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Managing Fiscal Risks from the State-Owned Enterprises by Mixed Ownership Structure: the Case of Mongolia

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Abstract: *This study analyzes the fiscal risks posed by state-owned enterprises (SOEs) in Mongolia and evaluates the potential of mixed ownership structures, achieved through partial privatization via stock markets, to mitigate these risks. The research hypothesizes that mixed-ownership enhances SOE profitability, governance, and transparency, thereby improving operational efficiency, reducing fiscal vulnerabilities, and strengthening public finances.*

Empirical findings validate that mixed-ownership reforms can alleviate fiscal risks by optimizing SOE financial performance and distributing risk among private stakeholders. However, structural challenges such as an underdeveloped stock market, weak governance, and persistent government control over privatized entities limit the effectiveness of these reforms.

The paper argues that while mixed ownership strategies hold potential, their success in Mongolia requires robust governance frameworks and improved stock market prerequisites. The findings contribute to the literature on fiscal risk management and SOE reforms in resource-dependent developing economies, offering actionable insights for policymakers and a framework for sustainable public finance strategies.

JEL codes: L32, H63, H83

I. INTRODUCTION

1.1 Definitions of the Main Terms

Fiscal risks: One of the well-known definitions of fiscal risks, from a macroeconomic perspective, is 'the possibility of deviations of fiscal outcomes from what was expected at the time of the budget or other forecast'(Cebotari et al., 2009).

State-Owned Enterprise: A commonly acceptable definition of a state-owned enterprise (SOE) describes that it is a legal entity either wholly or partially owned by the government to partake in commercial activities on behalf it. This definition includes also local government owned enterprises.

Mixed-Ownership: The mixed-ownership capital structure of an SOE refers to a financial and governance arrangement in which ownership of the SOE is shared between the government and private sector entities, such as individual investors, institutional investors, or corporations. This structure typically combines public ownership, ensuring state control or influence over strategic operations, and private ownership, which introduces market-driven practices, increased accountability, and access to additional capital.

1.2 Research Problem and Questions

SOEs pose major fiscal risks, especially in resource-rich economies. Their financial weaknesses—stemming from quasi-fiscal activities, political interference, and poor transparency—create contingent liabilities that threaten fiscal sustainability (OECD, 2018; IMF, 2020).

Theoretical frameworks such as Agency Theory, Public Choice Theory, and Institutional Economics link these risks to:

- Weak governance enabling misaligned managerial actions (World Bank, 2014);
- Political mandates that obscure true costs (Shirley & Walsh, 2000);
- Gaps in oversight and debt regulation (Peng et al., 2016);
- Poor disclosure masking fiscal exposure (Cebotari, 2008);
- Government guarantees increasing off-balance-sheet liabilities (Bova et al., 2016);
- Volatile performance in commodity-linked SOEs heightening fiscal vulnerability (World Bank, 2021).

In response, many governments, including Mongolia's, have turned to mixed-ownership reforms—introducing private investors via public listings—to improve performance, share risks, and reduce debt. Countries like China and Kazakhstan lead this trend. However, in Mongolia, weak capital markets and limited regulatory capacity have limited reform effectiveness.

While partial improvements are noted, the broader fiscal impact of mixed-ownership remains underexplored in both research and policy. Understanding its true effect is crucial for Mongolia and similar economies where SOE-related risks are embedded in the public financial system.

Primary research question: How can mixed-ownership reforms improve SOE performance and reduce government debt-related fiscal risks in Mongolia?

II. METHODOLOGY

2.1 Literature Review & Contribution

The literature emphasizes that fiscal risks from SOEs stem from complex interactions between state control, financial performance, and macroeconomic stability. Key theories, such as Agency Theory, Soft Budget Constraint, Property Rights, and Public Choice, highlight how weak governance, political interference, and lack of transparency drive inefficiencies and liabilities.

Partial privatization through stock offerings has emerged as a widely supported tool to address these issues. Mixed-ownership Theory explains how public-private ownership structures create dual accountability, with SOEs responding to both political mandates and market expectations. While this can enhance efficiency through private-sector oversight, it can also create tension where public and private goals diverge (Peng et al., 2016; Zhang, 2021).

Studies from China show that mixed-ownership can drive performance gains via stronger governance and market discipline (Xun & Weng, 2024). Public listings also boost transparency and broaden financing options (Gupta, 2005; Megginson & Netter, 2001). According to Signal Transmission Theory, such reforms signal confidence, attracting investors and reducing sovereign risk (Spence, 1973; Stiglitz, 2000).

However, effectiveness depends on market conditions and institutional maturity. Conflicts between private and political objectives may lead to governance inefficiencies, especially in strategic sectors. In weak institutional settings like Mongolia, market volatility and regulatory gaps can limit reform benefits and expose SOEs to new risks (Bajo et al., 2018).

In sum, while partial privatization can improve SOE performance and reduce fiscal risks, success depends on market readiness, governance integrity, and sectoral conditions. Hybrid ownership models must be carefully managed to ensure long-term fiscal benefits.

This study contributes to the literature by focusing on the underexplored link between mixed-ownership reforms and government fiscal risks in resource-dependent economies like Mongolia.

Empirical Risk Assessment: It quantifies the fiscal risks posed by SOEs using financial ratios and econometric models, showing how poor performance leads to hidden liabilities not captured in budgets—responding to Bova et al. (2016)'s call for broader risk assessments.

Evaluation of Partial Privatization: The study demonstrates that introducing private capital improves SOE performance and lowers public debt, offering a practical alternative where full privatization is unfeasible.

Theoretical Advancement: By applying Mixed-ownership Theory in a developing country context, it shows how dual accountability can enhance performance if well-managed, helping bridge the theoretical gap noted by Peng et al. (2016).

Contextual Insights: Grounded in Mongolia's case, the study offers relevant lessons for similar economies on managing SOE reform for fiscal sustainability and economic resilience.

2.2 Theoretical Framework

This research is grounded in a multidisciplinary theoretical foundation, as illustrated in the framework diagram. Rather than elaborating each theory in isolation, the diagram integrates them into the broader analytical logic of the study, linking theoretical assumptions, fiscal transmission mechanisms, and empirical focus.

