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Determinants of Minimum Wage Dynamics: A Comparative Econometric Analysis of Japan and South Korea

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ABSTRACT

The goal of this study is to identify and compare the determinants of national minimum wage (NMW) dynamics in Japan and South Korea over a two-decade period (2004–2023). Several **methodologies** for constructing a macroeconomic panel dataset, encompassing diverse indicators, are utilized to estimate regression and correlation-based econometric models. The quantitative findings are corroborated by qualitative results from other studies, enhancing the assessment of the minimum wage's elasticity concerning several aspects, including inflation and productivity. The results demonstrate that the primary determinants of adjustments to NMW in both economies are consumer price index (inflation) and gross domestic product per capita, whereas unemployment and income inequality factors are less statistically significant. Moreover, empirical analysis illustrates that the Japanese economy reacts with greater moderation to adjustments in determinants than the South Korean economy, which experiences a stronger inflation pass-through effect. This difference is potentially due to institutional constraints and regional variations that influence the elasticity of NMW adjustments in relation to macroeconomic variables. In conclusion, this study illustrates how the minimum wage policies in Japan and South Korea are strongly influenced not only by inflation and productivity trends but also by differences in institutional structures, which affect the magnitude and speed of adjustment to NMW. **The authors** succeeded in closing a major research gap of effective cross-country analysis and evaluation of the minimum wage dynamics, demonstrating that local economic zones should implement their own wage and cost adjusting system, adopt indexation of inflation, and support small enterprises.

Keywords: minimum wage; wage policy; Japan; South Korea; labor markets; econometric analysis; comparative analysis; macroeconomic variables; inflation; productivity

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Факторы, определяющие динамику минимальной заработной платы: сравнительный эконометрический анализ Японии и Южной Кореи

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АННОТАЦИЯ

Цель данного исследования — выявление и сравнение факторов, определяющих динамику национальной минимальной заработной платы (НМЗ) в Японии и Южной Кореи за два десятилетия (2004–

2023 гг.). **Методология:** для оценки эконометрических моделей, основанных на регрессии и корреляции, используется несколько методик построения макроэкономической панели данных, включающей различные показатели. Количественные результаты подтверждаются качественными данными других исследований, что улучшает оценку эластичности минимальной заработной платы по нескольким аспектам, включая инфляцию и производительность труда. **Результаты** показывают, что основными факторами, определяющими корректировки НМЗ в обеих странах, являются индекс потребительских цен (инфляция) и валовой внутренний продукт на душу населения, в то время как факторы безработицы и неравенства доходов имеют меньшую статистическую значимость. Кроме того, эмпирический анализ показывает, что японская экономика реагирует на корректировки факторов с большей умеренностью, чем южнокорейская экономика, которая испытывает более сильный эффект переноса инфляции. Это различие потенциально обусловлено институциональными ограничениями и региональными различиями, влияющими на эластичность корректировки минимальной заработной платы по отношению к макроэкономическим переменным. Данное исследование показывает, что политика минимальной заработной платы в Японии и Южной Корее сильно зависит не только от тенденций инфляции и производительности, но и от различий в институциональных структурах, которые влияют на масштабы и скорость корректировки минимальной заработной платы. Авторам удалось восполнить существенный пробел в исследованиях межстранового анализа и оценки динамики минимальной заработной платы, продемонстрировав, что местные экономические зоны должны внедрять собственные системы корректировки заработной платы и издержек, применять индексацию инфляции и поддерживать малые предприятия.

Ключевые слова: минимальная заработная плата; политика заработной платы; Япония; Южная Корея; рынки труда; эконометрический анализ; сравнительный анализ; макроэкономические переменные; инфляция; производительность

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Introduction

Minimum wage policies have acted as fundamental government tools for decades, helping regulate labor markets and solve problems connected to income distribution together with economic stability and basic living standards alongside community stability. The policies decrease economic differences between individuals while maintaining essential living requirements, particularly in nations classified as advanced economies [1]. However, the process of determining minimum wages requires detailed analysis because they depend on multiple macroeconomic elements which include inflation, unemployment and social statistics [2]. In this paper, we analyze these key factors through a comparative empirical assessment of two Eastern Asian countries, Japan and South Korea, to develop relevant policy solutions for existing challenges.

The two Organisation for Economic Co-operation and Development (OECD) members Japan and South Korea, maintain common economic characteristics, including similar population age distributions alongside similar gross domestic product (GDP) values. The labor markets, together with macroeco-

nomics dynamics, operate under different principles within these countries. Japan has experienced continuous economic stagnation since the 1990s asset price collapse. The partnership between low productivity growth and population aging with deflation pressures their labor market and make wage-setting more complicated. The economic transformation through Abenomics programs delivered initial recovery, yet these policies did not maintain constant economic expansion. Japan faces structural barriers from public debt problems together with weak domestic market activity and an export-based economic model, which limits its economic stability and minimum wage initiatives.¹ For realistic economic stability, Japan needs to design wage strategies that sustain employment while growing pay levels to strengthen both consumption patterns and national economic stability.

After the mid-20th century, South Korea demonstrated exceptional economic growth, which turned the country into a major industrialized economy. Recent times, though, have revealed Japan-style

¹ Organisation for Economic Co-operation and Development. 2023. Japan country profile. URL: <https://www.oecd.org/en/countries/japan.html>

demographic challenges in addition to progressively diminishing growth levels that accompany increasing household debts along with inequality problems [3]. Youth employment and underemployment are essential to examine, as they make implementing proper minimum wage policies that achieve social stability along with economic growth extremely difficult [4, 5]. The foundational strength of South Korea's economy faces risks due to its emphasis on technological exports and automotive exports, making it extremely vulnerable to global economic changes. South Korea puts together minimum wage policies to combat both high-income disparities and economic development needs, simultaneously with its reduced workforce size.

A joint analysis of South Korean and Japanese economies is essential, as they both belong to the OECD alliance and possess matching industrial sectors and population characteristics. The aging populations and declining workforces and mounting social welfare expenses create heavy pressure on labor markets as well as wage-setting systems in each country [6, 7]. The analysis of minimum wage policy adjustments resulting from socioeconomic changes leads to essential knowledge about solving income distribution and social unrest challenges. The comparative study of Japan and South Korea is valuable given their OECD membership and similar industrial and demographic structures. Both countries face aging populations, shrinking workforces, and rising social welfare costs, pressuring labor markets and wage-setting mechanisms [6, 8]. Understanding how these shifts influence minimum wage policies is crucial for addressing income distribution, equity, and social stability. Based on theoretical expectations and pre-existing empirical findings regarding which mechanisms are involved, our study tests the following key hypotheses:

H1: Inflation has a positive effect on minimum wage levels in both Japan and South Korea, expecting that governments adjust wages to maintain the real purchasing power of citizens.

H2: GDP per capita should have a positive association with changes in minimum wage levels, since greater productivity growth could lead to greater capacities in wage-setting mechanisms.

H3: Greater unemployment should lead to lower minimum wage level changes, indicating a negative relationship.

H4: Increased income inequality (Gini coefficient) should indicate greater pressure on increasing

the minimum wage, but this could be impacted due to other social and political constraints, thereby leading to a diminished potential empirical effect.

H5: The magnitude (strength and significance) of the impact of these determinants could differ between Japan and South Korea, given that key differences exist in the framework for wage setting.

1.1. Overview of the Japanese minimum wage system

The Japanese minimum wage system functions through minimum wage divisions specific to both regions and individual industries. The Japanese government established this system through the Minimum Wage Act of 1959 but performed major reforms in 2007 to link wages with the local cost of living. The established structure enables adjustable minimum wage combinations to suit the different economic conditions among diverse population centers across the country by being flexible.

1.1.1. Regional adjustments and governance

Every year, the Central Minimum Wage Council under the Ministry of Health, Labour, and Welfare (MHLW) Labour Standards Bureau develops national minimum wage standards.² National predictions concerning inflation and economic developments receive input from employer and labor representatives before integration into assessment guidelines. The prefectural councils transform MHLW policy into local minimum wage legislation for each of the 47 prefectures throughout Japan.³ The minimum wage rate stands at ¥ 1,163 (\$ 8.01) per hour in Tokyo for 2024 as the city experiences high living costs, but the lower ¥ 951 (\$ 6.56) rate is kept for prefectures such as Akita and Kochi, following the lower cost basis of these areas.⁴ Through its decentralized structure, the system maintains national policy goals with different economic conditions between regions and accommodates for the disparities.

² Ministry of Health, Labour and Welfare (MHLW): Monthly Labour Survey. (n.d.). URL: <https://www.mhlw.go.jp/english/database/db-l/monthly-labour.html>

³ Ministry of Health, Labour and Welfare (MHLW): Survey on wage increase. (n.d.). URL: <https://www.mhlw.go.jp/english/database/db-l/wage-increase.html>

⁴ WageIndicator Foundation. (2024). Minimum wages in Japanese Prefectures. URL: <https://wageindicator.org/salary/minimum-wage/japan>

1.1.2. Industry-specific wages

In addition to regional wages, certain industries, such as construction and electronics manufacturing, establish higher minimum wages based on sector-specific productivity and labor intensity.⁵ These rates, also negotiated by labor unions, employers, and councils, help to protect workers in demanding fields from being undercompensated and accommodate for any variations in economic activity across sectors, without imposing uniform wage standards that may disrupt the broader economy.

1.1.3. Key reforms and challenges

In 2007, a major reform took place, where it became mandatory for minimum wages to be linked with local living expenses, making them better respond to both inflation levels and regional economic developments. The transformation of minimum wages takes place yearly through prefectural assessments, which brings continuous nationwide wage growth. The wage adjustments created better income protection for minimum wage earners while minimizing urban poverty across urban areas such as Tokyo, together with Osaka and Yokohama. The wage increases protect worker income yet lead to restricted employment prospects for young uneducated staff members, especially in small and medium-sized enterprises (SMEs), which face difficulties absorbing higher labor costs [9, 10]. Additionally, the urban-rural wage gap exacerbates economic inequality, pushing young people in low-paying rural regions toward seeking employment in cities, which creates both local demographic change and workforce imbalance that weakens regional economies [11].

Moreover, according to Morikawa, the available data shows that there are minimal productivity improvements resulting from wage increases, mainly affecting businesses that depend on unskilled workers [12]. These findings raise concerns about the competitiveness of SMEs and highlight the need for policymakers to implement sustainable economic policies. The wage requirements create compliance challenges when small businesses fail to pay employees enough, undermining the system from its purpose of securing proper wages.

1.1.4. International comparisons and future considerations

Japan maintains minimum wage rates have stayed below those of other developed nations, both in their current values and their purchasing power parity (PPP) values. For instance, two OECD member states, France and Germany have more robust and stronger minimum wage standards for their low-income workers with the implementation of more aggressive policies. Future modifications of the minimum wage need to achieve an exact equilibrium, and wage policy revisions need to prevent new employment splits between workers and businesses to avoid augmenting geographical inequalities. Though the current framework in Japan has increased minimum wages for low-income workers, its success remains limited by maintenance challenges with regional unbalanced development and employment changes alongside productivity stagnation.

1.2. Overview of the South Korean minimum wage system

South Korea's minimum wage system, established under the Minimum Wage Act of 1986, provides a legal framework designed to ensure fair wages, reduce income inequality, and improve living standards. At its core, the Minimum Wage Commission (MWC), an independent tripartite body comprising representatives from labor unions, employer associations, and the government, annually reviews and adjusts the national minimum wage (NMW). This system has been shaped by evolving political, social, and economic considerations, reflecting South Korea's broader socio-economic goals.

1.2.1. National structure and regional wage debate

Unlike Japan, where minimum wages vary by region, South Korea enforces a unified national minimum wage. In 2023, this rate stands at 9,620 South Korean Won (KRW) per hour (\$ 7.40), up from 8,590 (\$ 6.50) KRW/hour in 2020.⁶ Having a regionalized system would mean that a uniform national minimum wage does not account for stark differences in living costs between urban centers like Seoul and rural areas such as Gangwon-do, and this could mean that regional varia-

⁵ Japan Institute for Labour Policy and Training JILPT. 2023. Labour market statistics datasets and reports. URL: <https://www.jil.go.jp/english/estatis/databook/index.html>

⁶ Statista. 2023. Minimum wage in South Korea. URL: <https://www.statista.com/statistics/641616/south-korea-minimum-wage/>

tion could better address these disparities. However, contrary to this, variation, like in Japan, could highlight concerns over potential administrative complexities and the exacerbation of regional inequalities.

1.2.2. Wage growth and economic effects

Since the implementation of the Minimum Wage Act, South Korea has experienced consistent wage growth, often driven by the government's efforts to reduce wage inequality. Notably, the 16.4% hike in 2018 aimed to boost sustainable economic growth⁷ and financial pressures on low-income workers, mainly working in the retail, hospitality, and agriculture sectors. According to the Korea Development Institute Statistical Data, these increases have raised the income of low-wage workers and reduced poverty rates. Additionally, some industries are likely to benefit from productivity gains tied to wage growth, contributing to economic stability in specific sectors [13, 14].

Despite these benefits, rapid wage increases have sparked concerns about their impact on SMEs and vulnerable worker groups. SMEs constitute a significant portion of South Korea's economy but have struggled to absorb the higher labor costs,⁸ particularly in low-margin industries, such as small-scale manufacturing and convenience stores. This has led to cost-cutting measures such as reduced working hours, automation, and delayed hiring. Therefore, such strategies would undermine the intended benefits of wage hikes for workers.

1.2.3. Employment challenges and youth impact

Current studies have shown that increasing minimum wage standards produces varied effects on the labor market. While many workers have escaped poverty due to wage increases that occurred as a result of more aggressive minimum wage policies, these increases have generated difficulties with employment for young people and disadvantaged vulnerable groups. Students and young workers now struggle to access part-time jobs due to minimum wage increases diminishing

their affordability for firms. This ongoing situation creates rising youth unemployment, especially in some industries. Using the Bank of Korea Inflation Rate Data and Reports,⁹ SMEs found it difficult to adapt their wage structure; consequently, these businesses reduced their workforce numbers.¹⁰

1.2.4. Policy enforcement and compliance gaps

Ensuring compliance with minimum wage regulations remains a persistent challenge. Rules governing minimum wage apply to major corporations, but many small companies, together with unregulated informal businesses, tend to disregard these requirements. Therefore, migrant workers, together with temporary ones, remain especially exposed to wage exploitation, since their contracts contain many loopholes, and enforcement systems lack adequate strength. Labor inspections require improvement, together with tougher punishment systems against companies that fail to meet standards as a result.

1.2.5. International comparisons and future considerations

When benchmarked against other OECD nations, South Korea's minimum wage is relatively high, surpassing Japan's, but falls below countries like Germany and Australia, where wages are more closely tied to living costs.¹¹ The country's annual wage increases, though, are also among the most aggressive in the OECD, reflecting its ambition to address income inequality. Looking forward, South Korea faces key policy challenges in balancing wage growth with economic sustainability, and as a result, policymakers must evaluate all of the benefits of higher wages against the potential risks to SME viability and employment rates. The ongoing debate over regionalizing the minimum wage highlights the need for nuanced solutions that can favor both local economic conditions and national socio-economic goals. As the economy evolves, factors such as an aging population, labor shortages, and global economic uncertainties

⁷ International Monetary Fund (IMF). 2018. Republic of Korea: Selected Issues IMF Country Reports. URL: <https://www.doi.org/10.5089/9781484341636.002>

⁸ International Monetary Fund (IMF). 2018. Republic of Korea: Selected Issues IMF Country Reports. URL: <https://www.doi.org/10.5089/9781484341636.002>

⁹ Bank of Korea. 2022. Annual Reports | Periodicals | News and Publications. URL: https://www.bok.or.kr/eng/bbs/E_0000740/view.do?nttId=10078310&menuNo=400221

¹⁰ Bank of Korea. 2023. Core inflation rate (CPI less food and energy) data. URL: <https://www.bok.or.kr/>

¹¹ Numbeo. (n.d.). Cost of living in Japan and South Korea. URL: <https://www.numbeo.com/cost-of-living/>

could further complicate these decisions, therefore demanding a careful equilibrium between equity and competitiveness.

2. Literature review

2.1. United States

Card and Krueger's study revealed that employment in New Jersey increased after the wage hike, and by employing surveys and difference-in-differences analysis, the study established a causal link between wage policies and labor market outcomes, becoming a cornerstone for subsequent research into minimum wage effects [15]. Despite its influence, the study faced critiques over self-reported data biases and potential regional distortions. Neumark and Wascher's analysis highlighted mixed results in the literature, emphasizing that minimum wage impacts depend on regional economic conditions and labor market structures, and this underscores that US minimum wage debates remain dynamic and highly context-sensitive, with effects varying based on economic and institutional contexts [16].

In addition to this, in the US, Clemens examined the employment effects of minimum wage increases on firms, also considering the relevance of non-employment margins, and by using longitudinal data from the Current Population Survey (CPS), they found that the employment impacts of minimum wage hikes were more pronounced during periods of less growth, particularly in vulnerable sectors like retail and hospitality [17]. While their findings supported Card and Krueger's assertion that moderate wage increases need not reduce employment, they highlighted the context-dependence of these outcomes. Their study adds to the growing body of literature emphasizing regional and temporal dimensions in wage policy analysis, and by focusing on recessions, Clemens and Strain provide insights into the interaction between economic conditions and minimum wage effects, expanding our understanding of wage policies in dynamic labor markets [15, 17].

The global literature on minimum wage policies reveals that there are diverse impacts shaped by institutional and economic contexts, where studies like Card and Krueger and Dolton, Bondibene, and Wadsworth demonstrate that minimum wage increases can reduce inequality without major job losses, challenging traditional economic models [18]. Meanwhile, research in Japan by Nakakubo

and Ishii highlights the importance of addressing labor market dualism to achieve equitable outcomes [19, 20]. In addition to this, Clemens and Strain further underscore the significance of regional and temporal variations, particularly during economic downturns, and collectively, these studies provide a nuanced understanding of minimum wage policies, emphasizing the need for tailored approaches based on local economic and institutional conditions [17].

2.2. United Kingdom

Dube, Lester, and Reich explore the wage spillover effects of the National Minimum Wage (NMW) in the UK, focusing on wage inequality and economic mobility, and in their study, they use data from the Labour Force Survey (LFS) and a quasi-experimental design, finding that minimum wage increases compress wage distribution, particularly benefiting workers just above the minimum wage [21]. The authors also build on earlier studies, namely those of Machin and Manning, and more recent work by Dolton et al., which suggest that minimum wage policies can reduce wage inequality without significantly affecting employment in countries with strong labor institutions [18, 22]. The review also highlights that the magnitude of spillover effects depends on labor market institutions and enforcement mechanisms. Ultimately, Dube et al. argue that under the right conditions, minimum wage policies can achieve distributional goals without severe employment consequences [21].

Furthermore, their research also analyzed the effects of the National Minimum Wage (NMW) introduced in the UK in 1999, where, unlike the US, where federal and state minimum wages diverge, the UK's uniform NMW allows broader insights into wage dynamics. Their study, using longitudinal data and regression analysis, found that the NMW significantly reduced wage inequality at the lower end of the distribution without substantial employment losses, even among young and low-skilled workers. These findings align with Machin and Manning's conclusion that minimum wages can compress wage inequality without severe job cuts, challenging neoclassical predictions [22], and Dolton et al.'s work highlights the importance of strong labor market institutions in shaping policy effectiveness, offering valuable lessons for policymakers in designing equitable wage systems.

2.3. Japan

Nakakubo provided a comprehensive overview of Japan's highly regionalized minimum wage system, emphasizing the influence of regional economic conditions and dual labor market dynamics. Non-regular workers — such as part-time and temporary employees — often earn near the minimum wage, exacerbating income inequality. The Minimum Wage Council, comprising representatives from labor unions, employers, and public officials, balances social harmony with economic efficiency in wage-setting decisions. Nakakubo's work underscores Japan's unique socio-political approach to wage policies, a perspective echoed by Ishii, and together, these studies emphasize the distinctiveness of Japan's labor market, where minimum wage policies aim to maintain societal balance while addressing economic disparities [19, 20].

Building on Nakakubo's findings, Ishii also examined the minimum wage effects on Japan's dual labor market, focusing on non-regular workers, and using econometric modeling and time-series data, they found that wage increases benefitted non-regular workers without significantly affecting employment [20]. They also identified a "wage spillover" effect, where minimum wage hikes raised wages for those slightly above the threshold, reducing wage inequality further, but it is important to note that the persistent dualism in Japan's labor market remains a barrier to equitable outcomes, and these findings parallel Dolton et al.'s study in demonstrating that well-designed minimum wage policies, supported by robust labor market institutions, can achieve redistribution goals without substantial employment losses [18].

2.4. South Korea

Kim investigates the impact of South Korea's 2002 to 2008 minimum wage increase on youth employment, using data from the Korean Labour and Income Panel Study (KLIPS) and fixed-effects regression models [23].¹² Kim's literature review integrates both international and domestic perspectives, referencing foundational studies like Card and Krueger and Neumark and Wascher [15, 16], while also focusing on South Korea's dual

labor market, given that Kim specifically points out that South Korea's high youth unemployment and the prevalence of non-regular workers make wage increases particularly impactful for young, low-skilled workers. Based on Neumark and Wascher's research, Kim argues that while increasing minimum wages benefits lower-income workers, it intensifies youth joblessness — particularly when labor markets function in distinct segments, and minimum wage policy evaluations therefore require an examination of present socioeconomic conditions, as they impact analysis outcomes.

Moreover, Doh et al. later conducted research that evaluates how South Korean minimum wage policies shape income distribution and consumer market dynamics [4], alongside insights from Jung [24]. Results from their research, which involves data from the Minimum Wage Commission, together with OECD databases, show wage increases improve purchasing behavior among households while decreasing economic disparities/income inequalities. Drawing on classical and modern economic research, including Haanwinckel and other works by Acemoglu and Autor, they argue that higher minimum wages increase disposable income for low-wage workers, leading to greater consumer spending [4, 24–26]. The review extends the work by Clemens and Strain, which examined consumer behavior, and finds that while wage increases boost consumption and economic activity, they also pose risks, such as inflationary pressures and reduced competitiveness for small businesses. The authors emphasize the need for complementary policies, such as SME support and inflation control, to mitigate these risks. These studies collectively emphasize the importance of contextual factors, such as labor market structure and institutional support, in determining the effects of minimum wage policies. While the literature suggests that wage increases can reduce inequality and boost economic activity, they also highlight potential adverse effects, particularly for vulnerable groups like youth and small businesses. Therefore, minimum wage policies should be implemented alongside supportive measures to maximize their benefits while minimizing negative consequences.

In addition to this, the fact that the current literature emphasizes that current minimum wage policies do not only affect macroeconomic variables but also social outcomes such as income

¹² Korean Labour Institute. 2015. Korean Labor and Income Panel Study (KLIPS), 1998–2206: Wave 1–9 (M1194) — Harvard Dataverse Dataset. URL: <https://www.doi.org/10.7910/dvn/kkujww>

distribution, poverty reduction, and the well-being of vulnerable groups as well illustrates the situation in Japan and South Korea, where these groups include youth workers and a large proportion of SMEs employing low-wage labor. However, due to the lack of comparable indicators and empirical measures available for these variables, our study, instead, incorporates values of Gini coefficients to find income inequality and looks at extreme poverty indicators and conceptually acknowledges that some variables that represent the remaining portion of the social impact of minimum wage policies could include factors such as employment shares that are specific to each sector. In order to address these limitations at a greater level, we also supplement our quantitative evidence with qualitative evidence that is discussed in the previous literature on specific groups. Consequently, though our regression analysis may highlight limited statistical significance between wage dynamics and inequality measures, our qualitative interpretation will integrate the possibility for broader social impacts that are evidenced in other literature sources.

3. Methodology

This paper uses econometric models as well as macroeconomic data of the past 20 years (from years 2004 to 2023) to analyze the determinants of minimum wage in Japan and South Korea. The econometric estimates use annual panel data sources that can be obtained from various reliable sources, including national statistical organizations^{13, 14, 15, 16, 17} the World Bank,^{18, 19, 20, 21}

Statista,^{22, 23, 24, 25, 26} Trading Economics,^{27, 28, 29} FRED Economic Data,^{30, 31} and other online sources,^{32, 33, 34} including the International Labour Organisation Reports³⁵ and International Monetary Fund³⁶ data sources.

3.1. Data sources and variables

The dependent variable in the analysis is the minimum wage level, while independent variables include the Consumer Price Index (CPI), GDP per capita, unemployment rate, and the Gini coefficient. These variables capture critical economic, social, and policy-related factors that influence minimum wage adjustments.

²² Statista. 2023. Inflation rate in Japan. URL: <https://www.statista.com/statistics/270095/inflation-rate-in-japan/>

²³ Statista. 2023. Inflation rate in South Korea. URL: <https://www.statista.com/statistics/377275/inflation-rate-in-south-korea/>

²⁴ Statista. 2023. Population of South Korea. URL: <https://www.statista.com/statistics/263747/total-population-in-south-korea/>

²⁵ Statista. 2023. Unemployment rate in Japan. URL: <https://www.statista.com/statistics/263700/unemployment-rate-in-japan/>

²⁶ Statista. 2023. Unemployment rate in South Korea. URL: <https://www.statista.com/statistics/263701/unemployment-rate-in-south-korea/>

²⁷ Trading Economics. 2023. Consumer price index (CPI) for Japan. URL: <https://tradingeconomics.com/japan/consumer-price-index-cpi>

²⁸ Trading Economics. 2023. Core inflation rate (CPI less food and energy) for South Korea. URL: <https://tradingeconomics.com/south-korea/core-inflation-rate>

²⁹ Trading Economics. 2023. Minimum wages in Japan. URL: <https://tradingeconomics.com/japan/minimum-wages>

³⁰ Fred Economic Data (St. Louis Fed). 2023. South Korea consumer price index (CPI): All Items. URL: <https://fred.stlouisfed.org/series/KORCPALTT01IXNBM>

³¹ Fred Economic Data (St. Louis Fed). 2023. South Korea producer price index (PPI). URL: <https://fred.stlouisfed.org/series/KORPPDMMINMEI>

³² Investing.com. 2023. Producer price index (PPI) YoY for Japan. URL: <https://www.investing.com/economic-calendar/ppi-35>

³³ Nikkei Asia. 2024. Japan's minimum wage falls short by international standards. URL: <https://asia.nikkei.com/Spotlight/Work/Japan-minimum-wage-falls-short-by-international-standards>

³⁴ Organisation for Economic Co-operation and Development. (n.d.). Minimum wage policy in OECD countries. URL: <https://www.oecd.org/en/topics/sub-issues/employment-protection-and-minimum-wages.html>

³⁵ International Labour Organization. 2014. Global Wage Report 2014/15: Wages and income inequality. URL: <https://www.ilo.org/publications/global-wage-report-201415-wages-and-income-inequality>

³⁶ International Monetary Fund. 2024. Unemployment rate in the Republic of Korea and Japan. URL: <https://www.imf.org/external/datamapper/LUR@WEO/KOR/JPN>

¹³ National Institute of Population and Social Security Research, Japan. 2014. Poverty and social security statistics. URL: <https://www.ipss.go.jp/s-info/e/ssj2014/006.html>

¹⁴ National Statistical Office, South Korea. (2023). Gini coefficient and poverty data. URL: <https://kostat.go.kr/>

¹⁵ Statistics Bureau of Japan. 2023. Consumer price index (CPI) data (Official Statistics Portal. URL: <https://www.stat.go.jp/english/data/cpi/158c.html>

¹⁶ Ministry of Employment and Labour, South Korea. 2023. Minimum wage commission statistics. URL: <https://www.minimumwage.go.kr/english/introduce/minWage.do>

¹⁷ Bank of Japan. 2023. Producer price index (PPI) data. URL: <https://www.boj.or.jp/en/>

¹⁸ World Bank. 2023. Development Indicators. URL: <https://data.worldbank.org/source/world-development-indicators#>

¹⁹ World Bank. 2023. Gini coefficient data. URL: <https://data.worldbank.org/indicator/SI.POV.GINI>

²⁰ World Bank. 2023. Population data for Japan. URL: <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=JP>

²¹ World Bank. 2023. Poverty data. URL: <https://data.worldbank.org/topic/poverty>

3.2. Justification of the selection of variables and limitations of scope

It is important to note that despite the minimum wage dynamics in Japan and South Korea being shaped by various demographic, sector-based, and institutional characteristics, which include factors such as duality of markets, youth employment, and disparities in costs of living, these factors were not included directly in the empirical model due to constraints in an effective cross-country panel. Since we prioritize the need for a more comprehensive panel, we chose not to include many institutional and demographic indicators measured in Japan and South Korea, given that they have not been consistently measured over long periods of time. Hence, these variables are not feasible for enclosure in our econometric models. However, the fact that these determinants can still influence the minimum wage dynamics means they remain important at a conceptual level, and in order to complement macroeconomic variables further, we include a qualitative discussion of these factors to help us enhance our regression findings and empirical analysis. Wherever relevant, we integrate factors such as youth unemployment and disparities between regions alongside the macroeconomic variables measured. While we may not be able to completely include these determinants in our regression, we acknowledge this exclusion as a limitation of our study; future research and data collection should prioritize gaining a more comprehensive overview of sector-based and demographic microdata.

3.3. Econometric framework

The following baseline model is taken from the relationships explored by the two regression models and incorporates all independent variables to identify their relative contributions:

$$MW_i = \beta_0 + \beta_1 CPI_i + \beta_2 GDP_i + \beta_3 UR_i + \beta_4 GINI_i + \varepsilon_i,$$

where MW_i is the minimum wage, CPI_i represents inflation, GDP_i is GDP per capita, UR_i is the unemployment rate, $GINI_i$ denotes income inequality, $\beta_0 - \beta_4$ are regression coefficients, and ε_i is the error term.

A refined model includes only statistically significant variables identified from the baseline model,

enhancing validity and robustness:

$$MW = \beta_0 + \beta_1 CPI + \beta_2 GDP \text{ per Capita} + \beta_3 Gini \text{ Coefficient} + \varepsilon.$$

3.4. Endogeneity, panel methods, and robustness

As part of our panel methodology, although our initial model utilizes a pooled ordinary least squares (OLS) regression model (estimation), we acknowledge that there are limitations to the use of a simple OLS regression for panel-based data, given that biases may arise from the fact that minimum wage determination could be influenced by unobservable (confounding) country-specific variables. These characteristics could include variations within the configurations of institutional bodies and regimes of countries.

Therefore, in order to address these issues, we create an alternative specification for the panel data, where FE (fixed effects) and RE (random effects) models are used in order to consider the unobserved heterogeneity present across Japan and South Korea, in addition to conducting Hausman tests that were reviewed to make the analysis of panel data more comprehensive. In addition to this, the fact that only two countries exist ($N = 2$) means our FE/RE estimates could provide inferences that have a limited scope for being powerful, and we discuss this further in this section.

Moreover, there could be potential scope for the existence of endogeneity between minimum wage levels, inflation, GDP per capita, and other macroeconomic variables, where both the minimum wage levels and macroeconomic conditions could be simultaneously influenced by each other. However, due to the limited evidence/data currently available to have a larger cross-country panel, we recommend that, in the future, when more data is available, instrumental variable (IV) and dynamic panel approaches (of Arellano-Bond Generalized Method of Moments – GMM) should be carried out.

Furthermore, in order to account for issues of non-stationarity, we do consider variables conceptually, and, as mentioned before, due to the limited observations and data at present, further tests, such as the unit root tests and structural break procedures, could be applied in the future in order to strengthen the causal interpretation. It is essential to note that, currently, the macroeconomic variables may contain unit roots or structural breaks, especially during

Table 1

Model summary – regression output for the entire set (all variables)

Multiple R	0.995758385
R Square	0.991534762
Adjusted R Square	0.986794228
Standard Error	0.227953451
Observations	40

Source: Compiled by the authors.

Table 2

Analysis of variance (ANOVA) output for statistical significance for the complete dataset

Output	df	SS	MS	F	Significance F
Regression	14	152.1602097	10.8685864	209.161005	0.0000
Residual	25	1.299069396	0.051962776		
Total	39	153.459279			

Source: Compiled by the authors.

times of global economic downturns such as in 2008 or 2020. Overall, as a result of recognizing these limitations, we believe that our results will not be strictly causal but could demonstrate a meaningful relationship that could be investigated further in future research through means of methodological enhancement.

3.5. Statistical analysis

The models used were estimated using ordinary least squares (OLS) regression. The statistical significance of coefficients was assessed using t -values and p -values, with thresholds set at $p < 0.05$. Model fit was evaluated using adjusted R^2 , while multicollinearity was checked using Variance Inflation Factors (VIF). This structured methodology ensures a precise and accurate examination of minimum wage determinants in Japan and South Korea, helping us to make valid cross-country comparisons and helps providing a strong basis for policy recommendations.

4. Empirical analysis

4.1. CPI/Inflation and its role in minimum wage adjustments

As seen in Table 1–3 (representing the complete regression output for all variables in the dataset), and the following output of Table 4–6 (representing the regression output for the statistically significant variables for Japan) and Table 7–9 (representing the regression output for the statistically significant variables for South Korea), Consumer

Price Index (CPI), based inflation has a large impact on minimum wage levels in both Japan and South Korea. The regression results indicate that the CPI has a positive and statistically significant coefficient indicating that the minimum wage responds positively to inflation. Additionally, the coefficient on CPI is about 0.05 in Japan (Table 6). That means a 1-point increase in the CPI is associated with a \$ 0.05 increase in the hourly minimum wage. The coefficient on CPI is slightly lower at 0.04 in South Korea (Table 9). In fact, a 1-point rise in CPI is equivalent to \$ 0.04 increase in South Korea's minimum wage. In light of these results, we find that inflation directly and proportionally affects minimum wage policy in both countries. For instance, this relationship can be restated in terms of real wages, that is, adjusted nominal wages for the impact of inflation. The real wage, MW_{Real} , is defined as:

$$MW_{Real} = \frac{MW_{Nominal}}{CPI}.$$

It is important for nominal wages to increase when CPI increases, in order to maintain a fixed real wage. For instance, if the CPI rises by 5%, and the nominal minimum wage is not adjusted, this failure leads to the real wage falling, reducing workers' purchasing power. As a result, the positive relationship between CPI and minimum wage is because real wages must be preserved in an inflationary setting. South Korea is characterized by stronger inflationary pressures, as the CPI has changed more markedly

Table 3
Detailed regression coefficients output for the entire set (all variables)

Variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-4.043279211	3.401278562	-1.18875274	0.24570662	-11.04834354	2.961785117	-11.048344	2.961785117
Percentage Increase in NMW	0.080658481	1.881772461	0.042863036	0.96615123	-3.79492445	3.956241412	-3.7949245	3.956241412
CPI	0.143344359	0.062060714	2.309743958	0.02944474	0.271160791	0.015527926	0.2711608	0.015527926
CPI (Less Fresh Food – Core)	0.071526217	0.076146661	0.939321783	0.35655319	-0.085300766	0.228353201	-0.0853008	0.228353201
CPI (Less Fresh Food and Energy)	0.286424231	0.063990673	4.476030891	0.00014492	0.154632972	0.41821549	0.15463297	0.41821549
PPI	0.014705917	0.015632246	0.940742436	0.35583874	-0.017489296	0.046901129	-0.0174893	0.046901129
Unemployment Rate	-18.49054005	8.888473017	-2.080283083	0.04790374	-36.7966929	-0.184387193	-36.796693	-0.184387193
Gini Coefficient	-0.150871301	0.059529577	-2.534392297	0.01790185	-0.27347476	-0.028267843	-0.2734748	-0.028267843
Poverty Rate (\$ 2.15)	6.773189194	13.06872291	0.518274757	0.60882352	-20.14234947	33.68872786	-20.142349	33.68872786
GDP (Billion \$)	0.001694555	0.00052565	3.223734853	0.00350578	0.000611959	0.002777151	0.00061196	0.002777151
GDP Per Capita (\$)	2.3586E-05	6.58982E-05	0.357915158	0.7234111	-0.000112134	0.000159306	-0.0001121	0.000159306
GDP Growth Rate	-0.003289297	0.006157427	-0.534199927	0.59792208	-0.015970755	0.009392161	-0.0159708	0.009392161
Cost of Living (\$)	-1.983853542	0.694252944	-2.857537097	0.0084794	-3.413694246	-0.554012839	-3.4136942	-0.554012839
Population	-1.19077E-07	2.62477E-08	-4.536657152	0.00012384	-1.73135E-07	-6.50187E-08	-1.731E-07	-6.50187E-08
Inflation Rate	-0.119259785	0.045908855	-2.597751225	0.01550461	-0.213810843	-0.024708728	-0.2138108	-0.024708728

Source: Dataset formulated by the authors.

Table 4

Model summary – regression output for the significant variables for Japan

Multiple R	0.994789128
R Square	0.98960541
Adjusted R Square	0.986922935
Standard Error	0.226839883
Observations	20

Source: Compiled by the authors.

Table 5

Analysis of variance (ANOVA) output for statistical significance for Japan

Output	df	SS	F	Significance F
Regression	8	23.60124437	24.3461964	3.223E-05
Residual	11	0.799996291		
Total	19	24.40124066		

Source: Compiled by the authors.

Table 6

Detailed regression coefficients output for the significant variables for Japan

Variables	Coefficients	Standard Error	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-1.027893117	1.623061902	0.53117937	-4.338149692	2.28236346	-4.3381497	2.28236346
CPI	0.054622903	0.023572736	0.02726671	0.102699814	0.006546	0.1026998	0.006546
CPI (Less Fresh Food and Energy)	0.303251782	0.040719421	0.00000002	0.220203975	0.38629959	0.22020398	0.38629959
Unemployment Rate	-18.85838652	8.351236741	0.03112074	-35.89084615	-1.8259269	-35.890846	-1.8259269
Gini Coefficient	-0.189527198	0.052612644	0.00108799	-0.296831392	-0.082223	-0.2968314	-0.082223
GDP (Billion \$)	0.001893128	0.000125612	0.00000000	0.001636941	0.00214932	0.00163694	0.00214932
Cost of Living (\$)	-2.372092485	0.417147475	0.00000300	-3.222870369	-1.5213146	-3.2228704	-1.5213146
GDP Per Capita (\$)	0.00241062	0.00157046	0.15580022	0.00590982	0.00108859	0.00590982	0.00108859
Population	-1.38839E-07	1.56136E-08	0.00000000	-1.70683E-07	-1.07E-07	-1.707E-07	-1.07E-07
Inflation Rate	-0.116565886	0.03887098	0.00530500	-0.195843772	-0.037288	-0.1958438	-0.037288

Source: Dataset formulated by the authors.

in this country than in Japan. This volatility could explain why South Korea has pushed harder on wage increases — as the government wants to push back against inflationary erosion of worker purchasing power. Furthermore, the *CPI* moderated wage policy is consistent with research, such as Neumark and Wascher, who find that often minimum wages are indexed to inflation to avoid a reduction in real wage [16].

4.2. GDP per capita and its role in adjusting minimum wage

A good proxy of economic productivity and living standards, *GDP* per capita plays an important role in determining minimum wage policy, as the results also show that minimum wage levels are positively related to *GDP* per capita. In Japan, the estimated coefficient for *GDP* per capita is 0.002, and in South Korea, 0.004. In other words, Ja-

Table 7

Model summary – regression output for the significant variables for South Korea

Multiple R	0.968568418
R Square	0.938124781
Adjusted R Square	0.893124622
Standard Error	0.344442355
Observations	20

Source: Compiled by the authors.

Table 8

Analysis of variance (ANOVA) output for statistical significance for South Korea

Output	df	SS	F	Significance F
Regression	8	19.78653031	20.8471436	1.32622E-05
Residual	11	1.305045896		
Total	19	21.0915762		

Source: Compiled by the authors.

Table 9

Detailed regression coefficients output for the significant variables for South Korea

Variables	Coefficients	Standard Error	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-75.71465151	18.82267568	0.00200745	-117.1430814	-34.28622166	-117.1430814	-34.28622166
CPI	0.040903408	0.055212394	0.47431004	0.162425067	0.080618251	0.162425067	0.080618251
CPI (Less Fresh Food and Energy)	0.381141093	0.078579608	0.00051045	0.208188542	0.554093645	0.208188542	0.554093645
Unemployment Rate	134.657694	44.25304525	0.01118844	37.2573981	232.0579899	37.2573981	232.0579899
Gini Coefficient	-0.157623517	0.29653492	0.16804235	-0.27321371	-0.02849143	-0.27321371	-0.02849143
GDP (Billion \$)	0.000208919	0.001099868	0.85280894	0.002629712	0.002211874	0.002629712	0.002211874
Cost of Living (\$)	-6.12717772	0.95793942	5.1073E-05	-8.235588167	4.018767272	-8.235588167	-4.018767272
GDP Per Capita (\$)	0.0044371	1.211136871	0.253687389	-0.004512535	0.015260395	-0.004512535	0.015260395
Population	9.48164E-07	4.30024E-07	0.04965827	1.68812E-09	1.89464E-06	1.68812E-09	1.89464E-06
Inflation Rate	0.103821467	0.096726392	0.30609544	-0.109071886	0.316714819	-0.109071886	0.316714819

Source: Dataset formulated by the authors.

pan's minimum wage increases by about \$ 0.002 for every \$ 1,000 increase in *GDP* per capita, and South Korea's by \$ 0.004. To better understand this relationship, it is also evident to consider the labor productivity. *GDP* per capita does not only show us the size of the economy but also the average amount of productive work done. The link with the minimum wage is formalized through the wage-productivity relationship:

$$MW_{Nominal} = f(\text{Productivity}).$$

As the productivity increases, the MPL (Marginal Product of Labor) also increases, which means that employers are more compelled to pay higher wages with an increase in the overall value generated by workers. As a result, the equation justifies the positive relationship between *GDP* per capita and minimum wage.

In South Korea, the rapid economic growth during the last few decades has led to substantial increases in *GDP* per capita, which has allowed for higher wage increases than in Japan. South Korea's faster growth has allowed the government to pursue more progressive wage policies, since higher productivity is the economic basis for raising minimum wages. On the opposite side, Japan's slower *GDP* growth, especially in the post-1990 "lost decades" has facilitated in less substantial increases of minimum wage, despite its higher overall *GDP* per capita. This dynamic can be summarized by the following wage adjustment equation:

$$\Delta MW = \beta_1 \Delta CPI + \beta_2 \Delta GDP \text{ per Capita},$$

where ΔMW represents changes in minimum wage, and the terms on the right-hand side reflect changes in inflation and *GDP* per capita.

Both inflation and productivity growth are required conditions for sustained minimum wage increases, but in periods when productivity growth is slower (as in Japan's recent history), inflation alone may not be sufficient to justify large nominal wage increases. Overall, in addition to focusing on the broad coefficient changes, our analysis also demonstrates how different market economic variables can jointly account for the majority of the variation in minimum wage dynamics, specifically *CPI* and *GDP* per capita variables. As a result of this, we can confirm that wage-setting institutions in both countries primarily respond to inflation compensation, alongside responding to the changes/trends in productivity, which confirms our hypotheses. Alongside this, our study is essential in expanding the current literature by demonstrating how different institutional structures, namely the Japanese decentralized prefectural councils and the South Korean centralized minimum wage commission, could alter the potential responsiveness/elasticity of minimum wage changes to macroeconomic variables. Even though prior studies have analyzed each country independently, it is important to note that there exist only a few studies that have carried out comprehensive cross-country analysis with similar macroeconomic variables tied to different institutional structures across economies. Our results also illustrate that the South Korean wage-setting structure generates a stronger impact on the *CPI*, while this adjustment is more moderated (lower) scale when looking at the Japanese regional system.

Consequently, our findings indicate that minimum wage elasticity is both mediated and moderated by the configuration of various wage-setting systems, thereby addressing a significant research void in literature, as this particular area has largely remained unexplored in prior studies.

4.3. Unemployment dynamics and minimum wage dynamics

CPI or *GDP* per capita is a much simpler, more direct relationship between unemployment and minimum wage levels than is the case, given that the regression results suggest that there is a weak negative relationship between unemployment and minimum wage, but this effect is not statistically significant at conventional levels. It means that fluctuations in unemployment rates do not significantly affect minimum wage policies in Japan and South Korea. Higher unemployment should theoretically depress upward pressure on wages because it is an increase in the relative supply of labor to demand that reduces the power the workers bargain with. However, this is because the data shows a weak relationship, which can be explained by consistently low unemployment rates in Japan and South Korea, which fluctuate between three and five percent, during the period analyzed. Under such tight labor markets wage-setting mechanisms are likely to be more driven by (rising) inflation and productivity considerations over labor supply dynamics. Therefore, the marginal effect of unemployment on the minimum wage can be represented as:

$$\Delta MW = -\beta_3 \Delta Unemployment,$$

where β_3 represents the sensitivity of wage changes to changes in unemployment.

Given the low unemployment rates and weak coefficients, this term contributes minimally to the overall determination of minimum wage in the two countries. Thus, the minimum wage policy in Japan and South Korea is rather immune to short-term fluctuations in unemployment rates due to more stable labor markets.

The empirical analysis of the minimum wage determinants in Japan and South Korea yields results that are consistent with, or deviate from, the results of previous research. In this section, we compare the important factors uncovered in our study, including the Consumer Price Index (*CPI*),

GDP per capita, unemployment rate, and income inequality (Gini coefficient), with conclusions from the literature on minimum wage economics. Our analysis confirms the existence of a positive and statistically significant relationship between *CPI* (inflation) and minimum wage in the broader minimum wage literature. Studies such as Neumark and Wascher, Lemos, alongside Renkin et al., claim that policymakers often adjust nominal minimum wages to counteract inflationary pressures in order to preserve workers' real income [16, 27, 28]. We find that wage increases have generally tracked inflation in our dataset for Japan and South Korea, and this also holds true for this finding. The higher sensitivity of minimum wage to *CPI* in South Korea is consistent with the more volatile inflation environment than in Japan and is consistent with studies examining the determination of minimum wage in countries with high inflation such as Brazil and Mexico [27]. Our findings also are consistent with other research, which found that wage growth is also a result of inflation, and that is mainly a result of the South Korean government placing a high premium on maintaining purchasing power, especially when the economy is expanding [29]. On the other hand, Japan's deflationary environment during much of the 2000s has resulted in more conservative wage adjustments, similar to the literature.

Furthermore, we found that there exists, consistent with past studies, a positive relationship between *GDP* per capita and minimum wage in both countries, which is consistent with the idea that growing economic productivity supports higher wages. Card and Krueger also demonstrate that minimum wage increases are more feasible in economies where per capita income is growing because wage-setting authorities seek to redistribute the benefits of economic growth to low-income workers [15]. The stronger effect of *GDP* per capita in South Korea compared to Japan in our model reflects South Korea's rapid economic expansion over the period analyzed, which allowed the government to adopt more aggressive wage policies, but it is important to recognize that in Japan's case, slower *GDP* growth, in particular during its 'lost decade', has been linked to a more conservative attitude towards wage increases. That is also consistent with Xu and Chahande, who imply that Japan's slow (inconsistent) wage growth is related to stagnant productivity and the reluctance of firms to raise wages in an uncertain economic environment, and

collectively, our analysis therefore confirms that minimum wage policy is a fundamental function of *GDP* per capita, but the size of the effect depends on the economic context [30].

On the other hand, contrary to much of the established literature, our analysis shows a weak and statistically insignificant relationship between unemployment and minimum wage. According to traditional economic models, higher unemployment is supposed to lower upward pressure on wages because higher unemployment is an excess supply of labor and therefore reduces workers' bargaining power [31]. However, the consistently low unemployment rates in Japan and South Korea (less than 5% and around 3%, respectively, throughout the analysis period) may explain why this variable does not have a strong influence on minimum wage policy in these countries, and, in addition to this, others and Kawaguchi and Mori argue in several studies on labor markets in East Asia that the structure of employment, marked by high levels of job security and stable unemployment rates, insulates minimum wage policy from short-term unemployment fluctuations [9, 32]. Collectively, our analysis shows that minimum wage changes are more driven by inflation and productivity than labor market conditions in this context.

