Socioeconomic Impacts of Financial Management Information System (FMIS): An Executive Summary

1 Research Background

☐ **(Background) Beyond individual case studies, there is a need for an empirical analysis of the expected effects of Financial Management Information Systems (FMIS).**

- (Definition) A Financial Management Information System (FMIS) is an IT-based solution developed to enhance the efficiency and transparency of public finance.
- (Korea's Status) Korea's dBrain^{+} system was awarded the UN Public Service Award in 2013, and ranked first globally on the World Bank's 2017 Open Budget Score and the FMIS evaluation indicators of the 2022 GovTech Maturity Index. *(See "Appendix" in the main text).*
- (Expected Benefits) Successful implementation of FMIS can enhance public sector trust, reduce budget waste, and maximize the effectiveness of government policies.
- (International Context) International organizations such as the World Bank, IMF, and OECD strongly encourage FMIS adoption and provide both technical and financial support to individual countries.
- (Need for Research) Existing studies have largely focused on country-specific case analyses, highlighting the need for international comparative research on FMIS effects.

☐ **(Purpose and Methodology) This study quantitatively assesses the expected impacts of FMIS development.**

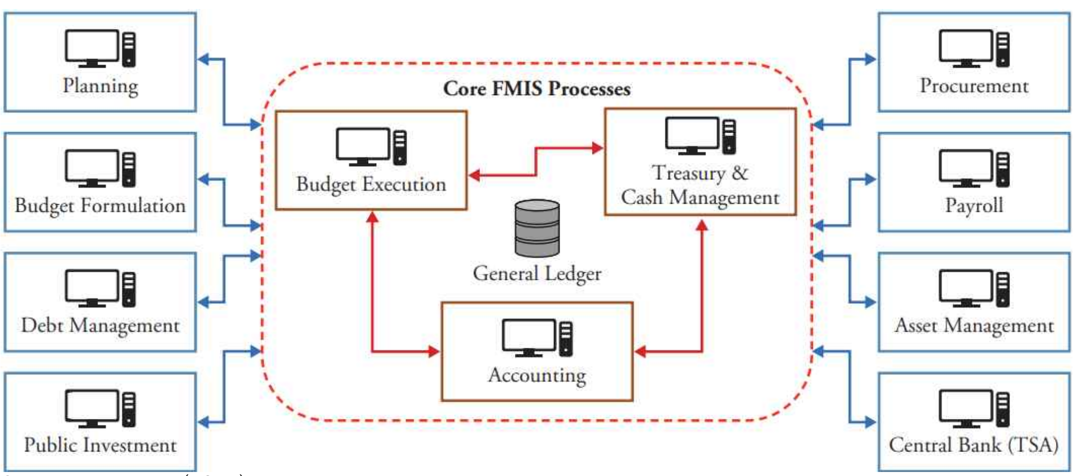
- (Objectives) To analyze the effects of FMIS on fiscal transparency, government effectiveness, and budgetary control, and to evaluate its broader impact on public sector operations.
- (Approach) Empirical analysis to identify socioeconomic spillover effects arising from cross-country differences in FMIS performance.
- (Data sources) World Bank FMIS surveys, IMF, OECD, PEFA data.
- (Coverage) Up to 198 countries, using data collected from 2013 to 2022.
- (Analysis Models) Multiple regression, fixed-effects, and random-effects panel models.

2 Concept and Performance Indicators of FMIS

□ (Concept and Main Functions)

- (Concept) FMIS is an integrated information system that digitalizes government budget and financial management.
  - An Integrated Financial Management Information System (IFMIS) serves as a core tool for public financial management (PFM), integrating a wide range of functions including budgeting, treasury, and accounting.

[Figure 1] Core and Auxillary PFM Functions of FMIS



Source: Uña et al.(2019)

- (Key Functions) Beyond core modules for budget execution, treasury operations, and accounting, FMIS can be linked with various PFM modules.
  - (Budget formulation and execution) Enables centralized management of departmental budgets and real-time tracking of execution status.
  - (Treasury management) Enhances transparency in government cash flows through a Treasury Single Account (TSA).
  - (Accounting and financial reporting) Collects and analyzes fiscal data in real time to build public trust and support policy decisions.
  - (Asset and debt management) Systematically manages national assets and liabilities to maintain long-term fiscal sustainability.

