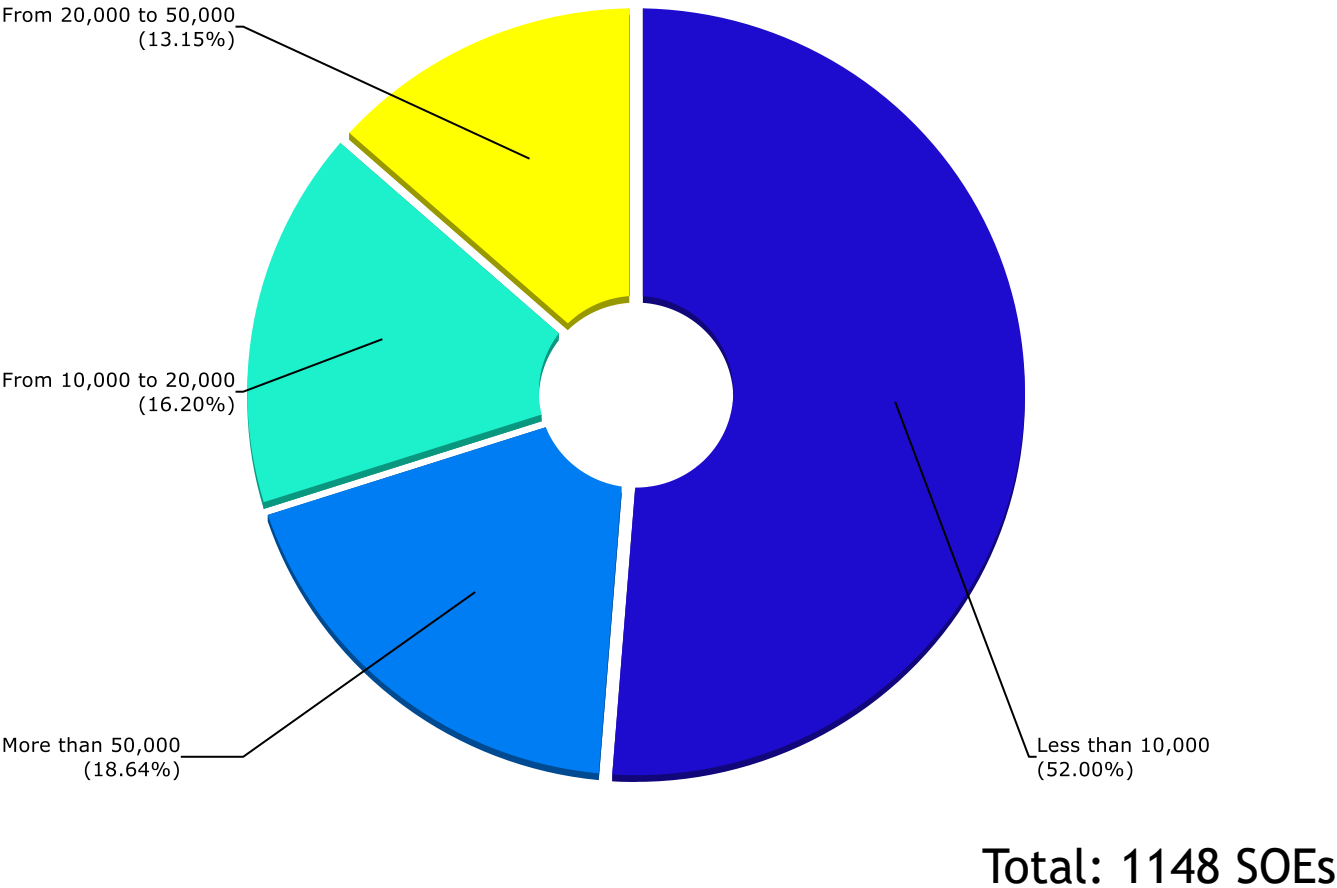


Source of Data: BvD, Orbis

Breakdown of data by Industry



Breakdown by operating revenue



III. Statistical Analysis

Principle Component Analysis (PCA)