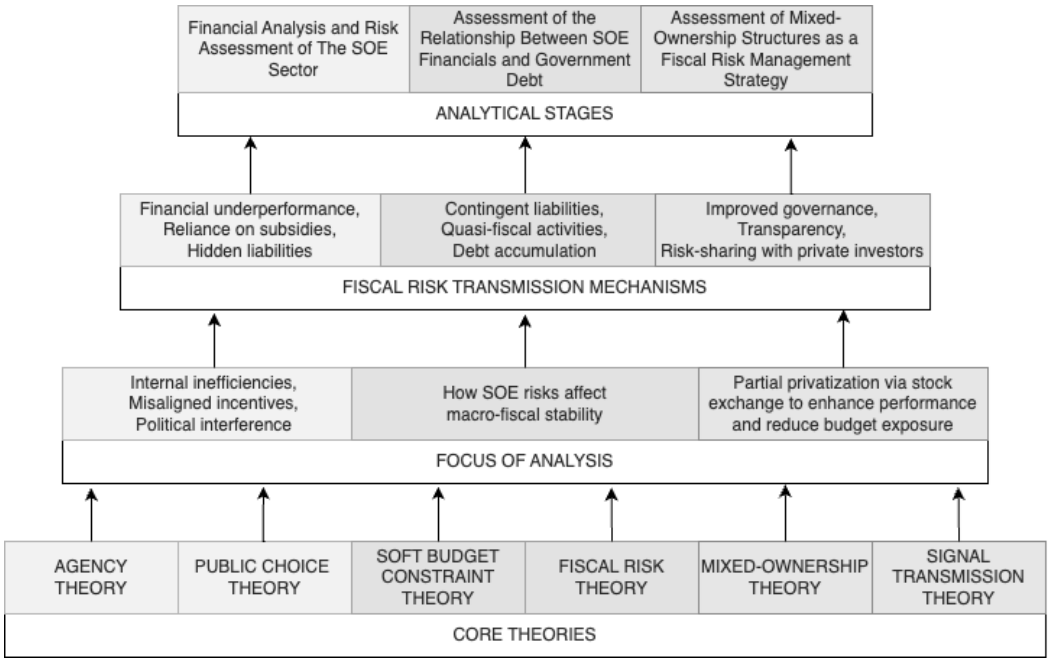

Figure 1. Illustration of theoretical foundations of the research

At the core, *Agency Theory* explains how misaligned incentives and weak oversight within SOEs contribute to inefficiencies. *Public Choice Theory* adds a political economy lens, highlighting how political interference and rent-seeking distort SOE decision-making. These internal dysfunctions lead to soft budget constraints, as theorized by Kornai, where recurrent bailouts and implicit guarantees weaken financial discipline, captured in *Soft Budget Constraint Theory.*

These dynamics create contingent liabilities, off-balance-sheet obligations, and direct fiscal risks for the government as explored through *Fiscal Risk Theory*, which links micro-level firm behavior to macro-fiscal stability. In response, the research applies *Mixed-Ownership Theory*, which proposes that introducing private investors through partial privatization can impose external governance discipline and improve financial outcomes without full divestiture. Finally, *Signal Transmission Theory* supports the notion that public listing of SOEs sends credible market signals, improving valuation and investor confidence while lowering sovereign risk.

2.3 Research Assumptions & Hypothesis

This research is grounded in several core research assumptions that guide its empirical analysis, interpretation of results, and theoretical contribution. Drawing from theoretical foundations, the following assumptions form the foundation of the research design.

A. Mixed-ownership structures enhance SOE performance and reduce fiscal risk

Anchored in Mixed-Ownership Theory, it is assumed that introducing partial private ownership, through public stock exchange mechanisms, improves SOE profitability, governance, and fiscal contributions through three pathways:

- Enhanced profitability and revenue generation due to efficiency gains and better capital access.
- Improved governance and transparency driven by market-based oversight and stronger managerial accountability.
- Risk sharing where private investors assume part of the financial risk, reducing the fiscal burden on the state and enhancing public sector balance sheet sustainability.

This assumption underlies the econometric testing of mixed-ownership reforms as a fiscal risk management strategy.

B. SOE financial performance directly impacts government fiscal risk

It is assumed that variations in SOE financial outcomes have a direct, quantifiable relationship with sovereign fiscal risk, operationalized through three key transmission mechanisms:

- Budget revenue effects such as reduced tax collections, dividend shortfalls, and growing SOE credit risk.
- Contingent expenditure effects including rising subsidies, bailouts, loan write-offs, and quasi-fiscal costs.
- Net financial position impacts involving the realization of contingent liabilities, public debt expansion, and impacts on sovereign balance sheets.

The analysis part of this research is dedicated to test following hypothesis.

Hypothesis 1*: The adoption of a mixed-ownership strategy, implemented through partial privatization via public stock exchanges, enhances the profitability, corporate governance, and transparency of SOEs, thereby contributing to a reduction in their associated fiscal risks.*

This optimization of operational efficiency and risk-sharing mechanisms significantly mitigates government fiscal risks by increasing tax revenues, reducing contingent liabilities, and strengthening the overall health of the government balance sheet.

Hypothesis 2*: The financial performance of SOEs has a direct and measurable impact on government debt levels, with weaker SOE performance contributing to increased public debt through contingent liabilities, bailouts, or revenue shortfalls.*

Improved profitability, reduced leverage, and enhanced operational efficiency in SOEs contribute to lower government borrowing needs, decreased fiscal pressure, and greater macroeconomic stability. Conversely, inefficient SOEs with poor financial health and excessive liabilities exacerbate government debt burdens, increasing fiscal risks.