□ **(International Landscape) Countries adopt FMIS models and software suited to their specific circumstances, resulting in varying levels of performance and utilization.**

- Depending on national conditions, countries may choose a centralized or decentralized FMIS approach, and either custom-developed or commercial off-the-shelf software.
  - (Centralized vs. decentralized) Centralized FMIS maintains data consistency through integrated management, while decentralized models allow agencies to operate independently while meeting common requirements.
  - (Custom-built vs. commercial software) Some countries develop secure, locally tailored FMIS, while others adopt commercial solutions to reduce costs.
- Advanced economies continue to pursue FMIS integration and efficiency through ICT innovations.
- Developing countries, although supported by international organizations, often face performance limitations due to infrastructure and institutional constraints.

〈Table 1〉 Summary of FMIS Performance Indicators

Area	Indicators	Details
FMIS Coverage	Functional Capability	Inclusion of treasury and budget functions
	Budgetary Scope	Share of the national budget executed through FMIS
	Budgetary Level	Coverage of both central and local governments
Public Finance Management (PFM) Support	Unified Budget Taxonomy	Availability of unified budget classifications and account charts
	SDGs	Ability to capture SDGs-related expenditures
	Key Performance Indicator (KPI)	Linking financial data with non-financial data such as KPIs for fiscal programs
	Mid-Term Expenditure Forecast	Disclosing MTEF and aligning it with budget formulation
Range of Treasury Single Account (TSA)	TSA Coverage	Application of TSA to all or part of line ministries
	TSA Interface	FMIS integration with the central bank via TSA
	TSA Governance	TSA governance, including compliance, security, and audit
Interoperability	Data Exchange	Data exchange between FMIS and other PFM systems - Including tax, human resources, social security, procurement, and asset/debt management systems

□ **(Performance Indicators) FMIS performance is measured by its coverage, real-time fiscal monitoring capability, and Interoperability.**

- (Key Areas) FMIS performance is assessed in terms of functional coverage, public financial management (PFM) support, Treasury Single Account (TSA) alignment, interoperability, etc.
  - (Coverage) Extent of support for fiscal operations, including both central and local government budgets.
  - (PFM support) Ability to manage unified budget classifications, track SDGs, and monitor KPIs.
  - (TSA) Capability to monitor real-time fiscal positions through integration with central bank settlement systems.
  - (Interoperability) Ability to exchange data with external public administration and financial information networks
- (Data sources) World Bank's FMIS & OBD indicators, GovTech Maturity Index (GTMI), and PEFA (Public Expenditure and Financial Accountability) scores are used to evaluate FMIS performance.

3 Corruption Perception Improvement Effect of FMIS

□ **(Theoretical Background) FMIS can enhance public trust by improving fiscal transparency.**

- (International organizations) emphasize that FMIS expands the scope of fiscal information disclosure and strengthens control over budgetary processes, thereby improving government accountability and transparency.
  - (Spillover effects of fiscal transparency) FMIS's capacity to capture and disclose comprehensive fiscal information can be leveraged to build trust across the entire public sector.

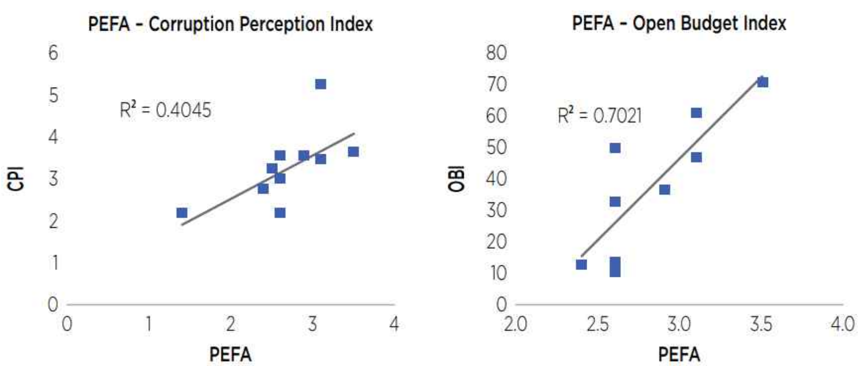
〈Table 2〉 Research on the effectiveness of FMIS in preventing corruption and improving financial transparency

Authors	Methodology	Objects	Key Findings on Fiscal Transparency
Ameen & Ahmad (2012)	Literature Review and Case Studies	Anti-corruption strategies using FMIS and ICT	• FMIS has the potential to reduce corruption. • A comprehensive anti-corruption strategy should combine FMIS expansion with ICT applications.
Chen & Neshkova (2020)	Panel Regression Analysis	95 Countries	• Preventing corruption requires not only budget disclosure but also ensuring the public can easily access and understand fiscal information. • Fiscal transparency serves as an effective anti-corruption tool and helps build accountable, integrity-based governance.
De Renzio et al. (2011)	Regression Analysis for PEFA Countries	100 countries participating in the PEFA assessment	• Sound public financial management (PFM) promotes fiscal credibility and economic development.
Dener & Min (2013)	Literature Review and Case Studies	World Bank FMIS projects	• FMIS plays a critical role in improving budget transparency, especially when disclosed information is timely and accessible. • Consistent and transparent disclosure of fiscal data over the long term strengthens public trust in government.