- PCA is a standard data reduction technique which extracts data, removes redundant information, highlights hidden features, and visualizes the main relationships that exist between observations.
- PCA is a technique for simplifying a data set, by reducing multi-dimensional data sets to lower dimensions for analysis.
- PCA does not have a fixed set of basis vectors; Its basis vectors depend on the data set, Unlike other linear transform methods, .
- PCA also has the advantage of indicating the similarities and differences of the various models created (Bruce-Ho, Dash-Wu, 2009).

Through this method, we reduce the 15 variables to determine the minimum number of components (As in Yoshino and Taghizadeh-Hesary 2014; 2015)

Correlation among variables is the main reason behind using PCA

Correlation Matrix																
Correlation		Var 1	Var 2	Var 3	Var 4	Var 5	Var 6	Var 7	Var 8	Var 9	Var 10	Var 11	Var 12	Var 13	Var 14	Var 15
	Var 1	1.000	.421	.321	.129	-.039	.013	.007	.001	.024	.110	.020	-.051	.069	.004	.043
	Var 2	.421	1.000	.570	.337	-.097	.017	.062	.371	.123	.114	.002	-.118	-.007	-.007	.001
	Var 3	.321	.570	1.000	.645	-.150	-.009	.139	.334	.080	.216	-.009	-.160	-.051	-.022	.128
	Var 4	.129	.337	.645	1.000	-.166	-.038	.124	.316	.154	.160	-.032	-.151	-.109	-.031	.214
	Var 5	-.039	-.097	-.150	-.166	1.000	-.057	-.089	-.191	-.079	-.026	-.038	-.077	-.022	-.022	-.024
	Var 6	.013	.017	-.009	-.038	-.057	1.000	.055	-.038	-.095	.141	.201	-.127	.153	.022	.194
	Var 7	.007	.062	.139	.124	-.089	.055	1.000	.264	-.076	.071	.138	-.084	-.001	-.022	-.017
	Var 8	.001	.371	.334	.316	-.191	-.038	.264	1.000	.117	.074	-.018	-.030	-.073	-.093	-.033
	Var 9	.024	.123	.080	.154	-.079	-.095	-.076	.117	1.000	-.046	-.062	.075	-.008	-.058	-.043
	Var 10	.110	.114	.216	.160	-.026	.141	.071	.074	-.046	1.000	.237	-.129	.094	.175	.580
	Var 11	.020	.002	-.009	-.032	-.038	.201	.138	-.018	-.062	.237	1.000	-.168	.097	.192	.482
	Var 12	-.051	-.118	-.160	-.151	-.077	-.127	-.084	-.030	.075	-.129	-.168	1.000	.186	-.163	-.195
	Var 13	.069	-.007	-.051	-.109	-.022	.153	-.001	-.073	-.008	.094	.097	.186	1.000	.242	.073
	Var 14	.004	-.007	-.022	-.031	-.022	.022	-.022	-.093	-.058	.175	.192	-.163	.242	1.000	.265
	Var 15	.043	.001	.128	.214	-.024	.194	-.017	-.033	-.043	.580	.482	-.195	.073	.265	1.000

5 Significant components achieved

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
Z1	2.782	18.549	18.549	2.782	18.549	18.549
Z2	2.164	14.430	32.979	2.164	14.430	32.979
Z3	1.284	8.563	41.542	1.284	8.563	41.542
Z4	1.227	8.178	49.720	1.227	8.178	49.720
Z5	1.114	7.428	57.147	1.114	7.428	57.147
Z6	.964	6.425	63.572			
Z7	.902	6.015	69.587			
Z8	.865	5.767	75.355			
Z9	.821	5.475	80.829			
Z10	.696	4.641	85.470			
Z11	.653	4.351	89.821			
Z12	.524	3.496	93.317			
Z13	.433	2.888	96.205			
Z14	.314	2.093	98.298			
Z15	.255	1.702	100.000			
Extraction Method: Principal Component Analysis.						