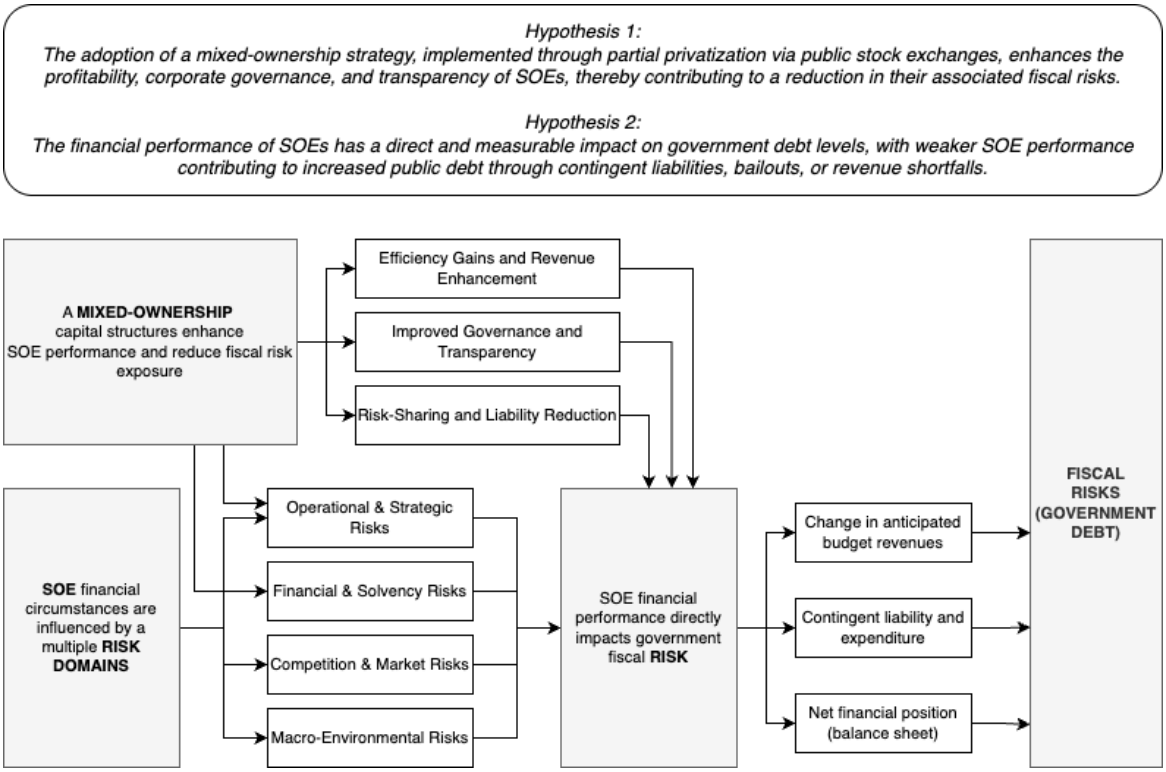

Figure 2. Hypothesis and Assumptions

2.4 Research Design & Methods

This study adopts a structured, multi-phase research design that integrates theoretical investigation, econometric modeling, and policy evaluation to assess the fiscal risks associated with Mongolia's SOEs and evaluate the mitigating impact of mixed-ownership reforms.

The design is aligned with the central research question: To what extent do variations in SOE financial performance and debt obligations contribute to government fiscal risks, and can mixed-ownership structures serve as an effective fiscal risk management strategy?

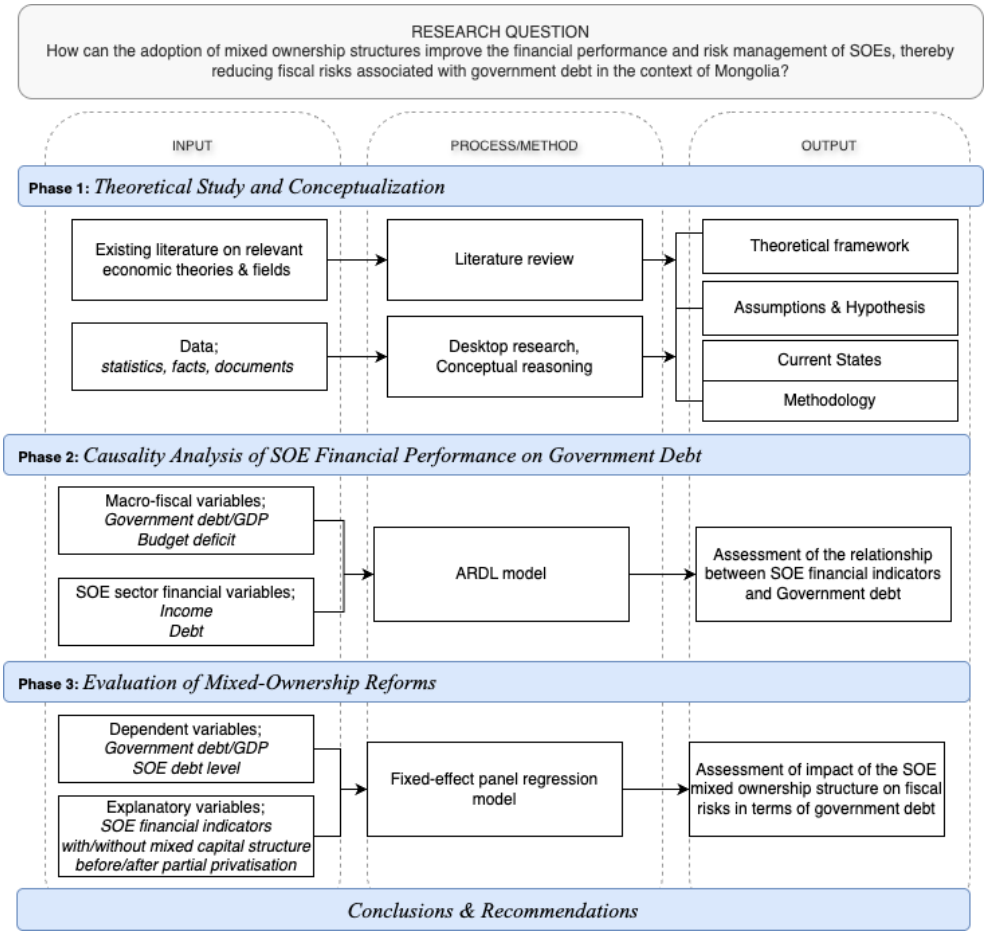

Figure 3. Research design & methods diagram

The econometric examination conducted in this study is composed of two distinct components. First, an ARDL model is employed to evaluate the dynamic relationship between the aggregate financial variables of SOEs such as profitability, leverage, and liquidity and government debt levels over a 20-year period. The Autoregressive Distributed Lag (ARDL) model is well-suited for analyzing the relationship between government debt and SOE debt for several reasons:

1. *Flexibility in stationarity requirements:* Unlike other models, ARDL does not require all variables to be integrated at the same level. This is particularly useful as fiscal indicators like government debt and SOE debt may exhibit different levels of integration. (Pesaran, Shin, & Smith, 2001)
2. *Captures both short-run and long-run effects:* ARDL estimates both short-term adjustments and long-term equilibrium relationships, which is essential for analyzing fiscal dynamics over time. (Nkoro & Uko, 2016)
3. *Efficient for small sample sizes:* This model performs well with limited observations, making it appropriate for analyzing annual government debt and SOE financial data.
4. *Accounts for Policy Lags:* Since fiscal policies and debt accumulation often have delayed effects, the ARDL framework accommodates these delayed reactions, providing more realistic estimates.

Equation 1. Proposed ARDL model

$$DGGDP_t = \beta_0 + \sum_{\tau=1}^{k} \beta_\tau \cdot DGGDP_{t-\tau} + \sum_{\tau=0}^{l} \alpha_\tau \cdot DBGDP_{t-\tau} + \sum_{\tau=0}^{m} \gamma_\tau \cdot DRSOE_{t-\tau} + \epsilon_t$$

Where:

- DGGDP - Government debt to GDP
- DRSOE - Budget deficit to GDP
- DBGDP - Debt ratio of SOEs

The optimal lag structure for the model was determined using Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). A lower AIC or SIC value indicates a better model fit.