Additionally, in our model, income inequality (as measured by the Gini coefficient) was not statistically significant, but previous research indicates that addressing inequality is a common reason to increase minimum wages. It is important to note that the current/existing literature on this topic is mixed, with one group of studies finding strong evidence that minimum wage increases reduce income inequality [33], while others suggest that this impact is small and, most importantly, limited to advanced economies that already experience little income inequality. Our results assert that the minimum wage has had a small effect on the increasing income inequality since so few workers make the minimum wage, seen to be consistent with the results of Sekine, who analyzed poverty in Japan [34]. However, according to another study, based in South Korea, the government's aggressive minimum wage policies have been motivated by fears of rising inequality, even though our statistical relationship between the Gini coefficient and minimum wage illustrated is not always significant [35], and even if the measured relationship is weaker than was expected, political motivation to address inequality could explain the upward pressure on wages.

4.4. Refined regression model with significant determinants

A refined regression model was created by isolating the significant determinants of minimum wage: *CPI*, *GDP* per capita, and the Gini coefficient. This model helps us understand the key drivers of minimum wage policy, excluding variables such as unemployment that showed little statistical significance. The refined regression model is represented as follows:

$$MW = \beta_0 + \beta_1 CPI + \beta_2 GDP \text{ per Capita} + \beta_3 \text{Gini Coefficient} + \varepsilon.$$

4.5. Significant factors analysis

The positive and significant *CPI* coefficient in both countries confirms that inflation (*CPI*) is a major determinant of minimum wage policy. The p-values for Japan and South Korea being <0.005 confirm the fact that wage adjustments are mainly due to real wage preservation in response to rising prices. The slightly higher coefficient for Core *CPI* (less fresh food and energy) in South Korea (0.381) against Japan (0.303) is consistent with the need for South Korea's more volatile inflation environment to maintain purchasing power to require a larger nominal wage increase. One example is that a 1% increase in *CPI* translates into a \$ 0.303 increase in the minimum wage in Japan. The rise is \$ 0.381 in South Korea, which is in response to inflation, as wages are more aggressively defended. The relationship between *CPI* and minimum wage can be expressed as:

$$MW = \beta_1 \times CPI.$$

Moreover, the evidence of the positive and significant relationship between *GDP* per capita and minimum wage shows that economic growth can support higher wages. Earlier, it was discussed that a rise in *GDP* per capita leads to an increase in labor productivity, and this is economic justification for higher wages. In South Korea, the coefficient is 0.004, meaning that for each \$ 1,000 increase in *GDP* per capita, the minimum wage rises by \$ 0.0044; in Japan, the effect is slightly smaller at \$ 0.002. This relationship can be formalized through the following equation:

$$MW = \beta_2 \times GDP \text{ Per Capita}.$$

Since the government has faster *GDP* growth there, the fiscal flexibility has allowed it to afford a more ambitious wage policy compared to Japan, which has slower growth. It can also be said that both in Japan (−0.018) and in South Korea (−0.015), the negative coefficients on the Gini coefficient indicate that the higher the income inequality, the lower the minimum wage level, but the relationship is not statistically significant at the 5% level for South Korea ($p = 0.168$ as seen in *Table 7–9*). While the coefficient is not statistically significant for South Korea, the negative sign indicates that economic policies aimed at increasing the minimum wage may be less effective at reducing income inequality in economies where existing income inequality is greater, as found by other studies as well [36]. This finding is contrasting, as the minimum wage has historically been raised in South Korea to reduce inequality, particularly inequality, which has been a major driver of wage policy. Our model's weak statistical relationship between the Gini coefficient and minimum wage, however, indicates that inequality, while a part of the political discourse, does not have a significant empirical relationship with wage levels as measured by *CPI* and *GDP* per capita for South Korea.

4.6. Model fit and interpretation

The refined regression model accounts for a significant fraction of the variation in minimum wage levels for Japan (adjusted $R^2 = 0.68$) and South Korea (adjusted $R^2 = 0.72$). The results from these values suggest that while *CPI* and *GDP* per capita are important determinants of wage policy, other factors not captured in the model, i.e. political considerations or labor market dynamics, also affect the wage policy. Overall, the refined model corroborates that inflation (*CPI*) and economic growth (*GDP* per capita) are the most important factors in determining minimum wage adjustments in Japan and South Korea, with the Gini coefficient being less important. Variations in the economic environments, the labor markets, and the priority of policies are in the two countries, resulting in the differences between them.

To recapitulate, inflation (*CPI*) and *GDP* per capita are found to be the key determinants of minimum wage changes, both in Japan and South Korea, through a detailed study of the summary statistics and regression models. Most of the variability in wage-setting decisions is explained by these two

factors, and other factors, such as unemployment and income inequality, are secondary. Our findings indicate a positive, significant relationship between *CPI* and minimum wage, in the sense that wage growth should be protected from inflationary pressures, and a link between *GDP* per capita and wage, in the sense of the effect of economic productivity on wage adjustments. The regression analysis is consistent with the existing literature on minimum wage determinants and provides insights into the economic foundations of wage policy in these two advanced economies.

5. Comparative analysis – correlation and regression comparisons

The correlation matrix (*Table 10*) and regression models (*Tables 1 to 9*) are both important in investigating the impact of minimum wage levels and macroeconomic variables for Japan and South Korea. However, while regression models reveal causal relationships that determine the effects of such characteristics as inflation, per capita *GDP*, and unemployment, they first prove that the minimum wage largely depends on these characteristics. On the other hand, the correlation matrix is more informative about these relationships, and it factors in things such as Multicollinearity for example, high correlation between *GDP* per capita and Inflation as presented in the correlation matrix above. In this way, this kind of analysis helps to integrate the causal findings of the regression model, which is a benchmark of this work, with the relational advantages of the correlation matrix, providing an elaborate understanding that contributes to the development of corresponding wage-related policy suited to the macroeconomic environment and fine-tuning this analysis.

5.1. Strength of relationships: correlation vs. coefficients

Table 10 revealed that minimum wage has a positive correlation with *GDP* per capita (0.96), and a moderate negative relationship with percentage increase in minimum wage and *GDP* growth (−0.24). Based on these types of results, it can be concluded that the minimum wage is strongly associated to the macroeconomic performance mainly in relation to *GDP* Per Capita. Nevertheless, negative relationship with *GDP* growth means that any acceleration in wages may hinder further eco-

nomic growth. In the regression analysis, *GDP* per capita and *GDP* growth are used as determinants or predictors of the minimum wage. The general form of the multiple linear regression model is:

$$MW_i = \beta_0 + \beta_1(GDP\ Per\ Capita_i) + \beta_2(CPI_i) + \beta_3(CPI_i) + \dots + \varepsilon_i.$$

β_1 being the sign of the effect of *GDP* per capita, while beta two, β_2 reflects the effect of *GDP* growth, on minimum wages. A regression model helps to illustrate the actual size of these impacts and whether they are statistically meaningful. Our estimate of the coefficient of *GDP* per capita, β_1 is 0.0002, thus for an increase in the *GDP* per capita by one unit, the minimum wage increases by 0.0002 \$ controlling for all other factors, respectively. The correlation matrix also gave a suggestion of this with a higher value, but the regression gives a lower quantity of this effect. On the other hand, *GDP* growth coefficient was equal to −0.003 which implies that a 1% increase in the *GDP* growth decreases the minimum wage by \$ 0.003. The correlation matrix we calculated earlier also pointed to this negative relationship, but the use of a regression model allows to assess the degree of this effect when other variables have been brought into picture. To facilitate the comparison to the previous approach it is important to define the comparison index (*CI*) between the correlation coefficient and the regression coefficient. This will help in integrating insights from both models:

$$CI = \left(\frac{|Correlation\ Coefficient|}{|Regression\ Coefficient|} \right) \times 100,$$

where *CI* measures the relative weight of the regression coefficient compared to the correlation, a value of *CI* close to 100 suggests that the regression and correlation provide similar insights, and a *CI* significantly greater or smaller than 100 suggests the regression provides deeper insights after controlling for other variables. For instance, the correlation and regression agree well on the relationship between minimum wage and *GDP* per capita, with a *CI* between 80% to 90%. However, the *CI* for *GDP* growth is much lower at between 20% to 30%, which demonstrates that regression analysis tells a more nuanced representation of this relationship than the correlation matrix does.

Table 10
Correlation matrix for all variables in the dataset

	Minimum Wage (\$)	Percentage Increase in NMW	CPI	CPI (Less Fresh Food – Core)	CPI (Less Fresh Food and Energy)	PPI	Unemployment Rate		
Minimum Wage (\$)	1								
Percentage Increase in NMW	-0.678685636	1							
CPI	0.809091042	-0.560468311	1						
CPI (Less Fresh Food – Core)	0.816315989	-0.54502179	0.995863415	1					
CPI (Less Fresh Food and Energy)	0.841653873	-0.592826705	0.984238476	0.986859475	1				
PPI	0.390291246	-0.213328286	0.648689106	0.620826522	0.607829203	1			
Unemployment Rate	0.014863239	-0.155620592	-0.137927989	-0.130606623	-0.137623742	-0.535317275	1		
Gini Coefficient	0.372391464	-0.60662744	0.362705001	0.339152631	0.377186813	-0.017210448	0.292620115		
Poverty Rate (\$ 2.15)	-0.673024547	0.504691499	-0.679362639	-0.692422412	-0.771520466	-0.165833785	0.005852768		
GDP in Billion \$	0.866612716	-0.725259554	0.565306212	0.567429033	0.604541728	0.048591155	0.203885139		
GDP Per Capita (\$)	0.955267289	-0.665084384	0.750144691	0.75848785	0.775214034	0.199198289	0.232676663		
GDP Growth Rate	-0.239907922	0.226827414	-0.306261576	-0.325459872	-0.339183574	-0.249978801	0.165397848		
Cost of Living (\$)	-0.459434153	0.536871757	-0.066074261	-0.059839648	-0.105479355	0.235773227	-0.168937894		
Population	0.788351622	-0.720871446	0.523832298	0.52320449	0.565163662	0.0389375	0.131445169		
Inflation Rate	-0.561576471	0.429840483	-0.344685217	-0.35324107	-0.340440891	0.268096299	-0.453523131		
Gini Coefficient	1								
Poverty Rate (\$ 2.15)	-0.436440101	1							
GDP in Billion \$	0.599444433	-0.613033342	1						
GDP Per Capita (\$)	0.466373929	-0.663523314	0.904478254	1					
GDP Growth Rate	-0.144187727	0.30036617	-0.223867539	-0.145402541		1			
Cost of Living (\$)	-0.568974203	0.255169573	-0.813432583	-0.501387322		0.155774513		1	
Population	0.65518947	-0.60235766	0.977167902	0.812755509		-0.283424971		-0.874264048	1
Inflation Rate	-0.445749882	0.310401758	-0.668314007	-0.681258398		-0.010921656		0.489457338	-0.6144936

Source: Dataset formulated by the authors (based on online statistics available).

5.2. Multicollinearity and interdependency

The correlation matrix is beneficial in the analysis of multicollinearity by presenting the community and direction of linear relationship between variables. However, the matrix does not control for the unique contributions of the predictors — such as minimum wages — when one or more of the others are present. This is where regression models are very helpful when applying the partial regression coefficients to assess the contribution of a particular variable adjusting to other variables. Regarding regression, which was discussed above while considering the panel data analysis, instability of coefficients can be an offence of multicollinearity. To assess this, the Variance Inflation Factor (*VIF*) is calculated for each independent variable, using the formula:

$$VIF_j = \frac{1}{1 - R_j^2},$$

where R_j^2 is the squared multiple correlation coefficient for the j -th independent variable.

A *VIF* greater than 10 indicates significant multicollinearity. In our regression analysis, the *VIF* for *GDP* per capita indicates moderate multicollinearity (between three and six), and the *VIF* for *GDP* growth is approaching problematic levels of multicollinearity but is still manageable (between six and eight point five). To measure how multicollinearity impacts the insights provided by the regression model versus the correlation matrix, we can define a multicollinearity adjustment factor (*MAF*):

$$MAF = \left(\frac{1}{VIF} \right) \times 100,$$

where a higher *MAF* indicates lower multicollinearity, meaning the regression model's coefficients are more reliable, while a lower *MAF* suggests that the correlation matrix may be misleading due to underlying multicollinearity. On one hand, *MAF* scores computed for *GDP* per capita and *GDP* growth are relatively low (below 20), indicating that both variables are highly correlated with the minimum wage, but the regression coefficients are somewhat attenuated by multicollinearity. This makes the case for the use of regression to understand complex interdependencies that can't be covered by the correlation matrix by itself.

5.3. Correlation matrix

The correlation matrix helps us to measure of how strong and in which direction the variables are associated. For instance, the high positive correlation between the minimum wage and *GDP* per capita (0.96) cannot be used to predict future changes in the minimum wage with changes in *GDP* per capita, but helps us to see a relation. One disadvantage is also that the correlation matrix also does not indicate whether higher *GDP* per capita leads to higher wages or vice versa, and is therefore causal agnostic. In contrast, the Regression Models used is an explicit prediction model that is designed for prediction and can be used to predict future wage levels based on a change in *GDP* per capita, *GDP* growth, *CPI*, and other pertinent factors. We can use the regression equation that we provided earlier to make a forecast of the minimum wage for expected changes in macroeconomic variables, and this paper utilizes the regression model in order to make useful suggestions to policymakers in order to quantify the relationship between variables.

Predictive Accuracy (*PA*): To quantify the predictive power of the regression model compared to the static nature of correlation, we define a Predictive Accuracy Index (*PA*), as the ratio of the explained variance from the regression model to the total variance in the minimum wage:

$$PA = \frac{\sum (\hat{y}_i - \bar{y})^2}{\sum (y_i - \bar{y})^2} \times 100,$$

where $\hat{y}_i$ are the predicted values from the regression model, y_i are the actual values of the minimum wage, and $\bar{y}$ is the mean minimum wage.

5.3.1. Strong relationships identification

The correlation matrix and regression model also indicated a strong positive relation of minimum wage to *GDP* per capita. In both analyses, minimum wage levels in Japan and South Korea are closely linked to *GDP* per capita. This implies that irrespective of the statistical technique, the minimum wage is influenced consistently by *GDP* per capita across all regions.

5.3.2. *GDP* growth is a negative influence

The second similarity between the two methods was the negative relation between *GDP* growth

and minimum wage increases. The correlation matrix showed a moderately strong negative correlation and the regression model confirmed this relationship, with more nuance, by quantifying the actual impact. This negative correlation and regression coefficient indicate that there is no necessary relationship between rapid *GDP* growth and proportionate wage increases or, indeed, increases in the minimum wage at all. This similarity underscores how both methods recognize the competitive relationship between short-term economic growth and wage policies.

5.3.3. General trends in inflation

The correlation matrix and regression model indicated that inflation (*CPI*) was somewhat less but still a relevant explanatory factor in wage behavior. Although it is less correlated with *GDP* per capita than with one another, the inflation term still appears to be correlated with wage adjustments. The correlation of higher minimum wages with higher inflation is suggested by both approaches, but not to the same degree as *GDP*-related factors. This means wages also go up as prices rise, a result that is largely due to attempts by policymakers to counteract inflation in order to keep purchasing power steady.

5.4. Data interpretation differences

5.4.1. Bivariate vs. multivariate context

The difference between the correlation matrix and the regression model is one of the contexts of the analysis. Strictly speaking, the correlation matrix is a bivariate tool, that is to say, it relates two variables at a time, without taking into account the effect of other factors. For the comparative discussion, see that the correlation between minimum wage and *GDP* per capita is very strong (0.96) in the matrix. This, however, overlooks the fact that there are other variables influencing results, such as *GDP* growth or inflation. On the other hand, the regression model is based on a multivariate situation, in which several variables can be included simultaneously. The regression model can do this, controlling other factors. For example, the regression model (with a value much lower than the correlation matrix for the coefficient of *GDP* per capita) is less impacted than pure correlation because it considers the impact of other variables (such as inflation, and *GDP* growth) as the variable is running in a model. This brings out how the re-

gression model can help us to understand better by separating each variable's unique contribution.

5.4.2. Magnitude of influence vs. direction of influence

The correlation matrix is meant to indicate the direction of relationships (positive or negative), but it doesn't emphasize how much change is being caused between the variables. In particular, the matrix indicates that minimum wage is positively related to *GDP* per capita, but not how much increase in minimum wage will take place in response to a given increase in *GDP* per capita. The regression model fills this gap by providing precise coefficients that measure the size of influence. Our regression model demonstrated that the minimum wage increased by 0.00002 *USD* for every additional dollar of *GDP* per capita. The ability to quantify the change, however, means that regression is a much more powerful tool for policymakers who need to understand the practical implications of economic changes on wage levels.

5.4.3. Impact of multicollinearity

Another important difference is how the two methods address multicollinearity. The result is that the correlation matrix is overstated since it cannot separate out the unique contributions of each factor. In contrast, the regression model has a better ability to address multicollinearity via techniques such as variance inflation factors (*VIF*). The regression model is able to control for the interrelationship between independent variables and thus provides a more accurate picture of how each factor affects the minimum wage. It is important to note that the regression model may not highlight the significance of one variable compared to the other, while the correlation matrix may overestimate the relationship due to the effect of multicollinearity.

5.4.4. Predictive power

There is a major difference between the two methods in terms of predictive capabilities. Although a correlation matrix is good for knowing the association, it cannot predict or forecast anything, and it merely tells us what has happened between variables in the past, which makes it difficult to hypothesize how these relationships will behave in the future. By contrast, the regression model is inherently predictive. With the regression equa-

tion, we can use the estimated future changes in minimum wage based on expected changes in *GDP* per capita, *GDP* growth and inflation. This makes regression a much more useful tool for policy analysis and can give concrete projections to inform future decisions.

5.4.5. Explaining variability

The other distinction is how each method explains the variability in the data. A correlation matrix captures only the linear relationship between two variables, and so only a fraction of the variability in the minimum wage. For example, the strong relationship between minimum wage and *GDP* per capita does not capture the effect of other factors, and a lot of the variation remains unexplained. In contrast, the regression model explains the variability of the data much better than the former by taking into account multiple independent variables. From the regression model, we can see how much of the total variability of the minimum wage is explained by a combination of factors such as *GDP* per capita, *GDP* growth and inflation. This enables a more detailed understanding of the drivers of minimum wage change, revealing not only that the relationship exists but also just how much of the wage variation is due to these factors.

6. Discussion

This paper offers an extensive comparison of the minimum wage determinations of Japan and South Korea from an endogenous perspective using correlation matrix and regression models to look for the interconnection between changes in minimum wages and macroeconomic factors. Therefore, the research calls for targeted evidence-based policy reforms in order to optimize the benefits of the minimum wage policies so that they help address poverty rates while maintaining macroeconomic stability. The current study utilizes both correlation analysis and regression modelling, which enables the study to provide an all-encompassing perspective that helps policymakers to determine not only the overall manner in which the direction of the economy trends, but also a more detailed approach that emphasizes trend causative factors. The analysis of correlation matrices also showed the decisive dependence of inflation rates in terms of *CPI* and *PPI*, poverty indicators, and *GDP* growth on the changes made to the minimum wage. This strong relationship

is especially evidenced in the pairwise regression analysis between inflation and the changes in the minimum wages, which is why there comes a need to adopt the inflation-indexed minimum wages as a protective gear for workers' consumptive capacity. To this end, the study proposes the following formula for inflation-adjusted minimum wages:

$$\text{New MW} = \text{Current MW} \times \left((1 + \text{Expected Inflation Rate}) + (\alpha \times \text{Productivity Growth Rate}) \right),$$

where α represents an elasticity coefficient that reflects the responsiveness of wages to productivity growth. This adjustment mechanism ensures that wages remain aligned with both inflation and productivity growth, thus mitigating the risk of real wage erosion during inflationary periods while promoting economic sustainability. This approach allows policymakers to balance wage increases with the broader economic context, avoiding excessive inflationary pressure on employers or the economy. In addition, the study reveals a positive correlation between the minimum wage level and poverty, as the rationale of a calibrated raise as an instrument to fight poverty is based on a sound foundation. However, regional differences in the cost of living call for some consideration in order to prevent minimum wage disparity across the regions. The idea of the non-price floor may not sufficiently prevent or ignore the differences in cost of living between the territories of a certain country. Consequently, this paper recommends the adoption of a regionally adjusted minimum wage system, which can be expressed through the following formula:

$$\text{Adjusted Wage}_{\text{region}} = \text{National Minimum Wage} \times \left(\frac{\text{Regional CPI}}{\text{National CPI}} \right).$$

This procedure conveniently aligns employee remuneration in relation to the local economic market price and reverses the disparities associated with geographic remuneration. This policy of paying wages with reference to local cost of living indices is not only aimed at raising living standards in higher-priced areas but also at eliminating the tendency for internal migration due to wage differentials, thus ensuring stability to the workforce across the region. Compared to the previous two tests, the regression analysis shows that the minimum wage

can positively affect the *GDP* per capita, while the negative impacts of the rapid or large increase of the minimum wage are also pointed out, especially for industries that rely on labor and SMEs. As a result, the subsidization of the operation of SMEs by the government and other associated organizations is proposed as a remedy to cushion the implications of minimum wage enhancement. The proposed subsidy allocation could be determined using the following formula:

$$\text{Subsidy Amount} = \beta \times \left(\frac{\text{Labour Cost}}{\text{Total Revenue}} \right) \times \text{Minimum Wage Increase},$$

where β is an adjustment factor based on industry profitability metrics. This approach ensures that subsidies are allocated proportionately to SMEs that are most vulnerable to wage increases, allowing them to comply with minimum wage laws without resorting to layoffs or business closures. Such a targeted system would preserve jobs, particularly in vulnerable sectors, while ensuring that minimum wage increases do not undermine economic growth or business viability. Moreover, the establishment of an independent minimum wage monitoring body is essential for ensuring the ongoing effectiveness of minimum wage policies. This body would be required to/be tasked with monitoring the economic impact of wage adjustments and providing data-driven recommendations for future policy changes. The body could also employ econometric models, such as the autoregressive integrated moving average (ARIMA) model, to forecast the necessary adjustments based on key economic indicators like *CPI* (Consumer Price Index), *PPI* (Producer Price Index), productivity, and unemployment rates. The model for wage forecasting could be expressed as:

$$\text{Forecasted Wage}_t = \alpha + \sum \beta_i \text{CPI}_{t-i} + \sum \gamma_j \text{Unemployment}_{t-j} + \sum \delta_k \text{Productivity}_{t-k} + \epsilon_t.$$

By using such econometric forecasting tools, the monitoring body would be able to provide timely and evidence-based recommendations, enabling policy-makers to adopt minimum wage policies in response to shifting economic conditions. It is important to note that the findings of this study align with key theoretical contributions in literature. Similar to

Belman and Wolfson, the study established that minimum wage increments affect inflation, especially for sectors with relatively high labor density [33], and the study also agrees, in some aspects, with Lee and Saez, who identify this using the regional wage variability model of Regional Minimum Wage Differentiation (which strives to increase equity by reducing excess wages resulting from changes in the regional cost). However, this research deviates from Neumark and Wascher, where the authors advised against extraordinarily high minimum wages for the same reason — loss of employment [31, 33, 36]. However, the present study concludes that moderate wage increases can be adopted without effects on employment through right subsidies and regional modification. Furthermore, when looking at different avenues for directions in future research, there will be a strong emphasis on expanding the availability of regular data collection and development of econometric models for different institutional, sectoral, and demographic areas. By employing these larger and more consistent data sets, we believe that future research could uncover the nuanced relationships between not only youth employment patterns or labor market dualities with minimum wage but also SME businesses — since they make up a majority of the employment structures in several major economies. In addition to this, we believe that different approaches of fixed effects, random effects, IV/GMM, and other tests could better address endogeneity between different variables of wages, inflation and productivity, hence improving the strength of the causal mechanism. Despite these potential limitations, we believe that our research was quintessential in improving the current policy framework in both Japan and South Korea by not only significantly expanding upon previous literature but also demonstrating that there is a presence of a very strong relationship between different macro-economic variables and minimum wage dynamics.

7. Policy recommendations

7.1. Adopt an inflation-indexed minimum wage system

With the aim of preserving the real wages against the tendencies of their erosion, it is suggested to introduce an inflation-indexed minimum wage regime. This adjustment mechanism should consider both inflation and productivity growth to moderate wages nationally yet maintain the purchase value for the workers.

7.2 Implement regional cost-of-living adjustments:

High unemployment rates will also persist, especially for inexperienced workers, due to high regional variations in economic conditions; hence, the call for a regionally adjusted minimum wage policy. Such changes would enable a wage relationship with the local cost of living conditions, increase income levels, reduce inequality and improve living standards in the areas characterized by higher costs.

7.3. Establish a subsidy program for SMEs:

In order to reduce the impact level of such measures specifically on SMEs, we suggest the use of a targeted subsidy system. The distribution of subsidies should depend on the ratio of employees to revenues; that is, governments should work out the necessary funding so that the most endangered sectors can meet the rate of minimum wages without using layoff measures.

7.4. Create an independent minimum wage monitoring body:

Minimum wage policies must therefore be implemented and monitored closely, and for this reason, there should be an independent monitoring body. This body would use, for instance, ARIMA to predict the necessary fluctuation in wages and then supply proactive recommendations to policymakers. Despite the promising nature of these recommendations, there are several challenges that policymakers must address. The adoption of an inflation-indexed minimum wage system could lead to wage-price spirals if not carefully managed. To mitigate this risk, wage adjustments should be linked to both inflation and productivity growth to ensure that increases remain sustainable and do not exacerbate inflationary pressures. Similarly, regional cost-of-living adjustments could introduce administrative complexities, particularly in standardizing criteria for adjustments. To overcome this, clear guidelines and transparency in the adjustment process should be established. Finally, while subsidies for SMEs can reduce the risk of negative economic impacts, the fiscal burden of such subsidies could become unsustainable if wage increases are too large. Policymakers should

therefore target subsidies to the most vulnerable sectors and industries, ensuring the effective allocation of resources.

8. Conclusion

To recapitulate, our study examined the numerous determinants of the dynamics of the national minimum wage in both Japan and South Korea over the two-decade period of 2004 to 2023. From our results, we were able to confirm that the primary determinants/influencers of the adjustments in these minimum wages have been inflation (*CPI*) and *GDP* per capita in both economies, illustrating that bodies that are responsible for wage setting and government institutions should put productivity-based capacity for minimum wage growth at the forefront. By contrast, unemployment and inequality were found to have a weaker and less consistent effect quantitatively, hence illustrating the structural stability already present in East Asian labor markets.

Our comparative analysis has shown that despite both countries responding to similar macroeconomic scenarios, the degree of responsiveness in weight the difference between Japan and South Korea due to differences institutionally. On one hand, Japan's more region-based approach/system contrasting with the most centralized South Korean approach means that Japan has more moderate adjustments, while the fellow OECD member state has more immediate responses based on the economic conditions.

To recapitulate, the study demonstrates that minimum wage policies in Japan and South Korea require a flexible, data-driven approach to address key socio-economic challenges, including inflation, regional disparities, and the needs of SMEs. By implementing inflation-indexed wage systems, regional adjustments, targeted subsidies for SMEs, and an independent monitoring body, policymakers can enhance the effectiveness of minimum wage policies while promoting economic stability and social equity in the two Southeast Asian nations. These reforms provide a balanced structure that addresses the competing demands of economic efficiency and social justice, ensuring that minimum wage policies deliver on their promise to improve living standards and contribute to long-term economic growth in Japan and South Korea.

REFERENCES

1. Mdingi K., Ho S.Y. Literature review on income inequality and economic growth. *MethodsX*. 2021;8(1):101402. DOI: 10.1016/j.mex.2021.101402
2. Choi K. Employment effect of minimum wage increase. *Korea Development Institute (KDI) Focus*. 2018;90. DOI: 10.22740/kdi.focus.e.2018.90
3. Seok B.H., You H.M. Macroeconomic impacts of increasing the minimum wage: The case of Korea. *Economic Modelling*. 2022;113:105880. DOI: 10.1016/j.econmod.2022.105880
4. Doh T., Kim K., Lee H., Kim S., Song K. The economic effects of a rapid increase in the minimum wage: Evidence from South Korea experiments. *The Federal Reserve Bank of Kansas City (Research Working Papers)*. 2022;22–13. DOI: 10.18651/rwp2022–13
5. Gregory T., Zierahn U. When the minimum wage really bites hard: The negative spillover effect on high-skilled workers. *Journal of Public Economics*. 2022;206:104582. DOI: 10.1016/j.jpubeco.2021.104582
6. Yamaguchi M. Minimum wage effects: Empirical evidence from Japan. *Research in Labor Economics*. 2020;48:107–51. DOI: 10.1108/s0147–91212020000048004
7. Allen S.G., Wang T. Forever young: where older workers keep on working. *Journal of Pension Economics and Finance*. 2023;22(4):490–508. DOI: 10.1017/S 1474747223000021
8. Lee J.W., Song E., Kwak D.W. Aging labor, ICT capital, and productivity in Japan and Korea. *Journal of the Japanese and International Economies*. 2020;58:101095. DOI: 10.1016/j.jjie.2020.101095
9. Kawaguchi D., Mori H. The labor market in Japan, 2000–2016. *IZA World of Labor*. 2017;385. DOI: 10.15185/izawol.385
10. Azar J., Huet-Vaughn E., Marinescu I., Taska B., Wachter T. Minimum wage employment effects and labor market concentration. *The Review of Economic Studies*. 2023;91(4):1843–83. DOI: 10.1093/restud/rdad091
11. Seeberg V. The social and educational impact of rural migration in China. *Chinese Education and Society*. 2024;57(1–2):1–14. DOI: 10.1080/10611932.2024.2377002
12. Morikawa M. Minimum wages and productivity: Evidence from Japan. *Research Institute of Economy, Trade and Industry (RIETI)*. 2019; Policy Discussion Papers 19015. URL: <https://ideas.repec.org/p/eti/polidp/19015.html>
13. Riley R., Bondibene R.C. Raising the standard: Minimum wages and firm productivity. *Labour Economics*. 2017;44(449):27–50. DOI: 10.1016/j.labeco.2016.11.010
14. Chun H., Lee J., Shin D. Does the minimum wage affect non-wage workers? *The Korean Economic Review*. 2024;40(1):5–47. DOI: 10.22841/kerdoi.2024.40.1.001
15. Card D., Krueger A.B. Minimum wages and employment: A case study of the fast-food industry in New Jersey and Pennsylvania: Reply. *American Economic Review*. 2000;90(5):1397–420. DOI: 10.1257/aer.90.5.1397
16. Neumark D., Wascher W.L. Minimum wages and employment. *Foundations and Trends in Microeconomics*. 2007;3(1–2):1–182. DOI: 10.1561/07000000015
17. Clemens J., Strain M.J. The heterogeneous effects of large and small minimum wage changes: Evidence over the short and medium run using a pre-analysis plan. *National Bureau of Economic Research (NBER)*. 2021; Working Paper w29264. DOI: 10.3386/w29264
18. Dolton P., Bondibene C.R., Wadsworth J. The UK national minimum wage in retrospect. *Fiscal Studies*. 2010;31(4):509–34. DOI: 10.1111/j.1475–5890.2010.00123.x
19. Nakakubo H. A new departure in the Japanese minimum wage legislation. *Japan Labor Review*. 2009;6(2):22–38. URL: https://www.jil.go.jp/english/JLR/documents/2009/JLR_22_nakakubo.pdf
20. Ishii T. Employment conditions and emerging labour movements of non-regular workers in Japan. *Asia Pacific Journal of Human Resources*. 2018 Mar 6;56(4):474–91. DOI: 10.1111/1744–7941.12177
21. Dube A., Lester T.W., Reich M. Minimum wage shocks, employment flows, and labor market frictions. *Journal of Labor Economics*. 2016;34(3):663–704. DOI: 10.1086/685449
22. Machin S., Manning A. The effects of minimum wages on wage dispersion and employment: Evidence from the U.K. Wages Councils. *Industrial and Labor Relations Review*. 1994;47(2):319. DOI: 10.2307/2524423
23. Kim W. The effects of the minimum wage on youth employment in Korea: A Cross-Provincial Analysis. *Conference: Japan Association for Applied Economics*. 2010. URL: <https://www.researchgate.net/publication/301770500>
24. Jung M.A. the impact of the minimum wage on older workers in South Korea — White Rose eTheses Online. *PhD Thesis, The University of Sheffield*. 2019;1–314. URL: <https://etheses.whiterose.ac.uk/id/eprint/25040/>

25. Haanwinckel D. Supply, demand, institutions, and firms: A theory of labor market sorting and the wage distribution. *National Bureau of Economic Research (NBER)*. 2023; Working Paper w31318. DOI: 10.3386/w31318
26. Acemoglu D., Autor D. Skills, tasks and technologies: implications for employment and earnings. *Handbook of Labor Economics*. 2011;4(B):1043–171. DOI: 10.1016/s0169–7218(11)02410–5
27. Lemos S. A survey of the effects of the minimum wage on prices. *Journal of Economic Surveys*. 2008;22(1):187–212. DOI: 10.1111/j.1467–6419.2007.00532.x
28. Renkin T., Montialoux C., Siegenthaler M. The pass-through of minimum wages into US retail prices: Evidence from supermarket scanner data. *The Review of Economics and Statistics*. 2022;104(5):890–908. DOI: 10.1162/rest_a_00981
29. Jordà Ò., Nechio F. Inflation and wage growth since the pandemic. *European Economic Review*. 2023;156:104474. DOI: 10.1016/j.eurocorev.2023.104474
30. Xu R., Chahande K. Structural barriers to wage income growth in Japan. *International Monetary Fund (IMF) Selected Issues Papers*. 2023;2023(031). DOI: 10.5089/9798400241734.018
31. Neumark D., Wascher W. Minimum wages and employment: A review of evidence from the new minimum wage research. *National Bureau of Economic Research (NBER)*. 2006; Working Paper w12663. DOI: 10.3386/w12663
32. Dzienis A.M. Labor market duality in Japan: A resilience perspective. *Gdansk Journal of East Asian Studies*. 2021;2021(20):187–207. DOI: 10.4467/23538724gs.21.007.14839
33. Belman D., Wolfson P. What does the minimum wage do? *Upjohn Research Institute*. 2014. DOI: 10.17848/9780880994583
34. Sekine Y. The rise of poverty in Japan: The emergence of the working poor. *Japan Labor Review*. 2008;5(4):49–66. URL: https://www.jil.go.jp/english/JLR/documents/2008/JLR_20_sekine.pdf
35. Fleckenstein T., Lee S.C., Park J. Skills and training in hierarchical capitalism: the rise and fall of vocational training in South Korea. *Journal of Contemporary Asia*. 2024;54(2):260–81. DOI: 10.1080/00472336.2023.2168207
36. Lee D., Saez E. Optimal minimum wage policy in competitive labor markets. *Journal of Public Economics*. 2012;96(9–10):739–49. DOI: 10.1016/j.jpubeco.2012.06.001

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Is Sustainability Beneficial in the Long Term? The Significance of Pre-IPO ESG Disclosure

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ABSTRACT

The persistent issue of long-term underperformance among firms has raised increasing concern within the capital market. **Purpose:** In response to the growing emphasis on sustainable and responsible investment (SRI), which integrates environmental, social, and governance (ESG) dimensions, we investigate whether pre-initial public offering (pre-IPO) ESG disclosure can predict firms' long-term performance. This research is motivated by the limited empirical evidence on ESG disclosure practices within the Malaysian IPO landscape, where such disclosures remain largely voluntary. **Method:** Using a sample of 100 IPOs issued between 2012 and 2019, event-time analyses are employed and observed until 2024. The cumulative and buy-hold abnormal returns are employed as the dependant variables, representing long-term performance, three years post-IPO. **Results:** The findings reveal that voluntary pre-IPO ESG disclosure has a significant impact on firms' long-term performance. However, the negative relationship suggests potential greenwashing effects consistent with prior literature. Furthermore, when examining the ESG dimensions individually, the study finds that social disclosure practices have a negative influence on firms' long-term performance. **Contributions:** This research contributes to IPO literature by offering evidence from a developing market context on how voluntary ESG disclosures prior to listing shape firms' sustainability. Strengthening ESG disclosure guidelines pre-IPO, aligning firms' disclosure with actual operational capacity, and expanding future research to Association of Southeast Asian Nations markets are essential to enhance the credibility and valuation relevance of ESG information. **Keywords:** IPO; initial public offering; performance; long-term; sustainability; ESG; disclosure; stock return; Malaysia

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Выгодно ли устойчивое развитие в долгосрочной перспективе? Значение раскрытия информации об ESG-факторах перед первичным публичным размещением акций

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АННОТАЦИЯ

Проблема низкой эффективности деятельности компаний в долгосрочной перспективе вызывает все большую обеспокоенность на рынке капитала. **Цель:** в связи с растущим вниманием к устойчивым и от-

ветственным инвестициям, которые интегрируют экологические, социальные и управленческие (ESG) аспекты, авторы исследуют, может ли раскрытие информации об ESG-факторах перед первичным публичным размещением акций (pre-IPO) предсказать долгосрочные результаты деятельности компаний. Данное исследование мотивировано ограниченными эмпирическими данными о практике раскрытия информации об ESG-факторах в рамках рынка IPO в Малайзии, где такое раскрытие информации остается в основном добровольным. **Метод:** используя выборку из 100 IPO, выпущенных в период 2012–2019 гг., проводится анализ событий во времени и наблюдение за компаниями до 2024 г. В качестве зависимых переменных использовались кумулятивная и аномальная доходности от покупки и удержания акций, отражающие долгосрочные результаты деятельности в течение трех лет после IPO. **Результаты:** полученные данные показывают, что добровольное раскрытие информации об ESG-факторах до IPO оказывает значительное влияние на долгосрочные показатели деятельности компаний. Однако отрицательная взаимосвязь указывает на потенциальные эффекты «зеленого камуфляжа», что согласуется с предыдущими исследованиями. Кроме того, при рассмотрении отдельных аспектов ESG исследование показывает, что практика раскрытия социальной информации оказывает негативное влияние на долгосрочные показатели деятельности компаний. **Вклад:** исследование вносит вклад в литературу по IPO, предоставляя данные из контекста развивающегося рынка о том, как добровольное раскрытие информации об ESG-факторах перед первичным публичным размещением акций влияет на устойчивость компаний. Усиление требований к раскрытию информации об ESG-факторах до IPO, приведение раскрытия информации компаниями в соответствие с фактическими операционными возможностями и расширение будущих исследований на рынки стран Ассоциации Юго-Восточной Азии имеют важное значение для повышения достоверности и значимости информации об ESG для оценки стоимости компаний.

Ключевые слова: IPO; первичное публичное размещение акций; показатели деятельности; долгосрочный эффект; устойчивость; ESG; раскрытие информации; доходность акций; Малайзия

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1. Introduction

Particularly in emerging markets where information asymmetry and disclosure quality remain central challenges in capital formation [1], the long-term success of newly listed firms is a critical concern for investors, regulators, and policymakers. Initial public offerings (IPOs) represent a major milestone for firms transitioning into public capital markets. However, the post-listing period remains uncertain as firms adjust to new regulatory environments, governance expectations, and investor scrutiny. While firms attract significant market attention at the point of listing, their ability to sustain performance beyond the early trading period has become an increasingly important measure of organisational resilience and long-term value creation.

In Malaysia, the issue of post-IPO sustainability has gained prominence as the capital market evolves towards higher transparency and accountability standards.¹ Investors placing greater emphasis on non-financial information, specifically Environmental, Social, and Governance (ESG) disclosure,

have emerged as a potential source of competitive advantage. ESG reporting is widely regarded as a mechanism that enhances transparency, promotes responsible business conduct, and fosters investor confidence [2, 3]. Despite these perceived benefits, the extent to which pre-IPO ESG disclosure contributes to firms' long-term post-IPO performance remains unclear, especially in markets where ESG reporting is largely voluntary and varies substantially across firms, such as Malaysia.

The increasing regulatory encouragement for sustainability practices in Malaysia, such as the Sustainability Reporting Guide (SRG) and the Malaysian Code on Corporate Governance (MCCG), highlights the growing expectation that firms should embed ESG considerations earlier in their corporate journey, including during the IPO stage. ESG disclosure enhances transparency and demonstrates a firm's alignment with regulatory expectations and the sustainability agenda [4], especially if it is voluntary. However, empirical evidence assessing whether such early disclosures translate into superior long-term performance or sustainability post-IPO remains limited.

Our study examines the 100 IPOs listed on Bursa Malaysia from 2012 to 2019, with observations

¹ Bursa Malaysia. FTSE 4Good Bursa Malaysia (F4GBM) Index. 2022. URL: https://www.bursamalaysia.com/trade/our_products_services/indices/ftse4good-bursa-malaysia-f4gbm-index

continuing until 2024. A three-year observation window is applied, utilising event study methodologies, to evaluate the influence of *ESG* disclosures on firms' long-term post-IPO performance. Contrary to expectations that *ESG* disclosures promote superior long-term performance, the results indicate that higher levels of *ESG* disclosures prior to listing reduce the likelihood of achieving sustainable performance in the long run.

When the *ESG* dimensions are examined individually, the findings suggest that selective or superficial disclosure of social initiatives may negatively affect firms' long-term performance. These findings remain consistent across both event study methodologies, reinforcing the evidence that *ESG* disclosure negatively influences firms' long-term performance. Robustness analyses further reveal an interdependence between initial and long-term performance, whereby firms exhibiting strong initial returns tend to experience subsequent underperformance.

2. Literature review

2.1. Long-term performance

in the developed and developing markets

The long-term performance anomaly in IPOs refers to the persistent difference between the offer price and subsequent market value over an extended post-listing period, typically measured over one, three, or five years. Two types of long-term performance reported in past studies are the firms' underperformance and outperformance. Firms are underperforming (outperforming) if their subsequent share prices are lower (higher) than the initial trading day prices, resulting in negative (positive) returns for investors [5].

Primarily introduced by Ritter [6], long-term performance has become of interest mainly to portray investment opportunities to investors, even after three years of firms going public, and to consider the informational efficiency of an IPO market, considering that the prospectus provides timely information for investors' guidance. Loughran and Ritter [7] refer to the long-term performance anomaly as a new issue puzzle in an IPO and state that there are significant differences between the performance of firms during periods of high and low numbers of IPO listings. The long-term performance of firms is a contentious issue in past studies, as evidenced by the contradictory findings. Some studies reported that firms underperform marginally or have no

abnormal performance in the long run, implying that the market is efficient because the results do not reject the market efficiency hypothesis [8, 9, 10]. Others found that firms outperform or do not underperform in the long run [11, 12]. IPO firms' long-term performance reported in past studies varies depending on the measurements, markets (developed or developing markets), or even different countries within similar market categories.

For example, a study in the United States (US) by Yip et al. [13] examined the firms' 1-year performance from 1996 to 2000 and reported -17.37 percent of underperformance using the cumulative market-adjusted return (CAR) method. On the other hand, Gompers and Lerner [8], who employ the buy-and-hold return (BHAR) method to examine firms' long-term performance from 1935 to 1972 (pre-Nasdaq market), report the underperformance of 3 years of -16.7 percent and 5 years of -21.00 percent. The study also highlights that firms' underperformance starts to disappear using the cumulative average abnormal return (CAAR) method, reporting 2 percent and -0.5 percent for 3-year and 5-year post-IPO. Other studies in the U.S., such as Jog et al. [14] and Fu et al. [15], consistently report firms' long-term underperformance at -99 percent (3 years) from 2000 to 2012 and -27.55 (3 years) and -40.71 (5 years) from 1999 to 2021, post-IPO, respectively. We discover that although past literature reports firms' long-term outperformance in the US, most past studies have proved that the long-term underperformance anomaly occurs in the US since Ritter [6]. Does this anomaly also exist in other developed markets?

A similar pattern of firms' long-term underperformance post-IPO was revealed in the U.K. market at -16.4 percent (3 years) and -47.6 percent (5 years) from 1975 to 2004 by Gregory et al. [17] and at -8.49 percent (3 years) from 1987 to 2007 by Ali [17]. While Gregory et al. [16] highlights that their findings are generally associated with firms' sizes (i.e., smaller firms underperform greater than larger firms), Ali's [17] finding is in line with Loughran and Ritter [7] that firms listed during periods of higher listing of IPOs in the market underperform severely in the long term. In contrast, Álvarez-Otero [18] recently reported that most European countries' firms outperform in the long-term post-IPO, with Hungary having the highest abnormal average return of 367.5 percent, 567.1 percent and 50.3 percent 1 year, 3 years, and 5 years post-IPO (1995 to 2013).

Past studies present various findings in the developing markets, regardless of countries. Cai et al. [19] report that the firms listed from 1997 to 2001 highly underperform by –30 percent compared to the Shanghai Share Exchange A-Share index. Contrary to this, Anderson et al. [20] report that firms listed in a new China share market (ChiNext) from 2009 to 2011 outperformed by 33.47 percent 3 years post-IPO. In India, Gupta et al. [21] find long-term outperformance (positive performance) in the first year post-IPO at 0.56 percent from 2009 to 2018. Similarly, Zakaria and Kamaludin [22] also report firms' long-term outperformance at 9.5 percent from 2000 to 2017, 3 years post-IPO in the Saudi Arabia market. This study acknowledges that developing markets mainly reported long-term performance as outperformance rather than underperformance.

In the Malaysian market, most studies also report firms' long-term outperformance. Nevertheless, the level of outperformance relies on the sample period. Paudyal et al. [23] investigated the long-term performance of 95 privatisation firms listed on the Main Board between 1984 and 1995 and discovered outperformance in the market by 8.9 percent 3 years post-IPO. However, the 3-year firms' outperformance level reported by Paudyal et al. [23] is lower than Jelic et al. [24], at 21.9 percent between 1980 and 1995. Corhay [25] and Ahmad-Zaluki et al. [26] discovered that firms in the Malaysian market outperformed the Kuala Lumpur Composite Index (KLCI) over 3 years post-IPO by combining the Main Board and Second Board IPOs, with cumulative abnormal returns of 41.7 percent and 32.6 percent, respectively.

A recent study using Malaysian IPOs showed firms' long-term underperformance post-IPO. Abdul Rahman and Che-Yahya [27] reported –31.87 percent of underperformance 3 years post-IPO from 2000 to 2014. They forwarded a concern about firms facing failure while investors are unable to secure desirable returns in the long term. The study also highlighted that although studies in Malaysia previously reported long-term outperformance, the consistent decline in the firms' initial performance in the Malaysian market could be the reason behind lower recent underperformance post-IPO (i.e., –31.87 percent). Hence, the variability of long-term performance points to the need for this study to examine the potential factors affecting firms' long-term performance, specifically in the Malaysian market.

2.2. The influence of *ESG* on firms' long-term performance

In recent years, *ESG* practices have gained significant prominence in global capital markets, as investors increasingly rely on *ESG*-related disclosures when formulating their investment decisions [28]. *ESG*-integrated investment vehicles, commonly referred to as socially responsible funds, reflect the growing recognition of the interdependence between corporate governance quality, social responsibility, environmental stewardship, and long-term sustainability [29]. Firms that embed *ESG* principles within their operations and voluntarily disclose their practices are generally perceived as more transparent, which may translate into a lower cost of capital and greater long-term value creation [3]. Furthermore, adopting *ESG* frameworks is frequently associated with enhanced governance mechanisms, reduced earnings volatility, more substantial environmental commitments, and improved access to cost-efficient financing [30].