Component Matrix

Component Matrix ^a							
			Component				
			Z1	Z2	Z3	Z4	Z5
Var 1	ROE using P/L before tax %	Profitability	0.597	-0.096	0.424	-0.313	0.393
Var 2	ROA using P/L before tax %	Profitability	0.680	-0.304	0.254	-0.134	0.233
Var 3	Profit margin %	Profitability	0.805	-0.263	0.060	-0.120	0.027
Var 4	Cash flow / Operating revenue %	Profitability	0.707	-0.233	-0.115	-0.051	-0.259
Var 5	Credit due dates	Operational	-0.262	0.107	-0.080	-0.559	0.165
Var 6	Export revenue / Operating revenue %	Operational	0.122	0.399	-0.006	0.213	0.372
Var 7	Liquidity ratio	Structure	0.271	-0.019	-0.400	0.487	0.377
Var 8	Solvency ratio (Asset based) %	Structure	0.502	-0.348	-0.218	0.391	-0.017
Var 9	Solvency ratio (Liability based) %	Structure	0.129	-0.280	0.231	0.072	-0.576
Var 10	Profit per employee in USD	Per Employee	0.473	0.520	0.023	-0.035	-0.198
Var 11	Operating revenue per employee in USD	Per Employee	0.237	0.631	-0.128	0.151	0.014
Var 12	Costs of employees / Operating revenue %	Per Employee	-0.318	-0.244	0.449	0.415	-0.169
Var 13	Average cost of employee in USD	Per Employee	-0.024	0.307	0.649	0.372	0.156
Var 14	Working capital per employee in USD	Per Employee	0.108	0.501	0.242	-0.021	-0.090
Var 15	Total assets per employee in USD	Per Employee	0.423	0.704	-0.054	-0.074	-0.312
Extraction Method: Principal Component Analysis.							
a. 5 components extracted.							

IV. Empirical results

Regression result:

Dependent variable Z4 (credit due days or default variable)

Variables	Coefficient	t-statistic	Std. Error	Probability
C Constant	19.19	9.59	2.00	0.00
Z1 Profitability	-0.14	-10.34	0.01	0.00
Z2 Per Capital Productivity	-0.22	-48.40	0.004	0.00
Z3 Per Capital costs	0.26	31.49	0.008	0.00
Z5 Solvency	-0.60	-71.41	0.008	0.00

Note: Dependent variable is Z4,

Observations=1137;