Authors	Methodology	Objects	Key Findings on Fiscal Transparency
Hashim et al. (2020)	Literature Review and Case Studies	International best practices	• FMIS can use data from payroll, e-procurement, and public investment systems to provide early warnings of corruption risks. • Analytical tools such as artificial intelligence, when appropriately applied within FMIS, can enhance its anti-corruption effectiveness.
Uña & Pimenta (2016)	Literature Review and Case Studies	Latin American FMIS	• An effective FMIS contributes to fiscal stability, transparency, efficient resource allocation, and overall operational effectiveness in the public sector. • Systematic government support and strategic approaches are essential to successfully implementing FMIS.

- (Prior Research) FMIS plays a key role in enhancing government fiscal accountability and transparency by broadening the scope of financial information disclosure and strengthening control over fiscal processes.
  - Improvements in fiscal transparency through FMIS ultimately help improve citizens' perceptions of corruption.
  - Numerous empirical studies report that FMIS adoption (i) reduces corruption, (ii) improves the quality of financial reporting, and (iii) strengthens accountability of financial authorities.

[Figure 2] Correlation between PEFA Index, Corruption Perception Index (CPI), and Open Budget Index (OBI)



Note: The PEFA index is an internationally comparable score used to assess a country's PFM system.
Source: Uña & Pimenta (2016)

□ **(Methodology and Data) A multiple regression model was applied to examine whether FMIS maturity and the Open Budget Score (OBS) strengthen the positive impact of e-government development on the Corruption Perceptions Index (CPI).**

- (Data sources) FMIS & OBD data collected by the World Bank, including FMIS maturity and OBS, along with other control variables identified from previous studies affecting CPI.
  - (CPI) Corruption Perceptions Index data for 180 countries from 2013 to 2023
  - (FMIS maturity) Assessed from level 0 to 3 based on (i) the functional coverage of PFM tasks and (ii) whether the FMIS supports a Treasury Single Account (TSA)
  - (OBS) Measures the scope of FMIS support for fiscal information disclosure
- (Analytical models) Multiple regression was used to analyze the long-term moderation effects of FMIS maturity and OBS on the relationship between e-government development and CPI.

〈Table 3〉 FMIS maturity level assessment criteria

FMIS Maturity	Criteria
level 0	No FMIS in place or under development
level 1	FMIS operating only with financial management functions
level 2	FMIS operating with both budgeting and financial management functions, or financial management functions linked to a TSA
level 3	FMIS covering both budgeting and financial management functions while also integrated with a TSA

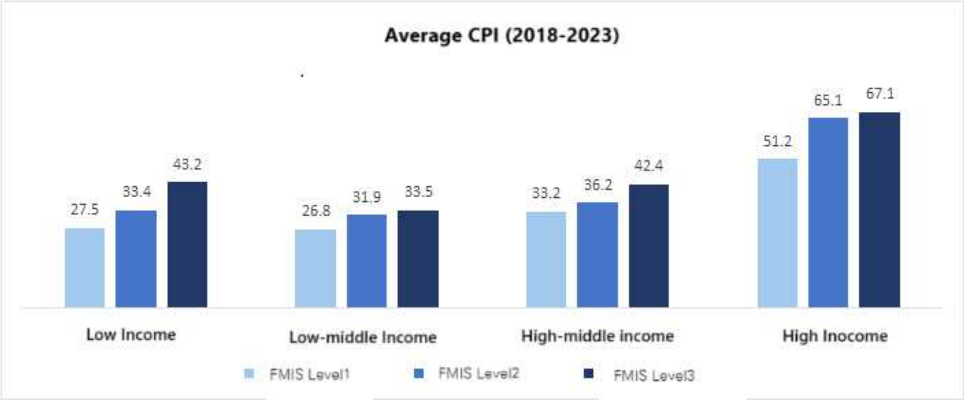
Source: World Bank FMIS & OBD data(https://datacatalog.worldbank.org/search/dataset/0041421)