From a corporate perspective, *ESG* disclosure is a strategic instrument for legitimisation and reputation building [31]. By communicating their environmental and social initiatives, firms reinforce their alignment with societal expectations and investor interests. Sadiq et al. [32] documented a sharp increase in the number of *ESG*-disclosure firms, rising from approximately 300 in 1996 to nearly 7,000 by the end of 2014, illustrating the growing institutionalisation of sustainability disclosure as a norm for legitimacy enhancement.

To sustain these practices, Slager and Chapple [33] suggest that firms must continuously engage in three interrelated mechanisms: remaining publicly listed to maintain market accountability, interacting with *ESG* rating providers to preserve or improve their scores, and reinforcing legitimacy through consistent and transparent disclosures. Despite these benefits, the credibility and integrity of *ESG* information remain crucial determinants of investor response. Wong and Zhang [34] found that the disclosure of negative or insincere *ESG* information may diminish firm value, suggesting that investors are highly responsive to the quality of sustainability disclosure.

Transparent and credible *ESG* communication reduces information asymmetry and mitigates IPO underpricing [35, 36]. Complementing this view, Hardiningsih et al. [37] contend that stronger capital

inflows at the time of listing, driven by investor confidence in *ESG* transparency, are likely to strengthen firms' future cash flows, thereby enhancing their long-term performance potential. These arguments suggest that genuine and high-quality *ESG* disclosure can reinforce firm legitimacy, reduce financing frictions, and support sustained post-listing success.

Hypothesis 1: There is a positive influence of *ESG* disclosure on firms' long-term performance.

Hypothesis 2: There is a positive influence of environmental disclosure on firms' long-term performance.

Hypothesis 3: There is a positive influence of social disclosure on firms' long-term performance.

Hypothesis 4: There is a positive influence of governance disclosure on firms' long-term performance.

3. Data, measurements and methods

3.1. Data and sample

This study employs secondary and cross-sectional data comprising 131 IPOs listed on the Main Market (prime market for established companies) and ACE (Access, Certainty, Efficiency) Market of Bursa Malaysia between January 2012 and July 2019. Following Mohammad and Wasiuzzaman [3], 2012 marks the onset of a significant increase in *ESG*-related disclosures among Malaysian listed firms; hence, it serves as the baseline year for the sample period. Our sample ends in July 2019, as long-term performance requires a three-year observation window, ending in July 2024.

Several exclusion criteria are applied, consistent with Ong et al. [38] and Zheng and Li [39]. Specifically, we omit two financial-sector IPOs (including banks, insurance firms, real estate investment trusts, and financial services) due to their unique reporting structures. We omit twenty-two IPOs from the Leading Entrepreneur Accelerator Platform (LEAP) Market owing to limited disclosure availability and seven IPOs for exhibiting missing data, outliers, or extreme values. After applying these criteria, the final sample comprises 100 IPOs listed on Bursa Malaysia's Main and ACE Markets.

3.2. Variables measurement and models

We use the event-time approaches to measure firms' long-term performance. According to Abdullah et al. [40], the event-time approach performance is calculated using the abnormal re-

turn of a baseline reference relative to the event date. Abnormal returns in an event-time approach are typically quantified by utilising two distinct measures: cumulative average abnormal return (*CAAR*) and the buy-and-hold abnormal return (*BHAR*).

Define R_{it} as the month t actual return on a sample firm, MR_{it} as the month t market return (Kuala Lumpur Composite Index) for the sample firm, and $AR_{it} = R_{it} - MR_{it}$ as the abnormal return in month t . Then, calculate the average abnormal return for a portfolio of the sample firm for the month t . Cumulating across t periods yields a cumulative average abnormal return (*CAAR*).

$$CAAR_{q,s} = \sum_{i=q}^s \overline{AR}_t. \quad (1)$$

In contrast, the return on a buy-and-hold investment in the sample firm is less the return on a buy-and-hold investment in the market benchmark index (KLIC).

$$BHAR_{i,t} = \left[\prod_{t=T_1}^{T_2} (1 + R_{i,t}) - 1 \right] - \left[\prod_{t=T_1}^{T_2} (1 + MR_{i,t}) - 1 \right]. \quad (2)$$

In measuring the *ESG* disclosures, we develop the *ESG* scoring using the fourteen indicators reported in the Financial Times Stock Exchange Index (FTSE) Russell. For each firm, we apply a binary scoring approach where the presence of any of the fourteen identified *ESG* components was assigned a value of "1", and the absence was assigned "0". Following Nicolo et al. [41], we derive the overall *ESG* score by dividing the total points accumulated by a firm across all indicators by the maximum possible number of indicators under each *ESG* dimension, subsequently expressed as a percentage.

We conduct the scoring process manually based on data extracted from the firms' IPO prospectuses. AntConc software, an open-source corpus analysis program, assists with concordancing and analysing textual content related to firms' *ESG* initiatives. This software ensured systematic extraction and reduced the likelihood of human error or omission when compiling the *ESG* scores for each firm. Other independent variables included in this study to control the relationship between *ESG* disclosure and long-term performance include initial return (offer-to-open and offer-to-close measurements), market capitalisation (natural logarithm), age of firm (incorporation year), IPO proceeds, underwriter

reputation (market share of underwriters), insider retention, total assets, leverage, sector and KLCI performance (3 years post-IPO of each firm).

The regression models for this study are divided into two equations. As stated, we measure the long-term performance using two methods of the event study, i.e., *CAAR* and *BHAR*. Equations (3) and (4) display the equations:

$$\widehat{CAAR}_i = \hat{\alpha} + \hat{\beta}_1 ENV_i + \hat{\beta}_2 SOC_i + \hat{\beta}_3 GOV_i + \hat{\beta}_e \sum_{t=1}^L OIV_{i,e} + \varepsilon_i \quad (3)$$

$$\widehat{BHAR}_i = \hat{\alpha} + \hat{\beta}_1 ENV_i + \hat{\beta}_2 SOC_i + \hat{\beta}_3 GOV_i + \hat{\beta}_e \sum_{t=1}^L OIV_{i,e} + \varepsilon_i, \quad (4)$$

where:

$\widehat{CAAR}_i$ — Cumulative average abnormal return.

$\widehat{BHAR}_i$ — Buy and holding abnormal return.

i — i th firm.

α — Constant term.

$\hat{\beta}$ — Coefficient of the respective independent variable.

ENV — Environmental disclosure which are climate change, water security, biodiversity, pollution and resources, and supply chain environment.

SOC — Social disclosure which are health and safety, labour standards, human rights and community, customer responsibility, and supply chain social.

GOV — Governance disclosure which are anti-corruption, tax transparency, risk management and corporate governance.

OIV — Other independent variables L which are initial return market capitalisation, age of firm, IPO proceeds, underwriter reputation, insider retention, total assets, leverage, sector and KLCI performance.

4. Results and discussion

4.1. Descriptive and diagnostic results

Table 1 shows the descriptive statistics analysis of the data. *CAAR* and *BHAR* capture the long-term performance of firms post-listing three years post-IPO. The mean *CAAR* is 16.48 percent, whereas the mean *BHAR* is significantly lower at 7.46 percent, suggesting that firms, on average, generate positive abnormal returns over the long term. The median values are −1.03 percent for *CAAR* and −4.57 percent for *BHAR*,

both negative, indicating that more than half of the sample firms underperform in the long run. The minimum values further highlight this trend, with *CAAR* plunging to −52.82 percent and *BHAR* to −60.50 percent, signifying severe underperformance for some firms. On the other end, the maximum values are considerably high at 159.98 percent for *CAAR* and 151.86 percent for *BHAR*, reflecting that a subset of firms substantially outperformed. The high standard deviations, 56.46 for *CAAR* and 53.62 for *BHAR*, underscore the significant dispersion and risk associated with long-term performance.

The mean of *CAAR* (16.48 percent) and *BHAR* (7.46 percent) demonstrate that firms' performance is more favourable when evaluated cumulatively rather than the buy-and-hold strategy. The negative median at −1.03 percent for *CAAR* and −4.57 percent for *BHAR* also confirm that more than half of firms in the sample underperform over the long run. This is consistent with Abbas et al. [42] reporting a median of −21 percent for firms listed from 2007 to 2015. The minimum value of −52.82 percent and −60.50 percent indicate more than 50 percent of loss for the firms' 3-year return post-IPO. The minimum values observed are more extreme as compared to Abdul Rahman and Che-Yahya [27] (−31.87 percent). The substantial negative minimum values for both *CAAR* and *BHAR* underscore the potential significant losses for firms in the years following their IPO. This indicates that a considerable proportion of firms may suffer substantial value erosion [43].

In order to meet the underlying assumptions of regression models and increase the reliability of the findings, we conduct several diagnostic tests on the data. We employ four diagnostic tests: normality, multicollinearity, heteroscedasticity, and autocorrelation. We found several non-normal distributions of the data, particularly for all data except for the *ESG* and *KLCI* performance data. However, Volgevang [44] discusses that the cause of non-normality is outliers and extreme values in residuals. Accordingly, Yusoff et al. [45] confirm that the violation is tolerable and will not be the main issue in cross-sectional regression models. We run several tests to remove outliers and extreme values, which include box plot, extremes function and winsorisation in Stata Software.

No severe multicollinearity issue is found in our models; however, our data suffers from a heteroscedasticity issue. Hence, we employ the Newey-West

Table 1

Descriptive statistics of IPOs from 2012 to 2019 on Bursa Malaysia

Variables	Mean	Median	Minimum	Maximum	Standard Deviation
ESG	40.9286	42.8571	0.0000	85.7143	16.2710
ENV	0.1740	0.2000	0.0000	0.8000	0.2003
SOC	0.3520	0.40000	0.0000	1.0000	0.2148
GOV	0.5875	0.5000	0.0000	0.7500	0.1643
INOP	17.45	13.65	-34.96	90.00	28.58
INCL	17.37	10.79	-24.31	113.67	31.38
MKTCAP (Mil)	1481.534	203.0250	31.64000	22787.00	3881.338
AGE	7.5400	2.0000	1.0000	41.0000	10.2656
IPOPRO (Mil)	295.2420	36.50000	0.0000	5300.000	904.8328
USHARE	0.0800	0.0570	0.0063	0.3731	0.0772
INSRET	69.7414	70.8350	0.0000	100.0000	16.8843
TOTA ('000)	63010.25	2025.500	9.0000	2100000	298863.6
LEVERAGE	2.0650	0.861	0.0143	15.0392	3.4887
SECTOR	0.1200	0.0000	0.0000	1.0000	0.3266
MC 3YCAAR	-4.1794	-5.82	-23.77	16.810	8.0176
MC 3YBHAR	-12.8	-16.5	-75	43.0000	22.9690

Source: Based on Thomson Reuters Datastream and IPO Prospectuses on Bursa Malaysia. URL: https://www.bursamalaysia.com/bm/market_information/announcements/firm_announcement?firm=5284 (accessed on 09.09.2023).

test as proposed by Yusoff et al. [45], which corrects the heteroscedasticity and autocorrelation issues in the model. The residual test is also employed to check for the endogeneity issue, which led us to conclude the absence of endogeneity evidence.

4.2. The influence of ESG on firms' long-term performance

Tables 2 and 3 display the findings for the influence of ESG disclosures on firms' long-term performance, which are ESG (ESG, ENV, SOC, and GOV), initial return (INOP and INCL), firm-specific characteristics (MKTCAP, AGE, TOTA, LEVERAGE), issuance characteristics (IPOPRO, USHARE, INSRET, SECTOR) and KLCI performance (MC3YCAAR and MC3YBHAR). The models also include INOP and INCL for robustness check on the integration between favourable initial return for positive long-term performance. The division of models is based on the INOP and INCL, as both variables are unable to be regressed in the same model due to a severe multicollinearity issue.

Across the models, the results reveal a consistently negative relationship between pre-IPO ESG disclosure and long-term performance, indicating

that firms disclosing higher levels of sustainability information prior to listing tend to experience poorer stock returns three years after the IPO. While ESG disclosure is traditionally viewed as a signaling tool that reduces information asymmetry, the Malaysian context suggests the opposite. In a voluntary-disclosure environment, firms may engage in symbolic reporting to satisfy perceived market expectations without undertaking substantive ESG practices.

Our findings suggest that the market adjusts to new information and investors reassess the firms' value based on their financial or operational performance metrics, leading to a market correction due to the untranslated improvements in firms' performance based on their ESG disclosure. This aligns with the argument in Abbas et al. [42], where Malaysian firms often lack the capacity to implement the reported ESG practices. As a result, the firms' legitimacy erodes due to the greenwashing act and the lack of meaningful ESG practices disclosure, which cannot translate to an enhancement of the firms' value [17]. The act of greenwashing results in misleading disclosure and could potentially harm the firm's reputation, leading to deterioration in its long-term performance.

In examining the effect of the ENV individually, the ENV is found to be negatively related to firms' long-term performance. This can be linked to costly environmental practices such as carbon emission management, renewable energy, and waste management, which the investments are also known to be translated in the long run, straining firms' current profitability and potentially obstructing shareholders' wealth. Firms use environmental practices disclosure to gain social acceptance and align with prevailing norms, but when these initiatives lack credibility or tangible results, it will erode investors' confidence and trust [46]. As a result, investors will perform capital withdrawal and will affect firms' long-term performance. This is consistent with Lin et al. [47]; disclosing environmental practices without substantial progress or actual implementation may become a financial and reputational liability rather than enhance firms' long-term performance. However, this finding is inconclusive due to the low p-value of ENV.

SOC also exhibits a significant and negative influence on firms' long-term performance. While social responsibility practices are perceived to be beneficial to the public, the social practices require ongoing investment in areas such as employee training, fair wages, and labour standards. For IPO firms with limited resources, these efforts can signal increased operational costs and can harm firms' long-term capital. Investors expecting outcomes and transparent disclosure may lose confidence in firms that fail to align social practices disclosure with tangible actions, particularly when the SOC appears to be reported due to the regulatory requirements rather than legitimate business strategies. Studies have shown that firms engaging in representative social practices disclosure, rather than authentic and measurable practices, experience reduced investor confidence and face greater scrutiny from stakeholders [42]. Ultimately, such social practices disclosure can result in firms' long-term underperformance.

Research consistently shows a negative relationship between GOV and firms' long-term performance. This can be attributed to several factors, including the potential for governance practices disclosure as an attempt to divert attention from underlying governance issues [48]. In these cases, the costs associated with improving governance to match reported standards can exceed the benefits, creating financial strain and further deteriorating

long-term performance. However, this argument is inconclusive due to the low significance. Overall, we are unable to support all of our hypotheses (H1, H2, H3, and H4) but offer a new insight into the role of ESG disclosure on firms' post-IPO performance.

Tables 2 and 3 also display the findings for the role of firms' initial return on long-term performance. The findings report a uniform negative influence of INOP and INCL on the models. Instead of the initial proposition of this study that firms with favourable initial return will have positive long-term performance, this study found that higher initial return will lead to long-term underperformance. Positive firms' initial return is found to be driven by excessive investor enthusiasm or speculative trading that can harm firms in the long run [40]. As a result, firms that are overvalued at the time of listing may face downward price corrections in the long run when investors reassess the firms' actual performance and prospects. This pattern is particularly evident in developing markets such as Malaysia, where speculative trading and investor sentiment tend to dominate price movements in the initial days of listing [1].

The persistent underperformance is also supported by previous studies such as Abdul Rahman and Che-Yahya [27], reinforcing the notion that Malaysian firms struggle to attain favourable returns in the long run. Firms' initial return serves as a market signal reflecting investor sentiment and perceived quality [49]. However, this study found that the positive initial return reflects a signal that firms benefit during high information asymmetry. As investor optimism fades and the firms' financial results materialise, the valuation may decline due to investors' capital withdrawal, leading to long-term underperformance.

Other independent variables worth highlighting their significance are MKTCAP, IPOPRO, TOTA, and MC 3YCAAR, which all are found to negatively influence firms' long-term performance. MKTCAP result aligns with the argument by Lafrance [50], who posits that larger firms tend to have lower growth potential relative to smaller firms, particularly in developing economies like Malaysia. In these contexts, policy incentives and market attention often favour small-cap firms, creating an environment in which smaller firms are perceived as more dynamic and capable of rapid growth. Additionally, Nguyen and Pham [51] note that larger firms, by virtue of their maturity and established revenue

Table 2

Multiple regression analysis of ESG and long-term performance models (Newey-west test)

Variables	Exp. Sign	Model 1: CAAR – ESG		Model 2: CAAR – ESG		Model 5: BHAR – ESG		Model 6: BHAR – ESG	
		Coefficient	t-stats	Coefficient	t-stats	Coefficient	t-stats	Coefficient	t-stats
Main Independent Variable									
ESG	+ve	−0.0065	−1.9000*	−0.0056	−1.7047*	−0.0054	−2.0874**	−0.0063	2.3168**
Other Independent Variables									
INOP	+ve	−0.4949	−3.1545***	−	−	−0.4374	−2.8739***	−	−
INCL	+ve	−	−	−0.0039	−2.9227***	−	−	−0.0034	−2.6498***
MKTCAP	+ve	−0.1063	−2.2863**	−0.0974	−2.1071**	−0.0732	−1.8759*	−0.0921	−2.4090***
AGE	+ve	−0.0042	−0.7829	−0.0052	−1.1007	−0.0044	−1.5982	−0.0043	−1.3768
IPOPRO	+ve	−0.0147	−1.8250*	−0.0098	−1.3825	−0.0007	−2.3758**	−0.0124	−2.0170**
USHARE	+ve	−0.3853	−0.7445	−0.0395	−0.6106	−0.2378	−1.3373	−0.0496	−0.9215
INSRET	+ve	0.0029	0.6925	0.0019	0.7685	0.0011	0.4505	0.0016	0.7119
TOTA	+ve	0.7910	1.5840	0.0911	1.8668*	0.0970	2.8151***	0.0901	2.3313**
LEVERAGE	−ve	−0.0082	−0.2924	−0.0081	−0.8345	0.0088	0.7745	−0.0039	−0.4450
SECTOR	−ve	0.1075	0.5401	0.1788	0.8689	0.1185	0.7451	0.1540	0.8678
MC 3YCAAR	+ve	−1.0149	−2.0786**	−1.5636	−2.4252**	−	−	−	−
MC 3YBHAR	+ve	−	−	−	−	−4.4900	−0.2395	−13.216	−0.6109
R ²		0.1787		0.1712		0.2017		0.1722	
Adjusted R ²		0.0760		0.0677		0.1019		0.0687	
F-statistics		1.7405		1.6536		2.0215		1.6638	
p-value		0.0774		0.0978		0.0354		0.0951	
F-statistics									

Source: Based on Thomson Reuters Datastream and IPO Prospectuses on Bursa Malaysia. URL: https://www.bursamalaysia.com/bm/market_information/announcements/firm_announcement?firm=5284.

Note: Asterisks ***, **, and * indicate significant at 1 percent, 5 percent, and 10 percent, respectively.

streams, are perceived to have limited growth, making them less attractive to speculative investors seeking quick gains during the IPO window. This perception reduces the likelihood of larger-cap firms being subscribed as high as small-cap firms, making larger firms to experience less favourable long-term performance post-IPO.

On the other hand, firms with higher IPOPRO are found to be entailed with performance deterioration and declining shareholder value, which discourages investors from subscribing to such shares post-IPO, negatively influencing firms' long-term performances and longevity. In fact, IPOPRO especially allocated for growth may seem attractive, but the use of IPO proceeds may also lead to a lack of value generation, seen as the possibility of high cash flow volatility, leading to investors' speculation and firms' unsustainability [52]. The negative relationship between TOTA and firms' long-term performance can be related to the underutilised resources argument highlighted in Ahmad et al. [53]. Other reasoning may be due to the fact that firms with higher TOTA may also have a choice to voluntarily delist themselves from the share market. The negative relationship between KLCI performance

(MC 3YCAAR) and long-term performance can be explained by the raised performance benchmark for all firms during strong market performance [54]. When general indices such as the FBMKLCI returns are high, investors expect firms to match or outperform the market average. If the firms fail to deliver growth or financial results that justify their valuations, especially in comparison to other established listed firms, investors will shift their interests to more well-performing firms. The other independent variables showed inconsistent significance across different models, which suggests they may not be as robust or central for explaining the variation in CAAR and BHAR.

5. Conclusion

We investigate how pre-IPO Environmental, Social, and Governance (ESG) disclosure affects the long-run performance of firms newly listed on the Malaysian stock market. Drawing on a sample of 100 IPOs from 2012 to 2019, we employ event-time modelling to investigate whether voluntary ESG disclosure serves as a reliable indicator of sustainable performance following listing. Contrary to expectations, our results consistently

Table 3

Multiple regression analysis of ENV, SOC, and GOV and long-term performance models (Newey-west test)

Variables	Exp. Sign	Model 3: CAAR – E, S, G		Model 4: CAAR –E, S, G		Model 7: BHAR – E, S, G		Model 8: BHAR – E, S, G	
		Coefficient	t-stats	Coefficient	t-stats	Coefficient	t-stats	Coefficient	t-stats
Main Independent Variables									
ENV	+ve	-0.0800	-0.2281	-0.1456	-0.3906	-0.2081	-0.9501	-0.3420	-0.7764
SOC	+ve	-0.3684	-1.7253*	-0.2980	-1.1420	-0.3349	-1.8044*	-0.0772	-0.1790
GOV	+ve	0.1227	0.4096	0.1201	0.2182	0.0471	0.1294	0.9793	0.9059
Other Independent Variables									
INOP	+ve	-0.5265	-3.1928***	-	-	-0.4549	-3.2600***	-	-
INCL	+ve	-	-	-0.0054	-3.1883***	-	-	1.0827	1.6585*
MKTCAP	+ve	-0.0007	-0.4071	-0.0871	-1.4384	-0.0545	-1.3046	-0.1818	-2.0024**
AGE	+ve	-0.5986	-1.7396*	-0.0049	-0.9214	-0.0050	-1.1519	0.0077	0.6961
IPOPRO	+ve	-0.0008	-1.7417*	-0.0007	-1.9581**	-0.0007	-1.9345*	0.0043	0.3060
USHARE	+ve	-0.1240	-0.5718	-0.2082	-0.7140	-0.4828	-1.1096	-0.3407	-1.7021*
INSRET	+ve	0.0020	0.8248	0.0023	0.6962	0.0017	0.7364	0.0077	1.2181
TOTA	+ve	0.0704	1.4798	0.1141	1.9836**	0.0979	2.2187**	0.2454	2.3120**
LEVERAGE	-ve	0.0043	0.2360	0.0022	0.1442	0.0062	0.4241	-0.0173	-0.8789
SECTOR	-ve	0.1283	0.6985	0.2857	1.1482	0.1168	0.7072	1.0518	1.3030
MC 3YCAAR	+ve	-1.9582	-2.6697***	-2.3101	-2.5868***	-	-	-	-
MC 3YBHAR	+ve	-	-	-	-	-0.0023	-1.0048	-0.0125	-1.8886*
R ²		0.1920		0.1950		0.1993		0.2303	
Adjusted R ²		0.0699		0.0734		0.0782		0.1140	
F-statistics		1.6126		1.6029		1.6464		1.9796	
p-value		0.0991		0.0999		0.0881		0.0320	
F-statistics									

Source: Based on Thomson Reuters Datastream and IPO Prospectuses on Bursa Malaysia. URL: https://www.bursamalaysia.com/bm/market_information/announcements/firm_announcement?firm=5284 (accessed on 09.09.2023).

Note: Asterisks ***, **, and * indicate significant at 1 percent, 5 percent, and 10 percent, respectively.

show that greater *ESG* disclosure in Malaysian IPOs is associated with poor long-term performance. This finding suggests that while *ESG* disclosure is intended to signal credibility and a commitment to sustainability, firms might struggle to fulfil investor expectations once listed. The observed disconnect may stem from symbolic *ESG* efforts or weak implementation, which fosters investor scepticism and undermines confidence over time. However, our analysis is constrained by the modest sample size and single-country focus.

The results further demonstrate that initial return plays a critical role in shaping long-term performance. Firms with strong first-day performance tend to experience long-run declines, supporting the argument that early sentiment-driven gains are often unsustainable. Instead of indicating quality, high initial returns appear to reflect temporary overvaluation. By focusing on a developing-market context, this study contributes to the IPO and *ESG* literature by uncovering the unintended consequences of *ESG* disclosure in settings where enforcement, stakeholder pressure, or regulatory frameworks may be

less rigid. It underscores the strategic tension facing firms: the benefit of signalling through disclosure versus the risk of failing to deliver value.

Voluntary *ESG* disclosure may result in wide variation in depth, quality, and reliability. Strengthening disclosure guidelines, particularly for *ESG* statements in IPO prospectuses, may be necessary to reduce symbolic reporting and enhance the firm's sustainability. Firms preparing for listing should ensure that *ESG* claims in their prospectuses align with their actual operational capabilities and long-term strategic plans. Since we found that heavy sustainability disclosure does not necessarily predict superior long-term performance and may even indicate potential greenwashing or capacity limitations, investors should evaluate whether *ESG* claims support financial strength, governance capability, and operational readiness. We suggest that future research should extend the investigation across Association of Southeast Asian Nations markets to enable comparative insights and examine how the role of *ESG* evolves in IPO valuation and post-listing performance over time.

REFERENCES

1. Mehmood W., Rashid R.M., Tajuddin A.H. A review of IPO underpricing: evidences from developed, developing and emerging markets. *Journal of Contemporary Issues and Thought*. 2021;11(1):1–20. DOI: 10.37134/jcit.vol11.1.2021
2. Mukhtar B., Shad M.K., Ali K., Woon L.F., Waqas A. Systematic literature review and retrospective bibliometric analysis on ESG research. *International Journal of Productivity and Performance Management*. 2025;74(4):1365–99. DOI: 10.1108/IJPPM-07–2023–0395
3. Mohammad W.M.W., Wasiuzzaman S. Environmental, social and governance (ESG) disclosure, competitive advantage and performance of firms in Malaysia. *Cleaner Environmental Systems*. 2021;2:100015. DOI: 10.1016/j.cesys.2021.100015
4. Baker E.D., Boulton T.J., Braga-Alves M.V., Morey M.R. ESG government risk and international IPO underpricing. *Journal of Corporate Finance*. 2021;67:101913. DOI: 10.1016/j.jcorpfin.2021.101913
5. Perrera W., Kulendran N. Why does underperformance of IPOs in the long-run become debatable? A theoretical review. *International Journal of Accounting and Business Finance*. 2016. URL: <http://dr.lib.sjp.ac.lk/handle/123456789/6827>
6. Ritter J.R. The long-run performance of initial public offerings. *The Journal of Finance*. 1991;46(1):3–27. DOI: 10.1111/j.1540–6261.1991.tb03743.x
7. Loughran T., Ritter J.R. The new issues puzzle. *The Journal of Finance*. 1995;50(1):23–51. DOI: 10.2307/2329238
8. Gompers P.A., Lerner J. The really long-run performance of initial public offerings: the pre-NASDAQ evidence. *The Journal of Finance*. 2003;58(4):1355–1392. DOI: 10.2139/ssrn.282757
9. Ibbotson R.G. Price performance of common stock new issues. *Journal of Financial Economics*. 1975;2:235–272. DOI: 10.1016/0304–405X(75)90015-X
10. Jenkinson T., Ljungqvist A. Going public: the theory and evidence on how companies raise equity finance. 2nd ed. New York: Oxford University Press; 2001.
11. Bird R., Yeung D. How do investors react under uncertainty? *Pacific-Basin Finance Journal*. 2012;20(2):310–327. DOI: 10.1016/j.pacfin.2011.10.001
12. Thomadakis S., Nounis C., Gounopoulos D. Long-term performance of Greek IPOs. *European Financial Management*. 2012;18(1):117–141. DOI: 10.1111/j.1468–036X.2010.00546.x
13. Yip Y., Hoque M., Su Y., Ang J.B. Effects of underwriters, venture capital and industry on long-term initial public offering performance. *Managerial Finance*. 2009;35(8):700–715. DOI: 10.1108/03074350910967240
14. Jog V., Otchere I., Sun C. Does the two-stage IPO process reduce underpricing and long-run underperformance? Evidence from Chinese firms listed in the U. S. *International Financial Markets, Institutions and Money*. 2019;59:90–105. DOI: 10.1016/j.intfin.2018.11.007
15. Fu M., Yu D., Zhou D. Secret recipe of IPO survival: ESG disclosure and performance. *Financial Markets, Institutions and Instruments*. 2023;32(1):3–19. DOI: 10.1111/fmii.12169
16. Gregory A., Guermat C., Al-Shawawreh F. UK IPOs: long-run returns, behavioural timing and pseudo timing. *Journal of Business Finance and Accounting*. 2010;37(5–6):612–647. DOI: 10.1111/j.1468–5957.2010.02182.x
17. Ali H.A.A. Behavioral timing, valuation and postissue performance of UK initial public offerings. *Journal of Behavioral Finance*. 2017;18(2):152–166. DOI: 10.1080/15427560.2017.1308938
18. Álvarez-Otero S. A European empirical study of institutional differences in IPO anomalies. *Journal of Risk and Financial Management*. 2022;16(1):8. DOI: 10.3390/jrfm16010008
19. Cai X., Liu G.S., Mase B. The long-run performance of initial public offerings and its determinants: the case of China. *Review of Quantitative Finance and Accounting*. 2008;30(4):419–432. DOI: 10.1007/s11156–007–0064–5
20. Anderson H., Chi J., Wang Q. IPO performance on China's newest stock market (ChiNext). *Chinese Economy*. 2015;48(2):87–113. DOI: 10.1080/10971475.2015.993215
21. Gupta V., Singh S., Yadav S.S. Impact of anchor investors on IPO returns during pre-market and aftermarket: evidence from India. *Journal of Advances in Management Research*. 2019;17(3):351–368. DOI: 10.1108/jamr-07–2019–0131
22. Zakaria N., Kamaludin K. Short and long-run initial public offerings (IPOs) performance in the emerging market: Evidence from Saudi Arabia share market. In: 31st International Business Information Management Association Conference Proceedings. 2018 Apr 9:25–26. URL: <https://ssrn.com/abstract=3246560>

23. Paudyal K., Saadouni B., Bristin R.J. Privatisation initial public offerings in Malaysia: initial premium and long-term performance. *Pacific-Basin Finance Journal*. 1998;6(5):427–451. DOI: 10.1016/S 0927–538X(98)00018–3
24. Jelic R., Saadouni B., Briston R. Performance of Malaysian IPOs: underwriters' reputation and management earnings forecasts. *Pacific-Basin Finance Journal*. 2001;9(5):457–486. DOI: 10.1016/S 0927–538X(01)00013–0
25. Corhay A., Teo S., Rad A.T. The long-run performance of Malaysian initial public offerings: value and growth effects. *Managerial Finance*. 2002;28(2):52–65. DOI: 10.1108/03074350210767690
26. Ahmad-Zaluki N.A., Campbell K., Goodacre A. The long-run share price performance of Malaysian initial public offerings. *Journal of Business Finance and Accounting*. 2007;34(1–2):78–110. DOI: 10.1111/j.1468–5957.2006.00655.x
27. Rahman A.S.S., Che-Yahya N. Initial and long-term performance of IPOs: Does growth opportunity matter? *Business and Economic Horizons*. 2019;15(2):276–291. DOI: 10.15208/beh.2019.17
28. Sullivan K., Bujno M. Emerging trends in ESG governance for 2023. Deloitte. 2023. URL: <https://corpgov.law.harvard.edu/2023/03/26/emerging-trends-in-esg-governance-for-2023/>
29. Hung T.N., Trung N.D. Factors shaping the future of the global economy and finance. *Review of Business and Economics Studies*. 2024;12(1):6–15. DOI: 10.26794/2308–944x-2024–12–1–6–15
30. Kumar P.C. ESG compliant companies provide superior returns. *The Star*. 2020, Feb 29. URL: <https://www.thestar.com.my/business/business-news/2020/02/29/esg-compliant-companies-provide-superior-returns>
31. Emon M.M.H., Khan T. Corporate social responsibility for sustainable development: a systematic review. *Review of Business and Economics Studies*. 2025;13(2):6–39. DOI: 10.26794/2308–944x-2025–13–2–6–39
32. Sadiq M., Singh J., Raza M., Mohamad S. Impact of environmental, social and governance index on firm value: evidence from Malaysia. *International Journal of Energy Economics and Policy*. 2020;10(5):555–562. DOI: 10.32479/ijep.10217
33. Slager R., Chapple W. Carrot and stick? The role of financial market intermediaries in corporate social performance. *Business and Society*. 2015;55(3):361–397. DOI: 10.1177/0007650315575291
34. Wong J.B., Zhang Q. Stock market reactions to adverse ESG disclosure via media channels. *The British Accounting Review*. 2022;54(1):101045. DOI: 10.1016/j.bar.2021.101045
35. Agustina L., Clara A. An investigation of IPOs initial performance in the Indonesian market. *Global Business Review*. 2025;26(1):101–19. DOI: 10.1177/0972150920976640
36. Cao J., Titman S., Zhan X., Zhang W. ESG preference, institutional trading, and stock return patterns. *Journal of Financial and Quantitative Analysis*. 2023;58(5):1843–77. DOI: 10.1017/S 0022109022000916
37. Hardiningsih P., Januarti I., Yuyetta E.N.A., Srimindarti C., Udin U. The effect of sustainability information disclosure on financial and market performance: evidence from Indonesia and Malaysia. *International Journal of Energy Economics and Policy*. 2020;10(2):18–25. DOI: 10.32479/ijep.8520
38. Ong C.Z., Mohd-Rashid R., Mehmood W., Tajuddin A.H. Does disclosure of earnings forecasts regulation affect the valuation of IPOs? *Asian Review of Accounting*. 2021;29(4):558–578. DOI: 10.1108/ara-09–2020–0142
39. Zheng S.X., Li M. Underpricing, ownership dispersion, and aftermarket liquidity of IPO stocks. *Journal of Empirical Finance*. 2008;15(3):436–454. DOI: 10.1016/j.jempfin.2007.08.001
40. Abdullah Y., Ahmad-Zaluki N.A., Rahim N.A. Supply chain strategy in initial public offering in Malaysia: a review of long-run share price performance. *International Journal of Supply Chain Management*. 2019;8(4):642–52. DOI: 10.59160/ijscm.v8i4.3548
41. Nicolo G., Zampone G., De Iorio S., Sannino G. Does SDG disclosure reflect underlying sustainability performance? *Journal of International Financial Management and Accounting*. 2023;35(1):214–260. DOI: 10.1111/jifm.12194
42. Abbas Y.A., Ahmad-Zaluki N.A., Mehmood W. From disclosure to sustainable performance: how CSR disclosure impacts the long-term share price performance of Malaysian IPOs. *Management of Environmental Quality: An International Journal*. 2024;35(3):653–683. DOI: 10.1108/meq-06–2023–0186
43. Wengerek S.T., Uhde A., Hippert B. Share price reactions to tariff imposition announcements during the first Trump administration. *Finance Research Letters*. 2025;80:107381. DOI: 10.1016/j.frl.2025.107381
44. Vogelvang B. Econometrics: theory and applications with E-Views. London: Pearson Education; 2005.
45. Yusoff Z.Z., Bahrudin N.Z., Ismail I., Bujang I., Che Yahya N., Sundram V.P.K. Quantitative research methods. Malaysia Logistic Supply Chain Association; 2022.

46. Tan E. J. Regulations: should Malaysia have a law against greenwashing? *The Edge Malasia*. 2023. URL: <https://theedgemalaysia.com/node/755304>
47. Lin W.L., Chong S.C., Pek C.K., Yong J.Y., Ming K.L.Y., XeChung N.L. The impact of greenwashing: risks and implications. In: Proc Int Conf Environmental, Social, and Governance (ICESG). 2025:77–94. DOI: 10.2991/978-2-38476-358-0_8
48. Tingle B.C. Hard lessons in corporate governance. Part I: What do we know about corporate governance practices? Cambridge University Press; 2024.
49. Funaoka K., Nishimura Y. Private information, investor sentiment, and IPO pricing. *Emerging Markets Finance and Trade*. 2018;55(8):1722–1736. DOI: 10.1080/1540496x.2018.1484355
50. Lafrance A. Are small firms more profitable than large firms? *Economic Insights Series. Canada*. 2012;1–2. DOI: 10.2139/ssrn.2141849
51. Nguyen L.N.M., Pham M.T. Determinants of stock market prices: empirical evidence in Vietnam. *Economic Insights-Trends and Challenges*. 2022;3:11–20. DOI: 10.51865/eitc.2022.03.02
52. Alyasa-Gan S.S., Che-Yahya N. Intended use of IPO proceeds and survival of listed companies in Malaysia. *Journal of Risk and Financial Management*. 2022 Mar 18;15(3):145. DOI: 10.3390/jrfm15030145
53. Ahmad I., Ismail I., Shaharuddin S.S. Predictive role of ex ante strategic firm characteristics for sustainable IPO survival. *Sustainability*. 2021;13(14):8063. DOI: 10.3390/su13148063
54. Peristiani S., Hong G. Pre-IPO financial performance and aftermarket survival. *Current Issues in Economics and Finance*. 2004;10(2):1–7. URL: <https://www.newyorkfed.org/newsevents/news/research/2004/rp040304>

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Theoretical Approaches to Evaluating the Annual Reports of Islamic Financial Institutions

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ABSTRACT

Russian financial institutions participating in the experiment on the development of partnership financing have started to increase the volume of transactions based on Islamic principles since 2023. Among them are banks and other public organizations. In this sector, it is especially important to take into account the long-term experience accumulated by Islamic financial institutions in disclosing information about their activities in annual reports. The **purpose** of the study is to assess the disclosure of information about the activities of Islamic financial institutions in annual reports and to develop theoretical approaches to its improvement for further use by Russian participants in partnership financing. The work uses comparative and deductive analysis **methods**, as well as logical and systemic approaches. The authors assessed the disclosure of information in annual reports by Islamic financial institutions based on more than 30 ratios grouped by categories of profitability, liquidity, asset quality, and capital adequacy. The authors identified the key indicators that Islamic financial institutions present to stakeholders for making investment decisions based on the information in annual reports. The **results** show that for investors of financial organizations, including those operating on the principles of the “Islamic window” (including Russian organizations participating in partnership financing), it will be constructive to disclose key indicators of Islamic financing operations in terms of six indicators (the CAMEL model modified by the authors) and five adjusted indicators of the performance index of these operations (Islamic Performance Index). The main **conclusion** of the study is the thesis on the need to adapt the modified CAMEL model by Russian participants in partnership financing to improve the quality of information disclosed in annual reports on their business models and attract investor funds to the industry.

Keywords: Islamic finance; annual report; key financial indicators; partner financing; AAOIFI standards; partner financing organizations; evaluation of annual reports

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Теоретические подходы к оценке годовых отчетов исламских финансовых организаций

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АННОТАЦИЯ

Российские финансовые организации, являющиеся участниками эксперимента по развитию партнерского финансирования начиная с 2023 г. стали наращивать объемы сделок по исламским принципам. Среди них есть банки и другие публичные организации. В этом секторе особенно важно учитывать накопленный исламскими финансовыми организациями многолетний опыт по раскрытию в годовых

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отчетах информации об их деятельности. **Целью** исследования является оценка раскрытия информации в годовых отчетах о деятельности исламских финансовых организаций и разработка теоретических подходов к ее совершенствованию для применения в дальнейшем российскими участниками партнерского финансирования. В работе использованы **методы** сравнительного и дедуктивного анализа, а также логические и системные подходы. Авторы проводят оценку раскрытия информации в годовых отчетах исламскими финансовыми организациями на основе более чем 30 коэффициентов, сгруппированных по категориям рентабельности, ликвидности, качества активов, достаточности капитала. Определены ключевые показатели, которые исламские финансовые организации представляют заинтересованным сторонам для принятия инвестиционных решений на основе информации, содержащейся в годовых отчетах. **Результаты** показывают, что для инвесторов финансовых организаций, в том числе функционирующих по принципам «исламского окна» (включая организации российских участников партнерского финансирования), будет конструктивно раскрывать ключевые показатели операций исламского финансирования в разрезе шести показателей (модифицированной авторами модели CAMEL) и пяти скорректированных авторами показателей индекса результативности этих операций (Islamic Performance Index). Основным **выводом** исследования является тезис о необходимости адаптации, модифицированной авторами модели CAMEL, российскими участниками партнерского финансирования с целью повышения качества раскрываемой в годовых отчетах информации об их бизнес-моделях и привлечения в отрасль средств инвесторов.

Ключевые слова: исламское финансирование; годовой отчет; ключевые финансовые показатели; партнерское финансирование; стандарты AAOFI; организации партнерского финансирования; оценка годовых отчетов

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Introduction

Annual reports are the main source of information about the activities and financial condition of an organization. The formation and publication of annual reports by Islamic banks, as well as traditional ones, is intended to obtain high-quality information for making investment decisions.

The quality of the annual report determines the understanding of the bank's business model, the effectiveness of its activities, and prospects for further development. Consequently, the issues of assessing annual reports are becoming increasingly relevant under modern conditions.

In the Russian Federation, a number of large banks (Public Joint Stock Company (PJSC) AK BARS Bank, PJSC Sberbank, PJSC Joint Stock Commercial Bank (JSCB) Metallinvestbank, Joint Stock Company (JSC) Tbank, PJSC ZENIT Bank, PJSC Credit Bank of Moscow, JSC Timer Bank) have been operating to varying degrees for two years of the experiment in developing partner financing operations. At the same time, their annual reports often do not include substantive and financial components that allow evaluation of the effectiveness of partner financing operations.

The purpose of the study is to evaluate the annual reports of Islamic banks for the selection

of the best global practices for disclosing key financial indicators (financial highlights) and develop recommendations for their application by Russian partner financing organizations.

To achieve this goal, we will identify and solve the following tasks:

1. To analyze the indicators that the management of institutions selects as key financial metrics for the purpose of communicating them to investors in annual reports.
2. To determine the compliance of such indicators with the interests of investors by comparing the actually presented indicators with those proposed by researchers for disclosure.
3. To suggest areas for applying foreign experience in disclosing key financial indicators in the annual reports of Islamic financial organizations for Russian participants in partner financing.

The scientific novelty lies in determining the composition of indicators that best convey the specificity of partner financing operations and their effectiveness in the annual reports of Islamic financial organizations.

The practical significance lies in the development of recommendations for Russian organizations operating according to the principles of the "Islamic window" on the disclosure of infor-

mation on partner financing in annual reports, which will significantly improve the quality of such reports.

Literature review

Issues of Islamic finance have long been in the field of scientific interest of researchers from different countries. They are concerned with the performance of Islamic banks in comparison with classical banks, which, for example, is reflected in the work of S. Zulfiqar et al. (2025) [1].

Investor interest in the performance perceptions of Islamic financial institutions remains consistently high. U. Berto et al. (2024) highlight the impact of investor attention on the performance of public companies listed on the Indonesian Stock Exchange [2].

An important scientific problem is also the risk of non-compliance by banks' activities with Islamic principles, which can be seen in the work of M.A.A. Sarker [3].

Researchers are looking for answers to many questions that concern investors in the annual reports of Islamic financial institutions. The annual report of any company, including Islamic financial institutions, discloses information about the company's activities, corporate governance, and financial information. Current approaches to evaluating annual reports include an analysis of which sections have priority value in the eyes of the investor.

Thus, Al-Ajmi (2009) wrote that the profit and loss statement and the balance sheet are perceived as the two most important sections of the annual report [4]. S. Das and S. Das (2017) [5], in their study on evaluating the usefulness of annual reports for investors to analyze the performance of companies, argued that the balance sheet was designated the second most important section of the annual report for investment decision-making in all studies [2], with the exception of Lee and Tweedie (1977), who found that the report of the chairman of the board of directors was more important than the balance sheet in the UK [6]. According to the results of research by L. S. Chang et al. (1983), for making purchase decisions, individual investors considered the review of a company over the past 5–10 years more useful than the income statement and balance sheet [7].

Since most researchers agree that financial information is more useful for investors than non-financial information in the annual report, the approaches we are developing follow in line with their predecessors. Our proposed approach to evaluation is to assess the quality of the analytical nature of the annual report. The annual report contains detailed information about the financial position and financial results of the organization, after analyzing which management determines which indicators should be communicated to investors. For this purpose, the annual report usually includes a subsection with the disclosure of key financial indicators (financial highlights) for 3–5 years. But the quality of disclosure of such indicators varies. Some institutions limit themselves to presenting the dynamics of absolute indicators of financial position and financial results, which reduces the analytical capabilities of the annual report. Other institutions disclose both absolute and relative performance indicators. Still others go further and structure relative metrics into groups of metrics. At the same time, researchers pay insufficient attention when answering the question: which indicators should be the key financial indicators in the annual reports of Islamic banks?

To date, the databases of peer-reviewed scientific literature have accumulated an impressive pool of studies devoted to various methods of analyzing the effectiveness of Islamic banks. So, S. Akter et al. argued that the most important financial indicators that users of annual reports of Islamic banks are guided by include return on assets, return on capital, leverage, return on costs and asset turnover [8]. M. T. Majeed et al. tended to use such coefficients as profitability and return on capital, the ratio of loans issued to deposits attracted, the share of loans issued in the total amount of bank assets, capital adequacy and leverage ratios, and the ratio of liabilities to assets [9]. Masruki et al., in their analysis comparing the performance of Islamic and traditional banks, analyzed more than 30 indicators, grouping them into four groups: asset quality indicators, capital adequacy ratios, profitability and liquidity [10].

The need to evaluate the performance of Islamic banks using the CAMEL model (a globally recognized system for measuring bank perfor-

mance) in the context of five groups of indicators is indicated by such authors as Hanif et al. [11–13], Rozzani (2013) [14], Hazman et al. [15], Islam and Ashrafuzzaman (2015) [16] and other researchers.

The risk profile, good corporate governance, earnings, and capital (RGEC) model (a model for predicting the critical financial position of a bank) is also widely described in the literature, which requires identifying four groups of indicators: the bank's risk profile (the ratio of problem debts and financing to deposits), problem financing (the share of problem debts to issued financing), capital adequacy, and profitability [17–19].

Without detracting from the contribution of our predecessors, our research is aimed at filling in the gap regarding the actual problem of choosing financial indicators by managers of Islamic banks, which should be communicated in annual reports for various groups of stakeholders of Islamic financial institutions. The paper provides an assessment of the quality of analytical information disclosed in annual reports, as well as recommendations for using the results of evaluating annual reports by Russian organizations participating in the partner financing experiment.

Methodology

The aim of the study is to evaluate the annual reports of Islamic banks for selecting the best global practices for disclosing key financial indicators (financial highlights) and develop recommendations for their use by Russian partner financing organizations.

To achieve the goal of the study we use the following methods:

- a method of analyzing scientific literature to study the current state of a scientific research problem;
- comparative analysis methods for studying the indicators that the management of institutions chooses as key financial indicators in order to communicate them to investors in annual reports;
- methods of comparing the indicators actually disclosed with those proposed by researchers for disclosure, in order to determine whether such indicators correspond to the interests of investors;

- logic method for identifying opportunities to apply many years of foreign experience in preparing and evaluating annual reports of Islamic financial organizations for Russian partner financing organizations.

Results

As part of the study, we analyzed the key financial indicators (financial highlights) that Islamic financial organizations communicate to stakeholders to make investment decisions based on information contained in annual reports. The results of this analysis are presented in *Table 1*.

As can be seen from *Table 1*, there are no unified approaches to identifying analytical indicators in annual reports, which reduces the analytical capabilities of annual reports. Thus, 4 out of 18 Islamic banks studied did not disclose relative performance indicators as part of key financial indicators. 17 out of 18 banks (with the exception of Jordan Islamic Bank) do not disclose deposit returns as part of key financial indicators, which may indicate that the annual report is more focused on the interests of the bank's shareholders rather than depositors. Comparing the dividend yield and the deposit account yield in the key financial indicator's subsection (rather than in different subsections of the annual report) would allow users to decide whether to join the bank as a shareholder or depositor.