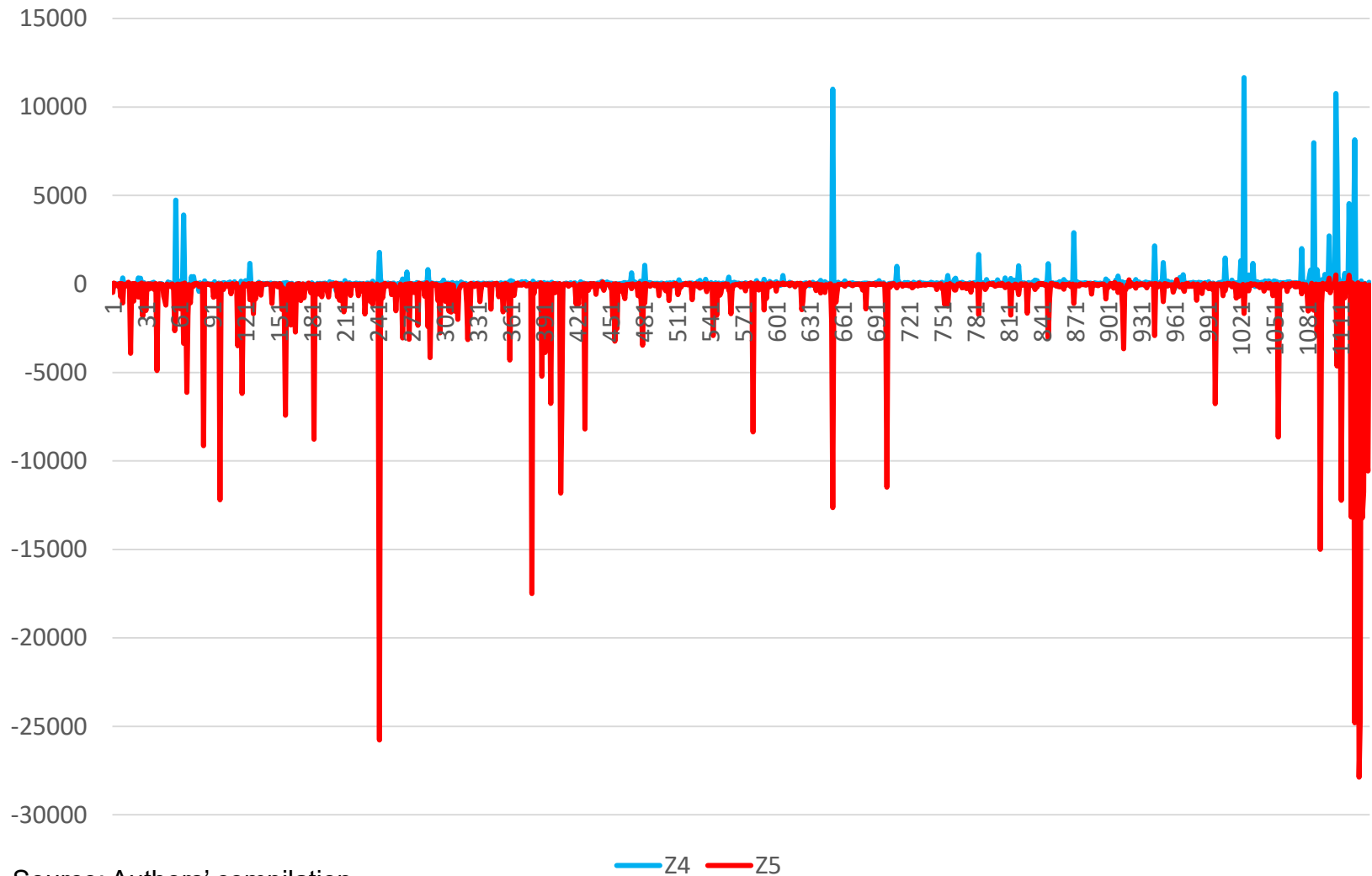
R-squared=0.994;

Adjusted R-squared=0.994;