As second econometric method, a Fixed-effect (FE) panel regression model is applied to investigate the impact of SOEs' mixed-ownership capital structures, particularly those resulting from partial privatization via stock exchanges, on their financial performance indicators. By controlling for firm-specific and time-invariant characteristics, the FE model isolates the reform effects, assessing how ownership diversification influences SOE profitability, debt management, and operational efficiency. This analysis also extends to evaluating the broader implications of these performance shifts for government fiscal risk, specifically in terms of contingent liabilities and the need for state financial intervention.

Equation 2. Proposed Fixed-Effect Model

$$\mathrm{Perf}_{it} = \alpha_i + \gamma_t + \beta_1 \mathrm{Priv}_{it} + \beta_2 \mathbf{X}_{it} + \epsilon_{it}$$

Where:

- $Perf_{it}$: Dependent variables
- $Priv_{it}$: Dummy variable to distinguish privatized SOEs
- X_{it}: Control variables
- α_i: Time-invariant firm-specific effects
- γ_t: Time fixed effects
- ϵ_{it}: Error term

Dependent Variables

For profitability impact analysis:

- Return on Assets (ROA): Measures profitability relative to total assets.
- Return on Equity (ROE): Evaluates profitability relative to shareholders' equity.

For debt impact analysis:

- Debt Ratio (DR): Measures financial leverage by comparing total debt to total assets.

Independent Variables:

- Total Asset Turnover (TAT): Indicates asset utilization efficiency.
- Net Profit Margin (NPM): Reflects profitability per unit of revenue.

- Debt-to-Equity Ratio (DER): Assesses leverage impact.
- Private Ownership Share (PES): Measures the extent of privatization.
- Current Ratio (CR): Indicates short-term liquidity and solvency.
- Fixed Assets Ratio (FAR): Measures capital intensity.
- Privatization Dummy (D1): Takes a value of 1 if privatized, 0 otherwise.
- Post-Privatization Dummy (D2): Takes a value of 1 after privatization, 0 before.

Data and Sample

The dataset comprises 21 years (2003–2023) of annual financial data for 24 major SOEs, compiled from balance sheets, income statements, and shareholder reports. To contextualize firm-level dynamics within the broader economic environment, the research also integrates key macroeconomic and fiscal indicators. This comprehensive dataset enables a robust analysis of the relationship between SOE financial performance and wider policy and economic trends, facilitating both firm-level and macro-level empirical modeling.

Table 2.1 Research sample SOEs

№	SOE Name	Industry
1	Erdenet Mining Corporation SE	Metals & Mining
2	Erdenes Tavantolgoi JSC	Mining
3	Mongolrostvetmet SE	Metals & Mining
4	Baganuur JSC	Mining
5	Shivee-Ovoo JSC	Mining
6	Erdenes Mongol LLC	Industrial Conglomerate
7	Erdenes Silver Resource LLC	Metals & Mining
8	UB Electricity Distribution JSC	Electric Utilities
9	Thermal Power Plant III JSC	Power & Electricity Producer
10	Thermal Power Plant IV JSC	Power & Electricity Producer
11	Darkhan Metallurgical Plant	Industrial, Steel Processing
12	Cement & Lime JSC	Construction Materials
13	MIAT LLC	Airlines
14	Mongol Post JSC	Logistics
15	Mongolian Telecom JSC	Telecommunication
16	Baganuur Road Maintenance JSC	Transportation Infrastructure
17	Nalaikh Road Maintenance JSC	Transportation Infrastructure
18	Bayanchandmani Road Maintenance JSC	Transportation Infrastructure
19	Mongolian Stock Exchanges	Financial Services
20	Tavantolgoi JSC	Mining
21	Mogoin Gol JSC	Mining

22	AutoImpex JSC	Tranportation
23	Khishig-Uul JSC	Mining
24	Bayan-Teeg JSC	Mining

Financially, selected SOEs are substantial. As of 2023, they collectively held 44.76 trillion MNT in total assets and generated 17.92 trillion MNT in income, representing 69.7% of total SOE assets and 75.9% of revenues, based on national estimates. These figures affirm their dominant economic footprint and provide a strong empirical foundation for the research.

From a methodological perspective, the 21-year span of panel data allows for robust econometric analysis. The duration is sufficient to observe the effects of ownership reforms, regulatory shifts, commodity cycles, and macroeconomic policy interventions. The time series can capture both structural changes (e.g., privatization waves, energy market liberalization) and cyclical trends (e.g., commodity booms, fiscal expansions).

However, the dataset is *not without limitations.* Although the sample includes the largest and most policy-relevant SOEs, it excludes smaller, regional, or municipal enterprises that may face different governance and market conditions. Additionally, certain sector-wide aggregates, particularly for assets and income, rely on official estimates and may contain reporting inconsistencies. As a precaution, robustness checks are necessary to ensure that the findings are not overly sensitive to sample selection. Where applicable, the study will acknowledge heterogeneity within the SOE sector and use caution when generalizing results beyond the sampled firms.

III. ANALYSIS & RESULTS

3.1 Empirical Assessment of the Relationship Between Financial Performance of SOE Sector and Government Debt

The ARDL framework focuses on a set of variables to examine both the short and long-run relationships between government debt and key explanatory factors, particularly fiscal deficits and SOE financial performance.

Table 3.1 Descriptive Statistics for ARDL Analysis

Variable	Mean	St.Deviation	Minimum	Maximum
Government Debt-to-GDP Ratio	0.4665	0.1490	0.2049	0.7654
Fiscal Deficit-to-GDP Ratio	-0.0640	0.1270	-0.3853	0.1053
SOE Debt Ratio	0.5433	0.0583	0.4356	0.6541

The data exhibit meaningful variation over the two-decade period. Government debt-to-GDP varies from 20.5% to 76.5%, reflecting periods of fiscal expansion and consolidation. The fiscal deficit-to-GDP ratio ranges from a high of 10.5% surplus to a low of 38.5% deficit, indicating significant fluctuations in fiscal stance. The SOE debt ratio is relatively stable but reveals periods of increased leverage, ranging between 43.6% and 65.4%.

These patterns highlight the fiscal volatility and structural exposure that motivate the need for long-run modeling of debt dynamics. The ARDL model is thus applied to rigorously estimate how past deficits and SOE financial leverage affect the trajectory of government debt over time.