The disclosed ratios differ significantly both in cross-country and intra-country terms, which also makes it difficult for users to make decisions about investments in a particular bank.

We will analyze the inclusion of certain relative indicators in the key financial indicators for a total sample of 18 Islamic banks.

The results of the analysis are presented in *Table 2* and ranked by frequency of occurrence.

As can be seen from *Table 2*, disclosure of asset quality indicators is not widely used in the Financial Highlights subsection, which may be due to the fact that the share of problem debts must be disclosed as part of these indicators, and this information may be quite sensitive to investors. On the one hand, these indicators can be obtained by users by analyzing other sections of the annual report. On the other hand, since ratios are an important indicator of a bank's financial health, they should be analyzed in

Table 1

Key financial indicators communicated to stakeholders by Islamic financial institutions on the effectiveness of their activities through annual reports (2023)

Name of the bank	Country of residence of the bank	Set of financial accounting and reporting standards for the annual report	What absolute financial indicators are presented	What relative financial indicators are presented
Al Rajhi Bank	Saudi Arabia	International Financial Reporting Standards (IFRS)	Total assets, financing, total liabilities, equity, customer deposits, financial and investment income (net), total operating income, total operating expenses, net profit	Earnings per share (EPS), Total capital adequacy ratio adequacy ratio Capital adequacy ratios (Tier 1, Tier 1 and Tier 2) Return on average annual capital (ROAE) Return on average annual assets (ROAA)
Saudi National Bank	Saudi Arabia	IFRS	Total assets, financing and advances, total equity, customers deposits, net income	Return on Net Special Commission (NSCI margin) Cost to income ratio, Cost of risk, Capital adequacy ratios (Tier 1) Return on tangible equity Earnings per Share (EPS), Share of distressed assets (NPL ratio 1) Capital Adequacy Ratio (CAR) Total liquidity coverage ratio Net stable funding ratio And other indicators
Saudi Awwal Bank	Saudi Arabia	IFRS	Total Assets, Equity, Loans and Advances (net), Customer deposits, Net income after Zakat and Income tax	Return on tangible equity Tier1 Capital Ratio1 ratio
Abu Dhabi Islamic Bank	UAE	IFRS	Revenues, Net profit, Total Assets, Deposits, Gross Customer Financing	Return on Equity (ROE), Cost – Cost to income ratio, Earnings per Share (EPS), Net profit margin, Cost of risk, Return on average annual capital (ROAE) Return on average annual assets (ROAA) Tier One Capital Ratio (CET1 ratio)
Tamweel P.S.C.	UAE	IFRS	Operating income, Net Profit, Islamic Financial and Investing Assets, Total Equity	-
Kuwait Finance House	Kuwait	IFRS	Total Operating Income, Operating Income (net), Finance Income (net), Net Income, Total Assets, Financing Receivables, Depositors Accounts, Shareholders' Equity	-
Maybank	Malaysia	Malaysian Financial Reporting Standards	Total Assets, Net Income, Net operating Income, amount of Deposits,	Return on Equity (ROE), Tier 1 Capital Ratio (CET1 ratio) Earnings per share (EPS), Dividend yield Share of non-performing loans

Table 1 (continued)

Name of the bank	Country of residence of the bank	Set of financial accounting and reporting standards for the annual report	What absolute financial indicators are presented	What relative financial indicators are presented
Hongkong and Shanghai Banking Corporation (HSBC) Amanah Malaysia Berhad	Malaysia	Malaysian Financial Reporting Standards	Profit before tax, Total Assets	Коэффициенты достаточности Capital adequacy ratios (Common Equity Tier 1 capital ratio, Tier 1 capital ratio, Total capital ratio)
Commerce International Merchant Bankers Berhad (CIMB) Islamic Bank Berhad	Malaysia	Malaysian Financial Reporting Standards	Profit after tax and zakat	–
City Islamic Investment Bank E.C.	Bahrain	Financial Accounting Standards (FAS) AAOIFI	Total Income, Profit for the year, Total assets, Total equity	Earnings per Share (EPS), Cost to income ratio, Return on average annual capital (ROAE) Return on Average Annual Assets (ROAA)
Bahrain Islamic Bank	Bahrain	FAS AAOIFI	Net profit, other income, owners' equity, total Islamic finances	Earnings per share (EPS), Cost to income ratio, Return on average annual capital (ROAE) Return on average annual assets (ROAA) Leverage (equity to total assets) Capital Adequacy Ratio (CAR)
ABC Islamic Bank	Bahrain	FAS AAOIFI	Indicators not allocated separately	Indicators not allocated separately
Al Baraka Islamic Bank	Bahrain	FAS AAOIFI	Total assets, investments, net income	Return on Equity (ROE), Return on Assets (ROA) Efficiency, Earnings per Share (EPS), Share of gross and net problem assets (Gross NPA, Net NPA) Capital Adequacy Ratio (CAR)
Al Salam Bank	Bahrain	FAS AAOIFI	Total assets, equity, net operating income, net profit	Cost to income ratio, Earnings per share (EPS)
Safwa Islamic Bank	Jordan	FAS AAOIFI	Assets, deposits, financing receivables and ijara, shareholders' equity, total revenues, gross income, net profit	Return on average annual capital (ROAE) Return on average annual assets (ROAA) Cost to income ratio, Earnings per share (EPS)) Share of bad debt Leverage (capital – to-assets ratio) Operating leverage (the ratio of revenue to the difference between revenue and fixed costs) Branch productivity (the ratio of assets to the total number of branches of the bank) Employee productivity (the ratio of assets per employee) Dividend yield

Table 1 (continued)

Name of the bank	Country of residence of the bank	Set of financial accounting and reporting standards for the annual report	What absolute financial indicators are presented	What relative financial indicators are presented
Jordan Islamic Bank	Jordan	FAS AAOIFI	Total assets, cash on hand and in banks, total financing and investment balances, total deposits, equity, profits of joint investments, profit before tax	Capital adequacy ratio (CAR) Return on deposit accounts in national and foreign currency Dividend Yield
Ahli Bank Saog	Oman	IFRS, FAS AAOIFI	Total assets, total equity, total deposits, loans and advances and financing (net), operating income, operating expenses, net profit	Return on Equity (ROE)
Standard Chartered Bank (Pakistan) Limited	Pakistan	Accounting and Reporting Standards of Pakistan	Total income, profit before tax and after tax, total assets, investments, deposits, equity, non-performing loans, provisions and write-offs	Return on Equity (ROE), Return on Assets (ROA) Cost to income ratio, Earnings per share (EPS), Dividend payout ratio payout ratio Advances to deposits ratio, NPL to gross advances, Capital Adequacy Ratio (CAR)

Source: Compiled by the authors.

conjunction with other performance ratios of the organization.

From the point of view of standardizing ratios for the purpose of disclosing key financial indicators in Financial Highlights, it should be noted that most modern researchers use the CAMEL model. Thus, the need to evaluate the performance of Islamic banks using this model is indicated by such authors as Hanif et al. [11–13], Rozzani (2013) [14], Hazman et al. [15], Islam and Ashrafuzzaman (2015) [16], Calandra D. [17], Rahmawati S. [18], Abdullah A. [19], Fitriana [20].

Thus, Muhammad Hanif developed the CAMEL model and proposed five financial ratios for analyzing the activities of an Islamic bank, as shown in Table 3.

The results of the analysis of compliance of the disclosed key financial indicators with the CAMEL model are presented in Table 4.

According to Table 4, only one bank out of 18 fully followed the CAMEL model — Saudi National Bank when disclosing key financial indicators, followed by Standard Chartered Bank (Pakistan) Limited with four out of five groups of

Table 2

The most common key ratios in the financial highlights subsection of the annual reports of Islamic banks

Ratios	Number of banks that have included the indicator in key financial indicators (financial highlights)
Capital adequacy ratios	10
Return on equity	9
Earnings per share	8
Return on assets	7
Return on costs	7
Asset quality ratios	5

Source: Compiled by the authors.

Table 3

CAMEL model ratios interpreted by Muhammad Hanif

Author	Proposed ratios				
Hanif	Capital Adequacy	Asset Quality	Management Performance	Earnings	Liquidity
	Capital adequacy ratio	Share of bad debts in total amount of financing issued	Return on costs	Return on capital	Share of liquid assets in total amount of assets

Source: Compiled by the authors.

Table 4

Compliance of the disclosure of indicators of Islamic banks with the CAMEL model in the subsection Financial Highlights of the annual report

Bank Name	Capital Adequacy	Asset Quality	Management Performance	Earnings	Liquidity	Number of indicator groups (maximum 5)
Al Rajhi Bank	+	–	–	+	–	2
Saudi National Bank	+	+	+	+	+	5
Saudi Awwal Bank	+	–	–	+	–	2
Abu Dhabi Islamic Bank	+	–	+	+	–	3
Tamweel P.S.C.	–	–	–	–	–	0
Kuwait Finance House	–	–	–	–	–	0
Maybank	+	+	–	+	–	2
HSBC Amanah Malaysia Berhad	+	–	–	–	–	1
CIMB Islamic Bank Berhad	–	–	–	–	–	0
City Islamic Investment Bank E.C.	–	–	+	+	–	2
Bahrain Islamic Bank	+	–	+	+	–	2
ABC Islamic Bank	–	–	–	–	–	0
Al Baraka Islamic Bank	+	+	–	+	–	3
Al Salam Bank	–	–	+	+	–	2
Safwa Islamic Bank	–	+	+	+	–	3
Jordan Islamic Bank	+	–	–	+	–	1
Ahli Bank Saog	–	–	–	+	–	1
Standard Chartered Bank (Pakistan) Limited	+	+	+	+	–	4
Total	10	5	7	13	1	–

Source: Compiled by the authors.

indicators. Most of the other banks chose capital adequacy and profitability ratios as their basic financial indicators.

At the same time, it is necessary to unify the approaches to disclosing key financial indicators in the annual reports of Islamic banks.

Standardization of analytical indicators by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) could serve as a solution to these problems. This organization could develop standards for the formation and presentation of information in annual reports in order to implement the principle of transparency of information declared in the AAOIFI governance standards.

To develop such standards and highlight the disclosed indicators in the annual reports of Islamic banks, it is necessary to attract highly qualified personnel with both practical competencies and theoretical knowledge of modern methods of financial analysis. In this regard, the practice of Safwa Islamic Bank (Jordan) is noteworthy. As follows from the analysis of the contents of the bank's annual report, the Chairman of the Board of Directors is a Doctor of Science in economics, and of the 11 members of the Board of Directors, six have academic degrees, including one in accounting. Analytical indicators in the annual report of Safwa Islamic Bank are grouped in three areas: profitability ratios, asset quality ratios and labor productivity ratios.

The approaches developed in the AAOIFI standard could also be used as a basis by Russian participants in partner financing, who have yet to disclose information about Islamic financial transactions in their annual reports [21].

It is obvious that large banks among the Russian participants in partner financing need to disclose the ratios that would make it possible to form an all-Russian rating of partner financing organizations [22].

Despite the widespread use of the CAMEL model, it does not contain the necessary specification of ratios. These ratios differ from bank to bank. For Russian companies, we propose to disclose the following six ratios in the annual report as part of key financial indicators:

- financial leverage;
- the share of bad debts in the total amount of financing;
- current liquidity ratio;

- return on equity;
- cost-effectiveness;
- asset turnover.

The proposed approach is based on the use of ratios that are used in the analysis of both traditional and Islamic banks. At the same time, it is important to highlight a problem in annual reports: there is a lack of unified approaches for disclosing ratios that are specific to Islamic banks.

Hameed offered an Islamic Performance Index, which is based on the analysis of ratios such as:

- profit sharing ratio (the ratio of the bank's ability to issue financing under profit sharing agreements) — the share of financing under musharakah and mudarabah agreements in the total amount of financing);
- zakat efficiency ratio (the ratio of zakat paid to equity);
- fair distribution ratios of funds. The purpose of the calculation is to determine the share of funds allocated by the Islamic bank to certain groups of individuals: the share of Kard Hassan and charity expenses in revenue net of taxes and zakat, the share of employees' salaries in revenue net of taxes and zakat, the share of dividends in revenue net of taxes and zakat, the share of net profit in revenue net of taxes and zakat;
- the share of halal investments in the total amount of investments;
- the share of halal income in total income [23–25].

Instead of the zakat efficiency ratio, we suggest disclosing in the annual report the rate of zakat growth in relation to the increase in equity. An Islamic financial institution should have a faster growth rate of zakat compared to the growth of equity, since in this situation the incentive role of zakat will be fulfilled.

As follows from our analysis of the annual reports of 18 Islamic banks, performance indicators based on Islamic principles or similar to them are practically not represented in key financial indicators. The inclusion of such indicators in the annual reports of Russian partner finance organizations seems to us a necessary solution to improve their quality as an effective mechanism for protecting the interests of investors.

Conclusions

Based on the results of a critical assessment of experience in the formation and disclosure of information by Islamic financial organizations, we recommend in this article that Russian organizations providing partnership financing include in their annual reports:

- six indicators (financial leverage, the share of problem debts in the total amount of financing, the current liquidity ratio, return on equity, the ratio of expenses and income, asset turnover);

- as well as five indicators of the efficiency index adjusted by us according to Islamic principles (the profit distribution ratio, the growth rate of zakat compared to the growth of equity, fair distribution ratios, the share of halal investments in the total amount of investments, the share of halal income in the total amount of income).

In order to further develop partnership financing in Russia, it is necessary to create a rating of participants in this sector based on the key financial indicators proposed for formation and disclosure in their annual reports.

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REFERENCES

1. Zulfiqar S., Alqatan A., Alsaber A. R., Al-Sabah M., Alshammari T., El-Halaby S. Islamic and conventional banks' governance in the GCC region: A comparative analysis of risk-based financial performance. *Journal of Governance and Regulation*. 2025;14:254–264. DOI: 10.22495/jgrv14i2siart4
2. Berto U., Muhammad G. H., Ridwan N., Baihaqi S. A. Exploring investor attention in Shariah markets, macroeconomic influences, and corporate performance: Insights from Indonesia. *Social Sciences and Humanities Open*. 2024;10:101015. URL: <https://doi.org/10.1016/j.ssaho.2024.101015>
3. Sarker M. A. A. Shari'ah non-compliance risks in Islamic banking: Concept, significance and management methodology. *Thoughts on Economics*. 2022; 32(03–04):7–35. URL: <https://www.ierb-bd.org/wp-content/uploads/2023/02/Corrected-Article-on-Shariah-Non-Compliance-for-IERB-Journal.pdf> (accessed on 09.07.2025).
4. Al-Ajmi J. Investors' use of corporate reports in Bahrain. *Managerial Auditing Journal*. 2009;24(3):266–289. URL: <https://econpapers.repec.org/article/ememajpps/02686900910941140.htm> (accessed on 02.02.2025).
5. Das S., Das S. The usefulness of annual report to evaluate the performance of companies: Investors perspective. *The Bangladesh Accountant*. 2017. Available at SSRN. URL: <https://ssrn.com/abstract=3605613> (accessed on 02.02.2025).
6. Lee T. A., Tweedie D. P. The private shareholder and the corporate report, the institute of chartered accountants in England and Wales. 1977. URL: https://link.springer.com/chapter/10.1007/978-1-349-16515-5_4 (accessed on 02.02.2025).
7. Chang L. S., Brain C. W. The utility of annual reports: An international study. *Journal of International Business Studies*. 1983;14(1):63–84. URL: <https://doi.org/10.1057/palgrave.jibs.8490507>
8. Akter S., Rahman Md, Subat A., Rahman M. Assessing the performance of selected Islamic banks: Evidence from Bangladesh. *International Business Education Journal*. 2021;14(2):101–123. DOI: 10.37134/ibej.vol14.2.9.2021
9. Majeed M. T., Zainab A. A comparative analysis of financial performance of Islamic banks vis-à-vis conventional banks: Evidence from Pakistan, *ISRA International Journal of Islamic Finance*. 2021;13(3):331–346. URL: <https://www.emerald.com/insight/content/doi/10.1108/ijif-08-2018-0093/full/html> (accessed on 02.02.2025).
10. Masruki R., Ibrahim N., Osman E., Wahab H. A. Financial performance of Malaysian founder Islamic banks versus conventional banks. *Journal of Business and Policy Research*. 2011;6(2):1–13. URL: https://www.academia.edu/83681242/Financial_Performance_of_Islamic_Banks_in_Pakistan (accessed on 02.02.2025).

11. Hanif M. Performance evaluation of Islamic banking services industry: Evidence from GCC. *Journal of Risk and Financial Management*. 2024;17:523. URL: <https://doi.org/10.3390/jrfm17110523>
12. Hanif M., Muhammad N.F. Objective performance evaluation of the Islamic banking services industry: Evidence from Pakistan. *ISRA International Journal of Islamic Finance*. 2023;15:38–59. URL: <https://journal.inceif.edu.my/index.php/ijif/article/view/541> (accessed on 02.02.2025).
13. Hanif M., Mahvish T., Arshia T., Wajeeh-ul-Momeneen. Comparative performance study of conventional and Islamic banking in Pakistan. *International Research Journal of Finance and Economics*. 2012;83:62–72. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1959950 (accessed on 02.02.2025).
14. Rozzani N., Rashidah A.R. Camels and performance evaluation of banks in Malaysia: Conventional Versus Islamic. *Journal of Islamic Finance and Business Research*. 2013;2(1):36–45. URL: https://www.academia.edu/30047375/Camels_and_performance_evaluation_of_banks_in_Malaysia_conventional_versus_Islamic (accessed on 02.02.2025).
15. Hazman S., Nawawi M.N., Zairihan A.H., Md Said A.S. Financial performance evaluation of Islamic banking system: A comparative study among Malaysia's banks. *Journal Ekonomi Malaysia*. 2018;52:137–47. URL: <https://www.ukm.my/jem/article/financial-performance-evaluation-of-islamic-banking-system-a-comparative-study-among-malaysias-banks/> (accessed on 02.02.2025).
16. Islam M.T.U., Ashrafuzzaman M. A comparative study of Islamic and conventional banking in Bangladesh: Camel analysis. *Journal of Business and Technology (Dhaka)*. 2015;10:73–91. URL: <https://www.banglajol.info/index.php/JBT/article/view/26907> (accessed on 02.02.2025).
17. Calandra D., Lanzalonga F., Biancone P.P. Exploring IFRS in Islamic finance: a bibliometric and coding analysis of emerging topics and perspectives. *International Journal of Islamic and Middle Eastern Finance and Management*. 2024;17(4):711–729. DOI: 10.1108/IMEFM-11-2023-0444
18. Rahmawati S., Maharani S. Reconstruction of performance measurement models for Islamic bank. Proceedings of the 2018 International Conference on Islamic Economics and Business (ICONIES 2018). 2019;390–399. DOI: 10.2991/iconies-18.2019.76
19. Abdullah A. Measuring Islamic bank's performance using CAMELS and RGEC method based on Indonesian financial services authority circular. *Journal of Business Management Review*. 2020;1:248–258. DOI: 10.47153/jbmr14.442020
20. Fitriana P.D. The effect of RGEC on financial distress in Islamic commercial banks. *EkBis: Jurnal Ekonomi dan Bisnis*. 2022;6:100–111. DOI: 10.14421/EkBis.2022.6.2.1578
21. Kharisova F.I., Derzaeva G.G., Dashin A.K., Umarov Kh.S. Managing crowdfunding based on Islamic principles. News of higher educational institutions. *Technology of the Textile Industry*. 2023;6(408):279–289. URL: https://tftp.ivgpu.com/wp-content/uploads/2024/02/408_37.pdf (accessed on 02.02.2025).
22. Sabitova, D. R., Voskoboynik, Yu. V., Imamkulieva, E. E. Evolution of Islamic banking in Russia: the experience of Ak Bars Bank. *Economy of the Middle East*. 2024;1(2):36–42. (In Russ.) URL: <https://www.elibrary.ru/item.asp?id=75153502>
23. Hameed S., Ade W., Bakhtiar A., Mohd Nazli dan S.P. alternative disclosure and performance measures for Islamic Banks. Kulliyah of Economics and Management Sciences. Malaysia: International Islamic University Malaysia. Proceeding of The Second Conference on Administrative Sciences: Meeting the Challenges of the Globalization Age, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia. 2004;19–21. URL: <https://apmba.ub.ac.id/index.php/apmba/article/view/156> (accessed on 02.02.2025).
24. Aisjah S., Hadianto A. Performance based Islamic performance index. Study on the Bank Muamalat Indonesia and Bank Syariah Mandiri. *Asia Pacific Management and Business Application*. 2013;2:98–110. DOI: 10.21776/ub.apmba.2013.002.02.2
25. Indrianasari N., Fadiah I., Awwaliyah I. Islamicity performance index and profitability determinants. Proceedings of the International Conference on Management, Business, and Technology (ICOMBEST 2021). 2021;32–38. DOI: 10.2991/aebmr.k.211117.005

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Unpacking the Determinants of Foreign Direct Investment: A Systematic Literature Review (2008–2024) and Future Research Agenda

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ABSTRACT

Purpose: This study presents a comprehensive systematic literature review about the factors influencing foreign direct investment (FDI) inflows and outflows. **Method:** We synthesize and analyze 294 empirical studies from 2008 to 2024 using a framework-based review of the Antecedent – Decision – Outcome (ADO) and Theory – Context – Method (TCM) model. **Findings:** The findings are presented, including theories, context, and methodologies adopted in the current literature. We also reveal factors influencing FDI and the impacts of FDI investigated in the literature. **Originality:** A major novelty of this review lies in its development of a categorization matrix that distinguishes between push versus pull factors and institutional versus non-institutional drivers. This matrix provides a bidirectional and multi-layered perspective on how FDI determinants operate across home and host countries. Additionally, we propose a conceptual model describing FDI inflow and outflow patterns. This offers a holistic picture of the affecting mechanisms and impacts on FDI. **Contribution:** The study offers a refined research agenda with research questions and directions for future studies. This review also contributes an actionable foundation for advancing FDI research and informing policymaking.

Keywords: foreign direct investment; FDI; systematic review; FDI determinants; directions; outcomes; ADO-TCM

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Анализ факторов, определяющих прямые иностранные инвестиции: систематический обзор литературы (2008–2024 гг.) и перспективы исследований

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АННОТАЦИЯ

Цель: в данном исследовании представлен всесторонний систематический обзор литературы, посвященный факторам, влияющим на притоки и оттоки прямых иностранных инвестиций (ПИИ). **Метод:** проведен синтез и анализ 294 эмпирических исследования, опубликованных с 2008 по 2024 г., с использованием модельно ориентированного подхода «предшествующий фактор – решение – результат» и «теория – контекст – метод» (ADO-TCM). **Результаты:** представлены результаты, включая теории, контекст и методо-

логии, используемые в современной литературе. Также выявлены ключевые факторы, влияющие на ПИИ, и последствия воздействия ПИИ, исследованные в предшествующих работах. **Оригинальность:** новизна данного обзора заключается в разработке матрицы классификации, которая различает «выталкивающие» и «притягивающие» факторы, а также институциональные и неинституциональные детерминанты. Данная матрица обеспечивает двунаправленный и многоуровневый взгляд на функционирование факторов ПИИ как в странах-донорах, так и в странах-реципиентах. Кроме того, предлагается концептуальная модель, описывающая закономерности притока и оттока ПИИ, что дает целостное представление о механизмах воздействия и их последствиях. **Вклад:** исследование формирует уточненную исследовательскую повестку с конкретными вопросами и направлениями для будущих работ. Также обзор вносит практический вклад, создавая основу для дальнейшего развития исследований в области ПИИ и поддержки процессов формирования экономической политики.

Ключевые слова: прямые иностранные инвестиции; ПИИ; систематический обзор; детерминанты ПИИ; направления; результаты; модель ADO-TCM

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1. Introduction

Foreign direct investment (FDI) refers to an investment made by a firm or individual in one country into business interests located in another country. Global FDI inflows stood at approximately USD 1.3 trillion in 2023, marking a 12% decline from 2022 and remaining below pre-pandemic levels. The aftermath of the 2008 global financial crisis, the trade tensions of the late 2010s, and the disruptions caused by the COVID-19 pandemic collectively reshaped international investment patterns. While developed economies saw modest recoveries, developing and transition economies emerged as major recipients, attracting more than half of global inflows, driven primarily by Asia's sustained economic dynamism and greenfield investments in manufacturing and services. Meanwhile, outward investment from emerging markets, particularly China, Singapore, etc., has risen sharply, altering global investment geography. These shifting dynamics underscore that FDI is influenced by a complex set of determinants that vary across regions and periods. Given the growing number of empirical studies exploring these drivers, a systematic literature review, especially covering 2008–2024, is crucial to synthesize fragmented evidence, identify consistent determinants, and propose a coherent future research agenda aligned with contemporary global investment realities.

Previous reviewing papers often lack a structured and systematic approach, resulting in potential biases in the selection and interpretation

of the literature. For instance, Blomström et al. (2001) [1] fail to provide an accurate classification of FDI spillovers and determinant categories. Other reviews frequently fail to incorporate moderating and mediating effects, as well as a diverse theoretical framework, thereby limiting their capacity to provide comprehensive insights. In contrast, Dimitrova et al. (2015) [2] focused on country-specific determinants in a specific region, potentially overlapping macroeconomic and institutional factors, and lacked comprehensive theoretical frameworks. Similarly, Islam and Beloucif (2024) [3] is primarily a descriptive analysis of the determinants of international migration, with a particular focus on economic, political, and institutional factors, and an emphasis on the role of host countries and the factors that attract migrants to them.

Therefore, a systematic literature review has been conducted to explore factors that influence FDI inflows and outflows in the current literature. The study differs from existing review papers in some major ways: First, the study integrates multiple techniques, such as bibliometric analysis, thematic analysis, and a framework-based review to organize current research. This integration is essential, as a bibliometric analysis maps collaboration networks and shows how knowledge flows within this field. Additionally, the thematic analysis is utilized as the foundation to synthesize findings into the framework-based analysis. Notably, the study applies a combination of the Antecedent — Decision — Outcome (ADO) and Theory — Context — Method (TCM) framework

proposed by Paul et al., (2021) [4] to organizing current studies. The TCM framework allows for an examination of how different theoretical approaches, research contexts, and methodologies have influenced the study of FDI, while the ADO framework facilitates an in-depth exploration of the variables and conditions associated with FDI flows. Second, by distinguishing between push and pull factors, institutional and non-institutional factors and further arranging them in a correlation matrix. The study provides a dual-level analysis highlighting the bidirectional nature of FDI determinants. Accordingly, the review reveals that institutional and non-institutional factors drive firms to seek investment opportunities abroad and attract foreign investors in host countries. Additionally, the study reveals that FDI decisions are seen as influenced by both formal institutional structures and broader economic or social factors. We also propose a conceptual model to explain these patterns. Third, the review highlights significant deficiencies in the current body of research categorized under the ADO-TCM framework. Consequently, we establish potential research questions that we believe will provide meaningful directions for future studies.

The structure of the paper is presented as below. Section 2 presents the methodology. Section 3 presents the findings and analysis of the systematic review. Section 4 presents the gap analysis. Sections 5 and 6 present the implications and conclusion of the paper.

2. Methodology

We utilized the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines as proposed by Page et al. (2021) [5] to synthesize the current studies (*Fig. 1*) to address four research questions.

- RQ1. What are the theories and models proposed to explain the effect of determinants on FDI flows?
- RQ2: What are the research contexts examined and the research methods adopted?
- RQ3: What are the factors shaping the FDI inflows in the current literature? And what constitutes a synopsis of the determinants and FDI inflow patterns?
- RQ4. What are the research gaps and directions for future research?

Search strategy

Web of Science (WoS) and Scopus were prioritized for this study to ensure a focused yet comprehensive dataset. The initial search utilized Boolean operators to capture relevant literature. Accordingly, a broad search using the search strings (Topic-Topic) was applied, such as (“FDI” OR “Foreign Direct Investment” OR “Foreign Invest*” OR “FDI flow*”) AND (“Determinants” OR “Factors”). This search yielded 4422 records. To narrow down the scope of the study, a focused search with the strings (Title-Topic-Topic) was also applied by adding keywords such as (“FDI” OR “Foreign Direct Investment” OR “Foreign Invest*” OR “FDI flow*”) AND (“Determinants” OR “Factors”) AND (“economic growth” OR “economic development”). This yielded 1018 records. The end date of the electronic search was April 25, 2024.

Screening

We used automation tools to identify records eligible for research purposes. Eligible criteria include (1) articles, (2) publications from 2008–2024, (3) being published by reputable publishers (e.g., Elsevier, Springer, Taylor and Francis, Wiley, Emerald, Sage, World Scientific, and Routledge), (4) being empirical studies, and (5) being in English.

In detail, only peer-reviewed journal articles were selected. We also restricted the timeframe for the included studies from 2008 to 2024. This particular period was selected for several reasons. First, the starting point of 2008 is closely tied to the onset of the global financial crisis, which marked a pivotal disruption in international financial markets and investment flows. Second, this period captures transformative changes in the global economy driven by rapid technological advancements and digitalization. Third, the rise of emerging markets, particularly in Asia, Africa, and Latin America, has increasingly drawn the attention of multinational enterprises, policymakers, and researchers. These economies have become not only recipients but also active sources of FDI. Fourth, this timeframe encompasses several major global disruptions and geopolitical developments that have influenced FDI patterns, including trade wars, increasing protectionism, the COVID-19 pandemic, and regional conflicts.

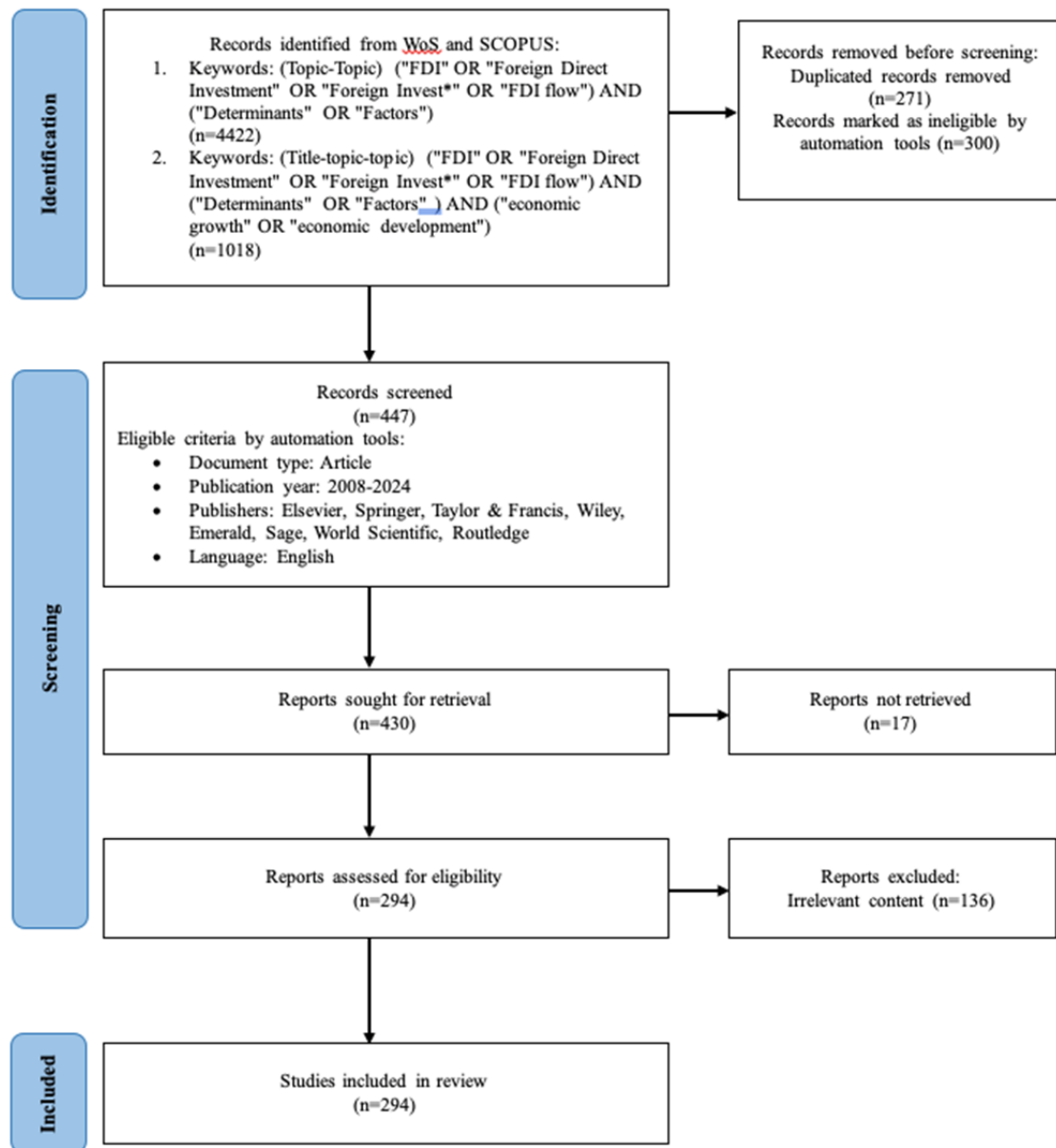


Fig. 1. The PRISMA Flow Diagram for systematic review

Source: Developed by authors.

The inclusion criterion restricts articles to those published by major academic publishers. The review also includes only empirical studies to ensure the consistency of the comparative analysis. We then examined the accessibility of the articles. Finally, the remaining 430 articles were manually screened based on their titles, abstracts, and keywords to ensure direct relevance to the topic. This process resulted in 294 studies for inclusion.

Data extraction

We adopted a hybrid coding approach, including deductive and inductive logic for data extraction.

Accordingly, deductive codes were developed based on established theoretical frameworks, including the ADO framework ((1) Antecedents, (2) Decisions, (3) Outcomes) and the TCM framework [(4) Theory, (5) Context, (6) Methodology)]. Then, inductive codes were generated as new themes emerged during in-depth reading of the full-text articles.

Data analysis

The selected articles were analyzed using several techniques. Accordingly, a bibliometric analysis was conducted using the Bibliometrix package in R (Aria and Cuccurullo, 2017) [6] to examine

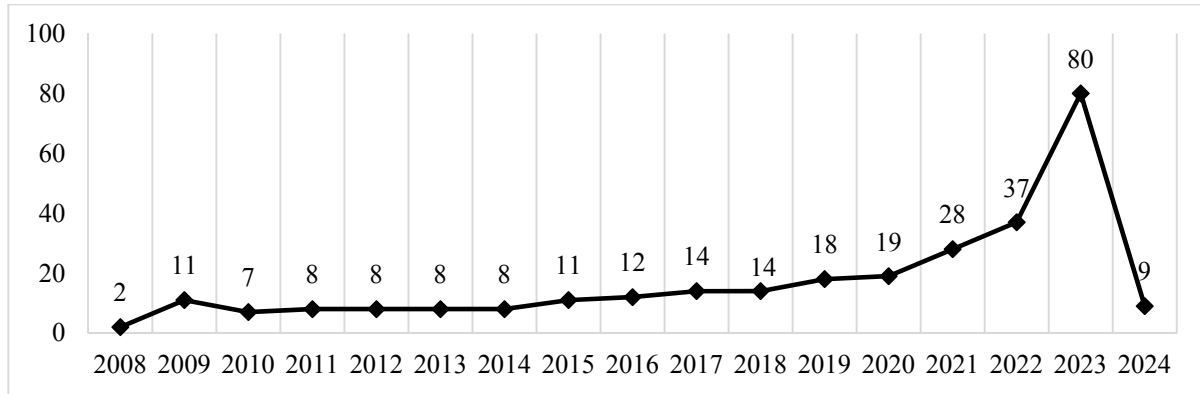


Fig. 2. Annual scientific production from 2008 to 2024

Source: Developed by authors.

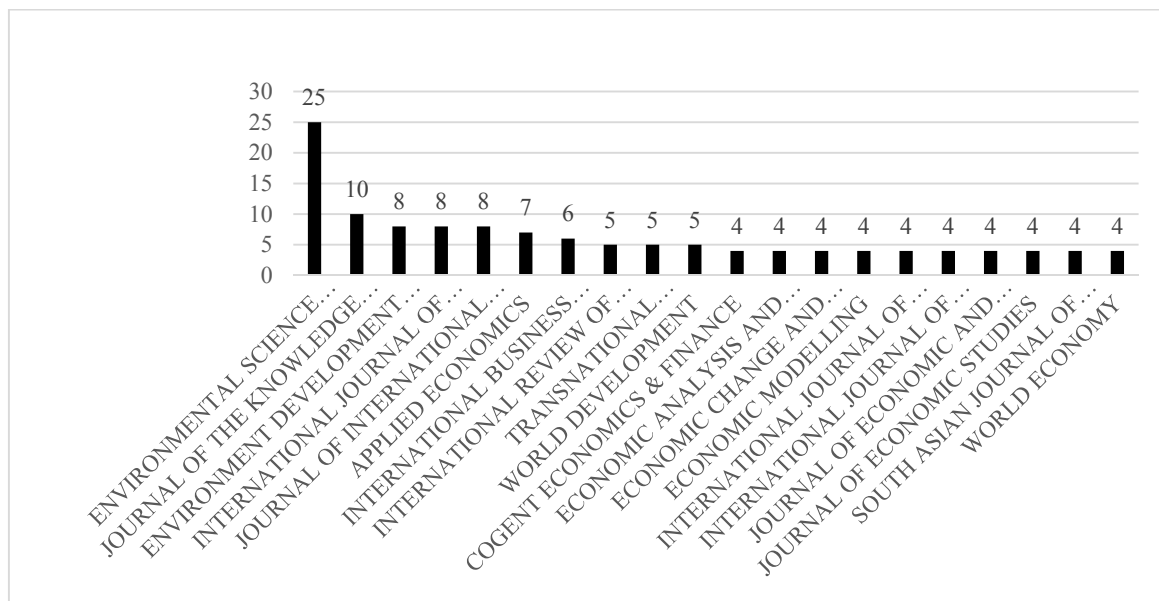


Fig. 3. Top 20 relevant journals

Source: Developed by authors.

publication trends, citation patterns, author collaborations, and influential journals. Additionally, we conducted a framework-based review adopting the ADO (Antecedents, Decisions, Outcomes)–TCM framework (Theory, Context, Methodology) and a gap analysis to address the research questions.

3. Results and analysis

3.1. Bibliometric analysis

Figure 2 describes the number of articles published from 2008 to April 2024. As seen from Fig. 2, the number of articles in this research domain has increased rapidly (from 2021 to 2023 boost from 28 to 80 articles), indicating the growing academic and research interest in FDI during this period.

Figure 3 depicts the compilation of journals that have published relevant studies. Notably,

journals that specialize in economic growth, environmental development, and economic sustainability disseminated the majority of the studies. Journals such as Environmental Science and Pollution Research, Journal of the Knowledge Economy, Environment, Development and Sustainability, and International Journal of Emerging Markets are all examples of publications that fall under this category. This ensures that the scope of the study will include literature of high quality and that it is pertinent to the topic at hand. Further, the results suggest that contemporary FDI research increasingly intersects with broader sustainability and development agendas, indicating a multidisciplinary expansion of the field.

Figure 4 illustrates the top 20 most cited publications. With over 9000 citations, the publication of Dean in 2009 was the highest-cited study,

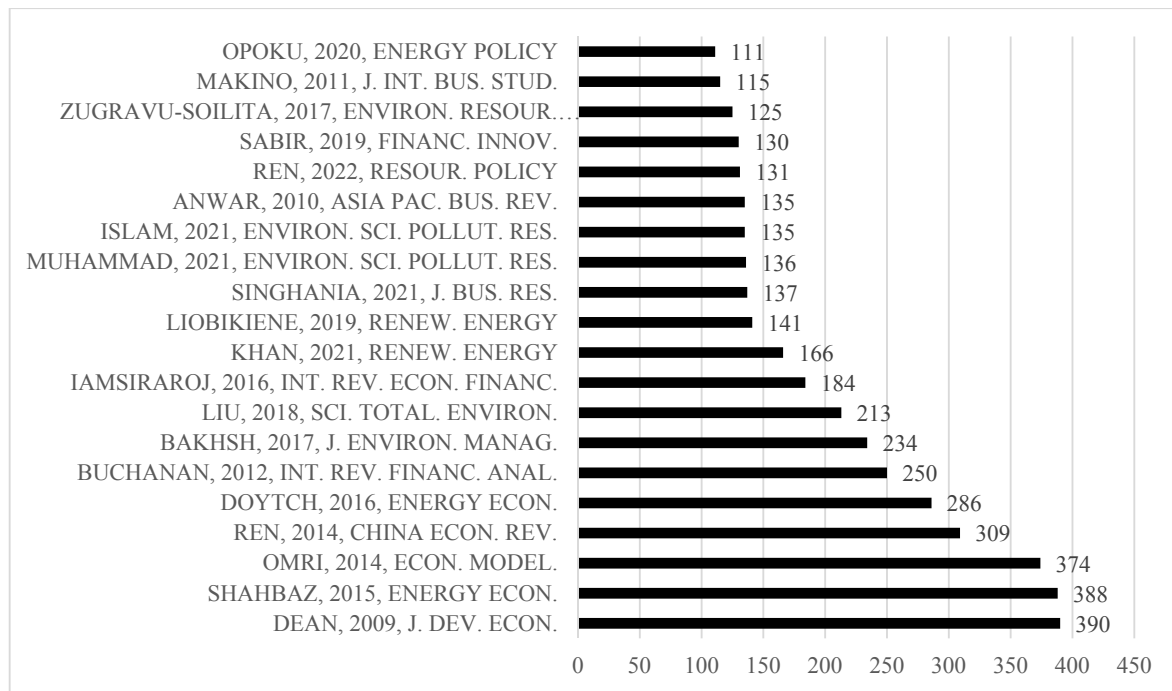


Fig. 4. Top 20 cited publications

Source: Developed by authors.

with 390 times, which is a clear indication of the substantial influence and contribution that it had to the area. Additionally, the work of Shahbaz in 2015, Omri's research in 2014, Ren's study in 2014, and Doytch's work in 2016 were also frequently cited by other scholars, demonstrating the importance and impact of these authors and their contributions to the ecosystem of research.

Figure 5 illustrates the thematic analysis of FDI research using the Walktrap clustering algorithm, which groups themes according to density (level of development) and centrality (importance within the field) [7]. The results highlight key strengths and gaps in FDI studies. Motor themes — including CO₂ emissions, FDI inflows, Asia, and environmental legislation — show both high density and centrality, indicating strong internal development and major influence on the field, reflecting the growing integration of environmental and regional issues into FDI research. Niche themes, such as international investment and political risk, display high density but low centrality, suggesting well-developed but less influential areas that offer potential for interdisciplinary expansion. Basic themes, including institutional quality, financial instability, and outward FDI, exhibit high centrality but lower density, meaning they are foundational yet require further development within their clusters. Declining themes,

such as emerging markets, show low density and centrality, indicating reduced emphasis, though future research could examine whether this reflects reduced relevance or a shift toward more focused studies.

3.2. Theory

The results show that over forty-one separate theories were identified from the prior literature, which demonstrates a diversity of theories and models in explaining aspects of FDI. However, only about 41.5% of the studies explicitly documented the theories, frameworks, and models that were used, indicating a lack of theoretical clarity and a lack of transparency or consistency in theoretical application. The review suggests that many studies do not clearly state the theoretical underpinnings guiding their research, which may hinder the ability to compare and synthesize findings across studies.

Several theories were frequently utilized in the literature, including the eclectic theory (27 times), endogenous growth theory (20 times), and international trade theory (14 times). The eclectic theory, also known as the OLI (Ownership, Location, and Internalization) paradigm, postulates that FDI inflows occur when firms possess ownership-specific advantages (such as proprietary technology), locational advantages (such

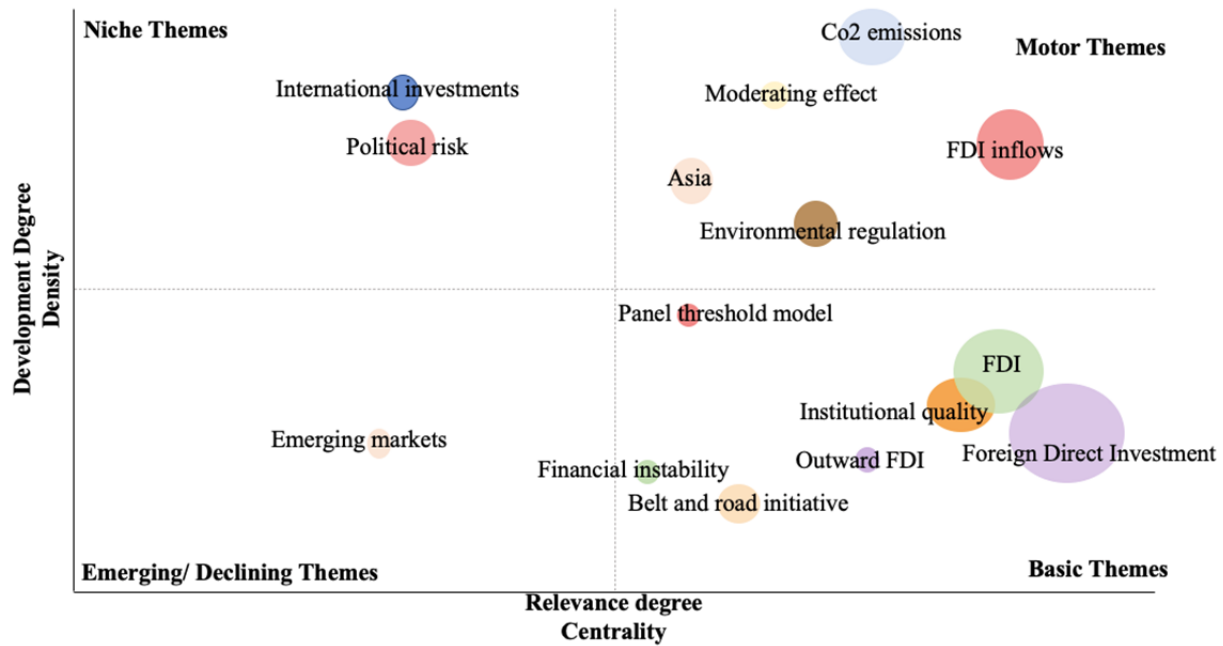


Fig. 5. Thematic map

Source: Developed by authors.

as low factor costs), and benefits of internalizing operations internationally [8, 9]. Whereas, the endogenous growth theory highlights the role of foreign technology and knowledge spillovers in enhancing local productivity [10]. Additionally, the international trade theory emphasizes the dynamic nature of trade advantages beyond traditional factors like natural resources [11]. The neoclassical economic growth model was also frequently applied (14 records). The model focuses on capital accumulation and its long-term impacts on economic growth [12]. Finally, the economic theory (12 records) discusses the reduction of production costs through specialization and economies of scale [13]. Other theories, although less frequently used, offer valuable perspectives that enhance our understanding of the complex factors driving FDI.

3.3. Context

We reveal two contexts of FDI studies, including (1) the multinational context and (2) the uninational context. The results show an outnumbering of multinational studies, indicating a growing interest in comparative studies. The multinational context was frequently investigated by previous scholars with 192 studies. The research spans a wide range of geographical regions, including regional groupings and broader economic classifications, such as de-

veloping and emerging economies, high-income and middle-income countries, the South Asian Association for Regional Cooperation (SAARC), the Central and Eastern European Free Trade Agreement (CESEE), and the Gulf Cooperation Council (GCC) countries, etc. The results also indicate that the sample selections of previous research on FDI mainly concentrated on developing and emerging economies, regional groupings, and income-based classifications.