Durbin-Watson statistics=1.98

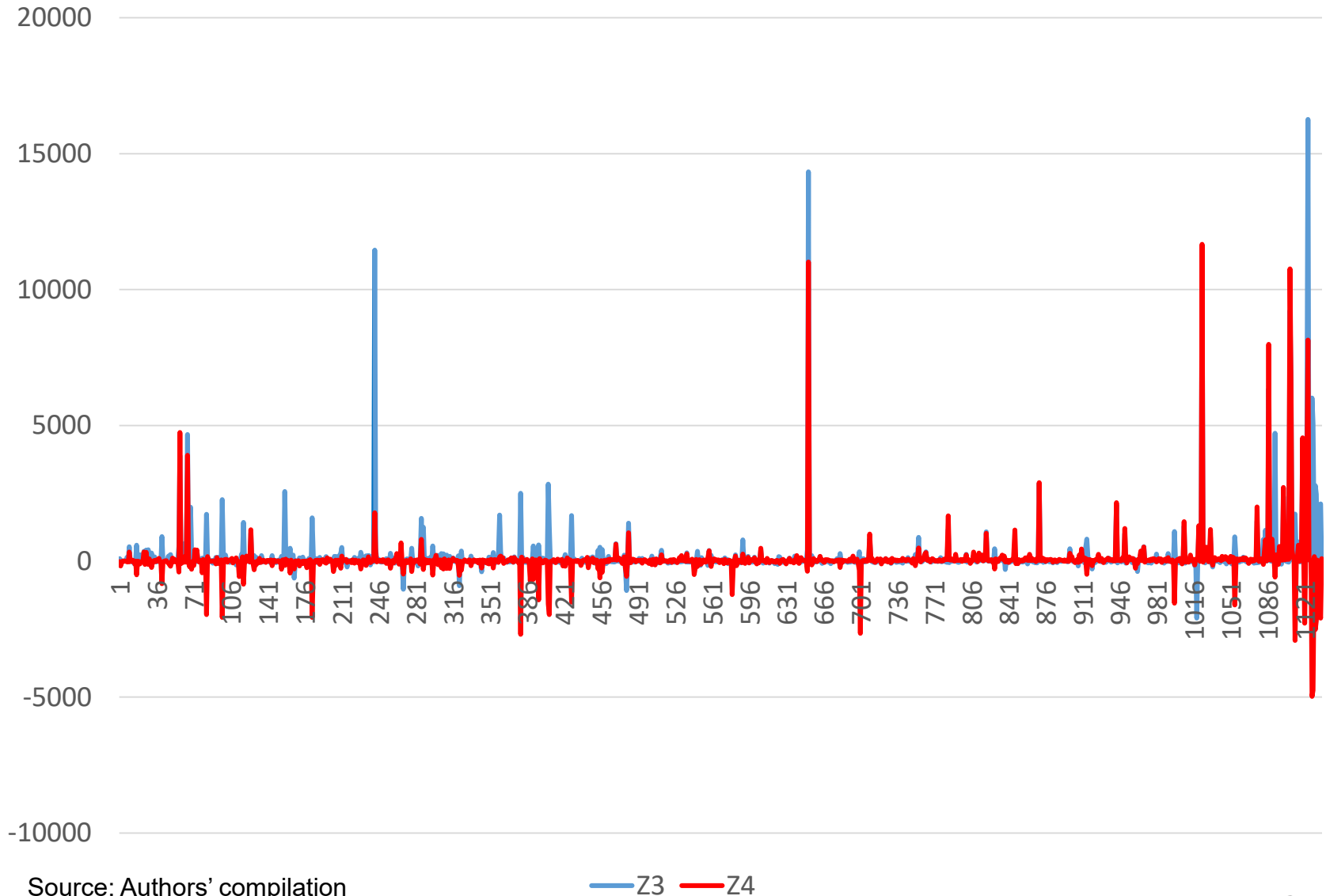
Source: Authors' compilation

Negative movements of solvency ratio (Z5) with credit due (Default variable Z4)