□ **(Findings) FMIS maturity and the Open Budget Score (OBS) enhance the positive effect of e-government development on improvements in the Corruption Perceptions Index (CPI).**

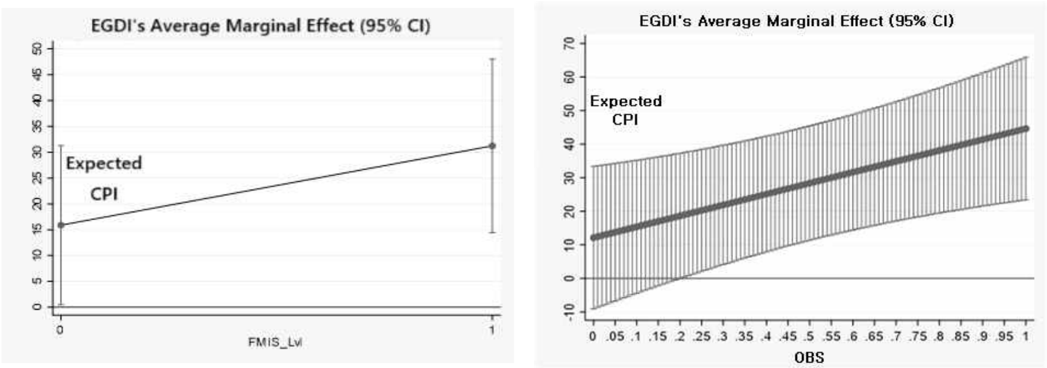
- (Descriptive analysis) A positive correlation between FMIS maturity and CPI was observed even after controlling for national income levels.
- (Econometric analysis) Multiple regression models confirmed that FMIS maturity and OBS further strengthen the CPI improvement effects of e-government development.

- (Robustness checks) The implications of these results remained consistent across various combinations of control variables and different analysis periods.

[Figure 3] Average Corruption Perception Index (CPI) by Income Level and FMIS Maturity



[Figure 4] Comparison of average marginal effects of e-government development on CPI by FMIS maturity (left) and OBS (right)



Notes: Visualization of the moderating effects of FMIS maturity and OBS on the relationship between e-government development and CPI based on Model 4 (left) and Model 10 (right) in Chapter 3.

- (Implications) Policy efforts to advance e-government can achieve greater transparency gains when combined with expanding FMIS functionality and enhancing fiscal information disclosure.
  - It is important to develop an integrated approach that strengthens the interaction among e-government services, infrastructure, and human resources during FMIS development.

4 Government Effectiveness Improvement with FMIS

□ **(Theoretical Background) Enhancing FMIS performance can improve government efficiency and policy outcomes.**

- (Prior Research) International organizations and researchers have found that advanced FMIS contributes to greater efficiency and effectiveness beyond fiscal management, benefiting the wider public sector.
- (Spillover effects in the public sector) Fiscal efficiency in FMIS contributes to overall public sector effectiveness.
  - (ⅰ) FMIS streamlines fiscal operations, reducing policy lags (ⅱ) Enhances the speed of public service delivery (ⅲ) Promotes performance-oriented fiscal management to maximize policy outcomes (ⅳ) Supports data-driven decision-making in government agencies (ⅴ) Improves cash utilization and rationalizes financial structures.
- (Improving government performance) FMIS strengthens (i) macro-fiscal stability, (ii) strategic resource allocation, and (iii) operational efficiency (Piatti-Fünfkirchen et al., 2017).

〈Table 4〉 Examples of how FMIS promotes government effectiveness

Fields	Government Effectiveness
Macro-fiscal Stability	• FMIS provides real-time fiscal data to line ministries and agencies, enabling them to manage their resources more effectively and operate within budget constraints. As a result, FMIS supports overall improvements in macro-fiscal discipline.
Strategic Resource Allocation	• (Budget formulation) Data analysis through FMIS helps secure more realistic budgets linked to actual revenue and expenditure trends. • (Budget execution) FMIS enables more active monitoring and management of public funds, supporting the implementation of strategic decisions made during the annual budget cycle. • (Automated data processing) FMIS allows both the treasury and line ministries to conduct better-informed analyses and decisions throughout the budget process, helping policymakers better understand and estimate the costs and impacts of proposed policies.

Fields	Government Effectiveness
Operational Efficiency	• By ensuring funds are delivered to their intended destinations, FMIS improves the efficiency of government operations. • FMIS data enables better control over activity costs and production methods. • FMIS can be linked to program budget structures with clear performance outcomes of fiscal policy. • Supports policy benchmarking against best practices. • Enhances cash flow forecasting, reducing cash management and debt repayment costs. • Integrates payroll, procurement, public investment, and inventory/asset management within a comprehensive financial management framework.