Compared to the baseline Model 1, the extended Model 2 which includes SOE sector debt as an explanatory variable improves explanatory capacity by roughly nine percentage points, underscoring the crucial role of SOE financial activity in shaping sovereign debt outcomes.

Table 3.2 ARDL model estimation results

Variables	Model 1	Model 2
Constant	-0.108	-0.441
Government Debt-to-GDP (t-1)	0.373	-0.112
Government Debt-to-GDP (t-2)	0.456	1.299**
Government Debt-to-GDP (t-3)	-0.408	-0.789*
Government Debt-to-GDP (t-4)	0.510	0.498*
Fiscal Deficit-to-GDP (t)	0.985	0.110
Fiscal Deficit-to-GDP (t-1)	1.450*	1.548*
Fiscal Deficit-to-GDP (t-2)	0.263	0.375
Fiscal Deficit-to-GDP (t-3)	1.173	0.497
Fiscal Deficit-to-GDP (t-4)	1.024	1.763**
SOE Debt Ratio (t)	-	0.009
SOE Debt Ratio (t-1)	-	1.272**

SOE Debt Ratio (t-2)	-	-1.289**
SOE Debt Ratio (t-3)	-	0.246
SOE Debt Ratio (t-4)	-	0.444
R Squared	0.900	0.995
Adjusted R Squared	0.772	0.958
Akaike Information Criterion (AIC)	-2.368	-4.723
Schwarz Information Criterion (SIC)	-1.878	-3.988
F-Statistic	7.018	27.017

Findings and Discussion

The findings validate that ARDL model not only confirms the effects of SOE financial indicators on sovereign debt but does so with stronger econometric rigor. Thus, it serves as a vital analytical extension, allowing the research to empirically substantiate Hypothesis 2 and to quantify the degree to which SOE borrowing contributes to debt accumulation.

- *Government debt accumulates over time*: The second, third, and fourth lags of government debt-to-GDP are statistically significant, indicating that past debt accumulation has a long-term impact. The sum of these coefficients (1.299 - 0.789 + 0.498 = 1.008) suggests that government debt accumulation has a persistent positive effect in the long run.

- *Fiscal deficit impacts government debt*: The first and fourth lags of the fiscal deficit-to-GDP ratio are statistically significant, with a combined effect of 3.31. This suggests that budget deficits significantly increase government debt levels in the long run.

- *SOE debt ratio's impact on government debt*: The first and second lags of the SOE debt ratio are statistically significant. The combined effect (1.272 - 1.289 = -0.017) suggests that in the long term, SOE debt does not significantly increase government debt, but in the short term, it has a strong positive effect on government borrowing. This finding points to an important temporal distinction: SOE borrowing patterns pose immediate fiscal risks that may taper off or be absorbed over longer horizons.

From a policy standpoint, this evidence reinforces the need for stronger oversight mechanisms governing SOE borrowing practices. Additionally, the results highlight the importance of designing reform strategies such as mixed-ownership structures or market discipline mechanisms that can improve SOE financial performance and reduce reliance on public debt guarantees.

3.2 Empirical Assessment of the Mixed-Ownership Structure As a Fiscal Risk Management Strategy

The FE model was selected over alternative approaches, such as RE and Diff-in-Diff, based on formal Hausman specification tests, which confirmed the presence of unobservable, firm-specific heterogeneity that needed to be controlled. Additionally, the limited scope of Mongolia's privatization process and the relatively small sample size justified using a model that could control for time-invariant firm characteristics without relying on large cross-sectional

variation. (Chapter 4). The following subsections provide a detailed explanation of the model's features, robustness assessments, and estimation results.

Dataset statistics indicate considerable variation across firms and years, particularly in terms of leverage (Debt Ratio) and profitability (ROE), which are central to assessing fiscal risk exposure and the potential effect of privatization policies. Table below summarizes descriptive statistics of the key variables in FE panel regression. Other variables were also used in specific versions of the models as well.

Table 3.3 Descriptive Statistics for FE Panel Regression Key Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Current Ratio	2.308	5.381	0.150	63.110
Debt Ratio	0.491	0.375	0.000	1.820
Fixed Asset Turnover (FAT)	3.019	8.003	0.120	71.120
Return on Equity (ROE)	-0.107	1.075	-7.778	5.900
Total Asset Turnover (TAT)	0.701	0.560	0.000	4.270

The study assessed five panel data models:

- Model 1: without fixed or random effects
- Model 2: with company-specific fixed effects
- Model 3: with time-specific fixed effects
- Model 4: with both company and time fixed effects
- Model 5: with company-specific random effects

Table 3.4 Estimation results of the debt-impact model

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.4467***	0.4833***	0.450***	0.4859***	0.4614***
CR	-0.0149**	-0.0056*	-0.0141**	-0.0048	-0.0076**
FAT	0.0248**	-0.0014	0.0239**	-0.0023	0.0056
ROE	-0.0495*	-0.0290*	-0.0547*	-0.0341*	-0.0299*
TAT	0.0054	0.1009**	-0.0005	0.1014**	0.0756*
D1	-0.2245	-0.3662***	-0.2861*	-0.4124***	-0.2918**
D2	0.1496	-0.1009	0.2309	-0.0575	-0.0455
D2*CR	-0.0142	0.0101	-0.0179	0.0082	0.0055
D2*FAT	-0.0306**	-0.0084	-0.0288**	-0.0067	-0.0149*
D2*ROE	-0.0610	0.0312	-0.0663	0.0345	0.0092
D2*TAT	0.5189**	0.6743***	0.4996*	0.6695***	0.6263***
R-squared	0.216	0.732	0.241	0.739	0.215

Adjusted R squared	0.168	0.683	0.148	0.671	0.167
S.E of Regression	0.342	0.211	0.346	0.215	0.231
F-Statistic	4.520	14.871	2.588	10.88	4.489
Prob(F-stat)	0.0000	0.0000	0.000	0.000	0.000
Internal standard deviation for each SOE					0.173
Overall standard error					0.211
Cross-sectional Rho					0.401

To ensure robustness, the analysis included several diagnostic checks across both specifications of the FE models. Variance Inflation Factors (VIFs) were calculated for each independent variable, with values consistently below the commonly accepted threshold of 5, indicating that multicollinearity was not a concern. Additionally, Breusch-Pagan tests for heteroskedasticity and Durbin-Watson statistics for autocorrelation were conducted, confirming that residual variance was stable and that serial correlation did not bias the estimates. The FE models also showed consistently superior fit, with R-squared values of 0.72 and 0.69 for the debt ratio and profitability models, respectively. Similarly, Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) scores were markedly lower in the FE models (AIC: 103.2 vs. 117.5; SIC: 109.4 vs. 124.1), indicating better model performance and parsimony.