By contrast, the uninational context was also explored with 102 studies. The results of the review show that China was the most prominent focus, with 16.67% (49 studies). China has provided an advantageous site for the investigation, as significant Chinese trade and investment liberalization in 1992 stimulated massive FDI inflows from various source countries, making China the biggest developing world FDI receiver in 1995. Apart from China, there is a noticeable concentration of studies on other emerging economies such as India, Vietnam, Bangladesh, and Indonesia indicating a shift in the focus of research towards the Asian sector. Generally, the outnumber of multinational studies in this research domain suggests a growing interest in comparative studies that explore broader regional or global patterns and dynamics rather than isolated, country-specific phenomena.

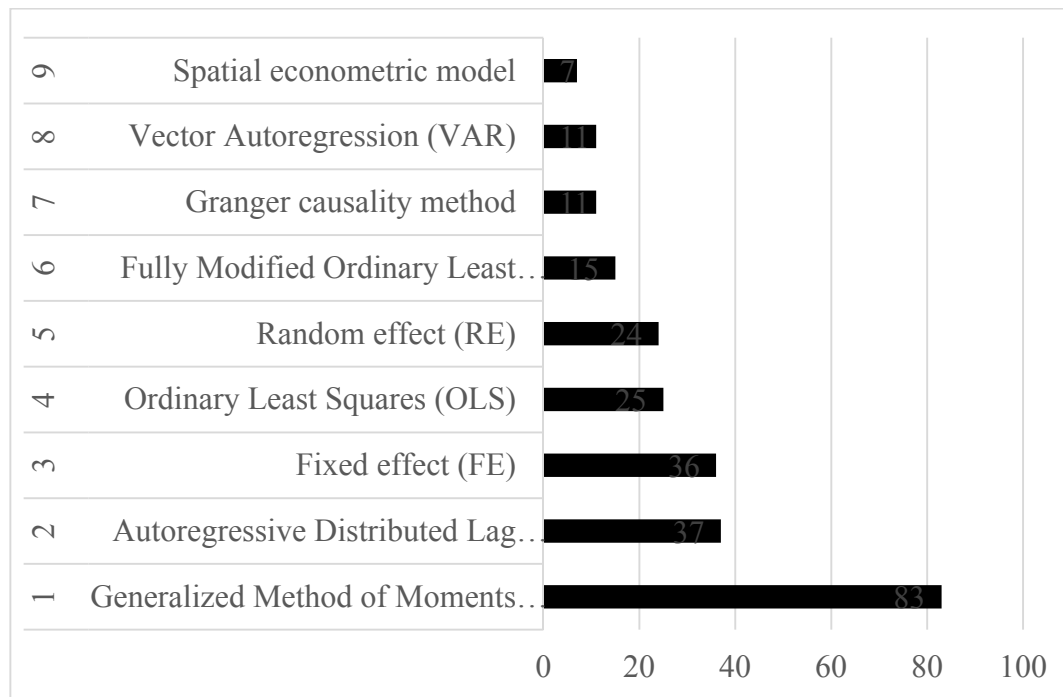


Fig. 6. Top methods utilized in FDI studies

Source: Developed by authors.

3.4. Analytical methods

The results indicated that studies investigating aspects of FDI majorly used a quantitative approach (Fig. 6). Accordingly, the generalized method of moments (GMM) emerged as the most frequently employed method with 83 times, followed by autoregressive distributed lag (ARDL) with 37 times, fixed effect (FE) with 36 times, ordinary least squares (OLS) with 25 times, and random effect (RE) with 24 times. According to Doytch and Narayan (2016) [14], GMM is a more effective approach than fixed effects when there is an issue of endogeneity in the data.

GMM leverages the stationary limitations and produces more reliable outcomes compared to differenced GLS. This is because GMM accounts for substantial biases that arise from poor sample instruments in limited samples [9]. On the other hand, ARDL was also applied in several studies. Islam et al. (2021) [15] reveal that ARDL has the ability to analyze the observable changes that occur in the independent variables and how they affect the dependent variable, both in the short term and the long term. Furthermore, FE, RE, and OLS were also applied to estimate the magnitude of the effect of determinants on FDI. The reason is that these methods support dealing with the problem, such as little informative variation in the

effect of variables over time [16]. Generally, the application of quantitative methods in previous literature was heavily influenced by the specific circumstances and objectives of the authors.

3.5. Determinants of FDI flows (antecedent)

Antecedents are defined as factors, conditions, or variables that exist prior to the decision-making process or the occurrence of an outcome. In this study, we collected determinants of FDI flows and proposed a matrix to categorize these determinants into 4 categories and 10 subgroups (Fig. 7). Vertically, we divided FDI determinants into (1) push and (2) pull factors. Push factors refer to conditions or attributes in the investor's home country that motivate corporations to invest in other countries. Pull factors, on the other hand, refer to the specific circumstances or features of the host nation that serve as incentives for overseas investment. Horizontally, we revealed two categories (i.e., (3) institutional factors and (4) non-institutional factors). Institutional elements include formal and informal guidelines, laws, and policies put in place by a nation's governmental and legal frameworks. These factors determine the conditions in which businesses operate and impact the desirability of a nation for FDI. Non-institutional variables

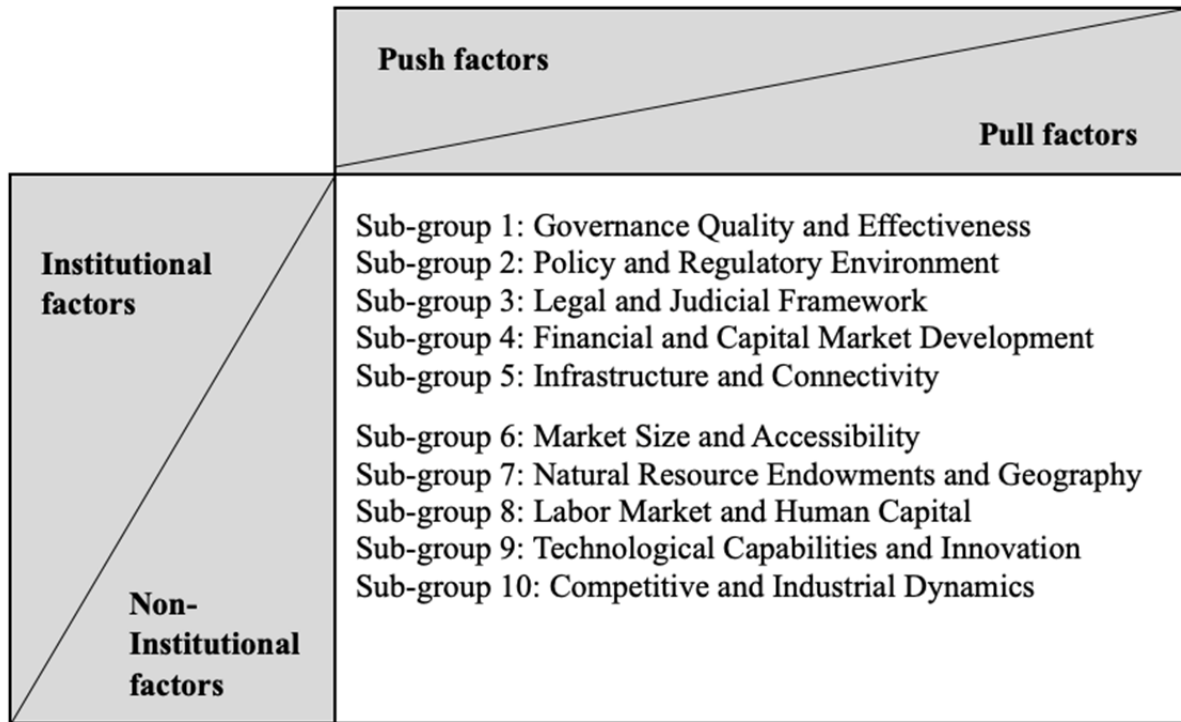


Fig. 7. Classification of FDI determinants

Source: Developed by authors.

include the wider economic, social, and cultural circumstances that influence FDI but are not directly connected to formal institutional structures. This matrix advances previous classifications in two key ways. First, it provides a more comprehensive and structured categorization that integrates institutional and non-institutional dimensions under both push and pull perspectives, enabling a holistic understanding of FDI determinants. Second, it explicitly reflects the dual-effect nature of these variables, recognizing that a given factor can act as either a push or pull force depending on relative country conditions.

Sub-group 1

Government policies and regulation factors refer to promotions, policies, incentives, and regulations associated with FDI, such as state legitimacy [17]; economic efficiency, government policy; and government support [18]. Further, environmental regulations were revealed to deter FDI in developing countries [19, 20].

Sub-group 2

Political stability and governance factors were identified as pull factors for FDI, such as the roles of control of corruption, voice and accountability, government effectiveness, regulatory quality, and rule of law in boosting the FDI in a country [21].

However, political instability was also identified as harming FDI in Pakistan [22], EU Structural Funds' influence on FDI inflows via institutions [23], reducing corruption might affect FDI inflows in the long run [24].

Sub-group 3

Cluster 3 includes the legal system, justice system soundness, legal structure, and property rights. Uddin et al. (2019) [25] showed that legal structure and strong property rights were essential for the inward FDI flow to Pakistan. By contrast, Ghazalian and Amponsem (2019) [26] revealed that robust intellectual property rights regimes are crucial in attracting FDI to nations with insufficient industrial infrastructure and technology.

Sub-group 4

Cluster 4 includes the macroeconomic environment, financial market conditions, and fiscal and regulatory aspects. According to Goh and Wong (2011) [27], nations with strong currencies are more inclined to invest overseas due to the advantageous impact of their home country's strong exchange rate. By contrast, Fang et al. (2021) [28] showed that the foreign exchange rate of the local currency was one of the motivations that host countries could utilize to attract foreign investors. Another perspective, Khan et al.

(2023) [29] indicated that macro-market determinants of host nations in Belt and Road Initiative (BRI) nations might attract Chinese FDI [30, 31]. According to Gupta and Singh (2016) [32], high inflation rates tend to discourage foreign investors from engaging in the activities of FDI; financial stability can be maintained by the optimal level of institutional development and attract more foreign investors [33, 34].

Sub-group 5

According to Mottaleb and Kalirajan (2010) [35], countries that have enhanced infrastructure (roads, port facilities, telephones, and internet) may have a substantial impact on the expenses of doing business. Similarly, Maryam and Mittal (2020) [36] affirmed that developed infrastructure has pulled major FDI inflow in India [37]. The factors of volatile energy, shipping capacity, energy transition, etc. were also investigated in several studies [38], etc. as characteristics associated with infrastructure development.

Sub-group 6

The literature showed that market size and trade openness are the determinants of FDI inflows. According to Anwar and Nguyen (2010) [39], larger market size might attract higher FDI inflows; similarly with Asongu et al. (2018), Khan and Ozturk (2020) [40], etc., Qamruzzaman (2021) [41] showed that foreign investors are attracted to nations with trade openness, similarly to Dinga et al. (2023) [42], etc. Additionally, agglomeration was also one of the frequently investigated antecedents of FDI inflows, such as market agglomeration [43] and economy agglomeration [44].

Sub-group 7

Resources abundance and high-quality natural resources in host countries mainly attracted foreign investors [44]. According to Anyanwu and Yaméogo (2015) (48–50), investors prefer countries with abundant natural. Olofin et al. (2019) [46] argued the role of countries' locations on FDI inflow could discourage or encourage investors from moving their businesses from or to other countries [47].

Sub-group 8

Human capital was the most frequently investigated. According to Asongu et al. (2018) [48], human capital is crucial to facilitate the absorption of significant skills and technology spillovers from FDI and foster sustainable long-term economic development [49, 50]. Berrill et

al. (2020) [51] exhibited the extent of the positive or negative spillover effects, depending on the education levels of employees, entrepreneurs, and the population [52]. Several determinant factors related to human and labor were also identified in the literature, such as labor cost and unemployment rate [32], labor skill, labor quality, and labor productivity [53].

Sub-group 9

Previous scholars showed that technology also impacted the FDI inflows across countries. According to Mei (2023) [54], FDI may vary due to the differences in technology and human capital between countries. By contrast, Obeng-Amponsah and Owusu (2023) [55] found that technology acts as a mediator in the short term between FDI and both economic development and employment. On the other hand, Das (2013) [56] demonstrated the role of technology as a motive of outward FDI.

Sub-group 10

Finally, FDI inflows are also related to competitive environment factors [57, 58]. Jimborean and Kelber (2017) [59] showed that the competitiveness of a nation, computed as the year-on-year growth rate of the share of each country, significantly impacted the inflows of FDI. Similarly, Gupta et al. (2022) [60] highlighted FDI creates a dynamic environment that disrupts local monopolies by encouraging the entry of multinational organizations. As a result, it is an important indicator for overseas investors when arriving at decision-making [61, 62], absorptive capacity [63], etc.

3.6. The directions of FDI flows (decision)

The directions of FDI flows have been classified into two streams (1) inward FDI and (2) outward FDI. Inward FDI (IFDI) describes the flow of capital from foreign investors into a domestic economy, typically through establishing new operations, acquiring existing businesses, or re-investing earnings in the host country. Research on IFDI has dominated the literature on FDI. IFDI played a crucial role in promoting economic progress in developing nations [64], natural resources, a growing middle class, government initiatives [65], and environmental degradation [66]. This was also agreed upon by several scholars, such as Gaies and Nabi (2021) [67], Li et al. (2022) [68], etc.

By contrast, outward FDI (OFDI) refers to investments made by domestic entities into foreign economies. The OFDI inflow also play an important role for home countries in the attempts to resolve economic and social issues [28]. Most of the studies investigated the OFDI from China. Ren et al. (2022) [69] argue that China's economic expansion is now facing new obstacles due to severe resource restrictions and ecological issues. Kurtovic et al. (2023) [70] showed that the OFDI inflow had a significant effect on the economic growth of Central, East and Southeast European (CESEE) countries in the long run [71]. Emerging and developing nations have promoted outbound FDI as a source of domestic innovation and productivity development.

3.7. Impacts of FDI flows (outcome)

We categorized the impacts of the FDI flows into five clusters, including (1) economic outcomes, (2) social outcomes, (3) environmental outcomes, (4) institutional and governance outcomes, and (5) technological and innovation outcomes.

Economic outcomes were frequently investigated. FDI increases the comparative advantages of host countries in the attempt to attract foreign investors. By contrast, Song et al. (2021) [72] indicated that FDI inflows raised income inequality while economic growth was reduced. Whereas, Kastratovic (2024) [73] found that FDI benefited agricultural exports in SAARC countries. Factors associated with employment (e.g., employment [55], wage level, and financial development) were also identified as outcomes that FDI inflow brought to host countries.

Social outcomes related to human development and welfare, tourism, and entrepreneurship. According to Kheng et al. (2017) [16], FDI and human capital had a bi-directional relationship. Therefore, FDI and human capital development policies need to be coordinated. Additionally, FDI was also found to support the poverty reduction in host countries [44, 74]. In another aspect, FDI is also important for tourism development. According to Sou and Vinnicombe (2021) [75], the presence of effective governance is directly linked to the accumulation of FDI, which in turn has a beneficial impact on the demand for tourism.

Environmental outcomes emerged as frequently investigated impacts recently. They mainly related to issues such as environmental quality,

pollution, energy consumption, and green development. Accordingly, scholars found that FDI inflows resulted in environmental degradation and pollution in host countries. Nathaniel et al. (2020) [76] showed that foreign investors tend to be attracted by countries with lax environmental regulations. Similarly, emissions were also identified as an outcome of FDI inflows in host countries. Most studies concluded that FDI inflow positively impact emissions, such as carbon emissions [77] and industrial emissions [78].

FDI might be associated with institutional quality, intellectual property, and civil conflict. FDI inflow and domestic institutions have a bi-directional relationship [79]. By contrast, higher inflows of FDI have a significant short-term impact on the institutional quality of recipient economies. FDI contributes to economic development by improving institutional quality in the host country [80].

Finally, the outcomes of FDI are associated with technology and innovation. Sultana and Turkina (2020) [63] reveal that the geographical location of a nation in the global FDI network is directly linked to the level of technological progress in that country. Additionally, the ability of a country to absorb new technologies might influence this connection. FDI has a significant impact on the transfer of technology [81].

3.8. The conceptual model

Building on the ADO model, we synthesize the findings of the literature and propose a conceptual model to offer a holistic understanding about FDI flow patterns (*Fig. 8*).

As previously mentioned, current scholars frequently investigate the influencing mechanism of IFDI toward host countries. Accordingly, this flow of influence is divided into two individual patterns: (1) the impacts of determinants on IFDI and (2) the impact of IFDI on host countries. For instance, most scholars have found that FDI inflow contributes to economic growth and development, as well as entrepreneurial activities and technology transfer, in host countries [76, 82, 83]. Rehman et al. (2022) [84] show that human capital, foreign aid, trade, domestic investment, population, and institutional quality are factors influencing the increase in IFDI. According to Chiyaba and Singleton (2024) [85], the natural resources of developing countries are a key factor

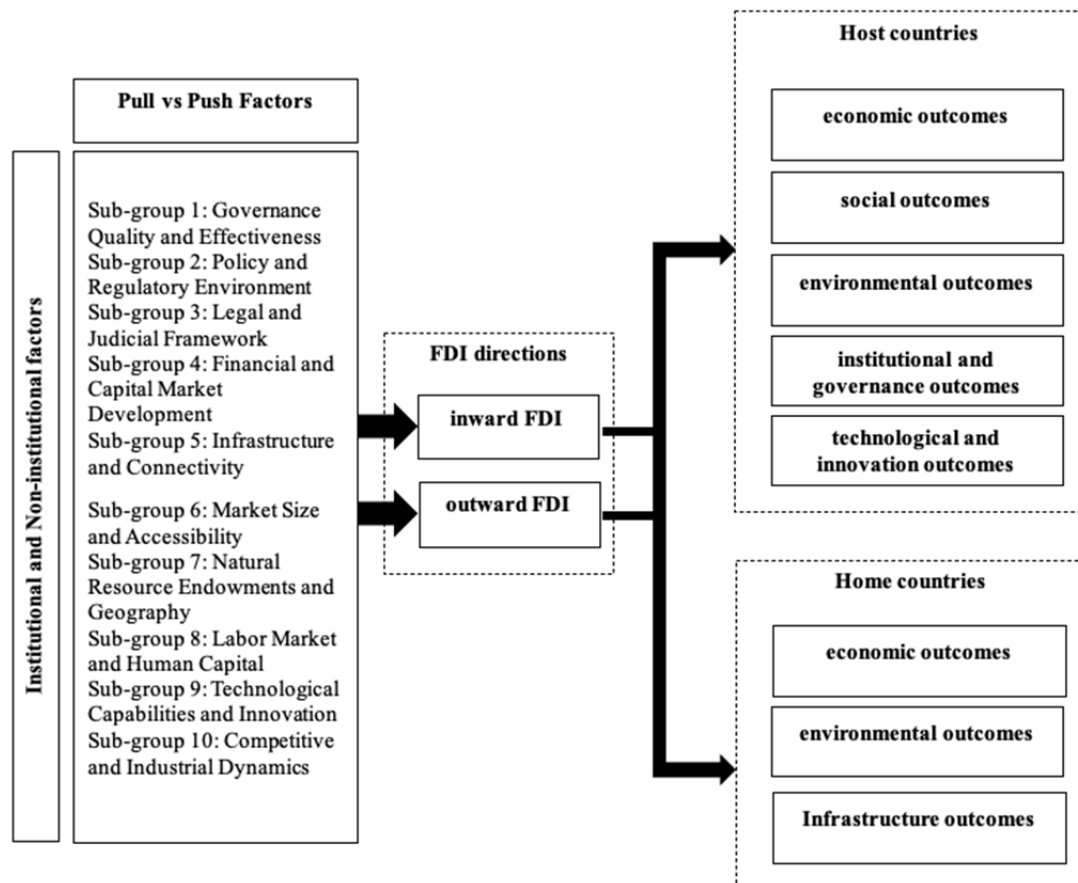


Fig. 8. The conceptual model

Source: Developed by authors.

motivating IFDI. However, natural resource rents tend to erode the institutions of these nations. Similarly, Rehman et al. (2020) [86] highlight that policymakers and the government play an important role in encouraging critical policy changes, which promote IFDI in Bangladesh and improve national economic development.

The OFDI pattern reveals that push factors, including market and trade factors, natural resources, and competitive factors, frequently drive OFDI. For instance, Drogendijk and Martín (2015) [87] demonstrate that cultural distance, historical distance, and physical distance motivate China's outward foreign direct investment (OFDI) to other countries. Additionally, Gao et al. (2013) [88] highlight the role of domestic economic development and the two-way mobility of highly skilled Chinese students and scholars as driving factors of OFDI. Further, the literature also investigates the impacts of OFDI on home countries. OFDI has a causal relationship with domestic investment in China [89]. Additionally, OFDI inflows positively impact export diversification in the home country in several ways [90]. The spillover effect of OFDI

will promote domestic economic productivity, thereby increasing the production and export of a wider range of goods in the home nation. Secondly, FDI allows local enterprises to lower their production costs, resulting in a decrease in the prices of various goods and freeing up more resources for RandD operations. Consequently, this enhances economic development. The research of Ali et al. (2021) [91] indicated the positive relationship between OFDI and the domestic logistics services industry. Accordingly, OFDI of logistics companies has a beneficial effect on the increase of productivity in the logistics sector. Furthermore, there was a long-term reciprocal relationship between the OFDI of logistics firms and the expansion of productivity in the domestic logistics service industry.

4. Research agenda

In this section, the authors highlight various gaps that emerged from the systematic review of 294 studies. Using this foundation, a future research agenda was set based on the ADO-TCM frameworks to address research question 4. Ac-

cordingly, the authors presented a list of pertinent research questions and research objectives in this topic, so that researchers may align research efforts with given research questions or objectives (Appendix 1).

4.1. Antecedents

Pull factors mostly dominated the literature in terms of the vertical classification. Therefore, we suggest that push factors from home countries seem meaningful to investigate in the future. For instance, Osabuohien-Irabor and Drapkin (2022) [92] show that the home country's composite risks, including economic hazards, financial risks, and political risks, influence enterprises' incentives to expand internationally via outward FDI. Consequently, the main factors that might lead to a decrease in FDI are political and financial concerns in home countries. With local markets reaching a point of saturation, firms may have challenges in sustaining development [93]. Consequently, they may turn to overseas markets to expand their operations. Additionally, intensified domestic rivalry may also prompt businesses to investigate other markets where they might gain a competitive edge and obtain higher returns on their investments.

Further, we propose that institutional factors associated with governmental policies, regulations, and legal frameworks need more concentration. State-led strategies are crucial in obtaining FDI inflows to cultivate a conducive investment environment, mitigate risks, and amplify the potential gains for foreign investors. For instance, implementing networks of networks of Special Economic Zones (SEZs) may attract a relatively large amount of new FDI [94]. Other factors, such as government support, the digital economy, regulations in terms of Fintech, innovation, environment, etc. may also be meaningful. Huang (2023) [95] indicates that the digital economy has a beneficial impact on the influx of skilled workers and FDI. Additionally, factors such as gender legislation and regulation should be concentrated on, as the existing body of study on factors influencing FDI generally overlooks the role of gender [96]. According to Lai and Sarkar (2017) [97], the gender equality law in Taiwan has had a significant influence on the working conditions of workers in FDI-intensive businesses. Consequently, fu-

ture studies may pay attention to the role and impact of factors such as women's rights, gender legislation, etc. Further, future studies should diversify approaches in investigating FDI's institutional determinants. For instance, the debate about whether corruption greases the wheels or sands the wheels in FDI seems to be interesting. Several studies support the view that investors are reluctant to provide funds to nations whose institutions promote corruption, nepotism, and bureaucratic obstacles since these characteristics increase the expenses associated with doing business [98]. By contrast, the helping hand theory reveals that corruption somewhat increases FDI, as significant amounts of lawbreaking may enable investors to circumvent laws and regulations [99].

In terms of non-institutional factors, the findings propose that the factor of culture may also be significant in studies on FDI determinants. The national culture has a considerable impact on the ownership- and location-specific factors that play a role in determining the entrance modalities of multinational enterprises into other countries [100]. According to Zhang et al. (2019) [101], since the majority of FDIs are motivated by the need to acquire resources, multinational companies (MNEs) may take advantage of national cultural features, parallels in identity, and geographical distances when making their choice to invest in new and strategically important resources overseas. The study by Izadi et al. (2023) [102] shows that countries that have lower levels of "masculinity" and greater levels of "individualism" and "indulgence" tend to attract more FDIs.

4.2. Outcomes

The results show that a huge concentration was given to the FDI spillovers in host countries. Consequently, we suggest that the outcomes related to home countries may also be promising in future studies. The concept of ecological symbiosis, which refers to the phenomenon of dynamics, interconnectedness, and coevolution of individuals within an ecosystem [38]. Accordingly, apart from the purpose of transferring technology to other countries, FDI inflows also aim at seeking new technologies. Therefore, investigating how outward FDI contributes to cultural and organizational transformations back home may be interesting. Further, utilizing FDI inflows strategically to augment geopolitical power and

its impact on international relations and economic policies also needs more scholarly scrutiny. The investments of China based on the BRI are a typical example. The selection of a corporation in a BRI project is determined via a one-tier bargaining game between China and a host country [42]. From another perspective, Sahasranamam et al. (2022) [103] propose that MNEs that operate in countries with strict corporate social responsibility (CSR) standards will demonstrate advanced CSR practices in their home country. This is because the stakeholders in the host country have greater expectations, and failing to meet these expectations might result in a loss of worldwide credibility for the MNE. Therefore, the potential impact of OFDI on promoting CSR and ethical business practices in the home nations holds promise for the future.

Another gap figured out from the current literature on FDI is the ongoing debate on whether FDI inflows negatively or positively impact nations. Most studies found that apart from benefits in terms of economic growth, technology, innovation, etc., FDI inflows also result in environmental degradation [76], carbon emissions [20], etc. By contrast, environmental pollution has a positive correlation with economic development but eventually decreases after income growth above a certain threshold [104]. Therefore, the study proposes that future research may attempt to investigate the dual impact of FDI inflow on home or host countries.

4.3. Theory

Previous researchers on FDI have drawn heavily from theories and frameworks such as the OLI paradigm, endogenous growth theory, etc. We propose that other theories may also be promising to unpack aspects of FDI.

National institutions play a significant role in attracting FDI inflows, as “the rules of the game” [105]. Consequently, the theories related to state-led strategies may offer a unique perspective in understanding how a nation can attract FDI. The developmental states model is one of the outstanding state-led strategies. The core idea of the developmental state concept describes that the states’ strong, interventionist policies can drive economic development by actively shaping economic policy, guiding investment, and fostering industrialization [106]. As a result, it may be

promising to explain how state policies can create a conducive environment for FDI.

Behavioral economic theories such as game theory and risk aversion theory may be applied in the FDI scenarios. Game theory aims to answer the issue of how individual individuals should pursue their interests when they are aware that the actions of other independent agents will influence the outcomes of their actions. Regarding FDI, host governments (those receiving investment) and MNCs participate in negotiations and bargaining to establish the conditions of investment. Additionally, game theory also supports explaining the competition for investment of host countries. For instance, certain emerging nations have maintained their competitive edge in the environmentally harmful manufacturing of products. Consequently, the game-theory approach may be useful to explain how developed and developing countries could maximize their payoffs without disregarding environmental concerns [107]. The risk emerges due to the temporal disparity between investment and earnings [108]. Consequently, risk theories such as risk aversion theory may be applied to explain the firms’ behaviors in selecting investment locations. Firm experience and context significantly influence risk-taking in FDI location decisions [109].

4.4. Context

The study proposes that different contexts, such as culture, force majeure, etc., may be promising in this field of study. The national culture has a considerable impact on the ownership- and location-specific factors that play a role in determining the entrance modalities of multinational enterprises into other countries [102]. Further, it may also be interesting to examine the similarities and differences in the attempts of FDI attraction between socialist and capitalist countries. This objective necessitates a comprehensive examination of the policies, incentives, and regulatory frameworks utilized by each system to attract FDI. For example, socialist countries may offer state-backed guarantees, and subsidies, or prioritize certain industries in accordance with their national development plans [110, 111]. In contrast, capitalist countries may focus on creating a favorable business environment through deregulation, tax incentives, and the protection of intellectual property rights.

Further, force majeure events include pandemics, natural disasters, weather conditions, war, etc. The COVID-19 pandemic has had a detrimental impact on highly productive kinds of investment, such as greenfield investment in infrastructure projects and industries [112]. The ongoing conflict between two countries has led to a rise in military spending, resulting in a notable decline in FDI and commercial ties [113].

4.5. Methodology

Most research assessing FDI inflows was done applying quantitative methods. Therefore, the study proposes that qualitative research methods are meaningful for exploring the complex and nuanced factors that influence FDI. For instance, an in-depth interview may be interesting to explore the host country's investment climate or investors' perception and reasons for selecting the locations. According to [114], qualitative evidence using multiple data sources is important to explore the skilled labor challenges within the host country's traineeship. Additionally, other methods such as narrative analysis and comparative studies (e.g., qualitative comparative analysis (QCA)) to explore stories and firm accounts related to FDI experiences and compare cross different contexts.

Further, most research in this field applied quantitative methods using several different statistical models, including Generalized Method of Moments (GMM), Autoregressive Distributed Lag (ARDL) model, FE, RE, and OLS regression. These are powerful methods to explain the relationships surrounding FDI inflows. For example, GMM is useful for addressing endogeneity issues [115], while ARDL models are excellent for handling small sample sizes and non-stationary data [116]. However, these methods may not fully capture the causal mechanisms, nonlinear relationships, and contextual factors influencing FDI. Consequently, exploring and integrating alternative methodologies could provide more comprehensive insights and enhance the robustness of empirical findings. For instance, the vector error correction model (VECM) may be potential. The studies using VECM were underrepresented in the literature. The VECM has the potential to enhance the study of transnational economic phenomena, both in current and future research endeavors [117]. VECM is particularly well-suited for the analysis

of the dynamic interrelationships among multiple time series variables, which is appropriate for the study of the long-term equilibrium and short-term adjustments in transnational economic systems. By capturing both the short-run dynamics and the long-run equilibrium relationships among variables, VECM enables researchers to uncover complex patterns of co-movements and interactions across countries or regions [115].

5. Theoretical and practical implications

5.1. Theoretical Implications

By integrating a bibliometric analysis and a framework-based review of ADO-TCM, the review offers several theoretical insights for this field. First, a TCM comprehensive review was presented systematically. Accordingly, the study reveals developing trends in current FDI studies in terms of central theories (i.e., the OLI paradigm, endogenous growth theory, and international trade theory), contextual coverage (i.e., the multinational context and the unination context), and frequent methodologies (e.g., quantitative studies, secondary data collection, econometric analyzing methods, etc.) adopted by the researchers in this field. This provides a strong framework for analyzing literature that goes beyond conventional reviews by emphasizing the important aspects of theory, context, and technique. This approach not only enhances the rigor and depth of the review but also offers useful insights for improving theory, refining methodology, and comprehending the contextual application of research results.

Second, the review consolidates factors associated with FDI inflows into the ADO framework. To our knowledge, few scholars utilized this approach to review FDI research. This structured approach is beneficial in two ways. To begin with, ADO pinpoints variables and factors surrounding FDI and categorizes them into antecedents (determinants), decisions, and outcomes. This systematically explores and understands how FDI inflows and outflows are made, what influences those flows, and what the outcomes of those flows are. Further, the ADO framework also contributes to explaining the mechanisms of the FDI flows. In other words, ADO enables systematic exploration of causal relationships by linking antecedents (push and pull factors) to decisions (whether to engage in outward

or inward FDI) and then to outcomes (the impacts on both home and host countries). For instance, changes in push factors (e.g., institutional and non-institutional factors) drive the decision to invest abroad, which then produces specific economic, infrastructural, and environmental outcomes in the home country. By contrast, the presence of attractive pull factors leads to inward FDI, which generates various outcomes such as economic growth, improved infrastructure, or technological advancements. Generally, this helps in identifying the pathways through which specific conditions lead to particular investment behaviors and their subsequent impacts.

Notably, by distinguishing between push and pull factors, institutional and non-institutional factors and further arranging them in a correlation matrix, the study allows for a nuanced analysis of how different factors contribute to the movement of FDI across borders. It introduces several novel elements and perspectives. This categorization matrix provides a dual-level analysis highlighting the bidirectional nature of FDI determinants. Accordingly, the review reveals that institutional and non-institutional factors drive firms to seek investment opportunities abroad and attract foreign investors to host countries. This implies that the same types of factors that push firms away from home can also pull them toward specific host countries. Additionally, the study reveals that FDI decisions are seen as influenced by both formal institutional structures and broader economic or social factors. This dual-level framework challenges the singular focus of many traditional FDI theories and suggests that investment decisions are more complex, requiring consideration of both institutional and non-institutional environments. In other words, the categorization matrix highlights that foreign direct investment (FDI) is impacted by both institutional and non-institutional variables in both the home country and the foreign country. This broad perspective offers a more comprehensive understanding of the motivations behind FDI. Further, the matrix is broad and adaptable, making it applicable to various countries, industries, and types of FDI (e.g., market-seeking, resource-seeking, etc.). This universality is a significant advancement, as it allows the framework to be used in diverse contexts, including emerging markets or specific sectors like technology or natural resources.

5.2. Strategic implications

This study additionally provides strategic implications for policymakers. This review offers strategic insights by unpacking the causal mechanisms linking FDI antecedents to firm-level and macroeconomic outcomes, thus challenging the often-assumed linear and uniform nature of FDI responses to policy stimuli. The synthesis reveals how institutional quality, market dynamics, and political stability interact differently across developing versus developed economies, suggesting that one-size-fits-all policy frameworks may be ineffective. Accordingly, we recommend that policymakers adopt a contingency-based policy model grounded in institutional theory and the eclectic paradigm, tailoring FDI incentives based on specific locational advantages and investor motives. Moreover, underexplored areas such as the role of digital infrastructure and green FDI demand urgent theoretical and policy attention.

In addition, the categorizing matrix towards FDI determinants serves as a tool for contextualizing FDI decisions in specific settings. The categorizing matrix of FDI determinants presented in this review goes beyond mere classification by offering a framework to interpret investment flows through the lens of context-specific dynamics. While most studies apply a universalist lens to FDI attraction, this matrix allows for differentiation based on a country's unique configuration of institutional and non-institutional and push and pull attributes. In doing so, it challenges the assumption that improving institutional quality alone is sufficient to attract FDI, revealing instead that political economy contexts and sectoral characteristics often mediate these effects. This insight has strategic policy implications: for example, countries with weak institutions but strong natural resource endowments may attract investment through stability guarantees rather than reforms. Policymakers can thus use the matrix not just to emulate «best practices» but to craft context-sensitive FDI strategies that align with their developmental goals. Future research should investigate how this matrix interacts with global trends such as ESG regulations, digital infrastructure, and geopolitical fragmentation, areas underexplored in current FDI literature.

6. Conclusion

This systematic review provides a comprehensive analysis of the factors that affect FDI inflows. It combines findings from 294 empirical studies done between 2008 and 2024. The review utilizes the TCM and ADO frameworks to classify the determinants of FDI into a matrix: vertical (host and home variables) and horizontal (institutional and non-institutional factors). The review acknowledges significant advancements in comprehending the economic, political, and institutional factors that influence FDI. However, it also notes notable deficiencies in the existing body of research. Significantly, there is excessive emphasis on pull factors while neglecting push ones, inadequate attention to the consequences for home nations, and a prev-

alence of cross-sectional research that restrict the thoroughness of study. Furthermore, current studies frequently give more importance to market mechanisms, business conduct, and economic expansion, while neglecting the significance of informal institutions and the wider social and environmental consequences of FDI. To fill these gaps, the review recommends doing additional longitudinal research to examine the lasting impacts of FDI determinants, conducting a more thorough examination of informal institutions, and conducting a more equitable analysis of both push and pull variables. Furthermore, it highlights the importance of conducting research that investigates the effects of FDI on the nations from where the investors originate, as well as its impact on sustainable development.

REFERENCE

1. Blomström M., Kokko A., Globerman S. The determinants of host country spillovers from foreign direct investment. *CEPR Discussion Papers*. 2000;2350. URL: <https://ideas.repec.org/p/cpr/ceprdp/2350.html>
2. Dimitrova B., Rosenbloom B., Andras T. Do retail foreign direct investment restrictions affect retail channel structure? *Journal of Marketing Channels*. 2015;22(4):265–278. URL: <https://doi.org/10.1080/10466669X.2015.1113488>
3. Islam M.S., Beloucif A. Determinants of foreign direct investment: A systematic review of the empirical studies. *Foreign Trade Review*. 2024;59(2):309–337. URL: <https://doi.org/10.1177/00157325231158846>
4. Paul J., Lim W.M., O'Cass A., Hao A.W., Bresciani S. Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR). *International Journal of Consumer Studies*. 2021;45(4): O1–O16. URL: <https://doi.org/10.1111/ijcs.12695>
5. Page M.J., McKenzie J.E., Bossuyt P.M., Boutron I., Hoffmann T.C., Mulrow C.D., et al. Updating guidance for reporting systematic reviews: development of the PRISMA 2020 statement. *Journal of Clinical Epidemiology*. 2021;134:103–112. URL: <https://doi.org/10.1016/j.jclinepi.2021.02.003>
6. Aria M., Cuccurullo C. bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*. 2017;11(4):959–975. URL: <https://doi.org/10.1016/j.joi.2017.08.007>
7. Cobo M.J., López-Herrera A.G., Herrera-Viedma E., Herrera F. Science mapping software tools: Review, analysis, and cooperative study among tools. *Journal of the American Society for Information Science and Technology*. 2011;62(7):1382–1402. URL: <https://doi.org/10.1002/asi.21525>
8. Dunning J.H., Lundan S.M. *Multinational Enterprises and the Global Economy*, Second Edition. 2008.
9. Singhania M., Saini N. Demystifying pollution haven hypothesis: Role of FDI. *Journal of Business Research*. 2021;123:516–528. URL: <https://doi.org/10.1016/j.jbusres.2020.10.007>
10. Benzaim S., Ftit Z., Khedhaouria A., Djermane R. US foreign investments: Technology transfer, relative backwardness, and the productivity growth of host countries. *Quarterly Review of Economics and Finance*. 2023;87:275–295. URL: <https://doi.org/10.1016/j.qref.2021.03.012>
11. Zhang Q. Sectoral and country-origin dynamics of FDI in China in 1997–2020. *Chinese Economy*. 2023;56(2):89–103. URL: <https://doi.org/10.1080/10971475.2022.2096808>
12. Dinga G., Fonchamnyo D., Ongo N., Bekun F. Dynamic common correlation effects of financial development, foreign direct investment, market size and trade openness on domestic investment: an income-level prognosis. *Journal of Economic and Administrative Science*. 2025;41(3):927–948. URL: <https://doi.org/10.1108/JEAS-04-2022-0099>
13. Caetano R., Marques A., Afonso T., Vieira I. Could private investment in energy infrastructure soften the environmental impacts of foreign direct investment? An assessment of developing countries. *Economic Analysis and Policy*. 2023;80:961–977. URL: <https://doi.org/10.1016/j.eap.2023.09.030>

14. Doytch N., Narayan S. Does FDI influence renewable energy consumption? An analysis of sectoral FDI impact on renewable and non-renewable industrial energy consumption. *Energy Economics*. 2016;54:291–301. URL: <https://doi.org/10.1016/j.eneco.2015.12.010>
15. Islam M.M., Khan M.K., Tareque M., Jehan N., Dagar V. Impact of globalization, foreign direct investment, and energy consumption on CO2 emissions in Bangladesh: Does institutional quality matter? *Environmental Science and Pollution Research*. 2021;28(35):48851–48871. URL: <https://doi.org/10.1007/s11356-021-13441-4>
16. Kheng V., Sun S., Anwar S. Foreign direct investment and human capital in developing countries: a panel data approach. *Economic Change and Restructuring*. 2017;50(4):341–365. URL: <https://doi.org/10.1007/s10644-016-9191-0>
17. Seyoum B., Camargo A. State fragility and foreign direct investment: The mediating roles of human flight and economic decline. *Thunderbird International Business Review*. 2021;63(2):159–174. URL: <https://doi.org/10.1002/tie.22135>
18. Sasidaran G., Aizhan S. What attracts Greenfield foreign direct investment inflows to Asia? Evidence from firms' motives. *Transnational Corporations Review*. 2023;15(1):111–129. URL: <https://doi.org/10.1016/j.tncr.2023.100009>
19. Kim Y., Rhee D. Do stringent environmental regulations attract foreign direct investment in developing countries? Evidence on the 'Race to the Top' from cross-country panel data. *Emerging Markets Finance and Trade*. 2019;55(12):2796–2808. URL: <https://doi.org/10.1080/1540496X.2018.1531240>
20. Liu L., Zhao Z., Zhang M., Zhou C., Zhou D. The effects of environmental regulation on outward foreign direct investment's reverse green technology spillover: Crowding out or facilitation? *Journal of Cleaner Production*. 2021;284:124689. URL: <https://doi.org/10.1016/j.jclepro.2020.124689>
21. Mousavian S., Mirdamadi S., Hosseini S., NajafAbadi M. Determinants of foreign direct investment inflow to the agricultural sector: a panel-data analysis. *Journal of Economic and Administrative Sciences*. 2023;39(3):709–729. URL: <https://doi.org/10.1108/JEAS-11-2020-0196>
22. Ajide K., Raheem I. Institutions-FDI Nexus in ECOWAS Countries. *Journal of African Business*. 2016;17(3):319–341. URL: <https://doi.org/10.1080/15228916.2016.1180778>
23. Buchanan B., Le Q., Rishi M. Foreign direct investment and institutional quality: Some empirical evidence. *International Review of Financial Analysis*. 2012;21:81–89. URL: <https://doi.org/10.1016/j.irfa.2011.10.001>
24. Baltas N., Tsionas M., Baltas K. Foreign direct investment in OECD countries: a special focus in the case of Greece. *Applied Economics*. 2018;50(52):5579–5591. URL: <https://doi.org/10.1080/00036846.2018.1488054>
25. Uddin M., Chowdhury A., Zafar S., Shafique S., Liu J. Institutional determinants of inward FDI: Evidence from Pakistan. *International Business Review*. 2019;28(2):344–358. URL: <https://doi.org/10.1016/j.ibusrev.2018.10.006>
26. Ghazalian P., Amponsem F. The effects of economic freedom on FDI inflows: an empirical analysis. *Applied Economics*. 2019;51(11):1111–1132. URL: <https://doi.org/10.1080/00036846.2018.1524979>
27. Goh S., Wong K. Malaysia's outward FDI: The effects of market size and government policy. *Journal of Policy Modelling*. 2011;33(3):497–510. URL: <https://doi.org/10.1016/j.jpolmod.2010.12.008>
28. Fang J., Collins A., Yao S. On the global COVID-19 pandemic and China's FDI. *Journal of Asian Economics*. 2021;74:101300. URL: <https://doi.org/10.1016/j.asieco.2021.101300>
29. Khan H., Dong Y., Bibi R., Khan I. Institutional quality and foreign direct investment: Global evidence. *Journal of the Knowledge Economy*. 2023;15(3):10547–91. URL: <https://doi.org/10.1007/s13132-023-01508-1>
30. Omri A., Nguyen D., Rault C. Causal interactions between CO2 emissions, FDI, and economic growth: Evidence from dynamic simultaneous-equation models. *Economic Modelling*. 2014;42:382–389. URL: <https://doi.org/10.1016/j.econmod.2014.07.026>
31. Tuan C., Ng L., Zhao B. China's post-economic reform growth: The role of FDI and productivity progress. *Journal of Asian Economics*. 2009;20(3):280–293. URL: <https://doi.org/10.1016/j.asieco.2009.02.010>
32. Gupta P., Singh A. Causal nexus between foreign direct investment and economic growth: A study of BRICS nations using VECM and Granger causality test. *Journal of Advances in Management Research*. 2016;13(2):179–202. URL: <https://doi.org/10.1108/JAMR-04-2015-0028>
33. Cakici S. Macroeconomic stability and foreign direct investment. *Macroeconomics and Finance in Emerging Market*. 2023;18(3):661–74. URL: <https://doi.org/10.1080/17520843.2023.2194121>

34. Singh D. Foreign direct investment and local interpretable model-agnostic explanations: a rational framework for FDI decision making. *Journal of Economics Finance and Administrative Science*. 2024;29(57):98–120. URL: <https://doi.org/10.1108/JEFAS-05-2021-0069>
35. Mottaleb K., Kalirajan K. *Determinants of Foreign Direct Investment in Developing Countries: A Comparative Analysis — Khondoker Abdul Mottaleb, Kaliappa Kalirajan, 2010*. URL: <https://journals.sagepub.com/doi/abs/10.1177/097380101000400401>
36. Maryam J., Mittal A. Foreign direct investment into BRICS: an empirical analysis. *Transnational Corporations Review*. 2020;12(1):1–9. URL: <https://doi.org/10.1080/19186444.2019.1709400>
37. Shahbaz M., Mateev M., Abosedra S., Nasir M., Jiao Z. Determinants of FDI in France: Role of transport infrastructure, education, financial development and energy consumption. *International Journal of Finance and Economics*. 2021;26(1):1351–1374. URL: <https://doi.org/10.1002/ijfe.1853>
38. Liu Y., Su M., Zhao J., Martin S., Yuen K., Lee C. The determinants of China's outward foreign direct investment: a vector error correction model analysis of coastal and landlocked countries. *Economic Change and Restructuring*. 2023;56(1):29–56. URL: <https://doi.org/10.1007/s10644-022-09407-2>
39. Anwar S., Nguyen L. P. Foreign direct investment and economic growth in Vietnam. *Asia Pacific Business Review*. 2010;16(1–2):183–202. URL: <https://doi.org/10.1080/10438590802511031>
40. Khan M. A., Ozturk I. Examining foreign direct investment and environmental pollution linkage in Asia. *Environmental Science and Pollution Research*. 2020;27(7):7244–7255. URL: <https://doi.org/10.1007/s11356-019-07387-x>
41. Qamruzzaman M. Nexus between environmental quality, institutional quality and trade openness through the channel of FDI: an application of common correlated effects estimation (CCEE), NARDL, and asymmetry causality. *Environmental Science and Pollution Research*. 2021;28(37):52475–52498. URL: <https://doi.org/10.1007/s11356-021-14269-8>
42. Li S., Hou D., Jin W., Shahid R. Impact of industrial agglomeration on environmental pollution from perspective of foreign direct investment-a panel threshold analysis for Chinese provinces. *Environmental Science and Pollution Research*. 2021;28(41):58592–58605. URL: <https://doi.org/10.1007/s11356-021-14823-4>
43. Zheng P. The determinants of disparities in inward FDI flows to the three macro-regions of China. *Post-Communist Economies*. 2011;23(2):257–270. URL: <https://doi.org/10.1080/14631377.2011.570053>
44. Dingru L., Onifade S., Ramzan M., AL-Faryan M. Environmental perspectives on the impacts of trade and natural resources on renewable energy utilization in Sub-Sahara Africa: Accounting for FDI, income, and urbanization trends. *Resources Policy*. 2023;80:103204. URL: <https://doi.org/10.1016/j.resourpol.2022.103204>
45. Anyanwu J. C., Yaméogo N. D. Regional comparison of foreign direct investment to Africa: Empirical analysis. *African Development Review*. 2015;27(4):345–363. URL: <https://doi.org/10.1111/1467-8268.12152>
46. Olofin O., Aiyegbusi O., Adebayo A. Analysis of foreign direct investment and economic growth in Nigeria: Application of spatial econometrics and fully modified ordinary least square (FMOLS). *Foreign Trade Review*. 2019;54(3):159–176. URL: <https://doi.org/10.1177/0015732519851631>
47. Wattanadumrong B., Collins A., Snell M. Still Big in Bangkok? An empirical analysis of the regional distribution of foreign direct investment in Thailand. *International Journal of the Economics of Business*. 2010;17(3):329–348. URL: <https://doi.org/10.1080/13571516.2010.516105>
48. Asongu S., Akpan U., Isihak S. Determinants of foreign direct investment in fast-growing economies: evidence from the BRICS and MINT countries. *Financial Innovation*. 2018;4(1):1–7. URL: <https://doi.org/10.1186/s40854-018-0114-0>
49. Dutta N., Kar S., Saha S. Human capital and FDI: How does corruption affect the relationship? *Economic Analysis and Policy*. 2017;56:126–134. URL: <https://doi.org/10.1016/j.eap.2017.08.007>
50. Sultana N., Turkina E. Foreign direct investment, technological advancement, and absorptive capacity: A network analysis. *International Business Review*. 2020;29(2):101668. URL: <https://doi.org/10.1016/j.ibusrev.2020.101668>
51. Berrill J., O'Hagan-Luff M., van Stel A. The moderating role of education in the relationship between FDI and entrepreneurial activity. *Small Business Economics*. 2020;54(4):1041–1059. URL: <https://doi.org/10.1007/s11187-018-0121-6>