Source: Piatti-Fünfkirchen et al.(2017, pp. 3-4)

- (Government Effectiveness Index) The GEI measures the quality of public services and the government's capacity for effective policy formulation, serving as a comprehensive indicator of government efficiency and policy performance.

□ **(Methodology and Data) A panel regression model was used to assess the positive impact of FMIS performance indicators on GEI.**

- (Data sources) FMIS performance indicators from the GovTech Maturity Survey collected by the World Bank and other control variables affecting GEI selected based on prior research.
  - (FMIS performance indicators) Excerpted from the World Bank's GovTech Maturity surveys (2020 and 2022), covering (i) the functional scope of PFM tasks, (ii) integration with other systems, and (iii) TSA support.
  - (GEI) Regularly reported within the World Governance Index (WGI)
- (Analytical models) Panel and cross-sectional regression models were applied to analyze how FMIS performance influences government effectiveness.

⟨Table 5⟩ FMIS-related performance indicators in the GovTech Maturity survey by year

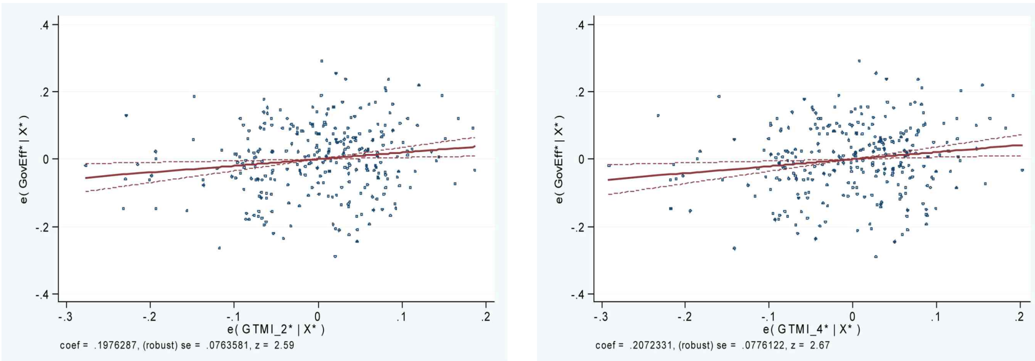
Indicators	Survey Year	Survey Items
I-5	2020, 2022	Presence of FMIS supporting core public financial management (PFM) functions
I-5.6	2020, 2022	FMIS functional capabilities
I-5.7	2020, 2022	FMIS scope (budget coverage)
I-5.8	2020, 2022	Type of FMIS software
I-5.10	2022	Existence of a unified budget classification and chart of accounts
I-5.11	2022	FMIS capacity to track Sustainable Development Goals (SDG) spending
I-5.12	2022	FMIS capacity to capture non-financial data (KPIs)
I-5.13	2022	FMIS ability to exchange data with other systems
I-5.14	2022	Reporting on FMIS operational governance
I-6	2020, 2022	Whether FMIS supports a Treasury Single Account (TSA)
I-6.5	2022	Scope of TSA operations
I-6.6	2022	Type of electronic payment systems in use
I-6.7	2022	Existence of a TSA interface between FMIS and the central bank
I-6.8	2022	Reporting on TSA operational governance

Source: World Bank Data Catalog homepage (retrieved December 31, 2024).

□ **(Findings) Improvements in FMIS performance indicators are associated with higher Government Effectiveness Index (GEI) scores.**

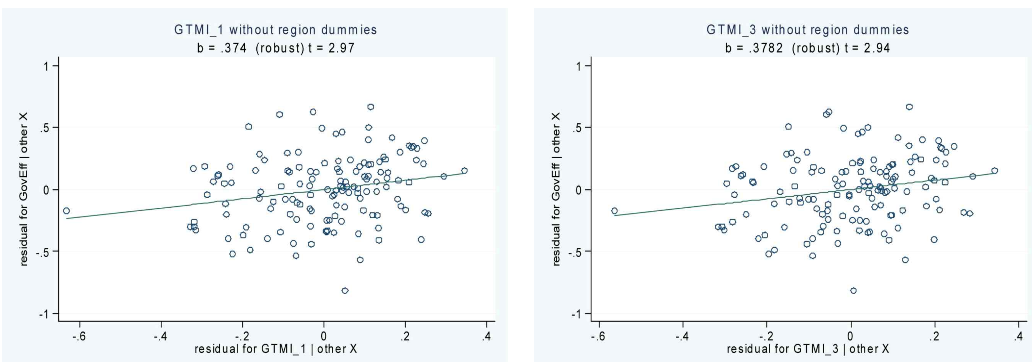
- (Econometric analysis) Both panel and cross-sectional regression results show that higher FMIS performance is linked to higher GEI.
  - (Analysis Result) FMIS performance and coverage contribute to enhancing competitiveness in the government sector.
  - (Robustness Check) These findings remained consistent across different model specifications, control variable sets, and aggregation methods for FMIS indicators.