The Hausman test results showed a significant difference between the fixed and random effects models, confirming that the Fixed-effects model is the most appropriate. Further analysis using the Redundant Fixed Effects Test confirmed that company-specific fixed effects are necessary, while time-specific fixed effects are not. (Test result tables in Annex B)

Table 3.5 Estimation results of profitability-impact models

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	-0.0176	-0.0417**	-0.0162	-0.039**	-0.0176*
DER	-0.0005	0.0001	-0.0008	-0.0002	-0.0005
NPM	0.1570***	0.1217***	0.1666***	0.1277***	0.1570***
PES	0.0247	0.3022**	-0.0048	0.2835**	0.0247
ROE	0.0009	0.0103*	-0.0013	0.0089	0.0009
TAT	0.0420**	0.0875***	0.0395*	0.0837***	0.0420***
D1	-0.0060	-0.0950	0.0114	-0.0940	-0.0060
D2	-0.0517	0.0731	-0.0970**	0.0553	-0.0517
D2*ROE	0.0003	0.0000	-.0059	-0.0047	0.0003
D2*DER	0.0000	-0.0033	0.0015	-0.0025	0.0000
D2*NPM	0.3427***	0.5369***	0.3868***	0.5618***	0.3427***
D2*TAT	0.0836	-0.1382**	0.1360*	-0.1039*	0.0836*

R-squared	0.389	0.681	0.438	0.700	0.389
Adjusted R squared	0.338	0.608	0.347	0.600	0.338
S.E of Regression	0.082	0.063	0.082	0.064	0.082
F-Statistic	7.697	9.269	4.830	6.992	7.697
Prob(F-stat)	0.0000	0.0000	0.000	0.000	0.000
Internal standard deviation for each SOE					0.000
Overall standard error					0.063
Cross-sectional Rho					0.000

Robustness tests as same as debt-impact model were conducted and resulted econometrical rigor.

Findings and Discussions

The FE regression results provide compelling evidence that mixed-ownership reform contributes meaningfully to both operational performance and fiscal risk mitigation in Mongolia's SOE sector. As illustrated in Figure 4, the empirical mechanism operates through multiple channels, such as governance improvement, transparency, profitability, and leverage reduction, all of which converge to reduce contingent liabilities and sovereign fiscal exposure.

After accounting for firm-level heterogeneity, the model reveals that mixed-ownership enterprises exhibit, on average, a 0.37-unit lower debt ratio compared to fully state-owned firms. This finding aligns with the theoretical expectation that diversification of ownership imposes greater financial discipline and restricts over-leveraging.

While private ownership share alone is not significantly associated with changes in ROA, its interaction with net profit margins shows a positive effect, reflecting post-reform improvements in cost efficiency. This suggests that the fiscal benefits of reform stem less from capital injection and more from structural governance transformation. Gains in asset turnover are modest, indicating that while internal efficiencies are improving, scalability constraints, possibly due to market size or infrastructure limitations, persist.

The analysis identifies net profit margin and private ownership share as the most robust predictors of profitability, reinforcing the conceptual model where improved management discipline and investor oversight enhance performance. These results strongly support the study's hypothesis that mixed-ownership reform serves as an effective **fiscal risk management strategy**.

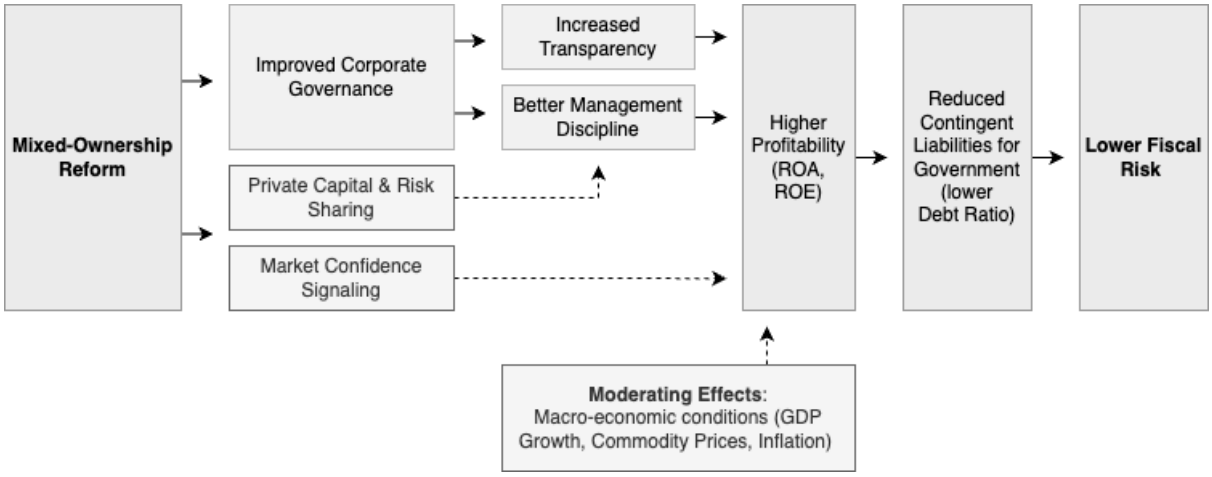

Figure 4. Mechanisms of linking mixed-ownership reform to fiscal risk reduction

The analysis of time-lag effects and macroeconomic control variables were additionally conducted. The result reveals that the most significant improvements occur within the first year following reform. This underscores the rapid materialization of governance and performance benefits, which appear to taper off moderately by the second year, highlighting the importance of ongoing institutional reinforcement to sustain long-term gains. Positive GDP growth and commodity price movements significantly bolster SOE profitability, reflecting the broader cyclical sensitivity of Mongolia's economy. Conversely, inflation pressures raise debt burdens, suggesting that ownership reforms must be nested within sound macroeconomic frameworks for maximum impact.

In sum, the results validate that mixed-ownership reform, when well-executed and supported by complementary policies, can meaningfully improve SOE performance and reduce fiscal risk. However, reform success is not automatic. It depends critically on market readiness, governance integrity, and macroeconomic stability. For policymakers, this reinforces the view that SOE reform should not be approached in isolation, but rather integrated into a broader strategy of fiscal resilience and public sector modernization.

3.3 Comparative Discussion of SOE Mixed-Ownership Reforms in Selected Countries

Mixed-ownership reform, defined by the partial privatization of SOEs through the introduction of private capital, has become a cornerstone strategy in the economic restructuring of many developing economies. This section summarizes how such reforms have been implemented in China and Kazakhstan and contrasts their outcomes with Mongolia's experience.