52. Bui T., Vo X., Bui D. Gender inequality and FDI: empirical evidence from developing Asia-Pacific countries. *Eurasian Economic Review*. 2018;8(3):393–416. URL: <https://doi.org/10.1007/s40822-018-0097-1>
53. Karim N., Fleming E. Factors affecting Foreign direct investment in Malaysia's manufacturing sector: An analysis across states. *Singapore Economic Review*. 2012;57(4). URL: <https://doi.org/10.1142/S0217590812500154>
54. Mei J. Foreign direct investment and relative capacity: Theory and evidence. *Economics of Transition and Institutional Change*. 2023;31(4):1175–1214. URL: <https://doi.org/10.1111/ecot.12369>
55. Obeng-Amponsah W., Owusu E. Foreign direct investment, technological transfer, employment generation and economic growth: new evidence from Ghana. *International Journal of Emerging Markets*. 2023;20(5):2088–2109. URL: <https://doi.org/10.1108/IJOEM-02-2022-0200>
56. Das K. Home country determinants of outward FDI from developing countries. *Margin-Journal of Applied Economic Research*. 2013;7(1):93–116. URL: <https://doi.org/10.1177/0973801012466104>
57. Kong Q., Guo R., Wang Y., Sui X., Zhou S. Home-country environment and firms' outward foreign direct investment decision: Evidence from Chinese firms. *Economic Modelling*. 2020;85:390–399. URL: <https://doi.org/10.1016/j.econmod.2019.11.014>
58. Hung C. Y., Chiang Y. H. Does an upper limit on foreign direct investment matter?: The case of Taiwan. *Journal of Asian Economics*. 2009;20(5):549–560. URL: <https://doi.org/10.1016/j.asieco.2009.07.002>
59. Jimborean R., Kelber A. Foreign Direct Investment Drivers and Growth in Central and Eastern Europe in the Aftermath of the 2007 Global Financial Crisis. *Comparative Economic Studies*. 2017;59(1):23–54. URL: <https://doi.org/10.1057/s41294-016-0018-9>
60. Gupta S., Jha B., Singh R. Decision making framework for foreign direct investment: Analytic hierarchy process and weighted aggregated sum product assessment integrated approach. *Journal of Public Affair*. 2022;22: e2771. URL: <https://doi.org/10.1002/pa.2771>
61. Chan M., Hou K., Li X., Mountain D. Foreign direct investment and its determinants: A regional panel causality analysis. *Quarterly Review of Economics and Finance*. 2014;54(4):579–589. URL: <https://doi.org/10.1016/j.qref.2013.07.004>
62. Islam S., Islam M. Friends or foe? The complementarity or substitutability of financial development and FDI, financial development, and trade openness on domestic investment. *Journal of International Trade and Economic Development*. 2023;32(7):1083–1111. URL: <https://doi.org/10.1080/09638199.2022.2147211>
63. Sultana N., Turkina E. Foreign direct investment, technological advancement, and absorptive capacity: A network analysis. *International Business Review*. 2020;29(2). URL: <https://doi.org/10.1016/j.ibusrev.2020.101668>
64. Kok R., Ersoy B. Analyses of FDI determinants in developing countries. *International Journal of Social Economics*. 2009;36(1–2):105–123. URL: <https://doi.org/10.1108/03068290910921226>
65. Geda A., Yimer A. What drives foreign direct investment into Africa? Insights from a new analytical classification of countries as fragile, factor-driven, or investment-driven. *Journal of the Knowledge Economy*. 2024;15(3):14199–234. URL: <https://doi.org/10.1007/s13132-023-01639-5>
66. Henri N., Luc N., Larissa N. The long-run and short-run effects of foreign direct investment on financial development in African countries. *African Development Review-Revue Africaine de Development*. 2019;31(2):216–229. URL: <https://doi.org/10.1111/1467-8268.12379>
67. Gaies B., Nabi M. Banking crises and economic growth in developing countries: Why privileging foreign direct investment over external debt? *Bulletin of Economic Research*. 2021;73(4):736–761. URL: <https://doi.org/10.1111/boer.12271>
68. Li J., Van Assche A., Li L., Qian G. Foreign direct investment along the Belt and Road: A political economy perspective. *Journal of International Business Studies*. 2022;53(5):902–919. URL: <https://doi.org/10.1057/s41267-021-00435-0>
69. Ren S., Hao Y., Wu H. The role of outward foreign direct investment (OFDI) on green total factor energy efficiency: Does institutional quality matters? Evidence from China. *Resources Policy*. 2022;76:102587. URL: <https://doi.org/10.1016/j.resourpol.2022.102587>
70. Kurtovic S., Halili B., Maxhuni N., Krasniqi B. Outward foreign direct investment and the economic growth of Central, East and Southeast Europe: an asymmetric approach. *International Journal of Emerging Markets*. 2024;19(12):4543–62. URL: <https://doi.org/10.1108/IJOEM-09-2021-1388>

71. Driffield N., Jones C., Kim.J, Temouri Y. FDI motives and the use of tax havens: Evidence from South Korea. *Journal of Business Research*. 2021;135:644–662. URL: <https://doi.org/10.1016/j.jbusres.2021.06.061>
72. Song Y., Paramati S., Ummalla M., Zakari A., Kummitha H. The effect of remittances and FDI inflows on income distribution in developing economies. *Economic Analysis and Policy*. 2021;72:255–267. URL: <https://doi.org/10.1016/j.eap.2021.08.011>
73. Kastratovic R. The impact of foreign direct investment on agricultural exports: The evidence from developing countries. *Journal of International Trade and Economic Development*. 2024;33(2):276–293. URL: <https://doi.org/10.1080/09638199.2023.2175306>
74. Qamruzzaman M., Karim S., Kor S. Does environmental degradation matter for poverty? Clarifying the nexus between FDI, environmental degradation, renewable energy, education, and poverty in Morocco and Tunisia. *Environmental Science and Pollution Research*. 2023;30(18):52872–52894. URL: <https://doi.org/10.1007/s11356-023-25954-1>
75. Sou J.P.U., Vinnicombe T. Does governance quality matter for FDI-led tourism development? A supply-side perspective. *Tourism Economics*. 2023;29(2):392–408. URL: <https://doi.org/10.1177/13548166211052814>
76. Nathaniel S., Aguegbah E., Iheonu C., Sharma G., Shah M. Energy consumption, FDI, and urbanization linkage in coastal Mediterranean countries: re-assessing the pollution haven hypothesis. *Environmental Science and Pollution Research*. 2020;27(28):35474–35487. URL: <https://doi.org/10.1007/s11356-020-09521-6>
77. Liu R., Kang Y., Zhang J. Ideological taboos, entry barriers, and FDI attraction: Evidence from China. *Journal of Asian Economics*. 2021;76:101365. URL: <https://doi.org/10.1016/j.asieco.2021.101365>
78. Zugravu-Soilita N. How does foreign direct investment affect pollution? toward a better understanding of the direct and conditional effects. *Environmental and Resource Economics*. 2017;66(2):293–338. URL: <https://doi.org/10.1007/s10640-015-9950-9>
79. Antonietti R., Mondolo J. Inward FDI and the quality of domestic institutions: A cross-country panel VAR analysis. *Economic systems*. 2023;47(3):101078. URL: <https://doi.org/10.1016/j.ecosys.2023.101078>
80. Ali F., Fiess N., MacDonald R. Climbing to the top? Foreign direct investment and property rights. *Economic Inquiry*. 2011;49(1):289–302. URL: <https://doi.org/10.1111/j.1465-7295.2010.00319.x>
81. Konstandina M., Gachino G. International technology transfer: evidence on foreign direct investment in Albania. *Journal of Economic Studies*. 2020;47(2): 286–306. URL: <https://doi.org/10.1108/JES-02-2018-0076>
82. Iamsiraroj S. The foreign direct investment–economic growth nexus. *International Review of Economics and Finance*. 2016;42:116–133. URL: <https://doi.org/10.1016/j.iref.2015.10.044>
83. Whalley J., Xin X. China's FDI and non-FDI economies and the sustainability of future high Chinese growth. *China Economic Review*. 2010;21(1):123–135. URL: <https://doi.org/10.1016/j.chieco.2009.11.004>
84. Rehman F.U., Islam M.M., Sohag K. Does infrastructural development allure foreign direct investment? The role of Belt and Road Initiatives. *International Journal of Emerging Markets*. 2022;19(4):1026–1050. URL: <https://doi.org/10.1108/IJOEM-03-2022-0395>
85. Chiyaba G., Singleton C. Do natural resources and foreign direct investment tend to erode or support the development of national institutions? *The World Economy*. 2024;47(3):1117–1146. URL: <https://doi.org/10.1111/twec.13447>
86. Rehman F., Ding Y., Noman A., Khan M. China's outward foreign direct investment and exports diversification: an asymmetric analysis. *Journal of Chinese Economic and Foreign Trade Studies*. 2020;13(2):45–69. URL: <https://doi.org/10.1108/JCEFTS-12-2019-0065>
87. Drogendijk R., Martín O. Relevant dimensions and contextual weights of distance in international business decisions: Evidence from Spanish and Chinese outward FDI. *International Business Review*. 2015;24(1):133–147. URL: <https://doi.org/10.1016/j.ibusrev.2014.07.003>
88. Gao L., Liu X., Zou H. The role of human mobility in promoting Chinese outward FDI: A neglected factor? *International Business Review*. 2013;22(2): 437–449. URL: <https://doi.org/10.1016/j.ibusrev.2012.06.001>
89. Ameer W., Xu H., Alotaish M. Outward foreign direct investment and domestic investment: evidence from China. *Economic Research-Ekonomska Istrazivanja*. 2017;30(1):777–788. URL: <https://doi.org/10.1080/1331677X.2017.1314824>

90. Rehman F., Khan M., Khan M., Pervaiz K., Liaqat I. The causal, linear and nonlinear nexus between sectoral FDI and infrastructure in Pakistan: Using a new global infrastructure index. *Research in International Business and Finance*. 2020;52:101129. URL: <https://doi.org/10.1016/j.ribaf.2019.101129>
91. Ali U., Li Y., Wang J. J., Yue X., Chang A. C. (Jasmine). Dynamics of outward FDI and productivity spillovers in logistics services industry: Evidence from China. *Transportation Research Part E: Logistics and Transportation Review*. 2021;148:102258. URL: <https://doi.org/10.1016/j.tre.2021.102258>
92. Osabuohien-Irabor O., Drapkin I. M. FDI Escapism: the effect of home country risks on outbound investment in the global economy. *Quantitative Finance and Economics*. 2022;6(1):113–137. URL: <https://doi.org/10.3934/QFE.2022005>
93. Kormakova I., Kruhlyanko A., Peniuk V., Ursakii Y., Verstiak O. Actual Strategies for Businesses Penetrating Foreign Markets in the Modern Economy: Globalisation Aspect. *International Journal of Professional Business Review*. 2023;8(5): e02148–e02148. URL: <https://doi.org/10.26668/businessreview/2023.v8i5.2148>
94. Bartlett W., Krasniqi B., Ahmetbašić J. Attracting FDI to the Western Balkans: Special Economic Zones and Smart Specialisation Strategies. *Croatian Economic Survey*. 2019;21(2):5–35. URL: <https://doi.org/10.15179/ces.21.2.1>
95. Huang X. The influence of digital economy on the inflow of foreign direct investment. *Frontiers in Business, Economics and Management*. 2023;11(2): 357–363. URL: <https://doi.org/10.54097/fbem.v11i2.12640>
96. Blanton R., Blanton S. Is foreign direct investment “gender blind”? Women’s rights as a determinant of US FDI. *Feminist Economics*. 2015;21(4):61–88. URL: <https://doi.org/10.1080/13545701.2015.1006651>
97. Lai Y. C., Sarkar S. Gender equality legislation and foreign direct investment: Evidence from the labour market of Taiwan ROC. *International Journal of Manpower*. 2017;38(2):160–179. URL: <https://doi.org/10.1108/IJM-08-2015-0133>
98. Sabir S., Rafique A., Abbas K. Institutions and FDI: evidence from developed and developing countries. *Financial Innovation*. 2019;5(1):1–20. URL: <https://doi.org/10.1186/s40854-019-0123-7>
99. Shaari M., Esquivias M., Ridzuan A., Zainal N., Sugiharti L. The impacts of corruption and environmental degradation on foreign direct investment: new evidence from the ASEAN+3 countries. *Cogent Economics and Finance*. 2022;10(1). URL: <https://doi.org/10.1080/23322039.2022.2124734>
100. Hofstede G. The GLOBE debate: Back to relevance. *Journal of International Business Studies*. 2010;41(8):1339–1346. URL: <https://doi.org/10.1057/jibs.2010.31>
101. Zhang Y., Cheng Z., He Q. Time lag analysis of FDI spillover effect: Evidence from the Belt and Road developing countries introducing China’s direct investment. *International Journal of Emerging Markets*. 2019;15(4):629–650. URL: <https://doi.org/10.1108/IJOEM-03-2019-0225>
102. Izadi S., Rashid M., Izadi P. Direct and indirect influence of national culture on foreign direct investment. *Research in International Business and Finance*. 2023;66:102037. URL: <https://doi.org/10.1016/j.ribaf.2023.102037>
103. Sahasranamam S., Arya B., Mukundhan K. V. Dual institutional embeddedness and home country CSR Engagement: Evidence from Indian MNEs. *Journal of Business Research*. 2022;141:163–174. URL: <https://doi.org/10.1016/j.jbusres.2021.12.003>
104. Shahbaz M., Nasreen S., Abbas F., Anis O. Does foreign direct investment impede environmental quality in high-, middle-, and low-income countries? *Energy Economics*. 2015;51:275–287. URL: <https://doi.org/10.1016/j.eneco.2015.06.014>
105. Chiyaba G., Singleton C. Do natural resources and foreign direct investment tend to erode or support the development of national institutions? *World Economy*. 2024;47(3):1117–1146. URL: <https://doi.org/10.1111/twec.13447>
106. Nem Singh J., Ovadia J. S. The theory and practice of building developmental states in the Global South. *Third World Quarterly*. 2018;39(6):1033–1055. URL: <https://doi.org/10.1080/01436597.2018.1455143>
107. Caetano R. V., Marques A. C. Could energy transition be a game changer for the transfer of polluting industries from developed to developing countries? An application of game theory. *Structural Change and Economic Dynamics*. 2023;65:351–363. URL: <https://doi.org/10.1016/j.strueco.2023.03.007>
108. Veeramani S., Shukla A., Jamaleh M. Financial theories of foreign direct investment: a review of literature. *Journal of Industrial and Business Economics*. 2020;47(2):185–217. URL: <https://doi.org/10.1007/s40812-019-00144-8>

109. Buckley P.J., Chen L., Clegg L.J., Voss H. Risk propensity in the foreign direct investment location decision of emerging multinationals. *Journal of International Business Studies*. 2018;49(2):153–171. URL: <https://doi.org/10.1057/s41267-017-0126-4>
110. Lewczuk A. Human rights protection and foreign direct investment: The case of post-socialist countries. *Economics of Transition*. 2019;27(4):1009–1030. URL: <https://doi.org/10.1111/ecot.12226>
111. Makino S., Tsang E. Historical ties and foreign direct investment: An exploratory study. *Journal of International Business Studies*. 2011;42(4):545–557. URL: <https://doi.org/10.1057/jibs.2010.53>
112. Al-kasasbeh O., Alzghoul A., Alghraibeh K. Global FDI inflows and outflows in emerging economies post-COVID-19 era. *Future Business Journal*. 2022;8(1):53. URL: <https://doi.org/10.1186/s43093-022-00167-z>
113. Benson A.K. Does the Russia-Ukraine war affects trade relations and foreign Direct investment flows from Europe into Asia and Africa? *International Journal of Research in Business and Social Science*. 2023;12(2):287–300. URL: <https://doi.org/10.20525/ijrbs.v12i2.2403>
114. Ayentimi D.T., Burgess J., Dayaram K. Skilled labour shortage: a qualitative study of Ghana's training and apprenticeship system. *Human Resource Development International*. 2018;21(5):406–424. URL: <https://doi.org/10.1080/13678868.2018.1447881>
115. Rehman F.U., Islam M.M., Sohag K. Does infrastructural development allure foreign direct investment? The role of Belt and Road Initiatives. *International Journal of Emerging Markets*. 2022;19(4):1026–1050. URL: <https://doi.org/10.1108/IJOEM-03-2022-0395>
116. Caetano R., Marques A. Nonlinear relationships between Foreign Direct Investment decisions and environmental degradation in high- and middle-income countries. *Journal of Industrial and Business Economics*. 2024;51(1): 135–188. URL: <https://doi.org/10.1007/s40812-023-00282-0>
117. Elneel F. Does Sudan's Removal from State Sponsors of Terrorism Designation Affect Foreign Direct Investment (FDI)? 'A Multivariate Analysis Combining VECM and ARDL Analysis' (1974–2019). *Journal of the Knowledge Economy*. 2024;15(2):7873–900. URL: <https://doi.org/10.1007/s13132-023-01402-w>

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Appendix 1. Future research questions and directions

	Gap area	Pertinent research questions (RQ)/or Research objectives (RO)
Antecedents	Pull factors towards FDI inflows dominated the literature. The studies on push factors were underrepresented.	RO1: To investigate push factors that influence FDI inflows
	In terms of institutional factors, the factors associated with governmental policies and regulations was underrepresented	RQ1: What are other factors related to policies and regulations impact FDI?
	In terms of non-situational factors, lack of studies investigates the impact of social-cultural factors	RQ2: Do social-cultural factors impact FDI investment?
Outcomes	Lack of outcomes related to home countries	RO2: To investigate impacts of FDI on home countries
	The debate of FDI's spillover impacts on home and host countries	RQ3: Do FDI's spillover negatively or positively impact a nation?
Theory	Most theories and frameworks widely used in this topic focused on market mechanisms, firm behaviour, and economic growth. Lack of studied in different perspectives.	RQ4: How do developmental state strategies influence the attractiveness of a country for FDI inflows? RQ5: How do game-theoretic dynamics shape the bargaining outcomes between host governments and MNCs in FDI negotiations? RQ6: In what ways does risk aversion influence the location selection decisions of multinational firms? RQ7: How can emerging economies strategically balance competitive fiscal incentives and environmental sustainability using behavioral frameworks?
Context	Most studies focused on the multinational or uninational contexts. Lack of studies focusing on other contexts such as cultural differences, industry, or force majeure	RQ8: How do historical, cultural, and ideological systems (e.g., socialist vs. capitalist regimes) influence FDI attraction strategies? RQ9: What are the differences in FDI policy effectiveness across under-researched regions such as Eastern Europe and South America? RQ10: How do force majeure events (e.g., COVID-19, armed conflicts) reshape the FDI landscape across political-economic systems? RQ11: In what ways do cultural distance and institutional trust mediate the success or failure of foreign investments in turbulent environments?
Methods	The majority of the studies are cross-sectional studies	RQ12: How do long-term macroeconomic and institutional factors interact with short-term shocks to influence FDI inflows (via VECM)? RQ13: What are the underlying rationales, perceptions, and barriers that shape foreign investors' decisions (via qualitative methods)? RQ14: In what contexts do different combinations of factors (using QCA) lead to high or low FDI inflow outcomes?

Source: Developed by the authors.

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Establishment of a Financial Education System for the Population in Contemporary Russia

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ABSTRACT

For adult citizens, financial education serves as the key tool for enhancing the level of financial literacy and, in the medium term, contributes to the formation of financial culture. In this regard, the establishment of an effective financial education system is currently a relevant strategic objective for the development of Russian society. **The aim** of the study is to develop a structural-functional model of a regional financial education system based on an analysis of the current state and development trends of the public financial education system. **Methods.** The research employed general scientific methods as well as systemic and structural-functional approaches. **Results.** The concept of the population's financial education system was clarified. The main trends in the emerging national system of financial education among the population were identified. It has been established that, within the framework of developing the financial education system for Russian citizens, two processes are currently occurring simultaneously: the integration of the fundamentals of financial education through elements of financial literacy into the educational system and the implementation of a mechanism for public financial education as part of informational and awareness-raising activities. The presented structural and functional model of the regional system of financial education provides for the involvement of institutions of various organizational and legal forms in the implementation of the mechanism of financial education of the population, including educational institutions, as well as cultural institutions, social services for the population, institutions supporting entrepreneurship, and employment service institutions. The key support point for the development of the system is the regional center for financial literacy of the population created in the region. The model reflects the process of interaction between the educational system and other spheres of the region. **Scientific novelty.** The authors proposed the conceptual foundations for improving the system of financial education for the population, focusing on developing its elements at the regional level.

Keywords: financial literacy; financial education; system; infrastructure; model; information and educational activities; concept; population

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Формирование системы финансового просвещения населения в России на современном этапе

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АННОТАЦИЯ

Финансовое просвещение является ключевым инструментом повышения уровня финансовой грамотности взрослых граждан, способствующим в среднесрочной перспективе формированию финансовой

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культуры общества. В связи с этим создание эффективной системы финансового просвещения в настоящее время является актуальной стратегической задачей развития российского общества. **Цель исследования** — на основе анализа состояния и тенденций развития системы финансового просвещения населения разработать структурно-функциональную модель региональной системы финансового просвещения. **Методы.** В ходе исследования использовались общенаучные методы исследования, а также системный и структурно-функциональный подходы. **Результаты.** Уточнено понятие системы финансового просвещения населения. Выявлены основные тенденции формирующейся национальной системы финансового просвещения населения. Установлено, что в рамках развития системы финансового просвещения российских граждан сегодня происходят одновременно два процесса: процесс интеграции основ финансового образования через элементы финансовой грамотности в систему образования и реализация механизма финансового просвещения населения в рамках информационно-просветительской деятельности. Представленная структурно-функциональная модель региональной системы финансового просвещения предусматривает вовлечение в реализацию механизма финансового просвещения населения учреждений различных организационно-правовых форм, в том числе образовательных учреждений, а также культуры, социального обслуживания населения, учреждений поддержки предпринимательства и учреждений службы занятости населения. Ключевой опорной точкой для развития системы выступает созданный в регионе региональный центр финансовой грамотности населения. Модель отражает процесс взаимодействия образовательной системы и других сфер региона. **Научная новизна.** Предложены концептуальные основы совершенствования системы финансового просвещения населения в контексте развития ее элементов на региональном уровне.

Ключевые слова: финансовая грамотность; финансовое просвещение; система; инфраструктура; модель; информационно-просветительская деятельность; концепция; население

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Introduction

In the contemporary socio-economic reality, an individual's well-being, including financial well-being, is increasingly becoming their personal responsibility. However, the effectiveness of personal finance management, manifested in an individual's conscious and rational financial behavior, is inextricably linked to financial literacy and is a reflection of their financial culture.

The economic literature notes that financial literacy implies an individual's possession of certain financial knowledge, skills, and practical abilities that enable the effective management of personal finances in various life situations [1–3]. The formation of a basic level of financial literacy in an individual begins with an understanding of the importance of financial planning, which allows for finding reserves to save money and create savings [4].

Studying the specifics of financial literacy formation among adult citizens, S. V. Shcherstobitova and T. V. Pletneva identified the following reasons for its low level: a lack of high-quality and easily accessible information regarding financial services and products; and an absence of understanding regarding the importance and

necessity of continuous accounting and control of income and expenses within the family budget as part of personal finance management [5].

The concept of "financial culture" has a broader meaning and is defined in a regulatory document¹ as a set of values, attitudes, and behavioral practices of citizens in the financial sphere. The culture of responsible financial behavior among citizens depends on upbringing, the level of financial literacy, experience in making financial decisions, and the availability and transparency of information about the features of financial products and services [6]. These areas have been reflected in contemporary research.

The systematization and classification of approaches to financial literacy, as identified by scholars in different countries and contexts, are presented in the studies of D. V. Lazutina, E. M. Pornyaga [7], O. A. Spiridovich [8], and R. V. Melnikov [9]. Approaches to the formation of financial culture among Russian citizens are presented in the works of A. I. Fatikhov, R. T. Nasibullina [10], A. V. Brykin, D. A. Kunizheva, S. A. Bolshunova [11], and K. A. Golubeva [12].

¹ Decree of the Government of the Russian Federation No. 2958-r of October 24, 2023.

Improving financial literacy and forming the financial culture of Russian citizens are priority tasks for the state today. The implementation of the Strategy for Improving Financial Literacy in the Russian Federation for 2017–2023² enabled the development of a mechanism for promoting elements of financial literacy within the education system and created prerequisites for developing a mechanism for the financial education of Russian citizens. As practice shows, the strategy focused on youth, since in most cases, the educational programs on financial literacy developed to date are aimed at forming knowledge in the area of personal finance management among preschoolers, schoolchildren, and students of secondary or higher educational institutions within a specially organized educational space.

Currently, from the standpoint of state policy, the main goal in the transition from financial literacy to financial culture is to expand the potential of long-term savings of the population and businesses as a source of investment in the national economy, which can be directed toward the development of infrastructure, innovation, and other strategically important areas [13, 14]. In this regard, the new Strategy for Improving Financial Literacy and Forming a Financial Culture until 2030³ pays special attention to the adult population, as the economic behavior of adults has the greatest impact on the country's socio-economic development.

Ensuring a high level of financial literacy is crucial for the growth of financial culture among Russians. Without basic financial literacy, understanding other financial information becomes difficult, and households find themselves in risky situations (excessive debt, insufficient and undiversified savings) [15]. Chinese researchers Fuzhong Chen, Xuli Lu, and Wang Wuxia also note that consumers' financial decision-making in some situations requires significant time and effort to find and analyze the information necessary for making decisions [16].

For an adult citizen, financial education becomes a tool for improving the level of financial literacy throughout life. The works of many Russian researchers are devoted to studying

the current level of financial literacy among Russians for intensified efforts to develop the mechanism of financial education, for example, E. K. Voronkova, E. I. Gromova, A. G. Kuzmina, N. S. Marinina, N. V. Mityaeva, A. I. Shakirzyanova, and others [17].

E. N. Isupova, S. Yu. Vart, and S. V. Bekareva noted that interest in expanding financial knowledge and forming relevant skills, along with increasing the accessibility of financial services for citizens with low incomes, could be an important step toward reducing the poverty level in Russia [18].

In this connection, the issue of organizing a system of financial education that facilitates the transfer of knowledge, skills, and abilities in financial literacy is now being actively discussed within the scientific and expert community due to the absence of a consistent practice of informing and advising the population in the area of personal finance management on the financial market. However, there is currently a very limited number of studies that reflect an understanding of the emerging system of financial education for Russian citizens. Furthermore, there is an objective need to clarify the concept of a public financial education system.

Certain aspects related to the process of forming a system of financial education for Russians are reflected in the publications of S. M. Kosenok [19], O. A. Alexandrova, N. V. Alikperova, K. V. Vinogradova, Yu. S. Nenakhov [20, 21], V. Sh. Kaganov, S. A. Lochan, D. S. Petrosyan [22], N. P. Harish, S. I. Abakumova, O. V. Timchenko, A. B. Cheboksarov [23], E. K. Voronkova, E. I. Gromova [24], and O. V. Kuznetsova [25]. Significant attention is paid to the creation of regional centers for public financial literacy and the improvement of the organizational foundations of their work.

Meanwhile, the publications of A. V. Abysheva, E. S. Korchemkina, S. R. Shibaev, Yu. A. Shadrin, A. A. Stolyarova, and G. E. Shakhnazaryan presented the experience of building and operating public financial education systems in foreign countries [26, 27]. It is noted that national policy for developing the mechanism of public financial education in foreign countries is implemented in the form of public-private partnerships. Additional functions for disseminating financial knowledge to the population are assigned to

² Decree of the Government of the Russian Federation No. 2039-r of September 25, 2017.

³ Decree of the Government of the Russian Federation No. 2958-r of October 24, 2023.

various social agencies responsible for employment, education, and pension insurance, as well as to organizations regulating financial services markets and ensuring consumer protection. For example, in the USA, this is the Financial Literacy and Education Commission; in Australia — the Financial Information Service (FIS); in Canada — the Financial Consumer Agency of Canada (FCAC); in the UK — the Financial Conduct Authority (FCA).⁴ Public organizations, supported by both the state and the private sector, are also actively involved in the financial education of the population. The largest-scale initiatives in public financial education conducted internationally are undertaken by prominent banking institutions and investment funds.

The federal and regional levels have already established certain institutions to ensure the development of the financial education system for Russian citizens. However, V. Sh. Kaganov notes that the mechanisms for developing the financial education system are currently underdeveloped at the regional level [28]. The complexity of managing the financial education system is due to: the absence of a system for continuous training of personnel to manage financial literacy development processes; the lack of scientific and methodological approaches to the management system of financial education; and the need to attract volunteers and resources for organizing effective work in the field of citizens' financial education.

In connection with this, the research goal was defined: to develop a structural-functional model of a regional financial education system based on an analysis of the current state and development trends of the public financial education system.

Methods

The methodological foundation of the research was constituted by a review, analysis, and synthesis of works by domestic and foreign scholars on issues of enhancing financial literacy and forming the financial culture of citizens, as well as conceptual approaches to developing the system of financial education for the population. In the course of the research, general scientific methods were employed, along with

systemic and structural-functional approaches. The information base of the study was also formed from open data sources presented by the information resources of key participants in the process of improving the population's financial literacy and from regulatory legal acts at the federal and regional levels in the sphere of enhancing financial literacy and forming the financial culture of Russians.

Results and discussion

At present, Russian legislation concerning the improvement of financial literacy and the formation of financial culture among Russians, as well as scientific literature, lack the concept of a system for public financial education. However, analysis of domestic and international literature reveals three primary approaches to improving financial literacy.

Formal Financial Education. State-organized programs implemented in educational institutions (schools, colleges and universities) and vocational training centers through approved curricula. Since 2022, Russian federal educational standards at all levels have incorporated financial literacy components.

Non-Formal Financial Education. Complementary to formal education, this approach allows individuals to acquire financial competencies outside institutional settings [29]. It primarily involves workshops, seminars, and training programs with specific objectives and methodologies. Notable examples include the nationwide "Financial Literacy Days in Educational Institutions" program organized by the Financial Literacy Development Association with regional government support, featuring seminars, roundtables, business games, online conferences, and specialized camps.⁵ Another example is the 2024 All-Russian family savings and investment festival, which was organized by the Financial Literacy Institute of the Financial University and supported by the Russian Ministry of Finance, offering lectures, quizzes, masterclasses and business games focused on personal finance management.⁶

⁵ The nationwide program "Financial Literacy Days in Educational Institutions". URL: <https://dnifg.fincubator.ru/> (accessed on 07.09.2025).

⁶ All-Russian family savings and investment festival. URL: <https://моифинансы.рф/events/vserossijskij-semejnyj-festival-sberezhenij-i-investicij/> (accessed on 07.09.2025).

⁴ How financial literacy is taught abroad / National Banking Journal. URL: <https://nbj.ru/publs/kak-uchat-finansovoi-gramotnosti-za-rubezhom/34065/> (accessed on 07.09.2025).

Informal Financial Learning. Occurs spontaneously in daily life — at work, home, or leisure — without formal structures [30]. It creates foundations for formal and nonformal education [31, 32]. Current forms include financial education websites and online portals and public awareness campaigns (billboards, media articles) [33, 34].

The examined theoretical provisions allowed for a refinement of the concept of the financial education system, building upon individual scientific reasoning. The authors propose considering the financial education system as a set of institutions and organizations that facilitate the organization of a unified and purposeful process of formal, nonformal, and informal learning in the field of enhancing the level of financial literacy and forming the financial culture of Russian citizens.

The interaction of these institutions and organizations with other participants in the process of improving the population's financial literacy (the Bank of Russia, executive authorities, educational organizations, financial institutions, cultural institutions, public organizations, media, and individuals) ensures the transfer of financial knowledge and practical skills to various target population groups.

Currently, the process of forming a system for public financial education continues in Russia. The basic primary elements of the system are the Regional Financial Literacy Centers (RFLC). The system-forming elements that coordinate the work of the primary elements are institutions and organizations, each with its inherent tasks: the Research Financial Institute of the Ministry of Finance of the Russian Federation, the Association for the Development of Financial Literacy, five leading Russian universities (Russian Presidential Academy of National Economy and Public Administration (RANEPA), Lomonosov Moscow State University, National Research University Higher School of Economics, Financial University under the Government of the Russian Federation, Plekhanov Russian University of Economics), the Autonomous Non-Profit Organization "National Center for Financial Literacy", and the Joint-Stock Company "National Agency for Financial Studies" (Fig. 1).

The coordination of activities among ministries, government agencies, public organizations, and commercial entities in developing

this financial education system is managed by the Financial Literacy Directorate — established within the Research Financial Institute of the Russian Ministry of Finance (NIFI).⁷ This body plays a central role in system coordination and the consumer protection and financial accessibility service—operating within the Central Bank of Russia's structure.

This service coordinates the integration of financial literacy components across all educational levels, organizes financial awareness campaigns and educational events, and develops targeted programs for various population groups, including small and medium-sized business owners.⁸

This institutional framework creates a comprehensive ecosystem for financial education, combining governmental oversight with multi-stakeholder participation to ensure effective knowledge dissemination and skill development across Russian society.

Federal methodological centers for financial literacy enhancement were established at five leading Russian universities (Russian Presidential Academy of National Economy and Public Administration (RANEPA), Lomonosov Moscow State University, National Research University Higher School of Economics, Financial University under the Government of the Russian Federation, and Plekhanov Russian University of Economics).⁹

The Financial Literacy Development Association (FLDA) is a public organization uniting major self-regulatory organizations of the financial market, professional associations, and financial institutions. It provides financial and organizational support to private and public financial education initiatives, scales successful financial literacy best practices nationwide, coordinates and expands the network of financial literacy volunteers.¹⁰

⁷ Financial Literacy. URL: <https://www.nifi.ru/ru/finansovaya-gramotnost> (accessed on 01.07.2025).

⁸ Consumer Rights Protection and Financial Services Accessibility Service. URL: https://cbr.ru/about_br/bankstructute/szpp/ (accessed on 01.07.2025).

⁹ Decree of the Government of the Russian Federation dated 02/10/2021 No. 291-p "On the Identification of educational institutions of higher education on the basis of which Federal Methodological Centers operate". URL: <http://government.ru/docs/all/132768/> (accessed on 01.07.2025).

¹⁰ Association for the Development of Financial Literacy. URL: <https://fincubator.ru> (accessed on 02.07.2025).

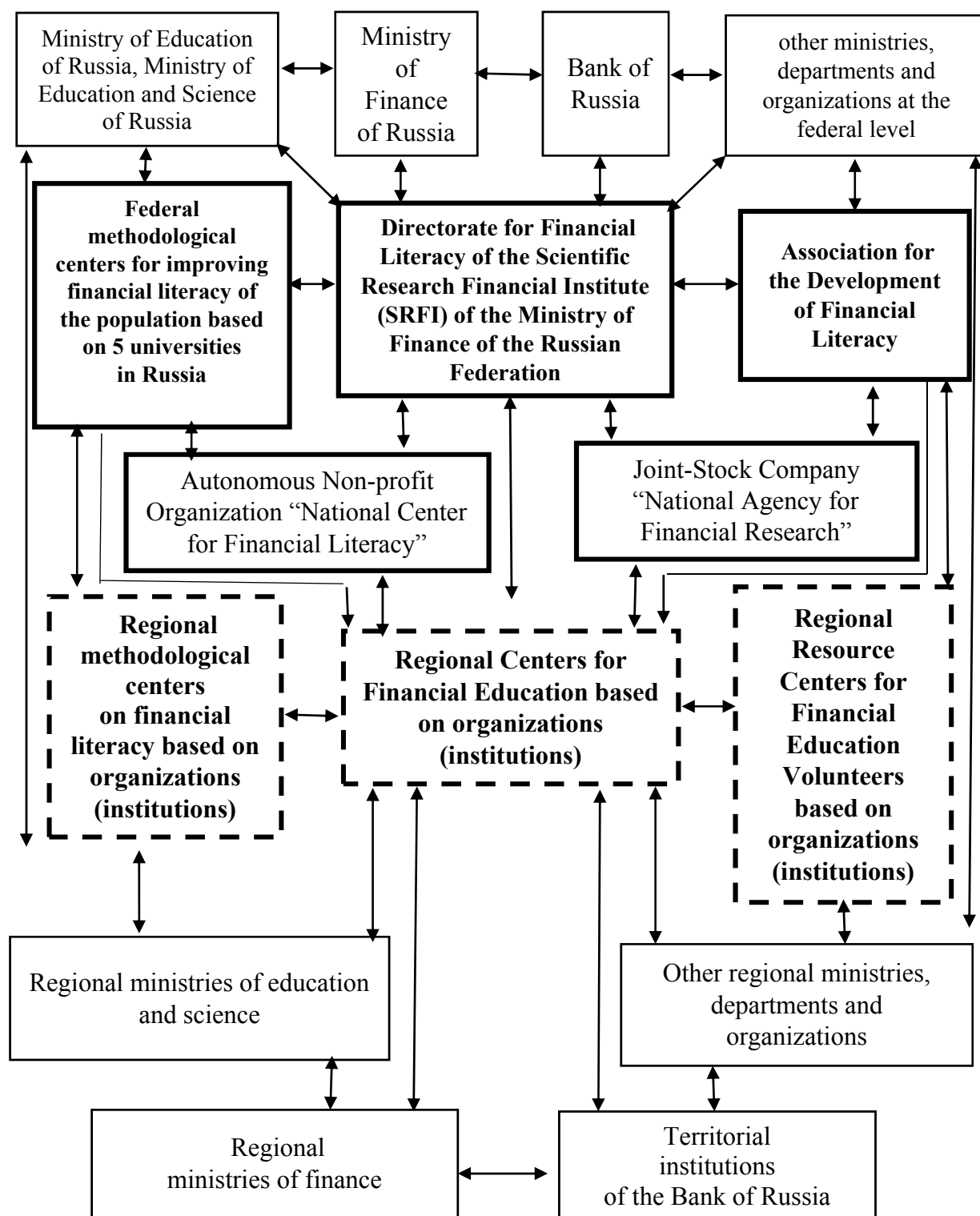


Fig. 1. The state and structure of the emerging system of financial education of the population in Russia

Source: Developed by the authors.

Note: --- not created in all regions.

The National Financial Literacy Center was established as an autonomous nonprofit organization. The center collaborates with federal, regional, and local authorities; partners with professional and academic communities; and works with commercial and non-commercial

organizations across Russian regions to develop and implement regional and federal-level financial literacy projects.

The National Agency for Financial Research measures the financial literacy index of Russian citizens to identify current financial competency

levels to determine priority areas for financial education programs and to provide data-driven recommendations for policymakers and educators.

At the regional level, the financial education infrastructure typically comprises regional financial literacy centers (RFLCs), regional resource centers for financial education volunteers, and regional methodological centers for teacher training in financial literacy.

Regional centers demonstrate diverse institutional arrangements for organizational models of RFLCs, including subdivisions of regional executive authorities, operations within regional state institutions, establishments under non-profit organizations, and affiliations with federal higher education institutions. Most commonly, these functions are performed by subordinate institutions of regional financial authorities and educational organizations.¹¹ As of March 2025, RFLCs operated in 61 regions. Current legislation does not mandate a standardized operational model for regional RFLCs.

The primary responsibilities of RFLCs include coordinating all stakeholders in regional financial literacy initiatives and implementing financial education mechanisms across the region. Funding is predominantly allocated from regional budgets.

Volunteer resource centers were established through the nationwide competition organized by the Financial Literacy Development Association in 21 regions in 2021–2023.

The centers currently host various educational activities and train motivated individuals to deliver financial literacy programs to diverse population groups. Key activities include interactive workshops and seminars, training programs for volunteer educators, and targeted financial literacy initiatives for specific demographics.

The resource centers engaged a total of over 2 million participants in their educational activities during 2022–2023. At the federal level, a national registry of financial literacy volunteers is being developed, documenting those who have successfully completed certification programs

and actively participated in FLDA-supported initiatives.¹²

For the effective integration of financial literacy fundamentals into educational practice, Regional Methodological Centers for Financial Literacy operate in certain regions on the basis of organizations for additional professional education and universities, with the purpose of supporting educators. A number of these centers are part of the network of the Federal Methodological Center of the National Research University Higher School of Economics (HSE University).

Key research findings reveal the following core trends in the development of Russia's financial education system.

1. An active process is underway to establish and develop the regulatory and legal framework that supports the financial education system's operations. Within the framework of state governance in financial literacy are implemented federal-level legislative acts and government decrees to initiate and coordinate nationwide financial literacy enhancement efforts. The Financial Literacy and Financial Culture Development Strategy until 2030 serves as the foundational document, facilitating constructive collaboration among federal and regional government bodies, public organizations and other key stakeholders.

At the regional level, authorities are developing their own legal and regulatory frameworks, primarily through regional financial literacy programs tailored to local needs and integrated policy documents that incorporate financial literacy initiatives into broader government programs or subprograms, regional plans and strategies for financial education implementation.

2. As part of the development of the financial education system for Russian citizens, it currently involves two simultaneous and complementary processes: systemic integration of financial education through the financial literacy components into all levels of the national education system and implementation of the financial education mechanism for citizens in the framework of information and educational activities. Financial literacy awareness campaigns and educational

¹¹ NIFI Hosts Discussion on Standardizing Regional Financial Literacy Centers' Operations. URL: <https://моифинансы.рф/article/v-nifi-obsudili-edinyj-format-raboty-regionalnyh-centrov-finansovoj-gramotnosti/> (accessed on 01.07.2025).

¹² All-Russian Competition for Establishing and Developing Resource Centers for Financial Literacy Volunteers (2024 Grant Competition) URL: <https://fincubator.ru/contests/grant2024-2/?ysclid=m8secwfawib539760089> (accessed on 01.07.2025.)

Table 1

Key areas of activity of federal methodological centers for improving financial literacy of the population

FMC	Key activities of the center
FMC based on Financial University under the Government of the Russian Federation	Professional development programs for adult financial education specialists, development of research-based methodological frameworks for adult financial education
FMC based on Moscow State University	Professional development for university faculty and administrators involved in the student financial literacy enhancement program, development of research-based methodological frameworks for financial literacy education in higher education institutions
FMC based on HSE University based on RANEPA	Professional development programs for educators across preschool, general education, and vocational education institutions; development of research-based methodological frameworks for financial literacy education in kindergarten, school, college, and technical school settings
FMC based on Plekhanov Russian University of Economics	Professional development for managers and specialists from various organizations involved in financial literacy education programs for retirees, development of research-based methodological resources for financial education targeting pre-retirement and retirement-age individuals

Source: Compiled by the authors.

activities are implemented across Russia on a completely free-of-charge basis.

The unified financial literacy competency framework serves as the core methodological guide for all stakeholders developing educational programs, awareness campaigns and targeted projects.¹³

3. The forms of information and educational activities in the field of financial literacy are: educational projects and events; financial literacy lessons in the main thematic areas for school-children of different grades; special headings in print publications, TV series, radio programs; lectures on financial topics; round tables, discussions; training seminars; information booklets, leaflets, memos, flyers; targeted dissemination of information to certain categories of citizens; Internet portals and websites; educational cases; educational and methodological materials for lecturers; practical financial consulting.

4. A pool of specialists in financial education of the population is being formed, including school teachers, teachers of secondary specialized and higher educational institutions, employees of financial organizations and government agencies, and employees of cultural institutions. One of the

key focus areas for federal methodological centers (FMC) for financial literacy enhancement is maintaining the required qualification standards for financial education specialists (see Table 1).

For example, on the basis of the Financial University under the Government of the Russian Federation, the FMCF trains and forms a professional community of financial literacy consultants who work directly with the public and implement activities in all regions of the country.

5. Financially literate individuals with active civic engagement—professionally accomplished and possessing practical expertise in personal finance management — are increasingly joining the ranks of financial education volunteers. These volunteers represent diverse professions and age groups: students, educators, retirees, university professors, and financial sector professionals.

The primary format of volunteer work is group-based, with financial literacy topics delivered through lectures, masterclasses, assessments, and competitions.

The Financial Literacy Development Association (FLDA) platform offers volunteers opportunities to enhance their knowledge and skills. Following training, participants advance through tiered volunteer roles based on their professional background (Event Coordinator Volunteer, Subject-Matter Expert Volunteer,

¹³ Unified Financial Literacy Competency Framework for Students and Adults. URL: <https://мойфинансы.рф/materials/edinaya-ramka-kompetencij-po-finansovoj-gramotnosti-dlya-shkolnikov-i-vzroslykh/> (accessed on 01.07.2025).

Table 2

Distinguishing features of financial education volunteers and informational charlatans

Criteria	Volunteer financial literacy educators	Informational charlatans
Primary objective	Free and accessible public education in the sphere of personal finance management, aimed at enhancing overall financial literacy and protecting citizens from fraud	Profit extraction through the manipulation and exploitation of the audience's trust and lack of knowledge, achieved via the sale of courses, trainings, and programs
Primary target audience	Socially vulnerable groups in need of knowledge and protection (pensioners, youth, low-income citizens)	Individuals seeking "easy money", who are emotionally vulnerable or desperate
Work arrangements	Free lectures, meetings, and webinars in libraries and social centers. Consultations with an emphasis on safety and legislation	Paid "closed" webinars, expensive courses, intrusive advertising. Pressure on the audience ("buy now, or you'll miss the opportunity")
Expertise and transparency	They undergo training and certification (e.g., under programs of the Ministry of Finance of Russia). They openly indicate their information sources and partners	They often lack financial education. They conceal genuine reviews, use pseudonyms, and assume no liability for financial losses
Funding sources	Support of state programs and NGOs. Grant writing. Pro bono work	Commercial revenue from the sale of premium content, native advertising, and affiliate partnerships

Source: compiled by the authors.

Federal-Level Expert Volunteer). To mitigate risks of improper practices, FLDA has established a Financial Education Volunteer Code of Conduct. Typically, new volunteers begin by registering on the FLDA portal. After completing foundational training, each volunteer is assigned a mentor — either from FLDA headquarters or a regional branch — to facilitate their ongoing participation in FLDA initiatives and projects.

6. Trust in the emerging system of financial education is currently being undermined by imperfections in the legislation regulating the activities of bloggers, coaches, and business trainers. This has led to the emergence of various types of informational charlatans, whose activities involve dissemination of informational products (courses, trainings, webinars, and books in the field of personal finance management) that have no proven benefit or value, for their own personal gain. The activities of informational charlatans can masquerade as financial education, but ultimately lead to destructive individual behavior (see *Table 2*).

7. The establishment of regional financial education systems in Russia is just beginning. Each region adopts its own approach to organizing this system. There is an ongoing search for an

effective model of regional financial education systems.