[Figure 5] Random effects model coefficients: Effect of FMIS Performance on GEI (2020-2022)



Note: Visualization of the marginal effect of FMIS performance on GEI based on Model 5 (left) and Model 7 (right) in Chapter 4.

[Figure 6] Cross-sectional regression model coefficients: Effect of FMIS Performance on GEI (2022)



Note: Visualization of the marginal effect of FMIS performance on GEI based on Model 9 (left) and Model 11 (right) in Chapter 4.

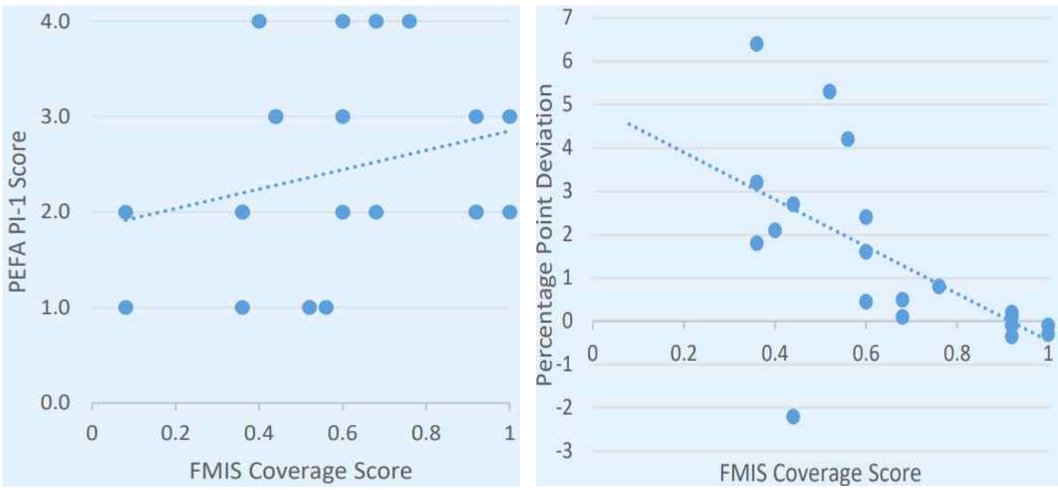
- (Implications) Enhancing FMIS performance contributes not only to greater government operational efficiency but also to more effective policy design and improved policy outcomes.
  - FMIS development strategies should be understood and implemented as part of a broader roadmap to strengthen the competitiveness of the entire public sector, beyond mere fiscal reform initiatives.

5 Effectiveness of FMIS in Strengthening Budgetary Control

□ **(Theoretical Background) FMIS is expected to improve budget accuracy and strengthen fiscal discipline.**

- International organizations emphasize that one of the core objectives of FMIS development is to enhance fiscal discipline through expenditure control during budget formulation and execution.
  - Additionally, FMIS provides comprehensive public financial data, enabling clearer visibility of budget execution and supporting more rigorous fiscal management.

[Figure 7] PEFA PI-1 Expenditure Performance (left) and Actual/Budgeted Deficit Variance (right) by FMIS Utilization Coverage



Note: Horizontal axis shows FMIS coverage score calculated by the authors below; vertical axis shows PEFA PI-1 score (left) and actual/budgeted deficit variance (right).
Source: Piatti-Fünfkirchen et al.(2017)

- (Prior Research) Studies have highlighted the expected benefits of expanding FMIS performance and coverage, as well as strengthening fiscal control through the operation of a Treasury Single Account (TSA).

- Piatti-Fünfkirchen et al. (2017) observed that broader FMIS coverage reduces discrepancies between planned budgets and actual execution (or fiscal deficits).
- Hashim et al. (2020) pointed out that integrating TSA with central bank settlement systems is essential to reinforce expenditure controls.

• (Research hypothesis) This study examines how the FMIS coverage and its integration with a TSA jointly affect fiscal control over budgets.