China's SOE reform agenda has been marked by a structured and deliberate push toward mixed-ownership since the Third Plenary Session of the 18th CPC Central Committee. By 2021, over RMB 1.5 trillion (USD 220 billion) in private capital had been injected into central SOEs, transforming their ownership and operational structures. Empirical research, such as Zhang and Liu (2024), shows that this influx of private capital has significantly boosted SOE profitability, largely by streamlining operations, curbing redundant expenditures, and introducing private-sector governance disciplines. These reforms have also enhanced investment efficiency and innovation, supporting China's shift toward higher value-added production and technological upgrading.

Table 3.6 China's mixed-ownership reform result

Metric	Pre-Reform (2013)	Post-Reform (2020)
Average Return on Assets	3.9%	6.5%
Debt-to-Asset Ratio	68%	64.5%
Total Factor Productivity	Baseline	+15%
Profit Contribution to GDP	18%	25%

Sources: Ministry of Finance of China; Zhang & Liu (2024)

Kazakhstan's reform path has involved multiple waves of privatization, particularly under the Comprehensive Privatization Plan (2016–2020), which aimed to divest 675 public and quasi-public entities, including giants like KazMunayGas and Kazakhstan Temir Zholy. Despite these efforts, Kazakhstan's SOEs continue to underperform relative to private-sector benchmarks. The World Bank attributes these gaps to governance deficiencies, weak competition, and political interference, while OECD assessments emphasize the urgent need for stronger corporate governance frameworks. Without these institutional reinforcements, Kazakhstan's privatization outcomes have remained modest and uneven across sectors.

Table 3.7 Kazakhstan's mixed-ownership reform result

Metric	Pre-Reform (2015)	Post-Reform (2022)
Average Return on Assets	2.5%	3.2%
Debt-to-Asset Ratio	70%	68%
Total Factor Productivity	Baseline	+5%
SOE Contribution to GDP	16%	14%

Sources: World Bank; OECD Reports

Mongolia's early privatization initiatives, launched in the 1990s, were emphasized for their rapid rollout, including voucher schemes that transferred ownership to citizens. However, these efforts fell short of delivering sustainable efficiency gains, largely due to the underdevelopment of capital markets and persistent regulatory weaknesses. Recent evidence, including the findings of this research, shows that while mixed-ownership reforms have improved SOE profitability and reduced debt burdens, the effects are modest relative to China's benchmarks. Specifically, a one-unit increase in mixed-ownership share in Mongolia is associated with a substantial improvement; 14-percentage-point rise in profitability and a 12-percentage-point drop in debt ratios within one year. But not transformative given Mongolia's broader structural challenges.

Mongolia's experience is further constrained by several contextual factors:

- *Recent and narrow privatization scope*: Mixed-ownership reforms on the stock market began only in 2014, and as of 2024, just 14 SOEs are publicly traded, limiting dataset variability and reform reach.
- *Stock market underdevelopment*: Low liquidity, shallow trading volumes, and weak investor confidence limit the ability of capital markets to amplify privatization impacts.
- *Economic Transition Challenges*: Mongolia's legacy as a former centrally planned economy, coupled with policy instability and heavy dependence on mineral exports, blunts the fiscal and economic effects of ownership reforms.

IV. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

This research has provided a comprehensive, multi-layered examination of the fiscal risks posed by SOEs in Mongolia and assessed the effectiveness of mixed-ownership reforms, particularly partial privatization via capital markets, as a fiscal risk management tool.

Drawing upon the theoretical lenses of Agency Theory, Public Choice Theory, Soft Budget Constraint Theory, Mixed-Ownership Theory, and Signal Transmission Theory, **the research developed and tested two core hypotheses**; (1) that mixed-ownership reforms enhance SOE efficiency, governance, and profitability, thereby reduce the government's fiscal burden, and (2) that SOE financial performance directly affects government debt levels and fiscal risk.

Empirically, the study offers robust, data-driven support for both hypotheses. Using FE panel regression and ARDL econometric models over a 21-year longitudinal, panel dataset, the research confirms that poor SOE financial performance that characterized by low profitability, high debt leverage, and weak operational efficiency increase government debt exposure and contingent liabilities, creating hidden fiscal risks not fully captured in official budget statistics and policy monitoring frameworks. Notably, the econometric results reveal a statistically significant causal relationship between SOE financial distress and sovereign debt pressures, underscoring the urgency of reforming this sector.

The findings show that SOEs adopting mixed-ownership structures achieved improvement in profitability and decrease in contingent liabilities. These results mirror similar reform outcomes observed in comparable emerging markets such as China and Kazakhstan. Moreover, the study demonstrates that partial privatization, when conducted through public stock exchanges, can serve as a credible signal of reform seriousness, as predicted by Signal Transmission Theory, and a powerful mechanism for introducing market discipline into SOE governance.

The results offer **not only academic confirmation of Mixed-Ownership Theory's** applicability in developing country contexts but also deliver actionable insights for policymakers seeking to modernize SOE governance without full divestiture.

Theoretically, this study contributes to the growing body of knowledge that seeks to bridge firm theory and fiscal risk literature in the context of hybrid public-private ownership models. By applying established theories such as Agency Theory, Public Choice Theory, Soft Budget Constraint Theory to the Mongolian context, the research provides a nuanced understanding of how political interference, misaligned incentives, and weak institutional oversight drive SOE inefficiency and fiscal exposure. Furthermore, the study extends Mixed-Ownership Theory by empirically validating its fiscal benefits in small, resource-dependent economies. This contextual specificity enriches both theoretical and empirical discourse and offers a framework that is adaptable to similar countries facing comparable structural and institutional challenges.

In terms of practical contributions, the research offers a set of concrete, evidence-based policy recommendations.

In sum, this research stands as **both an academic and policy-oriented contribution**. It fills a critical empirical and theoretical gap by demonstrating how carefully designed ownership reforms can improve SOE performance and reduce fiscal vulnerabilities in emerging economies. More broadly, the findings advance global understanding of how mixed-ownership

structures, when properly managed, can align state and market incentives, strengthen public balance sheets, and promote long-term fiscal sustainability.

4.2 Policy Recommendations

To reduce fiscal risks and improve SOE performance in Mongolia, a coordinated reform agenda is essential. This involves enhancing governance, transparency, and operational efficiency, while leveraging the benefits of mixed-ownership.