In turn, the understanding that the need for financial knowledge and practical financial literacy skills at the grassroots level of administrative-territorial units and individual settlements differs significantly from the general regional needs has led the authors to develop a conceptual and structural-functional model of the financial education system.

The listed circumstances attest to the necessity of consolidating efforts from the pedagogical and business communities, alongside state and public institutions, for the further development of the financial education system in Russia.

Key principles for model development include.

1. The objective of public financial education is to ensure consumers can access clear and relevant information precisely when needed. This necessitates developing a financial education infrastructure that enables citizens to receive personal finance management advice and be informed about major types of financial products, consumer rights, and financial legislation fundamentals. This infrastructure must extend to rural areas, as rural residents' financial competence serves as a key indicator of the government's financial education policy effectiveness.

2. The cornerstone for developing regional financial education systems is the existing Regional Financial Literacy Center (RFLC), regardless of its legal organizational form. The RFLC's primary mission is establishing sustainable long-term financial education infrastructure to engage regional populations through diverse financial literacy awareness initiatives.

3. The coordination councils operating in the regions should ensure interagency cooperation and cross-level information exchange within a unified regional system for improving the population's financial literacy. At the regional level, the task of municipalities is to assist the region in building a comprehensive system of financial education for the population. Similar functions in the municipalities of the region may be assigned to established municipal commissions for implementing measures in the field of improving financial literacy of the population, headed by the heads of municipalities.

4. The social status of a teacher in rural areas differs significantly from that of a teacher in an urban environment due to their greater involvement in the communicative space and active expert role. Consequently, the tasks of improving the financial literacy of the rural population can be addressed through the established contacts of rural teachers with various social groups: parents of students, rural retirees, and temporarily unemployed citizens.

5. Each region demonstrates its own demand for financial products and services among the population. Consequently, the specifics of conducting financial awareness campaigns will vary from region to region. This necessitates continuous improvement of the competencies of those involved in various educational programs and initiatives aimed at enhancing financial literacy. At the same time, it is essential to consider the socio-demographic, economic, and psychological characteristics of the target population groups residing in the region.

A model, like any other system, implies a certain structure. To implement this approach, we present a model of the studied system, highlighting its most significant elements, mechanisms, and interaction vectors (*Fig. 2*).

Within the framework of our proposed model, at the regional level of the financial education system, the activities of the Regional Center for

Financial Literacy (RCFL) in implementing the regional financial literacy enhancement program should provide organizational, informational, expert-advisory, and methodological support to regional stakeholders in the field of financial literacy. This support is delivered through collaboration with the Regional Methodological Center for Supporting Financial Literacy Educators, the Scientific and Methodological Center for Financial Literacy Specialists, the Volunteer Financial Education Resource Center, Federal Methodological Centers for Financial Literacy Enhancement.

The scientific and methodological center for financial literacy specialists established in the region (serving employees of financial institutions, public organizations, library staff, and university professors) serves as a platform that develops and tests innovative financial education approaches for different target population groups, taking into account regional specificities and provides training for financial literacy specialists. The model for establishing such a scientific and methodological center for financial literacy specialists can be implemented through a consortium of regional higher education institutions and financial sector organizations.

The regional methodological center for supporting financial literacy educators (which may be established at a local pedagogical university or teacher training institute) should create conditions within the region for developing the professional capacity of teachers, instructors, methodologists, tutors, preschool educators, staff of orphanages and boarding schools, and educational administrators and building effective infrastructure to support educators in promoting financial literacy. The center's activities should foster an enabling environment for human resource development while strengthening institutional support mechanisms for financial education initiatives.

The regional resource center for financial education volunteers was established to form and comprehensively develop a community of volunteers involved in improving financial literacy among the region's population. It may be created as a structural unit within one of the regional universities. The center is designed to coordinate demand for volunteer services with supply from potential volunteers, to provide managerial sup-

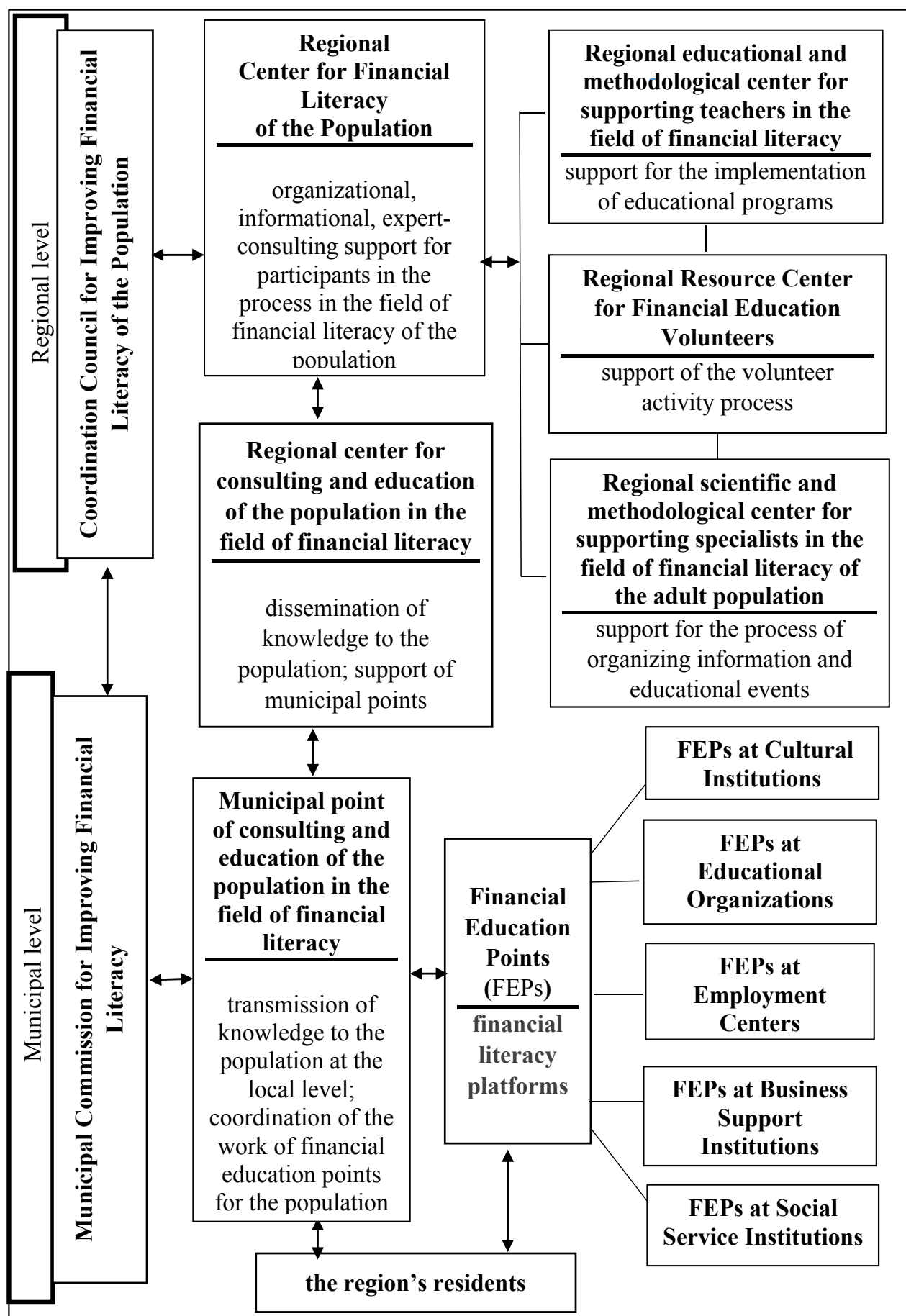


Fig. 2. Structural and functional model of the regional financial literacy awareness system's operation

Source: Developed by the authors.

port and attract resources necessary to enhance the effectiveness of volunteer activities.

The regional center for financial literacy counseling and education can be established at one of the regional universities that has both economics and law faculties. The Center's concept involves creating a platform for conducting financial literacy awareness events and providing advisory and informational support to residents in matters of financial literacy. The goals and objectives of such centers impose specific requirements on teaching staff, including knowledge of personal finance management, understanding of modern financial products (both theoretical and practical aspects) and readiness to address the problem of low financial literacy in the region. While university professors of economics and law are best prepared to implement financial education mechanisms, most lack practical experience with financial instruments. Therefore, the centers' activities require involvement of professional financial market participants, business representatives, government agencies and services and public and non-profit organizations.

The establishment and development of a regional financial literacy education system involves creating an extensive network of branches of the regional financial literacy counseling and education center across all municipal districts of the region. These branches will operate as financial literacy counseling and education points. A municipal financial literacy counseling and education point may be established either at an institution of secondary vocational education or at a general education institution located in the administrative center of the municipal district.

The establishment of municipal financial literacy counseling and education centers does not require significant government funding, as the existing infrastructure of educational institutions enables conducting both offline and online seminars and consultations on financial literacy for the population.

Establishing cooperation between the regional financial literacy center and institutions of various organizational-legal forms will enable the creation of additional financial education outreach points at these institutions for different target groups across the region. Local financial education points for rural populations may be organized by rural settlement administrations

in public reception areas. These outreach points help identify the population's demand for the most needed forms of financial literacy awareness activities.

Under the proposed model, the majority of financial literacy counseling and information services should be provided by certified methodologist-consultants. These are specialists who have completed training at the regional scientific-methodological center for financial literacy professionals and are listed in the regional register of financial education volunteers (certified volunteers).

Conclusion

A society achieves the greatest economic success when its citizens possess well-developed skills for making responsible and informed financial decisions. It should be emphasized that sound financial behavior among the population requires continuous improvement of financial knowledge to enhance an individual's and their family's financial well-being. This, in turn, shapes the work of regional authorities in establishing a system and infrastructure for ongoing financial education, taking into account the region's existing socio-economic development potential.

The proposed structural and functional model envisages the involvement of various types of educational institutions, as well as cultural institutions, social service organizations, entrepreneurship support centers, and employment service agencies in the public financial education mechanism. The participation of financial sector organizations in developing the regional financial education system, along with attracting private investments into this system, will enable regular updating of financial literacy awareness campaign content and provision of necessary equipment and expert support from practicing professionals.

Establishing municipal financial literacy counseling and education centers with coordination functions for competent authorities responsible for financial literacy levels in municipal districts represents a timely and necessary innovation that should be widely implemented and expanded. Partnerships with various regional institutions serve as a critical success factor for implementing specific projects within financial literacy improvement initiatives.

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REFERENCES

1. Kurovsky S. V., Sosnin D. A., Mishin D. A. Financial literacy of the population as a factor in the competitiveness of a region. *Bulletin of Eurasian Science*. 2023;15(5). URL: <https://esj.today/PDF/52ECVN 523.pdf>
2. Hung A., Parker A., Yoong J. Defining and measuring financial literacy. *RAND Working Paper Series* WR-708. 2009;9(4):1–28. URL: <https://doi.org/10.2139/ssrn.1498674>
3. Sudakova A. E. Financial literacy: Theoretical understanding and practical research. *Finance and Credit*. 2017;23(26):1563–1582. URL: <https://doi.org/10.24891/fc.23.26.1563>
4. Pyatkov S. V., Stepanova M. N. Some approaches to the formation of the initial level of financial literacy of the population. *Global and Regional Research*. 2023;5(2):36–41. URL: https://www.elibrary.ru/download/elibrary_54161874_62517068.pdf
5. Sherstobitova S. V., Pletneva T. V. Features of the process of forming financial literacy among the adult population: practical experience. *Moscow Economic Journal*. 2021;(10):406–417. URL: <https://doi.org/10.24412/2413-046X-2021-10598>
6. Morris T., Maillet S. and Koffi V. Financial knowledge, financial confidence and learning capacity on financial behavior: a Canadian study. *Cogent Social Sciences*. 2022; 8(1). URL: <https://doi.org/10.1080/23311886.2021.1996919>
7. Lazutina, D. V., Portnyaga, E. M. Financial literacy analysis: a comprehensive study. *Tyumen State University Herald. Social, Economic, and Law Research*. 2023; 9(3):43–67. URL: <https://doi.org/10.21684/2411-7897-2023-9-3-43-67>
8. Spiridovich O. A. Theoretical and methodological foundations of financial literacy research. *Economics: Yesterday, Today and Tomorrow*. 2022;12(10A):22–31. URL: <https://doi.org/10.34670/AR.2022.20.85.002>
9. Melnikov R. M. The impact of financial literacy on the choice of financial instruments by private investors in Russian conditions. *Finance: Theory and Practice*. 2024;28(5):239–248. (In Russ.) URL: <https://doi.org/10.26794/2587-5671-2024-28-5-239-248>
10. Fatikhov A. I., Nasibullin R. T. Problems of Formation of Financial Culture of the Population of Russia through the Prism of Sociological Research. *Bulletin of TOGU*. 2010;2(17):235–244. URL: <https://cyberleninka.ru/article/n/problemy-formirovaniya-finansovoy-kultury-naseleniya-rossii-skvoz-prizmu-sotsiologicheskikh-issledovaniy/viewer>
11. Brykin A. V., Kunizheva D. A., Bolshunova S. A. Methodological approaches to the study of financial and economic culture. *Humanities. Bulletin of the Financial University*. 2021;11(6):73–80. URL: <https://doi.org/10.26794/2226-7867-2021-11-6-73-80>
12. Golubeva K. A. Financial culture among young people: the experience of sociological research. *Theory and Practice of Social Development*. 2022;3:59–63. URL: <https://doi.org/10.24158/tipor.2022.3.8>
13. Smirnov V. D. Financial stability and economic development: Setting priorities. *Finance: Theory and Practice*. 2025;29(3):148–165. (In Russ.). URL: <https://doi.org/10.26794/2587-5671-2025-29-3-148-165>
14. Gamukin V. V. Sustainability of trends in credit and savings behavior of the Russian population. *Finance: Theory and Practice*. 2025;29(1):146–158. (In Russ.). URL: <https://doi.org/10.26794/2587-5671-2025-29-1-146-158>
15. Oppong K., Salifu Atchulo A., Akwaa-Sekyi E. K., Grant D. D., Kpegba S. A. The relationship between financial literacy, investment, and personal financial management: Empirical evidence from private sector employees. *Cogent Business and Management*. 2023;10(2). URL: <https://doi.org/10.1080/23311975.2023.2229106>
16. Chen F., Lu X., Wang W. Informal financial education and consumer financial capability: The mediating role of financial knowledge. *Frontiers in Psychology*. 2022;13:1042085. URL: <https://doi.org/10.3389/fpsyg.2022.1042085>

17. Semashko A. V. Problems of assessing the level of financial literacy of the population. *Industrial Economics*. 2022;4(4):369–375. URL: https://doi.org/10.47576/2712-7559_2022_4_4_369
18. Isupova E. N., Vart S. Yu., Bekareva S. V. Does the availability of financial services affect the level of population well-being in the Russian Federation? *St. Petersburg University Journal of Economic Studies*. 2024;40(1):102–126. (In Russ.). URL: <https://doi.org/10.21638/spbu05.2024.105>
19. Kosenok S. M. Regional resource center for improving financial literacy as the core of forming a financial education ecosystem. *Bulletin of Surgut State University*. 2021;3(33):26–38. URL: <https://doi.org/10.34822/2312-3419-2021-3-26-38>
20. Aleksperova N. V. Classification of target population groups. *Living Standards of the Population in the Regions*. 2020;16(2):42–50. URL: <https://doi.org/10.19181/lsprr/2020.16.2.4>
21. Alexandrova O. A., Aleksperova N. V., Vinogradova K. V., Nenakhova Yu. S. Conceptual approaches to forming prerequisites for effective financial education of the Russian population. *Economic and Social Changes: Facts, Trends, Forecast*. 2020;13(4):169–185. URL: <https://doi.org/10.15838/esc.2020.4.70.10>
22. Kaganov V. Sh., Lochan S. A., Petrosyan D. S. Financial education as a tool for developing human capital. *Society and Economy*. 2022; (7):106–124. URL: https://doi.org/10.31857/S_020736760021101-0
23. Kharish N. P., Abakumova S. I., Timchenko O. V., Chebokarov A. B. Financial literacy and its impact on the development of the regional economy. *Bulletin of the Expert Council*. 2017;1(8):147–152. URL: <https://cyberleninka.ru/article/n/finansovaya-gramotnost-naseleniya-i-ee-vliyanie-na-razvitie-regionalnoy-ekonomiki/viewer/>
24. Voronkova E. K., Gromova E. I. Conceptual approaches to forming a national system of financial education and improving financial literacy: A new perspective. *Education. Science. Scientific Personnel*. 2020;(1):102–105. URL: <https://doi.org/10.24411/2073-3305-2020-10024>
25. Kuznetsov O. V., Ivanov A. V., Vorovsky N. V., Shevalkin I. S. Institutionalization of financial literacy among the adult population of Russia. *Finance: Theory and Practice*. 2020;24(1):34–45. URL: <https://doi.org/10.26794/2587-5671-2020-24-1-34-45>
26. Shibaev S. R., Shadrina Yu. A. Foreign experience in increasing the financial literacy of the population. *Finance and Credit*. 2015;24(648):27–33. URL: <https://cyberleninka.ru/article/n/analiz-mirovoy-praktiki-razvitiya-finansovogo-obrazovaniya-i-povysheniya-finansovoy-gramotnosti-naseleniya>
27. Abysheva A. V., Korchemkina E. S. Topical issues of improving financial literacy of the population: domestic and foreign experience. *The Eurasian Scientific Journal*. 2018;2(10). URL: https://esj.today/PDF/16ECVN_218.pdf
28. Kaganov V. Sh. On financial education and more. *Banking: a journal on the practice and theory of banking business*. 2023;5:26–28. URL: <https://www.elibrary.ru/item.asp?edn=fqxxwx>
29. Roitblat O. V. Development of non-formal education in the modern socio-cultural space of Russia. *Man and Education*. 2013;1(34):25–28. URL: <https://cyberleninka.ru/article/n/razvitie-neformalnogo-obrazovaniya-v-sovremennom-sotsiokulturnom-prostranstve-rossii>
30. Nefedova G. M. Specifics of integrating formal, non-formal, and informal education. *Scientific and Pedagogical Review*. 2017;3(17):127–132. URL: <https://doi.org/10.23951/2307-6127-2017-3-127-133>
31. Lyashevskaya N. V. Informal education: Approaches to defining the concept. *Proceedings of the Volgograd State Pedagogical University*. 2019;7(140):10–14. URL: <https://cyberleninka.ru/article/n/informalnoe-obrazovanie-podhody-k-opredeleniyu-ponyatiya/>
32. Smirnova S. I., Otvinovskaya L. A. Informal education as an innovative format for continuous pedagogical education. *Innovative Development of Professional Education*. 2023;4(40):112–121.
33. Goncharuk N. P. Personal educational environment as a means of integrating formal, non-formal, and informal education. *Sustainable Development Management*. 2024;2:97–103. URL: https://doi.org/10.55421/2499992X_2024_2_97
34. Alekseev S. V. Education and enlightenment: Two facets of a single process (on the example of forming ecological culture). *Lifelong Education: XXI Century*. 2018;2(22). URL: <https://doi.org/10.15393/j5.art.2018.3944>

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Bayesian Versus Classical Perspectives: Does Financial Inclusion Truly Drive Economic Growth?

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ABSTRACT

Objectives: This study synthesizes quantitative evidence on the relationship between financial inclusion (FI) and economic growth (EG) to estimate the overall effect size, comparing classical (frequentist) and Bayesian meta-analytic approaches to understand how methodological choices influence the interpretation of the FI-EG nexus. **Methods:** A meta-analysis of 27 studies was conducted. Effect sizes (Fisher's z) were pooled using classical random-effects and Bayesian hierarchical models. Heterogeneity was assessed using Cochran's Q , I^2 , and τ estimators (classical), as well as posterior τ distributions with Bayes factors (Bayesian). **Results:** Both approaches confirm significant positive FI-EG relationships (classical: 0.682, 95% CI [0.582, 0.782]; Bayesian: 0.616, 95% CrI [0.342, 0.824]). Substantial heterogeneity was detected (classical $\tau = 0.076$; Bayesian $\tau = 0.195$, $BF_1 > 1000$), with Bayesian analysis suggesting larger variation magnitude. **Conclusion:** Financial inclusion has a significant impact on economic growth. However, substantial heterogeneity indicates context-dependent impacts, requiring tailored policies. The Bayesian framework provides a richer characterization of uncertainty, offering more conservative and realistic evidence assessment.

Keywords: financial inclusion; economic growth; meta-analysis; Bayesian meta-analysis; heterogeneity; economic development; evidence synthesis; policy implications; frequentist statistics; quantitative synthesis

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Сравнение Байесовского и классического подходов: способствует ли доступность финансовых услуг экономическому росту?

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АННОТАЦИЯ

Цели: в данном исследовании обобщаются количественные данные о взаимосвязи между финансовой доступностью и экономическим ростом для оценки величины эффекта, сравнивая классический (частотный) и байесовский метааналитические подходы, чтобы понять, как методологические решения влияют на интерпретацию взаимосвязи финансовой доступности и экономического роста. **Методы:** был проведен метаанализ 27 исследований. Величины эффектов (z -критерий Фишера) были объединены с использованием классических моделей случайных эффектов и байесовских иерархических моделей. Гетерогенность оценивалась с использованием Q -критерия Кохрена, индекса I^2 и τ -оценок (классических), а также апостериорных распределений τ с байесовскими факторами (байесовский подход). **Результаты:** оба подхода подтверждают значимые положительные взаимосвязи между финансовой доступностью и экономическим

ростом (классический метод: 0,682, доверительный интервал 95% [0,582, 0,782]; байесовский метод: 0,616, байесовский доверительный интервал 95% [0,342, 0,824]). Была обнаружена существенная гетерогенность (классический $\tau = 0,076$; байесовский $\tau = 0,195$, $BF_1 > 1000$), при этом байесовский анализ указывает на большую величину вариации. **Вывод:** доступность финансовых услуг оказывает значительное влияние на экономический рост. Однако существенная гетерогенность указывает на контекстно зависимые последствия, требующие разработки индивидуальной политики. Байесовский подход обеспечивает полноту характеристики неопределенности, предлагая более консервативную и реалистичную оценку фактических данных.

Ключевые слова: финансовая доступность; экономический рост; метаанализ; байесовский метаанализ; гетерогенность; экономическое развитие; синтез доказательств; политические последствия; частотная статистика; количественный синтез

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1. Introduction

Financial inclusion (FI), defined as the widespread availability and utilization of formal financial services, constitutes a fundamental element of contemporary development policy. A vast body of research has explored its potential to drive economic growth (EG), yet the empirical evidence remains fragmented and often contradictory. Studies across different regions and employing varied methodologies have yielded a spectrum of results, from strongly positive to mixed or even negative, creating a puzzle for policymakers seeking to design effective economic strategies. This inconsistency highlights a critical need for a systematic, quantitative synthesis of the existing evidence to clarify the true nature of the FI-EG relationship.

This study addresses this gap by conducting a comprehensive meta-analysis of the FI-EG literature. Our primary objective is to estimate the overall effect size of financial inclusion on economic growth, providing a much-needed consolidated figure. However, we go a step further by employing both classical (frequentist) and Bayesian meta-analytic techniques. This dual-paradigm approach allows for a critical comparison of the results, interpretations, and policy implications derived from each method. By examining how these two dominant statistical frameworks handle issues of uncertainty and heterogeneity, we aim to provide a more nuanced understanding of the FI-EG nexus and offer valuable insights into the practical consequences of methodological choices in evidence synthesis. This research, therefore, not only provides a robust estimate of the FI-EG link but also illuminates the path for future meta-analytic work in economics and beyond.

Despite strong theoretical underpinnings, the empirical literature presents a complex picture. Numerous studies have found a positive FI-EG link in various contexts, including India, Nigeria, and across South Asian Association for Regional Cooperation (SAARC) and Organisation of Islamic Cooperation (OIC) countries [1–4]. However, other research reports mixed or even negative relationships, particularly in regions such as the Middle East and North Africa (MENA) and the Southern African Development Community (SADC), or under specific conditions [5, 6]. Causality also remains debated, with evidence supporting FI driving EG, EG driving FI, or bidirectional links [1, 7, 8]. This heterogeneity in findings underscores the context-specific nature of the FI-EG relationship, which is influenced by factors such as institutional quality, income levels, financial literacy, and the overall development of the financial sector [2, 5, 9].

This inconsistency in empirical results presents a significant research challenge, as policymakers lack a clear and synthesized understanding of the average magnitude and variability of the financial inclusion–economic growth (FI-EG) effect. While literature reviews summarize findings qualitatively, quantitative synthesis through meta-analysis is needed to estimate an overall effect size and quantify the degree of heterogeneity across studies. Furthermore, the meta-analytic literature itself employs different statistical paradigms — primarily classical (frequentist) and Bayesian. These approaches differ in their philosophical underpinnings, estimation methods, and interpretation of results, particularly concerning uncertainty and heterogeneity [10, 11]. A research gap exists in directly comparing these two meta-analytic ap-

proaches within the specific, policy-relevant context of the FI-EG nexus.

Therefore, this study aims, firstly, to synthesize the quantitative evidence on the relationship between financial inclusion and economic growth using meta-analysis. Secondly, employ both classical (frequentist) and Bayesian meta-analytic methods to estimate the overall effect size and heterogeneity. Thirdly, critically compare the results, interpretations, and implications derived from the classical and Bayesian approaches in the context of the FI-EG relationship.

This research contributes to the field by providing an updated quantitative synthesis of the FI-EG link and, more importantly, by offering a practical comparison of two major meta-analytic methodologies in applied economics. This comparison highlights how methodological choices can impact the interpretation of synthesized evidence, particularly in relation to the crucial aspect of heterogeneity, providing valuable insights for researchers and policymakers seeking to understand the nuanced relationship between financial inclusion and economic prosperity.

2. Literature review

2.1. Theoretical foundations

The theoretical link between FI and EG is multifaceted. The core argument posits that access to a range of financial services (credit, savings, insurance, payments) is critical for economic activity [1]. By enabling individuals and businesses, particularly micro, small, and medium enterprises (MSMEs) and the poor, to smooth consumption, manage risks, accumulate capital, and undertake productive investments, FI can stimulate economic development [1, 8, 12].

2.1.1. Several specific channels are proposed

The financial institution helps consolidate small savings from the public into productive financial investments, which drives both economic growth and capital development [3, 13]. The availability of credit and financial services enables entrepreneurs to start new businesses as well as support existing businesses at various stages of development and innovation, in line with Schumpeterian theories of economic progress [1, 6, 14]. The implementation of well-functioning financial systems, combined with inclusivity, leads to cost

reduction and enhances resource allocation efficiency, thereby enabling better investment planning, which in turn produces higher growth prospects [13]. Households and firms that can obtain insurance coverage alongside multiple savings options manage economic risks better by safeguarding themselves from poverty and investing in reputable but risky enterprises [1, 12]. Conversely, financial exclusion presents significant barriers. Difficulty in accessing credit can stifle MSME growth, limit investment opportunities for the poor, and trap vulnerable populations in poverty cycles, thereby hindering overall economic progress [13, 15].

2.2. Empirical evidence

Empirical investigations into the FI-EG nexus yield diverse findings, reflecting contextual differences and methodological variations.

2.2.1. National level evidence

Several research investigations conducted in individual countries have revealed positive outcomes from their analysis. Research by [1] and [12], among other authors, demonstrates through Autoregressive Distributed Lag (ARDL), error correction model (ECM), Granger causality, and panel data analysis that FI delivers enhanced gross domestic product (GDP) growth during both short-term and long-term periods. The same conclusions emerge in other studies, e.g., [17]. Central to their argument is a shift toward modern financial techniques within the SAARC nations, along with Nigeria. The study [8] provides extensive findings. Further studies [1, 6] show that the per capita GDP of SAARC countries, alongside Iraq, has a parallel relationship with the variable of financial inclusion [1, 2]. The studies produced contradictory findings regarding their results. Multiple studies in the MENA region and in the SADC area have shown that most economic growth patterns exhibit negative long-term relationships among financial development and inclusion elements [5, 6]. Studies have shown negative effects between FI indicators through evaluations of the Nigerian borrower population and Zimbabwean trade-growth relationship [5]. Context-specific interactions exist between financial development and growth, as socio-economic development levels and conditions modify their correlation [6, 8]. Different members of the legis-

lative body express contrasting views about how cause-and-effect connections function. Financial inclusion research generates three distinct models regarding the FI-EG relationship, which assign FI as the driver of EG [1], lead EG to foster FI [7], and demonstrate FI as a parallel force that fosters EG [2, 8].

2.2.2. International level evidence

Global investigations reveal that most findings support a positive relationship between the variables. Various FI indicators (such as bank branches and automated teller machines (ATMs), and depositors) demonstrate positive impacts on EG across large samples of developing countries, OIC nations, and Asian economies, specifically in the long run [2, 4, 5, 6, 9, 16, 17]. The relationship between EG and FI is affected by variations in income level. Studies show that financial inclusion has stronger positive effects in low-income nations with less advanced financial services because such conditions create favorable conditions for FI to generate more benefits [2, 4]. The available literature indicates that governments with robust governance systems can achieve sustainable growth by implementing well-developed, equitable financial institutions [2]. Some evidence suggests that the positive relationship between financial inclusion and economic growth exhibits non-monotonic dynamics, as satisfactory levels of financial inclusion have a heightened impact on economic growth [9].

2.3. Methodological approaches in primary studies

The literature employs diverse econometric techniques, including panel data methods (generalized method of moments (GMM), two-stage least squares (2SLS) regression analysis, panel vector autoregression (PVAR), feasible generalized least squares (FGLS), panel-corrected standard errors (PCSE), fixed effects and dynamic panel threshold) to handle country-specific effects and endogeneity [1, 2, 5, 6, 16, 18], and time-series techniques (ARDL, ECM, Granger causality, VAR) for single-country analyses [1, 7, 8]. Many studies construct composite Financial Inclusion Indices (FIIs), often using principal component analysis (PCA) to weight indicators of access, availability, and usage [1, 4, 9, 19].

2.4. Research gaps and motivation for meta-analysis

Despite extensive research, gaps remain. There is a need for more robust evidence on the macro-economic impact, understanding precise transmission channels, the role of non-financial factors (social norms, trust, literacy), heterogeneity across contexts, and the impact of digitalization and fintech [2, 3, 5, 7, 20, 21]. The mixed empirical results and context-specificity necessitate a quantitative synthesis via meta-analysis to estimate an average effect size and, crucially, to quantify the extent of inter-study heterogeneity. This study further addresses the methodological gap by comparing classical and Bayesian approaches to this synthesis.

3. Methodology

This study employs a systematic review and meta-analysis approach to explore the relationship between financial inclusion and economic growth at both national and international levels. Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, secondary data from peer-reviewed, Scopus-indexed journals were analyzed to assess the impact of financial inclusion on economic growth. The study employed a suitable search strategy and predefined inclusion and exclusion criteria to ensure that only high-quality, relevant research was included in the analysis [22–24].

3.1. Search strategy

On March 23, 2024, searches were performed in electronic databases, including PubMed, Scopus, Web of Science, Google Scholar, and EconLit. The search query was developed using keywords related to financial inclusion and economic growth, national evidence, or international evidence. For financial inclusion, the keyword selection process included (“Financial Inclusion” OR “Banking Access” OR “Credit Access” OR “ATM Booths” OR “Branches of Banks Available for Every 10,000 People” OR “Bank Deposit” OR “Savings Accounts” OR “Remittance”). For economic growth, the keywords used were (“Economic Growth” OR “GDP Growth” OR “Income Distribution” OR “Macroeconomic Stability” OR “Socio-Demographic Development” OR “Political Stability” OR “Employment” OR “Trade Openness” OR “Population Growth”). The rela-

tionship term was defined using (“Relation” OR “Impact” OR “Effect” OR “Linkage” OR “Correlation”). To ensure a comprehensive review, the search was further refined using combinations such as (“Financial Inclusion” AND “Economic Growth”) AND (“National Evidence” OR “International Evidence”), along with variations like (“Financial Inclusion” OR “Banking Access” OR “Microfinance”) AND (“Economic Growth” OR “GDP Growth” OR “Development”). The search also considered economic classifications through (“Financial Inclusion” AND “Economic Growth”) AND (“Developing Countries” OR “Developed Countries”), and digital financial services with (“Financial Inclusion” AND “Economic Growth”) AND (“Digital Banking” OR “Mobile Money” OR “Microfinance Institutions”). The timeframe was restricted to studies published between 2010 and 2024, using the filter (Year >= 2010 AND Year <= 2024) to ensure contemporary relevance. Additionally, emphasis was placed on empirical analyses by including search queries such as (“Financial Inclusion” AND “Economic Growth”) AND (“Causal Relationship” OR “Empirical Analysis” OR “Panel Data Evidence”). These search strategies were systematically applied across multiple databases to ensure a comprehensive collection of studies for review.

3.2. Inclusion and exclusion criteria

This study included peer-reviewed, Scopus-indexed studies that examined the relationship between financial inclusion and economic growth in both developing and developed economies. Specifically, the study considered research focusing on South Asian countries such as Bangladesh and India, as well as studies conducted in African, American, and European nations. To ensure relevance, this study only included studies published between 2010 and 2024. Eligible studies were published in top-tier economic and financial journals, including Elsevier, Taylor and Francis, ResearchGate, and the Journal of Risk and Financial Management. This study included studies that used empirical research methods and provided measurable indicators of financial inclusion, such as bank account ownership, access to credit, mobile banking penetration, microfinance participation, the availability of bank branches, ATM booths, remittance accounts, and savings accounts. Similarly, we selected studies that as-

sessed economic growth using indicators such as GDP growth, income levels, poverty reduction, employment rates, trade openness, income distribution, macroeconomic stability, socio-demographic development, political stability, and population growth. However, this study excluded papers that were non-empirical or lacked data-driven analysis. Studies published in journals other than those indexed in Scopus were also excluded. Since this study focuses on contemporary economic trends, this did not consider studies published before 2010. Additionally, research that failed to report statistical measures such as mean and standard deviation was removed. Lastly, studies that did not explicitly examine the relationship between financial inclusion and economic growth were excluded from inclusion. This selection process ensured that this study is based on high-quality, relevant, and empirical research, providing valuable insights into the impact of financial inclusion on economic growth.

3.3. Study selection and data extraction

The initial searches yielded 550 results, which were from different journals and from different categories. Afterwards, two researchers independently screened the title and the abstract of each study based on the predetermined inclusion and exclusion criteria. The conflicts that were encountered during the title and abstract screening were resolved through discussion between the screeners. Subsequently, 141 studies were selected; however, to satisfy the criteria of publication in top-tier journals and the availability of mean and standard deviation data, some studies were excluded. Eventually, 27 studies were eligible for full-text screening. While conducting the full-text screening, the researchers encountered additional studies in the reference lists that met the inclusion criteria, which were then included in the screening process.

This study employs meta-analysis to synthesize quantitative findings on the FI-EG relationship. We utilize both classical (frequentist) and Bayesian statistical paradigms to provide a comprehensive comparison. The data for the meta-analysis consists of effect sizes (Fisher’s z), correlation-based metrics, based on mean and standard deviation extracted from $k = 27$ primary studies investigating the FI-EG link (inferred from $df = 10$ in the PET test). The effect sizes in

the meta-analysis were derived from sample size, standard deviation, standard error and mean to correlation coefficients (r) first. To ensure normality and stabilize the variance, each correlation coefficient was transformed into Fisher's z using the following equation:

$$z = 0.5 * \ln\left(\frac{1+r}{1-r}\right).$$

3.4. Classical (frequentist) meta-analysis

Classical meta-analysis treats parameters as fixed, unknown constants and interprets probability as long-run frequency.

3.4.1. Models

Fixed-Effect Model (FEM) assumes a single population effect size, θ . The observed variance in the FEM arises exclusively from sampling error within individual studies (v_i). The model is defined as:

$$y_i = \theta + \varepsilon_i, \text{ where } \varepsilon_i \sim N(0, v_i).$$

Under the Random-Effects Model (REM), the true effect sizes (θ_i) are assumed to vary, following a normal distribution:

$$\theta_i \sim N(\mu, \tau^2).$$

The observed effect (y_i) is a combination of the true effect and sampling error:

$$y_i = \theta_i + \varepsilon_i.$$

Therefore, the observed effects follow a normal distribution with a mean of μ and a variance that includes both within-study variance (v_i) and between-study variance (τ^2):

$$y_i \sim N(\mu, v_i + \tau^2).$$

The REM is generally preferred for this type of analysis as it accounts for the expected variability in-country variations in FI measurement data.

3.4.2. Parameter estimation

In the FEM, the overall effect size is calculated as a weighted average of the study effects (y_i), where the weights (w_i) are the inverse of the within-study variance (v_i):

$$w_i = \frac{1}{v_i},$$

$$\hat{\theta}_{FEM} = \frac{\sum w_i y_i}{\sum w_i},$$

$$Var(\hat{\theta}_{FEM}) = \frac{1}{\sum w_i}.$$

In the REM, the weights account for both within-study variance (v_i) and between-study variance (τ^2):

$$w_i = \frac{1}{v_i + \tau^2},$$

$$\hat{\mu}_{REM} = \frac{\sum w_i y_i}{\sum w_i},$$

$$Var(\hat{\mu}_{REM}) = \frac{1}{\sum w_i}.$$

3.4.3. Heterogeneity estimation (τ^2)

Estimating the between-study variance (τ^2) is crucial for the REM. We use the DerSimonian-Laird (DSL) method, a non-iterative method of moments approach based on Cochran's Q statistic:

$$Q = \sum w_i (y_i - \hat{\theta}_{FEM})^2,$$

$$\hat{\tau}_{DSL}^2 = \max\left(0, \frac{Q - (k-1)}{\sum w_i - \frac{(\sum w_i)^2}{\sum w_i}}\right).$$

3.4.4. Interval estimation

95% confidence intervals (CIs) are constructed around the estimated overall effect:

$$CI_{FEM} : \hat{\theta}_{FEM} \pm 1.96 * \sqrt{Var(\hat{\theta}_{FEM})},$$

$$CI_{REM} : \hat{\mu}_{REM} \pm 1.96 * \sqrt{Var(\hat{\mu}_{REM})}.$$

In a frequentist interpretation, the 95% CI means that if the meta-analysis were repeated many times, the CI would contain the true parameter in 95% of the cases. The prediction interval (PI) in the REM provides a range for the true effect size in a future study:

$$PI_{REM} : \hat{\mu}_{REM} \pm t_{df} * \sqrt{Var(\hat{\mu}_{REM}) + \tau^2}.$$

3.4.5. Heterogeneity assessment

Cochran's Q tests the null hypothesis of homogeneity ($H_0: \tau^2 = 0$). Under H_0 , Q follows a χ^2 distribution with $k - 1$ degrees of freedom. The I^2 statistic quantifies the percentage of total variation across studies that is due to heterogeneity rather than chance:

$$I^2 = \max\left(0, \frac{Q - (k - 1)}{Q}\right) * 100\%.$$

3.4.6. Publication bias

We use the Precision Effect Test (PET), a form of Egger's regression test, which regresses the study effect sizes (ES_i) on their standard errors (SE_i):

$$ES_i = \beta^0 + \beta^1 * SE_i + \varepsilon_i.$$

A significant β_1 coefficient (tested via a t-statistic) suggests funnel plot asymmetry, which can be an indicator of publication bias.

3.5. Bayesian meta-analysis

Bayesian meta-analysis treats all parameters (θ , μ , τ^2) as random variables with probability distributions. Inference updates prior beliefs using observed data (y_i) via Bayes' theorem to obtain posterior distributions.

3.5.1. Models (hierarchical REM)

$$\text{Level 1 (Within-study)}: y_i | \theta_i, v_i \sim N(\theta_i, v_i),$$

$$\text{Level 2 (Between-study)}: \theta_i | \mu, \tau^2 \sim N(\mu, \tau^2).$$

3.5.2. Priors

Prior distributions must be specified for the hyperparameters μ and τ . For this analysis, we use weakly informative priors. For the overall mean effect (μ), we use a normal distribution with a mean of 0 and a large variance, or a Cauchy distribution:

$$P(\mu) \sim \text{Normal}(0, \sigma_\mu^2) \text{ or } P(\mu) \sim \text{Cauchy}(0, \gamma_\mu).$$

For the heterogeneity standard deviation (τ), we use a half-normal or half-Cauchy distribution, as τ must be positive:

$$P(\tau) \sim \text{Half-Normal}(0, \sigma_\tau^2) \\ \text{or } P(\tau) \sim \text{Half-Cauchy}(0, \gamma_\tau).$$

Based on the comparison table, a half-normal distribution was selected as the prior for τ :

$$P(\tau) \sim \text{Half-Normal}(0, \phi^2).$$

3.5.3. Posterior Estimation

The joint posterior distribution is proportional to the likelihood multiplied by the prior:

$$P(y_1, \dots, y_k) \propto \text{Likelihood} \times \text{Prior}.$$

Since closed-form solutions are rare for the REM, Markov Chain Monte Carlo (MCMC) methods, e.g., Gibbs sampling, no-u-turn sampler (NUTS) are used to draw samples from the posterior distributions. Point estimates are summaries of the marginal posterior distributions (e.g., posterior mean or median).

3.5.4. Interval estimation

Bayesian credible intervals ($CrIs$) are derived from the quantiles of the marginal posterior distribution (e.g., the 2.5th and 97.5th percentiles for a 95% CrI). A 95% CrI for μ , denoted as (L , U), has a direct probabilistic interpretation:

$$P(L < \mu < U | \text{data}) = 0.95.$$

Uncertainty in the estimation of τ^2 is naturally propagated into the posterior for μ and its CrI .

3.5.5. Heterogeneity assessment

The marginal posterior distribution of τ , $P(\tau | \text{data})$, directly quantifies the heterogeneity and its uncertainty. Summaries such as the mean, median, and CrI can be calculated. Bayes factors (BF_{10}) can be used to compare the evidence for a model with heterogeneity ($H_1: \tau > 0$) versus a model without ($H_0: \tau = 0$). A $BF_{10} > 1$ provides evidence in favor of H_1 .

$$BF_{10} = \frac{P(H^1)}{P(H^0)}.$$

3.5.6. Software

Bayesian analysis was performed using software R (with packages rjags, rstan, brms) and JASP (open-source statistical software program) employing MCMC methods.

3.6. Methodological comparison framework

We compare the results from classical and Bayesian analyses using two types of approaches to

Table 1
Pooled effect size test

Estimate	Standard Error	<i>z</i>	<i>p</i>
0.682	0.051	13.393	< .001

Source: Developed by the author.

Table 2
Meta-analytic estimates (including heterogeneity)

Variable	Estimate	95% <i>CI</i>		95% <i>PI</i>	
		Lower	Upper	Lower	Upper
Effect Size	0.682	0.582	0.782	0.503	0.861
τ	0.076	0.017	0.231		
τ^2	0.006	2.926×10^{-4}	0.053		

Source: Developed by the author.

analyze the overall effect. The width of the respective ranges together with their location determines the interpretation of interval estimates between *CI* vs. *CrI*. The heterogeneity evaluation includes $\hat{\tau}^2$ comparison with $P(\tau^2|\text{data})$ estimation alongside its point evaluation and uncertainty presentation through *CrI* instead of *CI* for τ/τ^2 and final heterogeneity evaluation based on I^2 values and posterior probabilities/BF. Handling of uncertainty (plug-in estimates vs. full propagation). Interpretation of results (long-run frequency vs. probability statements about parameters).

4. Results

4.1. Classical meta-analysis results

The estimated pooled effect size (expressed as Fisher's *z*) calculated under REM comes out to $\hat{\mu} = 0.682$ (Table 1). The measurement uncertainty of the estimated mean stands at 0.051. The research results yield a significant statistical value of $z = 13.393$ with a *p*-value below 0.001 which shows strong evidence contradicting a zero average effect.

Meta-analytic estimates (including heterogeneity).

The REM calculated average effect maintains its original value as $\hat{\mu} = 0.682$ (Table 2). The measurement area of the actual average effect size spans (0.582, 0.782) according to a 95% confidence interval (*CI*).

Heterogeneity calculation indicates that the standard deviation of actual effect sizes amounts to $\hat{\tau} = 0.076$. The computed variance of true effect sizes amounts to $\hat{\tau}^2 = 0.006$. The interval estimates show that τ ranges between 0.017 to 0.231 and τ^2

Table 3
Test of publication bias (*PET*)

PET	<i>t</i>	df	<i>p</i>
Estimate	−1.393	10	0.194

Source: Developed by the author.

exists between 0.00029 to 0.053. Statistical significance exists because the confidence interval for τ does not contain 0. The wide range of the τ interval indicates that researchers have high levels of uncertainty regarding its actual value. The significant value of τ indicates heterogeneity even though Cochrane *Q* and I^2 values are not visible in the provided tables. The Prediction Interval demonstrates that the forecast values for the data fall between 0.503 and 0.861 at the 95% confidence level. This broad range of the effect size interval indicates a significant variation in possible results from future studies due to harmful heterogeneity.

The Precision Effect Test yielded a *t*-statistic of −1.393 with *df* = 10 (implying *k* = 27 studies). The *p*-value is 0.194. This result is not statistically significant, suggesting no strong evidence of funnel plot asymmetry of the type detected by this test (i.e., no significant relationship between effect size and standard error). However, the test likely has low power with only 27 studies.

4.2. Bayesian meta-analysis results

Prior distributions (effect size and heterogeneity) are shown on Fig. 1.

The prior for the average effect size (μ) appears weakly informative, likely centered at zero with heavy tails (e.g., Cauchy or broad Normal/*t*). The

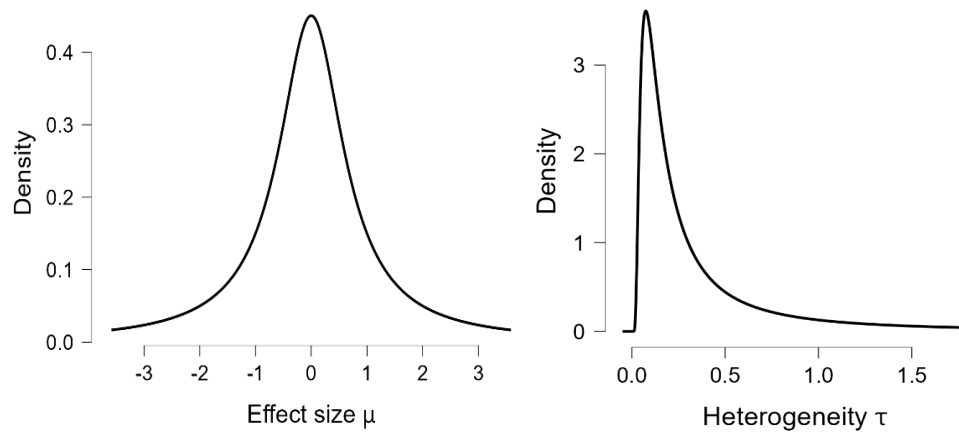


Fig. 1. Prior distributions

Source: Developed by the author.

Table 4

Posterior estimates per model (random effects)

Random effects	Mean	SD	Lower	Upper	BF ₁₀
μ	0.616	0.121	0.342	0.824	53.813
τ	0.195	0.108	0.058	0.476	48134.155

Source: Developed by the author.

Notes: μ and τ are the group-level effect size and standard deviation, respectively. Posterior estimates per model (random effects). Bayes factor of the random effects H_1 over the fixed effects H_0 . 95% credible interval.

prior for the heterogeneity standard deviation (τ) is restricted to be positive, peaks near zero but has a long right tail (e.g., Half-Cauchy or Half-Normal), allowing for potentially large heterogeneity if supported by the data.