□ **(Methodology and Data) Panel regression models were used to assess how the integration of FMIS with TSA and Tax Management Information Systems (TMIS) influences budgetary control.**

• (Data sources) FMIS functional capabilities from the World Bank's GovTech Maturity surveys in 2020 and 2022.

- TSA operation status, indicating whether FMIS is linked with TSA.
- TMIS operation status, indicating whether tax systems are connected with other public information systems.
- Budget revenue/expenditure deviation: the absolute percentage deviation between actual and planned revenue/expenditure, collected from PEFA.

• (Current status) As of 2022, the number of countries without a fully functional FMIS or TSA integration (104) still exceeded those with both fully functional FMIS and complete TSA integration (94).

〈Table 6〉 FMIS and TSA Operational Status Cross Table (as of 2022)

	FMIS=0	FMIS=1	Total
TSA=0	28(14.1%)	50(25.3%)	78
TSA=1	26(13.1%)	94(47.5%)	120
Total	54	144	198(100%)

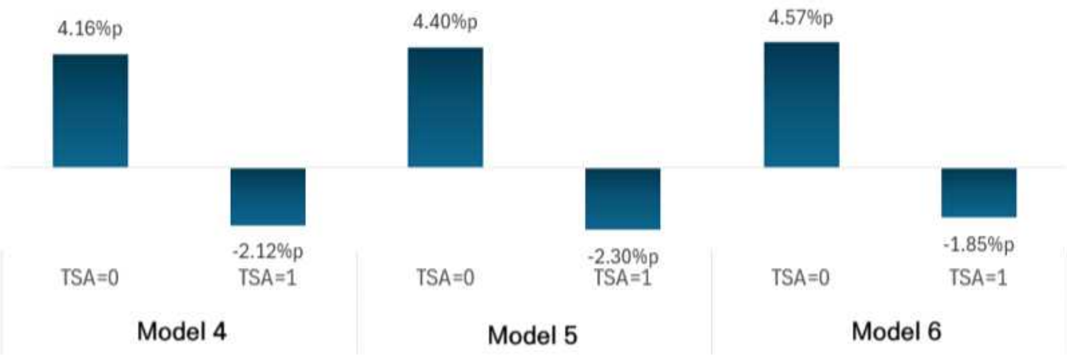
Note 1: FMIS refers to whether or not the FMIS has complete treasury management and budgeting capabilities.
Note 2: TSA refers to whether the FMIS is linked to the Treasury Single Account (TSA).

- (Analytical Model) Panel regression models with moderation effects were used to analyze how the integration of advanced FMIS with TSA affects the reduction of expenditure deviations from the budget.
  - Additionally, the impact of having a TMIS connected to other public information systems on reducing revenue deviations from the budget was assessed.

□ **(Findings) FMIS integration with TSA and TMIS can strengthen fiscal control over budgets.**

- (Econometric analysis I) Advanced FMIS without TSA integration tended to increase expenditure/budget deviations, while only the case of advanced FMIS with TSA integration showed a reduction in expenditure/budget deviations.
  - (Implication) This confirms prior findings that automated FMIS without proper expenditure controls may actually lead to fiscal waste.
  - (Robustness check) These results were consistent across random-effects, fixed-effects, and pooled regression models.
- (Econometric analysis II) Operating a TMIS linked to other public information systems helped reduce revenue deviations from the budget.

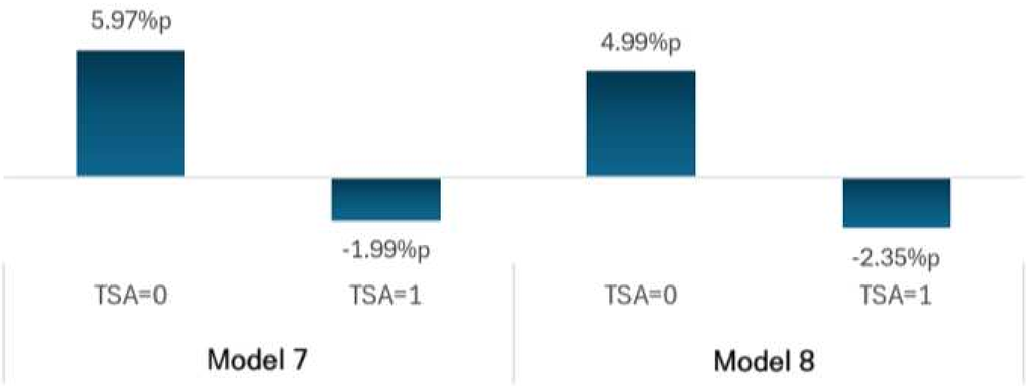
[Figure 8] Marginal effect of FMIS on budget-to-expenditure deviation (%) by TSA operation status: random effects model



Note1: From left, visualization of estimated coefficients for Models 4-6 in Chapter 5.