Regulatory and Legal Reforms

- Integrate SOE debt into fiscal monitoring: Treat SOE and mixed-ownership entity debts as contingent liabilities in the national debt registry to improve risk assessment and transparency.
- Streamline SOE legal forms: Adopt a unified legal framework to harmonize governance and oversight across SOEs.
- Regulate SOE formation: Require clear justifications for new SOEs to ensure alignment with development and fiscal sustainability goals.

Governance and Efficiency

- Apply OECD governance guidelines: Improve decision-making, accountability, and risk control through internationally recognized standards.
- Enforce performance monitoring: Introduce KPIs and industry benchmarking, overseen by SOE boards or PCSP.
- Increase operational autonomy: Empower management to make independent decisions while upholding accountability.

Quasi-Fiscal Risk Reduction

- Rationalize pricing: Liberalize prices in competitive sectors; ensure fair returns through regulated pricing in monopolies.
- Limit political interference: Legislate protections against political influence in SOE management.

Financial Reporting and Transparency

- Adopt International Accounting Standards: Ensure data consistency and comparability across SOEs.
- Centralize reporting: Appoint a dedicated unit to collect and verify SOE financial data.

SOE Sector Rationalization

- Privatize non-strategic SOEs: Sell inefficient or redundant enterprises, using proceeds for development priorities.
- Restructure remaining SOEs: Focus public oversight on operational efficiency and fiscal discipline.
- Focus on strategic sectors: Retain state ownership only in critical areas such as energy, transport, and mining.

Mixed-Ownership Reform Implications

- Enhance financial discipline: Use private sector participation to impose market-based accountability.

- Enable risk sharing: Distribute financial risks across government and private actors.
- Build capital market capacity: Strengthen infrastructure and investor confidence to support partial privatization.
- Ensure governance autonomy: Provide legal safeguards to protect SOEs from undue political influence under mixed ownership.

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Appendices

Appendix A **Econometric Analysis Dataset**

Year	GDP/nominal, in MNT trillion/		Gov't debt /MNT trillion/	GovDebt/GDP	Budger revenue /MNT trillion/	Budget expenditure /MNT trillion/	Budget deficit /MNT trillion/	Deficit/GDP	SOE average debt /MNT trillion/	SOE income /MNT billion/	SOE Debt Ratio	SOE Net profit /MNT trillion/	SOE ROE	SOE ROA
2003	18.29	1.829	1.40	0.77	0.55	0.62	(0.07)	(0.11)	0.03	0.03	0.53	0.002175	(0.38)	(0.01)
2004	23.61	2.361	1.60	0.68	0.71	0.75	(0.04)	(0.05)	0.03	0.05	0.58	0.009102	(0.11)	0.03
2005	30.41	3.041	1.60	0.53	0.84	0.76	0.08	0.11	0.03	0.05	0.62	0.011579	(0.05)	0.04
2006	40.28	4.028	1.60	0.40	1.36	1.24	0.12	0.10	0.03	0.07	0.56	0.016716	0.06	0.05
2007	49.57	4.957	1.80	0.36	1.88	1.75	0.13	0.07	0.04	0.09	0.54	0.014824	(0.07)	0.07
2008	65.56	6.556	2.00	0.31	2.17	2.47	(0.30)	(0.12)	0.05	0.08	0.56	0.000234	(0.15)	(0.07)
2009	65.91	6.591	2.60	0.39	1.99	2.34	(0.35)	(0.15)	0.05	0.08	0.56	0.003071	(0.23)	(0.05)
2010	97.57	9.757	2.20	0.23	3.12	3.08	0.04	0.01	0.05	0.10	0.45	0.008415	(0.58)	0.03
2011	131.74	13.174	2.70	0.20	4.48	5.00	(0.52)	(0.10)	0.09	0.11	0.53	0.016524	(0.32)	0.01
2012	166.88	16.688	6	0.36	4.98	6.02	(1.04)	(0.17)	0.12	0.12	0.57	0.010968	0.01	0.00
2013	191.74	19.174	7.3	0.38	5.99	6.16	(0.17)	(0.03)	0.15	0.12	0.62	(0.000511)	(0.10)	(0.04)
2014	222.27	22.227	9	0.40	6.32	7.14	(0.82)	(0.11)	0.17	0.15	0.60	0.003158	(0.13)	(0.01)
2015	228.95	22.895	7.88	0.34	5.98	7.14	(1.16)	(0.16)	0.16	0.14	0.59	(0.007777)	0.08	(0.05)
2016	239.31	23.931	12.36	0.52	5.84	9.5	(3.66)	(0.39)	0.15	0.27	0.65	0.037477	(0.27)	(0.01)
2017	280.11	28.011	16.86	0.60	7.92	9.02	(1.10)	(0.12)	0.16	0.31	0.53	0.066522	(0.08)	0.03
2018	325.83	32.583	18.87	0.58	10.05	9.22	0.83	0.09	0.17	0.33	0.51	0.071371	(0.58)	0.04
2019	378.39	37.839	20.44	0.54	12.04	11.66	0.38	0.03	0.15	0.38	0.46	0.090141	(0.28)	0.05
2020	374.53	37.453	24.85	0.66	10.44	13.9	(3.46)	(0.25)	0.32	0.32	0.45	0.019649	(0.13)	0.01
2021	435.55	43.555	24.64	0.57	14.31	15.63	(1.32)	(0.08)	0.41	0.36	0.44	0.066150	0.13	0.04
2022	538.52	53.852	29.62	0.55	18.52	18.16	0.36	0.02	0.49	0.53	0.52	0.122823	(0.04)	0.00
2023	704.42	70.442	30.32	0.43	24.31	22.45	1.86	0.08	0.51	0.95	0.56	0.259094	(0.31)	0.02

Source: Ministry of Finance, National Statistical Office

Appendix B **FE model robustness test results**

Hausman test result of debt-impact model

Correlated Random Effects - Hausman Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	42.738758	10	0.0000

Redundant FE test results of debt-impact model

Effects Test	Statistic	d.f.	Prob.
Cross-section F	15.550290	(17,138)	0.0000
Cross-section Chi-square	187.264164	17	0.0000
Period F	0.449025	(9,138)	0.9058
Period Chi-square	5.051135	9	0.8298
Cross-Section/Period F	10.672531	(26,138)	0.0000
Cross-Section/Period Chi-square	192.884083	26	0.0000

Hausman test result of profitability-impact model

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	103.588	11	0.0000

Redundant FE test result of profitability-impact model

Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.888075	(16,108)	0.0000
Cross-section Chi-square	90.939879	16	0.0000
Period F	0.733675	(9,108)	0.6772
Period Chi-square	8.604791	9	0.4745
Cross-section/Period F	4.472499	(25,108)	0.0000
Cross-section/Period Chi-square	103.043322	25	0.0000