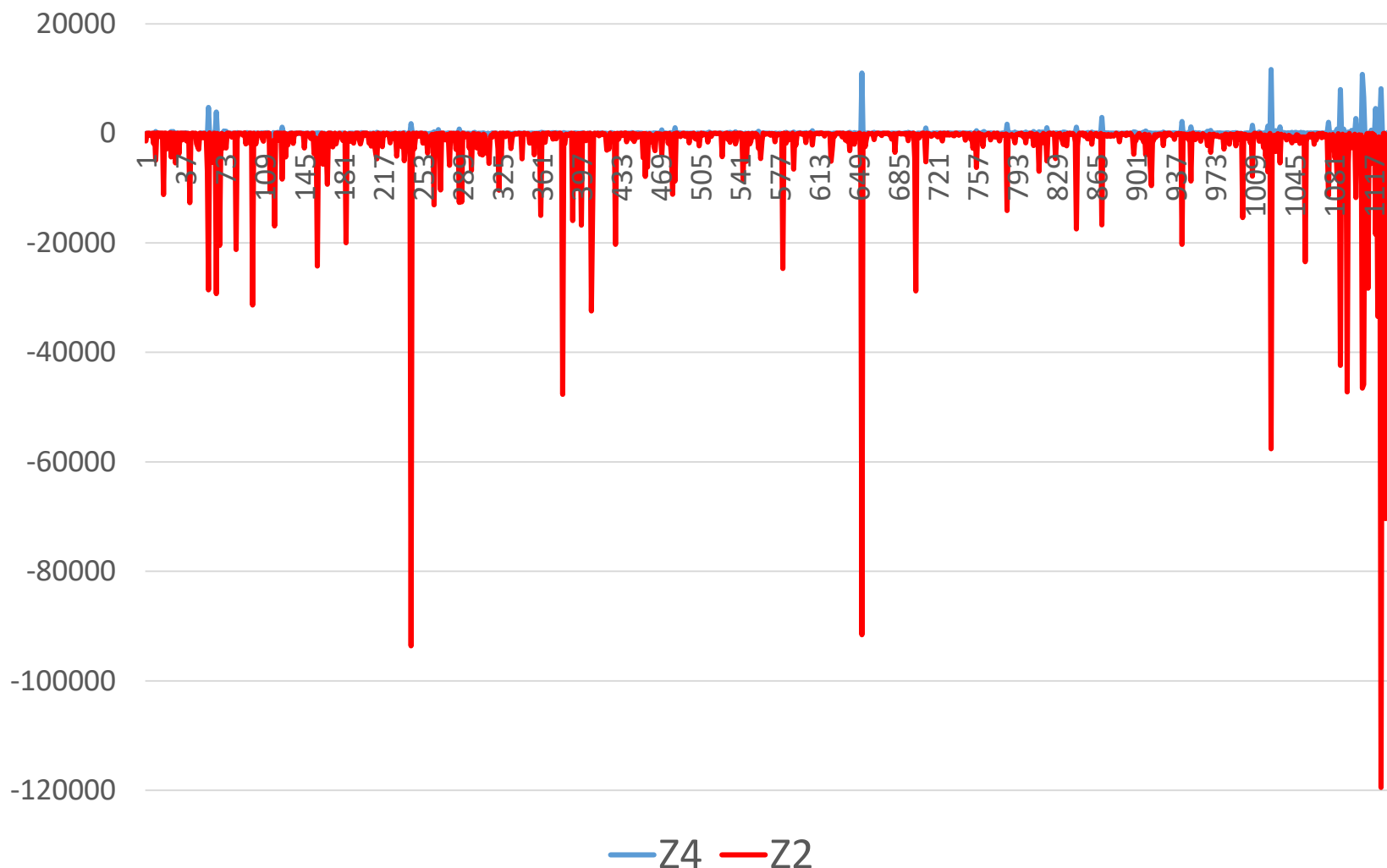


Source: Authors' compilation

Positive movement of Per employee costs (Z3) with Credit due days (default Z4)