Note2: TSA indicates whether or not the Treasury Single Account is operationalized in conjunction with the FMIS.

[Figure 9] Marginal effect of FMIS on budget-to-expenditure deviation (%) by TSA operation status: fixed effects model



Note1: From left, visualization of estimated coefficients for Models 7 and 8 in Chapter 5.
Note2: TSA indicates whether or not the Treasury Single Account is operationalized in conjunction with the FMIS.

- (Implication) Efforts to enhance FMIS performance for promoting fiscal process automation should be accompanied by measures to eliminate blind spots in government financial monitoring through TSA integration.
  - Recently, many developing countries have advanced their FMIS projects to support automation of treasury management and budget formulation.
  - However, FMIS systems that cannot monitor cash flows in real time may instead allow fiscal leakages.

6 Conclusions and implications

□ Summary of Findings

- (Definition) FMIS is an IT solution that integrates budget formulation, execution, monitoring, and performance evaluation, serving as a key tool to improve public financial management (PFM) efficiency.

- (Status of Korea's dBrain$^+$) Korea's dBrain$^+$ system was awarded the UN Public Service Award in 2013 and ranked first globally on the World Bank's 2017 Open Budget Score and the FMIS evaluation indicators of the 2022 GovTech Maturity Index. *(See "Appendix" in the main text)*
- (International context) International organizations such as the World Bank, IMF, and OECD have prioritized FMIS development, providing continuous technical and financial support, though country-level gaps persist.
  - OECD members are upgrading legacy FMIS with AI and automation, while some developing countries still rely on manual fiscal processes due to institutional and infrastructure challenges.
  - A variety of indicators (e.g., FMIS & OBD, GovTech Maturity surveys) have been developed to measure FMIS performance and interoperability, enabling international comparison.
- (Transparency) FMIS improves fiscal transparency, helping to build public trust and reduce corruption perceptions.
  - (Previous research) FMIS supports government trust by making budget formulation and execution data available to citizens in real time.
  - (Descriptive analysis) Countries with higher FMIS maturity tend to have lower perceived corruption and greater transparency in fiscal data.
  - (Econometric analysis) Countries with advanced FMIS and strong budget disclosure see greater improvements in CPI as their e-government capacity develops.
- (Government effectiveness) FMIS contributes to improving government operational efficiency and policy effectiveness.
  - (Operational efficiency) Advanced FMIS improves the accuracy of resource allocation, strengthens budget planning, and reduces administrative costs.

- (Policy effectiveness) Supports shorter policy implementation lags, promotes medium- to long-term resource allocation, facilitates performance-oriented financial management, and enables data-driven policy decisions.
- (Econometric analysis) A positive relationship between higher FMIS maturity and the Government Effectiveness Index (GEI) was found.

• (Budgetary control) Linking FMIS with TSA and TMIS plays a crucial role in effectively controlling government expenditures against budget targets and improving the accuracy of revenue forecasting.

- (Previous research) FMIS supporting TSA operation maintains transparency in fund flows by managing all government transactions through a single account.
- (Econometric analysis Ⅰ) The development of FMIS integrated with TSA strengthens budget compliance for government expenditures.
- (Econometric analysis Ⅱ) Linking TMIS with other information systems improves the revenue forecasting capability of fiscal authorities.
- (Implication) Governments that can monitor real-time cash balances and manage revenues and expenditures through FMIS can reduce fiscal uncertainty and operate their budgets more stably.

□ Implications and Future Studies

• The positive socio-economic spillover effects of improved FMIS projects can be clearly presented.

- These quantitative findings can support future international cooperation projects on FMIS development.

• A strategic roadmap for successful FMIS development can be refined.

- FMIS improvement projects should proceed in coordination with the advancement of e-government infrastructure, human resources, and service quality.

- Integrating FMIS with TSA is essential to secure the effectiveness of budgetary control.
- When FMIS is effectively linked with other PFM systems such as TMIS, fiscal management efficiency and effectiveness can be maximized.

• (Future research tasks) Conduct in-depth case studies of successful FMIS outcomes to refine domestic FMIS operation/development strategies and promote knowledge-sharing in international cooperation projects.