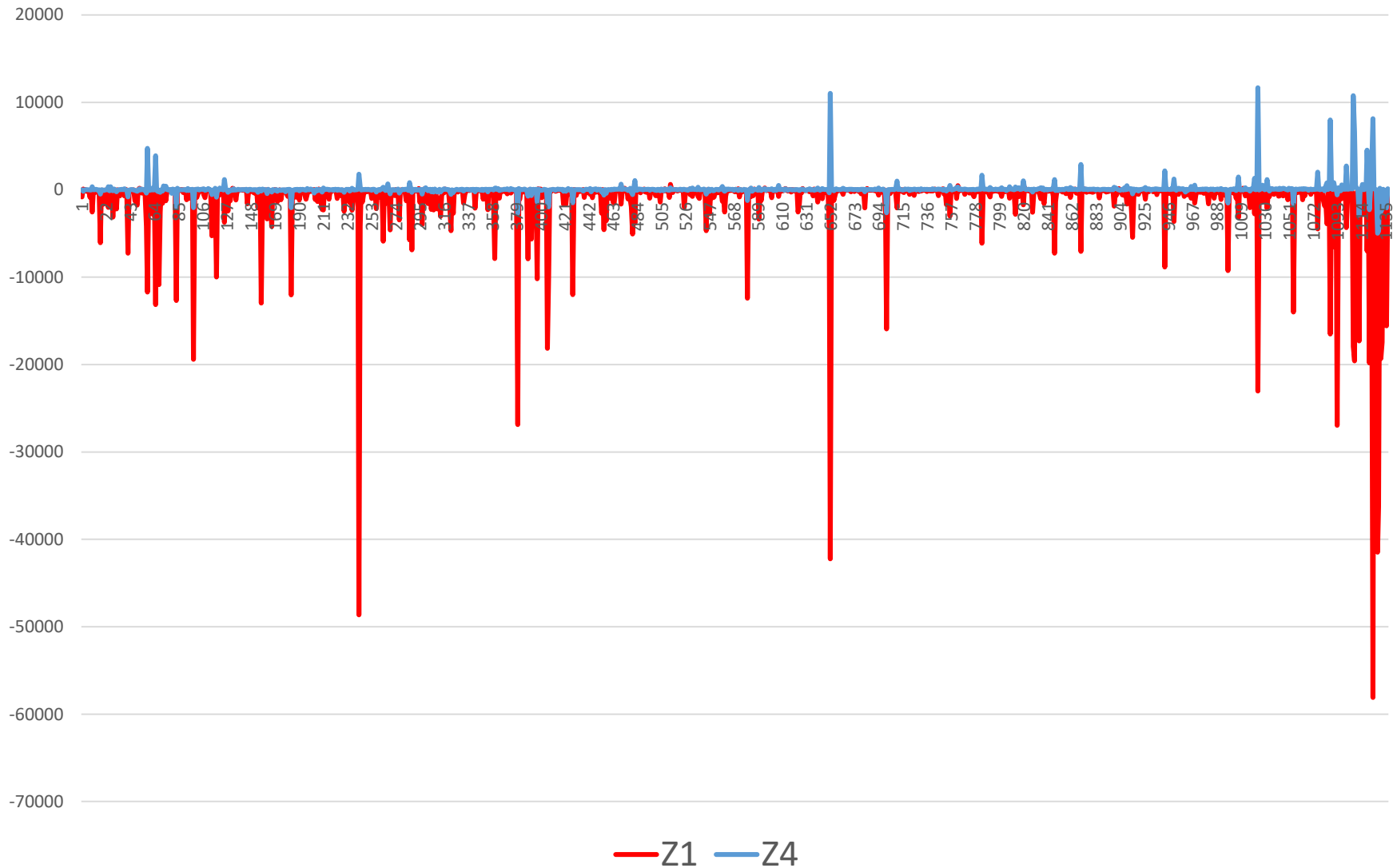


Negative movements of Per Employee Productivity (Z2) with Credit due days (default variable Z4)



Source: Authors' compilation

Negative Movements of Profitability (Z1) with Credit Due Days (Default variable Z4)



Source: Authors' compilation

IV. Conclusion and Policy Implications

1. Low productive SOEs, will slow the economic growth in many economies that SOEs have significant share in the whole economy.
2. Not only slowing the economic growth but also low productivity of SOEs will make the business environment more severe for the private sector.
3. It is important for the central governments to implement comprehensive evaluation methods for evaluating the performance of SOEs.
4. Profit making of SOEs is important, however just focusing on one criteria, will mislead the policy makers, in addition nature of many SOEs is for generating social welfare and not profit.
5. Empirical part of this research shows that solvency ratios and per employee variables (cost and revenue) have more deterministic power on success or failure of SOEs comparing to profitability.

Thank you for your attention!

farhad@aoni.waseda.jp
www.linkedin.com/in/farhadth