4.2.1. Average effect (μ)

The posterior mean estimate is $E(\mu | \text{data}) = 0.616$ (Table 4). The posterior standard deviation is $SD(\mu | \text{data}) = 0.121$. The 95% credible interval (CrI) is (0.342, 0.824). This interval indicates a 95% probability that the true average effect lies between 0.342 and 0.824, given the data and model. The Bayes Factor comparing $H_1: \mu \neq 0$ vs. $H_0: \mu = 0$ is $BF_{10} = 53.813$. This provides very strong evidence ($BF_{10} \gg 10$) in favor of a non-zero average effect size.

4.2.2. Heterogeneity (τ)

The posterior mean estimate for the heterogeneity standard deviation is $E(\tau | \text{data}) = 0.195$. The posterior standard deviation is $SD(\tau | \text{data}) = 0.108$. The 95% credible interval (CrI) is (0.058, 0.476).

This interval clearly excludes zero, providing strong evidence for the presence of heterogeneity. The Bayes factor comparing the random-effects model ($H_1: \tau > 0$) against the fixed-effect model ($H_0: \tau = 0$) is $BF_{10} = 48134.155$. This extremely large value provides decisive evidence in favor of the random-effects model, i.e., decisive evidence for the presence of heterogeneity.

5. Discussion

This meta-analysis, employing both classical and Bayesian methods, sought to synthesize the evidence on the FI-EG relationship and compare the insights afforded by each statistical approach.

5.1. Synthesis of the FI-EG Relationship

Both methodologies consistently indicate a positive and statistically significant relationship between financial inclusion and economic growth. The classical REM estimate ($\hat{\mu} = 0.682$) and the Bayesian posterior mean ($E(\mu | \text{data}) = 0.616$) are comparable in magnitude, suggesting that, on average, higher financial inclusion is associated

with higher economic growth, aligning with the dominant theoretical predictions [1, 14]. The strong statistical significance (Classical $p < 0.001$; Bayesian $BF_{10} = 53.8$) provides robust support for this linkage across the synthesized studies. This meta-analysis uses Fisher's z-transformed correlation coefficients to normalize the effect size distribution and stabilize its variance. This enhances the statistical robustness of the meta-analysis, displaying reported aggregated effect sizes, intervals, and heterogeneity estimates. The magnitude of Fisher's z accurately reflects the positive correlation between financial inclusion and economic growth, validating its reliability across the analyzed studies.

5.2. Comparison of classical and Bayesian results

While converging on the overall positive effect, the two approaches offer different perspectives, particularly regarding uncertainty and heterogeneity

5.2.1. Point estimates

The Bayesian posterior mean for μ (0.616) is slightly lower than the classical REM estimate (0.682). This minor difference could stem from the influence of the weakly informative prior in the Bayesian analysis or differences in how heterogeneity is estimated and incorporated.

5.2.2. Interval estimates

The Bayesian 95% *CrI* for μ (0.342, 0.824) is considerably wider than the classical 95% *CI* (0.582, 0.782). The *CrI* provides a direct probabilistic statement about the parameter's location, which is often considered more intuitive. The wider *CrI* suggests that the Bayesian approach, by fully propagating the uncertainty associated with *all* parameters, including τ , may be capturing a greater degree of uncertainty about the precise magnitude of the average effect compared to the standard classical *CI* (which often treats $\hat{\tau}^2$ as fixed or uses approximations).

5.2.3. Heterogeneity

This is where the most striking difference emerges. Both methods strongly conclude that significant heterogeneity exists (Classical $\hat{\tau} = 0.076$, 95% *CI* (0.017, 0.231); Bayesian $E(\tau|\text{data}) = 0.195$, 95% *CrI* (0.058, 0.476), $BF_{10} \approx 48134$). However,

the Bayesian point estimate of heterogeneity ($\tau \approx 0.195$) is substantially larger than the classical DSL estimate ($\tau \approx 0.076$). The Bayesian 95% *CrI* for τ is also wider than the classical *CI*. This suggests that the true effect of FI on EG likely varies considerably more across different contexts (countries, measures, time periods) than might be inferred from the classical point estimate alone. The extremely high Bayesian BF_{10} provides decisive confirmation of this variability. The classical prediction interval (0.503, 0.861), being much wider than the *CI*, also reflects this heterogeneity practically, indicating substantial expected variation in effects for future studies. The difference in τ estimates could arise from the known potential bias of the DSL estimator versus the MCMC-based Bayesian estimation incorporating a specific prior (half-normal). The Bayesian approach provides the entire posterior distribution for τ , offering a richer understanding of heterogeneity beyond a simple point estimate and *CI*.

5.2.4. Publication bias

The classical PET test did not find significant evidence of publication bias. While reassuring, the low power of such tests with $k = 27$ studies warrants caution. Bayesian methods offer alternative ways to model publication bias (e.g., selection models), although they are not implemented here.

5.2.5. Interpretation

The fundamental difference remains that classical results are interpreted in terms of long-run frequencies of hypothetical repetitions, while Bayesian results offer direct probability statements about parameters conditional on the observed data and chosen model (priors).

5.3. Implications

The consistent finding of a positive average effect reinforces the policy focus on promoting financial inclusion as a strategy for economic growth. For policymakers, this meta-analysis provides a clear, evidence-based mandate to continue and expand efforts to broaden access to financial services. The positive FI-EG link suggests that investments in financial infrastructure, the promotion of digital financial services, and the creation of a regulatory environment that encourages financial innovation are likely to yield significant economic dividends.

However, the significant heterogeneity, particularly emphasized by the Bayesian analysis and the wide classical prediction interval, is critically important. This strongly implies that FI initiatives are not universally applicable. The impact of financial inclusion is highly context-dependent, and policymakers must tailor their interventions to the specific needs and conditions of their economies. For example, in countries with low levels of financial literacy, simply increasing the number of bank accounts may not be sufficient. In such cases, financial inclusion initiatives should be coupled with educational programs to ensure that individuals can make informed financial decisions. Similarly, in economies with weak institutional frameworks, efforts to promote financial inclusion should be accompanied by reforms to strengthen the rule of law and protect property rights.

Methodologically, the comparison between classical and Bayesian approaches offers valuable lessons for researchers. While both methods can lead to similar conclusions about the direction of an effect, the Bayesian framework provides a more nuanced and arguably more realistic assessment of uncertainty and heterogeneity. The ability of Bayesian methods to incorporate prior information and provide direct probabilistic statements about parameters makes them a powerful tool for evidence synthesis, particularly in fields like economics, where context is crucial. Researchers should consider the strengths and weaknesses of both approaches and select the method that best suits their research question and the nature of their data.

In conclusion, this study provides a robust and nuanced understanding of the FI-EG relationship. It confirms the positive role of financial inclusion in driving economic growth, while also highlighting the critical importance of context and the practical implications of methodological choices in evidence synthesis. For policymakers, the message is clear: promoting financial inclusion is a worthwhile endeavor, but it must be done thoughtfully and with a deep understanding of the local context. For researchers, this study provides a practical guide to the application and interpretation of classical and Bayesian meta-analytic techniques, paving the way for more sophisticated and insightful evidence synthesis in the future.

6. Conclusion

This study synthesized the quantitative evidence on the relationship between financial inclusion and economic growth using both classical and Bayesian meta-analysis. Both approaches robustly support a positive and statistically significant average association, confirming the theoretical importance of FI for EG. Furthermore, both methods provide strong evidence for the existence of significant heterogeneity in the true effect sizes (expressed as Fisher's z) across studies.

The comparative analysis revealed nuances: while the direction and statistical significance of the average effect were consistent, the Bayesian analysis yielded a slightly lower point estimate, a wider credible interval for the average effect, and a substantially larger estimate for the magnitude of heterogeneity (τ) compared to the classical DerSimonian-Laird approach. The Bayesian framework, through its full propagation of uncertainty and provision of posterior distributions, offered a richer characterization of the variability inherent in the FI-EG relationship.

The presence of substantial heterogeneity underscores the importance of context in mediating the impact of FI policies. The findings highlight that while promoting FI is generally beneficial for growth, the specific outcomes can vary significantly, necessitating tailored policy design. Methodologically, the study demonstrates that the choice between classical and Bayesian meta-analysis can influence the quantification of uncertainty and heterogeneity, with Bayesian methods potentially offering a more comprehensive picture, particularly regarding the variability of effects across diverse settings.

6.1. Contribution

The study presents modern quantitative information on the total effect size of the FI-EG relationship. The approach explicitly demonstrates the considerable diversity present throughout the analyzed studies. The primary value of this research lies in the applied scientific comparison between classical and Bayesian meta-analysis in this relevant economic setting. The study demonstrates the analytical methods used for different estimation and interpretation processes, specifically addressing heterogeneity and uncertainty, and provides useful information for researchers analyzing and interpreting meta-analytic evidence in economic settings and related disciplines.

6.2. Limitations and future research

This study has limitations. The meta-analysis was based on only 27 primary studies, limiting statistical power (especially for publication bias tests) and the ability to explore sources of heterogeneity robustly. The specific effect size metric used in the primary studies was inferred rather than explicitly stated. The quality and potential biases within the primary studies inevitably carry over to the meta-analysis. We did not conduct meta-regression to investigate specific moderators (e.g., income level, region, and FI measurement) that could explain the observed heterogeneity, which constitutes a crucial next step. Sensitivity analysis regarding prior choices in the Bayesian framework could also be explored further.

Future research should aim to include a larger number of studies, allowing for more powerful analyses and robust investigation of heterogeneity sources through meta-regression using both classical and Bayesian techniques. Examining different dimensions of FI (access, usage, quality) and EG (e.g., poverty reduction, inequality) within a meta-analytic framework would also be valuable. Incorporating more advanced Bayesian models, potentially addressing publication bias, or utilizing network meta-analysis when comparing different FI interventions could provide deeper insights.

During the preparation of this work, the author used Google AI Studio in order to improve the grammar and language of the manuscript. After using this tool (service), the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

REFERENCES

1. Ali M., Hashmi S.H., Nazir M.R., Bilal A., Nazir M.I. Does financial inclusion enhance economic growth? Empirical evidence from the IsDB member countries. *International Journal of Finance and Economics*. 2021;26(4):5235–5258. DOI: 10.1002/ijfe.2063
2. Alkhafagy T., Abd M., Nsaif A.D., Alasadi S.R., Al-Muttar M.Y.O. Does financial development and financial inclusion matter for economic growth? Evidence from Iraq. *Cuadernos de Economía*. 2023;46(131). DOI: 10.32833/cude.v46i131.419
3. Ashenafi Biru A., Molla A., Ferraro S., Navon Y. The impact of financial inclusion initiatives: Evidence from meta-analysis. *Journal of International Development*. 2024;36(8):2926–2958. DOI: 10.1002/jid.3943
4. Asuming P.O., Osei-Agyei L.G., Mohammed J.I. Financial inclusion in Sub-Saharan Africa: Recent trends and determinants. *Journal of African Business*. 2019;20(1):112–134. DOI: 10.1080/15228916.2018.1484209
5. Azmeh C., Al-Raeei M. Exploring the dual relationship between fintech and financial inclusion in developing countries and their impact on economic growth: Supplement or substitute? *PLoS One*. 2024;19(12): e0315174. DOI: 10.1371/journal.pone.0315174
6. Banik S., Padhan P.C. Financial inclusion and economic development in the SAARC region. *Journal of Economic and Administrative Sciences*. 2023;40(2):263–281. DOI: 10.1108/JEAS-03–2023–0075
7. Cabeza-García L., Del Brio E.B., Rueda C. The effect of financial development on renewable energy consumption: A panel data analysis. *Energy*. 2019;170:173–181. DOI: 10.1016/j.energy.2018.12.125
8. Chinoda T. The impact of financial inclusion on economic growth in Zimbabwe. *Cogent Economics and Finance*. 2020;8(1):1845310. DOI: 10.1080/23322039.2020.1845310
9. Zehri C., Mosbah E., Kadja A., Inaam Z., Sekrafi H. exploring the nexus of decent work, financial inclusion, and economic growth: A study aligned with SDG 8. *Sustainable Futures*. 2024;7:100213. DOI: 10.1016/j.sftr.2024.100213
10. Domeher D., Konadu-Yiadom E., Aawaar G. Financial innovations and economic growth: Does financial inclusion play a mediating role? *Cogent Business and Management*. 2022;9(1):2115651. DOI: 10.1080/23311975.2022.2115651
11. Grohmann A., Klühs T., Menkhoff L. Does financial literacy improve financial inclusion? Cross country evidence. *World Development*. 2018;111:84–96. DOI: 10.1016/j.worlddev.2018.06.020
12. Hussain S., Rehman A.U., Ullah S., Waheed A., Hassan S. Financial inclusion and economic growth: Comparative panel evidence from developed and developing Asian countries. *SAGE Open*. 2024;14(1). DOI: 10.1177/21582440241226740

13. Ioan B., Kumaran R.M., Larissa B., Anca N., Lucian G., Gheorghe F., Horia T., Ioan B., Mircea-Iosif R. A panel data analysis on sustainable economic growth in India, Brazil, and Romania. *Journal of Risk and Financial Management*. 2020;13(8):170. DOI: 10.3390/jrfm13080170
14. Kabakova O., Plaksenkov E. Analysis of factors affecting financial inclusion: Ecosystem view. *Journal of Business Research*. 2018;89:198–205. DOI: 10.1016/j.jbusres.2018.01.066
15. Kimmitt J., Muñoz P. Entrepreneurship and financial inclusion through the lens of instrumental freedoms. *International Small Business Journal*. 2017;35(7):803–828. DOI: 10.1177/0266242617696354
16. Koomson I., Villano R.A., Hadley D. Effect of financial inclusion on poverty and vulnerability to poverty: Evidence using a multidimensional measure of financial inclusion. *Social Indicators Research*. 2020;149:613–639. DOI: 10.1007/s11205-019-02263-0
17. Le T.H., Chuc A.T., Taghizadeh-Hesary F. Financial inclusion and its impact on financial efficiency and sustainability: Empirical evidence from Asia. *Borsa Istanbul Review*. 2019;19(4):310–322. DOI: 10.1016/j.bir.2019.07.002
18. N'dri L.M., Kakinaka M. Financial inclusion, mobile money, and individual welfare: The case of Burkina Faso. *Telecommunications Policy*. 2020;44(3):101926. DOI: 10.1016/j.telpol.2020.101926
19. Nizam R., Karim Z.A., Rahman A.A., Sarmidi T. Financial inclusiveness and economic growth: new evidence using a threshold regression analysis. *Economic Research-Ekonomska Istraživanja*. 2020;33(1):1465–1484. DOI: 10.1080/1331677X.2020.1748508
20. Ohlan R. The relationship between tourism, financial development and economic growth in India. *Future Business Journal*. 2017;3(1):9–22. DOI: 10.1016/j.fbj.2017.01.003
21. Okello Candiya Bongomin G., Mpeera Ntayi J., Munene J.C., Malinga Akol C. Financial intermediation and financial inclusion of poor households: Mediating role of social networks in rural Uganda. *Cogent Economics and Finance*. 2017;5(1):1362184. DOI: 10.1080/23322039.2017.1362184
22. Ouechtati I. The contribution of financial inclusion in reducing poverty and income inequality in developing countries. *Asian Economic and Financial Review*. 2020;10(9):1051–1061. DOI: 10.18488/journal.aefr.2020.109.1051.1061
23. Ramzan M., Amin M., Abbas M. How does corporate social responsibility affect financial performance, financial stability, and financial inclusion in the banking sector? Evidence from Pakistan. *Research in International Business and Finance*. 2021;55:101314. DOI: 10.1016/j.ribaf.2020.101314
24. Shahbaz M., Sbia R., Hamdi H., Ozturk I. Economic growth, electricity consumption, urbanization, and environmental degradation relationship in the United Arab Emirates. *Ecological Indicators*. 2014;45:622–631. DOI: 10.1016/j.ecolind.2014.05.022

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Clustering of Russian Regions and Creating a Favorable Institutional Environment for Tax Incentives that Promote Technological Sovereignty

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ABSTRACT

Technological sovereignty as a strategic imperative of national development requires the development of adapted fiscal mechanisms aligned with the goals of innovation transformation. **The subject** of the study is the institutional environment for tax incentives for the technological sovereignty of Russian regions. **The main objective** of the study is the clustering of Russian regions that promotes the development of technological sovereignty of the country, applying various instruments of tax regulation. The **novelty** of this work lies in proposing and empirically testing a differentiated approach to creating a favorable institutional environment for tax incentives that promote technological sovereignty through the clusterization of Russian regions. The **methodology** of the study employs systemic analysis, Python-based cluster analysis, comparative research, and modeling to deepen understanding of the interaction between tax instruments and regional innovation development. **The results** of the study confirm that establishing an effective institutional environment for tax incentives supporting technological sovereignty requires a differentiated approach based on regional production index clustering, underpinned by four core criteria: regulatory transparency and international standard alignment, innovation ecosystem maturity, public-private collaborative frameworks, and digital tax procedures. **The conclusions** indicate that tax rate reductions and incentives for investment projects in all regions create a favorable institutional environment for technological sovereignty. Cluster 0 requires stabilization of tax incentives subsequent to the imposition of sanctions, Clusters 1 and 2 require the development of cross-border ties through federal mechanisms, and Cluster 3 requires the modernization of tax regimes, taking into account resource specifics.

Keywords: technological sovereignty; tax incentives; favorable institutional environment; tax instruments; tax benefits; government-private partnership; investment deductions; regional clustering; digitalization

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Кластеризация российских регионов и создание благоприятной институциональной среды для налоговых льгот, способствующих обеспечению технологического суверенитета

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АННОТАЦИЯ

Технологический суверенитет как стратегический императив национального развития требует разработки адаптированных фискальных механизмов, соответствующих целям инновационной трансформации. **Предметом исследования** является институциональная среда для налоговых льгот в целях формирования технологического суверенитета российских регионов. Основная **цель исследования** — кластеризация российских регионов по уровню технологического развития с учетом применения различных инструментов налогового регулирования. **Новизна** работы заключается в предложении и эмпирической проверке дифференцированного подхода к формированию благоприятной институциональной среды для применения налоговых льгот, поддерживающих технологический суверенитет на основе кластеризации российских регионов. В **методологии** исследования используются системный анализ, кластерный анализ с помощью Python, сравнительное исследование для углубления понимания взаимодействия налоговых инструментов и регионального инновационного развития. **Результаты исследования** подтверждают, что создание эффективной институциональной среды для налоговых льгот, поддерживающих технологический суверенитет, требует дифференцированного подхода, основанного на кластеризации регионов с учетом развития высокотехнологичных видов деятельности, подкрепленного четырьмя основными критериями: прозрачностью регулирования и соответствием международным стандартам, зрелостью инновационной экосистемы, рамками государственно-частного сотрудничества и цифровыми налоговыми процедурами. **Выводы** показывают, что снижение налоговых ставок и льготы для инвестиционных проектов во всех регионах создают благоприятную институциональную среду для технологического суверенитета. Регионы Кластера 0 требуют стабилизации налоговых льгот после введенных санкций, регионы в Кластерах 1 и 2 успешно справляются с внешними шоками, однако нуждаются в развитии трансграничных связей, а в Кластере 3 необходима существенная модернизация налоговых режимов с учетом ресурсной специфики. **Ключевые слова:** технологический суверенитет; налоговые льготы; благоприятная институциональная среда; налоговые инструменты; налоговые преференции; государственно-частное партнерство; инвестиционные вычеты; региональная кластеризация; цифровизация

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Introduction

In the context of rapid technological progress and economic globalization, the issue of technological sovereignty becomes particularly relevant for Russia. Modern challenges necessitate active state engagement in shaping the innovation ecosystem and developing effective tax incentives to support domestic technology development and reduce dependence on foreign policy solutions. In this context, studying how to create a favorable institutional environment for tax incentives that promote technological sovereignty in Russian regions is a significant scientific task. Current research reveals that, despite existing studies on tax regulation and innovation policy, their interdependence and impact on technological sovereignty and regional development remain inadequately explored.

This study was launched to address the need for systematizing and assessing the effectiveness of tax instruments aimed at supporting technological sovereignty in Russian regions. The authors identified a lack of a methodological framework for classifying regions based on tax mechanism efficiency,

which obstructed the creation of tailored tax policies reflecting regional characteristics. The availability of a substantial dataset of empirical information on the index of high-tech industry production in Russian regions for 2022–2024, provided by the Federal Service for State Statistics of the Russian Federation (Rosstat), created a unique opportunity for comprehensive analysis. Researchers recognized the potential for identifying patterns and constructing regional clusters, enabling a transition from speculative conclusions to scientifically grounded findings regarding the impact of the tax environment on the technological development of territories.

The realization that technological sovereignty represents a strategic priority for national development necessitated scientific reflection on the role of tax instruments in achieving this goal. Researchers understood that without an in-depth analysis of regional specificity in the application of tax incentives, it would be impossible to develop effective support policies for high-tech industries that promote reduced dependence on imported technologies.

Thus, the decision to develop this research topic was driven by a combination of the unexplored regional specificity of tax incentives, recognition of the practical significance of the problem, and the availability of unique empirical data that enabled comprehensive research using modern analytical methods.

The scientific novelty of this research lies in the development and testing of an original methodological approach to evaluating the effectiveness of tax instruments for ensuring regional technological sovereignty. For the first time in Russian economic science, comprehensive clustering of Russian regions has been conducted based on the index of high-tech industry production, taking into account the specificity of applied tax mechanisms. The novelty of the obtained results lies in identifying and systematizing four key criteria for effective tax regulation: regulatory transparency and international standard alignment, innovation ecosystem development, public-private collaborative frameworks, and digital tax procedures. Of particular scientific value is the establishment of the relationship between regional cluster type and the effectiveness of specific tax instruments, which enables a transition from a uniform to a differentiated approach in tax regulation of technological development.

The research is grounded in the scientific hypothesis that a significant relationship exists between specific combinations of tax instruments, the institutional environment in regions and the dynamics of the high-tech industry production index. Regions with tax incentive systems carefully calibrated to industry-specific traits, workforce capabilities, and geographic attributes exhibit more resilient technological advancement and reduced susceptibility to external pressures. An additional hypothesis posits that clustering regions by tax mechanism efficacy can reveal tailored tax stimulation strategies suited to diverse regional economic profiles.

The research's practical significance stems from developing scientifically validated recommendations to enhance tax policy efficiency across federal and regional jurisdictions. The obtained results can be utilized by government authorities in formulating regional technological development strategies, designing support programs for high-tech industries, and creating special economic zones. The proposed evaluation criteria for tax mechanisms will refine the incentive system aimed at achieving technological sovereignty. Research findings offer practical value

to businesses when selecting regions for high-tech production and assessing the efficacy of existing tax incentives. Furthermore, the clustering methods employed can be applied in evaluating regional investment attractiveness and forecasting the dynamics of high-tech industry development under various economic conditions.

Literature review

This study fits into a new paradigm of regional development, where institutions are understood as dynamic systems adapting to technological shifts. The key distinction of the proposed approach lies in the integration of four criteria for effective tax regulation: regulatory transparency and international standard alignment, innovation ecosystem development, public-private collaborative frameworks, and digital tax procedures. This allows institutional elements to be viewed not as isolated structures but as part of a complex system, where each component interacts with others in a context of global competition.

This approach overcomes the limitations of Michael Porter's classical cluster theory, which ignores digital aspects and sanctions pressure and inadequately describes contemporary regional realities. Instead, the study offers an understanding of institutions as dynamic elements of an innovation ecosystem, where tax instruments become not simply regulatory tools but catalysts for technological development in the face of global challenges.

Furthermore, fiscal federalism and classical institutional economics demonstrate significant limitations in the face of contemporary challenges. Fiscal federalism, focusing on the distribution of powers between levels of government, often ignores the dynamics of digital transformation and global value chains, making it inadequate for analyzing regional development under sanctions pressure. Classical institutional economics, meanwhile, insufficiently considers the role of innovative ecosystems and digital technologies in shaping regional advantages.

The systematization of key research presented in *Table 1* demonstrates the evolution of scientific understanding: from a focus on individual tax instruments (e.g., L. I. Goncharenko, A. V. Gurnak) to a comprehensive understanding of the institutional environment (e.g., S. Appelt, P. B. Saptono) and further to a systemic approach that considers multi-level determinants of technological development (e.g., M. Dębski, R. Alvarado). This confirms

the relevance of this study, which aims to develop a cluster approach to identify a favorable institutional environment for tax incentives.

Table 1 synthesizes key research on tax incentives for technological sovereignty, revealing structural trends in the evolution of scientific approaches to this complex domain. Grouping studies based on similarities in analytical contribution demonstrates the evolution of scientific understanding: from fragmented analysis of individual tax instruments to a comprehensive understanding of their place within a multi-level system for ensuring technological sovereignty. This classification does not merely catalog existing works but reveals the methodological, institutional, instrumental, contextual, and systemic aspects of the problem, creating a foundation for knowledge synthesis and identification of research gaps.

The presented grouping holds significant value for this study as it clearly demonstrates that existing scientific works, despite their merit, primarily focus on isolated aspects of the problem without offering a holistic methodology for assessing the effectiveness of tax incentives in the context of regional specificity of technological sovereignty. Literature analysis confirms the relevance of developing a cluster approach that integrates achievements from all five research groups and justifies the necessity of transitioning from analyzing individual instruments to a comprehensive assessment of the institutional environment of tax incentives as a factor in regional technological development.

The current study develops and tests the application of regional cluster analysis methods based on the high-tech industry production index, taking into account the specificity of applied tax mechanisms. For the first time in scientific literature, a comprehensive approach to assessing the effectiveness of the tax incentive institutional environment is proposed, incorporating both quantitative and qualitative indicators.

This research integrates all five aspects of previous studies into a unified analytical framework. The study is based on a unique dataset of empirical information from 85 Russian regions for 2022–2024, enabling the identification of patterns in how the tax environment influences technological development. For the first time, a large-scale empirical analysis has been conducted that confirms or refutes theoretical propositions from previous research. Four regional clusters with different characteristics

have been identified, and optimal tax stimulation models have been proposed for each territory type.

Based on cluster analysis results, differentiated recommendations for improving tax policy for various regional types can be developed. Specific mechanisms for optimizing the tax incentive system, adapted to the specificity of each regional cluster, can be formed.

The current study complements previous works by proposing a system of key criteria for effective tax regulation. Thus, this research proposes a paradigm shift in the approach to tax stimulation of technological sovereignty: from analyzing individual instruments to a comprehensive assessment of the institutional environment and differentiated regional policy based on a scientifically grounded regional typology.

At the same time, a separate stage of the literature review is devoted to examining the term “technological sovereignty,” as this term defines the parameters of the clustering conducted in this study. *Table 2* presents various approaches in the literature related to the study of the term “technological sovereignty”.

As can be seen from the literature presented in *Table 2*, the key aspect in developing approaches to technological sovereignty includes a focus on the development of high-tech industries and the use of development indices for the relevant industries to assess sovereignty. This emphasis is placed on eliminating potential cooperation and competition between countries for technological industrial leadership. Thus, “technological sovereignty” is a state’s ability to independently develop, advance, control, and ensure the security of critical technologies. The state of sovereignty can be assessed using index methods and comparisons with corresponding industry development indices in other jurisdictions.

Materials and methods

The research methodology of the study is built as a multilevel system of analytical procedures that ensures the realization of key research objectives. System-structural analysis of legal acts allowed us to decompose the institutional environment into four interacting levels: federal standards of tax regulation, their regional modifications, cluster regulations of special economic zones and corporate tax strategies, which corresponds to the introduction’s requirement to identify multilevel determinants of technological sovereignty.

Table 1
Summary of prior studies

Direction	Authors	Analytical contribution
Methodology for assessing tax efficiency	A.E. Goncharenko [3]	Application of the cost of capital model when taking into account the effect of accelerated depreciation
	S.V. Bogachev, V.P. Vishnevsky [10]	Using tax elasticity to assess non-governmental organizations (NGO) revenue dynamics with the integration of digital tools
Institutional mechanisms of tax regulation	O.N. Golovchenko [2]	Justification of the role of the institutional environment as a foundation for effective tax incentives
	V.P. Vishnevsky, A.E. Goncharenko, I.V. Nikulkina, A.V. Gurnak [6]	Identifying the relationship between technological changes and the tax system, requiring adaptability of fiscal mechanisms
	S.V. Trofimov [12]	Analysis of legal barriers in tax regulation of research and development (R&D)
	Z. Mannan et al. [15]	A study of coordination mechanisms in public-private partnerships
Specific tax instruments and their impact	L.I. Goncharenko, N.G. Vishnevskaya [1]	Analysis of the specifics of tax credit as the main instrument for stimulating R&D
	A.V. Gurnak, N.A. Nazarova [5]	Empirical evidence for the dominance of the corporate income tax in the incentive structure
	O.V. Mandroshchenko [11]	A study of the dual nature of income tax: as a barrier and as an incentive
	H.M. Musaeva [9]	The effectiveness of the investment tax deduction and its role in regional development
	O.V. Staroverova [7]	Recommendations for optimizing tax incentives to attract investment in high-tech industries
Contextual factors of technological sovereignty	M. Dębski et al. [17]	The relationship between investment in human capital, innovation and taxes
	M.M. Abdul et al. [19]	Identification of infrastructure determinants of tax policy effectiveness in the regions
	A.A. Kochurova [20]	Integration of the logistics factor into the analysis of regional efficiency of tax incentives
International experience and systemic effects	T. Gross, P. Klein [4]	Development of a tax policy model in the context of endogenous innovative growth
	S. Appelt et al. [13]	Systematization of international experience of income-based tax incentives (IBTI) models and their potential for Russia
	P.B. Saptono et al. [14]	Empirical evidence for the long-term effect of tax incentives
	O.V. Antipina [8]	Universal principles of tax incentives for innovation based on international experience
Clustering of regions by level of technological development	D.R. Belousov, D.A. Matveev, N.A. Ganichev et al. [26]	Consideration of spatial aspects of technological development in the context of regions as a single ecosystem that should develop evenly
	J.L.A. Colmenero, J.P. Portela Garcia-Miguel [27]	The effectiveness of clustering for classifying regions and the use of industry development indicators in regions has been confirmed
	M. Fabińska [28]	Analysis of the resilience of regional clusters to changes in the economic environment, identification of regional development dynamics
	R. Fan, et al. [29]	Spatiotemporal patterns of innovation and high-tech industry agglomeration in 30 provinces of China from 2012 to the present

Source: Compiled by the authors.

Table 2
Summary of research on the term “technological sovereignty”

Direction	Authors	Analytical contribution
Interpretation of technological sovereignty as a stage of development of digital technologies (IT)	To.N. Hung et al. [16]	Justification of the need to integrate digitalization into tax policy as a condition for technological sovereignty
	S. Couture, S. Toupin [21]	The concept of “sovereignty” in the digital context as control over data and infrastructure
	I. Calzada [22]	Defines technological sovereignty as the protection of citizens’ digital rights in the AI era
An index approach to assessing technological sovereignty based on productivity	A. Da Ponte, G. Leon, I. Alvarez [23]	A multidimensional synthetic indicator, the Technological Sovereignty Index (TSI), is being developed. It identifies key issues of technological sovereignty: access to technology and productivity management in high-tech industries
Emphasis on the reproducibility of technological processes	O. Falck, S. Falk [24]	Highlighting key challenges to technological sovereignty, including in the term the concept of reproducibility of technologies within industrial processes
Inclusion of intangible factors in the interpretation of the term	R. Alvarado et al. [18]	Expanding the concept of technological sovereignty to include intangible factors (academic environment)
	S. Mariotti [25]	Explores aspects of cooperation between countries and industrial pressure on the policy of technological sovereignty, a skeptical assessment of cooperation between countries in the issue of competitiveness of producers

Source: Compiled by the authors.

The comparative-legal method with cluster differentiation was used to operationalize the concept of adaptive tax mechanisms. This approach realizes the thesis of the introduction about the necessity to take into account regional and sectoral specifics when designing tax incentives. The empirical component combined qualitative and quantitative methods to create a multifactor evidence base. The analysis of tax instruments with a focus on concealed regulatory risks and cluster analysis of data on Russian regions made it possible to comprehensively study the instruments of tax incentives for technological sovereignty and identify institutional factors of index growth in the production of high-tech industries in Russian regions.

The selection of cluster analysis as the primary research method is justified by its unique capabilities for addressing the scientific problem at hand. Unlike traditional econometric modeling methods, which focus on establishing causal relationships between individual variables, cluster analysis enables the identification of hidden structures and patterns in multidimensional data, which is critically important for the typology of regions based on the effectiveness of tax instruments.

The proposed application of cluster analysis in this study is well-grounded and aligns with the nature of the phenomena under investigation and the research objectives. It is algorithmically transparent, as all stages of the analysis are clearly formalized and can be reproduced by other researchers. Cluster analysis also demonstrates high potential for empirical verification. Moreover, clustering can be utilized for regular monitoring of tax policy effectiveness across regions.

Particular importance is given to the method’s reproducibility: all calculations were performed in the Python environment using scikit-learn, pandas, numpy, and matplotlib libraries. The source code and data can be provided for independent verification of the results, which adheres to the principles of open science.

Compared to traditional regional analysis methods (regression models, data envelopment analysis (DEA) analysis, expert assessments), the proposed cluster approach enables working with data of diverse nature without rigid distributional assumptions. This methodological flexibility is particularly valuable when analyzing complex institutional environments where variables may not conform to standard statistical distributions, allowing for a

more accurate representation of regional differences in tax policy implementation and technological development trajectories.

An integrated methodological approach is employed to evaluate the institutional significance of tax instruments for harmonizing the assessment of technological development in Russian regions, considering the country's technological sovereignty. The authors decompose the institutional environment into four interacting levels: federal tax regulation standards, regional modifications, cluster norms for special economic zones, and corporate tax strategies.

This systemic approach allows us to identify the multi-level determinants of technological sovereignty and establish a direct link between specific tax mechanisms and actual results in the development of technological sovereignty at the regional level.

Particularly important is the comparative analysis method, which allows us to compare clustering results with tax regimes. This method includes both a comparison of clusters of regions with tax preferences and a quantitative comparison, as well as an analysis of the regulatory framework and a comparative legal method with cluster differentiation.

Application of tax incentives in practice

This study aims to pinpoint critical institutional factors and tax regulatory instruments that advance technological sovereignty. Key objectives include (1) assessing current tax incentives and (2) performing a cluster analysis of Russian regions to bolster technological sovereignty. The research analyzes current regulations and empirical data on tax mechanisms supporting Russia's technological sovereignty across regions. The study aims to develop a comprehensive understanding of how a supportive institutional framework for tax incentives advances technological sovereignty, a critical step toward building a sustainable innovation economy in Russian regions. Effective tax incentives can significantly improve the competitiveness of the national economy, promote the development of innovative projects and attract investment in high technology.

Results

Empirical data analysis on high-tech industries in the context of Russian regions appears rather ambiguous. In particular, the assessment using cluster analysis of data for all regions, starting

from 2022, based on the Production Index, which characterizes the scale of production in comparable periods with respect to manufacturing types of economic activities (OKVED2 — All-Russian Classifier of Types of Economic Activity), showed contradictory results. The first stage of the analysis is related to the study of data from 85 regions on the Production Index characterizing high-tech manufacturing types of economic activities (OKVED2) provided by Rosstat for 2022–2024.¹ The classification covers high-tech sectors, including pharmaceutical R&D, advanced medical materials, semiconductor electronics, and spacecraft systems, alongside medium-high-tech industries, such as medical device manufacturing, precision optical instruments, and aircraft components. Clustering was conducted using Python. A normalization procedure was performed on the data, and statistical outliers were taken into account. Some regions had extreme values, for example, the Republic of Tyva went from 6.5 in 2022 to 245.3 in 2024, and Chukotka Autonomous Okrug (AO) went from 306.7 in 2022 to 912.7 in 2024.

According to the data presented in *Fig. 1*, we can conclude that it is necessary to cluster into three to four clusters, since according to the elbow method, the largest significant bend is between the marks $k = 3$ and $k = 4$. At the same time, if $k = 4$ is chosen, only one region — Chukotka AO — will be in the cluster with the highest index growth rate, which is not representative of the general trend. This is clearly evident from *Fig. 2*, which presents visualized data on clusters of regions.

In particular, a strong gap is demonstrated not only by Chukotka AO, which is the only one in the first cluster, but also by the Republic of Tyva, which is in cluster 2 and has made an unprecedented jump in the index over three years.

Accordingly, the study concludes that there are at least three (globally — four) clusters of regions with regard to the Production Index characterizing high-tech manufacturing types of economic activity (OKVED 2). The composition of clusters by the number of regions is presented in *Fig. 3*. As can be seen from *Fig. 3*, a cluster that includes only one region is anomalous. This cluster includes only the Chukotka AO.

¹ Rosstat. URL: <https://rosstat.gov.ru/folder/11189> (accessed on 25.03.2025).

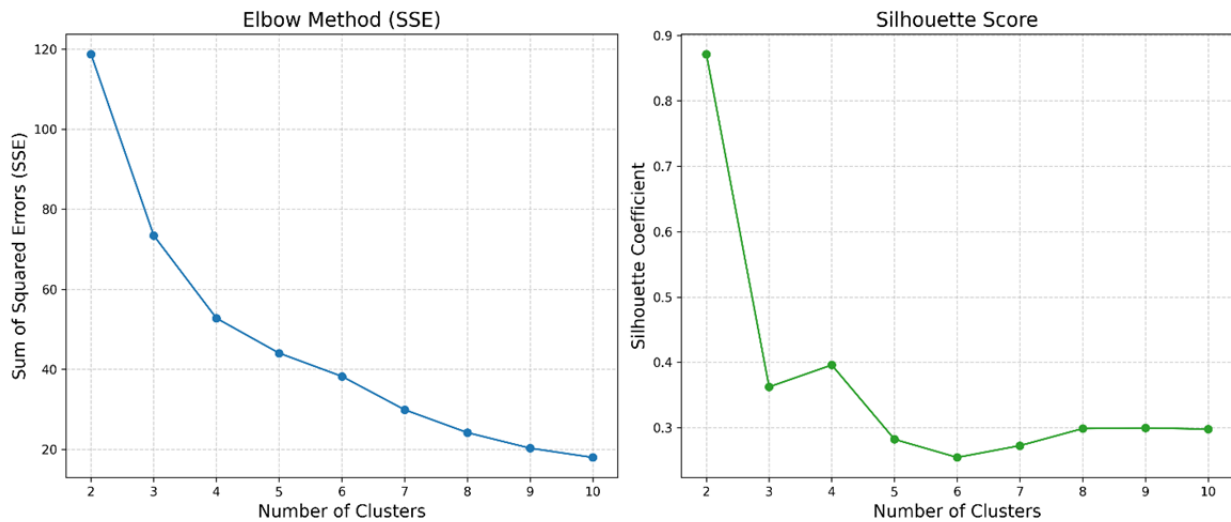


Fig. 1. Elbow method and Silhouette coefficient in relation to data on the Production Index characterizing high-tech manufacturing economic activities

Source: Compiled by the authors.



Fig. 2. Visualization of clusters of regions in relation to data on the Production Index characterizing high-tech manufacturing economic activities

Source: Compiled by the authors in mapchart.net based on Rosstat data.

Note: Statistics within the new regions of the Russian Federation are not presented in the Rosstat materials.

Discussion

Practical interpretation of clusters. As the analysis of the results of the conducted clustering showed, the clusters differ significantly in terms of the growth rates of the Index and the composition of the regions. Simultaneously, regions are consolidated into coordinated clusters featuring standardized implementation of innovation-fostering mechanisms.

The largest cluster is cluster 3. However, the industrial Production Index for this cluster is not outstanding.

The most outstanding results are demonstrated by regions from clusters 2 and 0. At the same time, cluster 0 can be described as comprising underperforming entities — regions that were unable to cope with the consequences of the sanctions pressure and whose Production Index was suppressed.

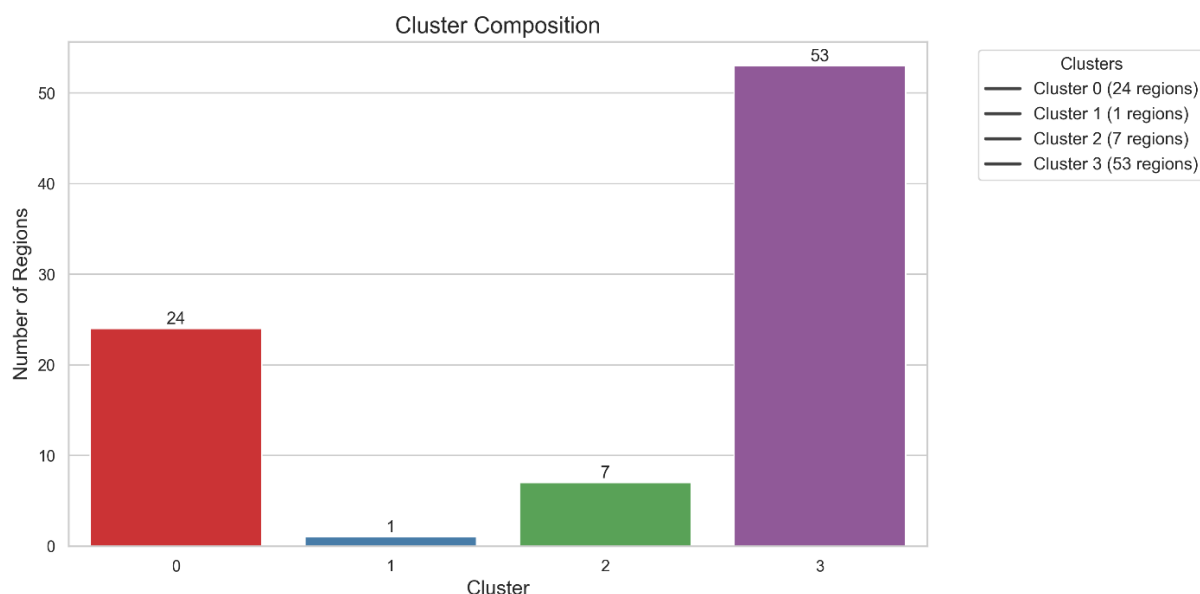


Fig. 3. Visualization of clusters by number of regions

Source: Compiled by the authors.

Cluster 0 groups regions characterized by either explosive growth in 2023 or a substantial decline in production in the subsequent year (primary defining factor). Examples include the Voronezh Region, Kostroma Region, Kursk Region, Lipetsk Region, Moscow Region, Tambov Region, Tver Region, City of Moscow, Komi Republic, Leningrad Region, City of Saint Petersburg, Republic of Crimea, Volgograd Region, Karachay-Cherkess Republic, Republic of North Ossetia-Alania, Republic of Mari El, Udmurt Republic, Chuvash Republic, Samara Region, Ulyanovsk Region, Sverdlovsk Region, Novosibirsk Region, Omsk Region, and Sakhalin Region.

The main characteristic of the cluster is the overlapping growth and sharp decline of the Index (more than 20 percentage points). Possible reasons are probably external economic factors (sanctions) and the subsequent decline in investment attractiveness and reduction of state financing of some projects (growing deficit).

It is sufficient to examine the characteristics of the dynamics during three consecutive years (2022 → 2023 → 2024):

Kostroma Oblast (77.4 → 141.0 → 104.8);

Samara Region (91.1 → 128.0 → 107.8);

Moscow Region (96.2 → 132.6 → 95.1);

Kursk Oblast (72.3 → 124.1 → 95.9);

Karachay-Cherkess Republic (82.5 → 144.6 → 105.7).

Sakhalin Oblast vividly illustrates how tax incentives drove index growth pre-sanctions — via new oil and gas developments and enterprise-specific reliefs

on the Kuril Islands, including income, property, land, and transport tax exemptions plus reduced insurance contributions — followed by a sharp investment contraction due to unlawful sanctions.

Cluster 1 exclusively features Chukotka AO, exhibiting highly volatile production indices in high-tech manufacturing sectors during 2022–2024. As noted earlier, this region and the corresponding cluster are the result of a statistical outlier and do not fully represent a full-fledged cluster. The dynamics also appear to be sufficiently broken. Cluster peculiarities are associated with anomalous jumps in values; such sharp jumps are unlikely without obvious reasons (e.g., unique investment projects or data errors).

Cluster 2 comprises multiple regions, including Karelia, Kaliningrad, Murmansk, Kabardino-Balkaria, Tyva, Primorsky Krai, and Amur Oblast. These areas exhibit distinct geographic or economic traits, such as border locations (e.g., Kaliningrad and Amur Oblasts) or specialized resource-driven sectors (e.g., Murmansk's Arctic-focused economy and Tyva's mining industry). The cluster's defining feature is consistent growth with minor fluctuations or a temporary 2023 dip followed by a 2024 recovery, resulting in a cumulative increase exceeding 20 percentage points over three years.

The dynamics can be characterized as follows, with subclusters identified:

1. Moderate growth:

- Republic of Karelia: from 77.8 in 2022 to 99.9 in 2024 (28% growth over 2 years);

- Murmansk Oblast: from 78.9 in 2022 to 94.5 in 2024 (20% growth over 2 years);

- Kaliningrad Oblast: 57.1% in 2022 (the lowest value among the cluster), 2024: 103.7% (recovery to the average level);

- Amur Oblast: from 83.4 in 2022 to 114.6 in 2024 (37% growth over 2 years).

2. Instability:

- Kabardino-Balkar Republic: Decrease in 2023 (from 90.7 in 2022 to 80.4 in 2023), then increase in 2024 (to 107.8).

- Primorsky Krai: Sharp decline in 2023 (from 100.0 in 2022 to 68.8 in 2023), then recovery in 2024 (to 115.1).

3. Anomalous figures:

- Republic of Tyva: in 2022: 6.5% (the lowest value among all regions), in 2024: 245.3% (a sharp jump, an increase of 38 times in 2 years).

Steady growth indicates stable development of high-tech industries (e.g., aircraft construction, IT sector).

Cluster 3 is the largest and includes the remaining 53 regions. The cluster is characterized by stable dynamism, with all regions of the cluster growing steadily or having insignificant index dips not exceeding 20 percentage points over three years in the aggregate and for each observed year in particular. At the same time, annual index growth values rarely rose or fell above 5 percentage points. Conditionally, the cluster can be called stagnant according to the level of development of the Production Index, which characterizes high-tech manufacturing types of economic activity.

Within a cluster, subclusters are also present:

1. Regions with sustained low growth, e.g.:

- Republic of Tatarstan (from 104.4 in 2022 to 118.6 in 2024);

- Krasnoyarsk Territory (from 99.2 in 2022 to 107.4 in 2024).

2. Regions with small unstable dynamics (2022 → 2023 → 2024), e.g.:

- Penza Oblast (104.5 → 117.7 → 98.9);

- Kurgan Oblast (113.8 → 120.6 → 115.7).

The subsequent analytical phase examines regional tax incentives within clusters, assessing their institutional relevance for the index reflecting high-tech industry development.

Thus, with regard to Cluster 0, it can be noted that there are special economic zones (SEZs) in Moscow and St. Petersburg, as well as in the Lipetsk region, but there are also SEZs in the Republic of Ta-

tarstan, which fell into Cluster 3. Moreover, certain doubts about the exclusivity of the fiscal impact of the preferential treatment of SEZs may be present due to the age of these SEZs, but it is understandable that major investments were attracted to SEZs in 2022 (inclusive), after which there was a decline due to sanctions.

This conclusion is confirmed by the fact that Kaluga Oblast also has a free economic zone (FEZ), which implies preferential treatment for high-tech industries.

In total, the cluster regions have zones with preferential tax treatment for high-tech production:

1. In the Central Federal District:

- Voronezh region: Industrial Park “Novovoronezh” (not a FEZ, but supports industrial projects), Territory of advanced socio-economic development (TASED) “Voronezh”, and 9 other industrial parks;

- Kostroma region: Industrial Park “Basic” in Kostroma (specializing in machine building and production of construction materials), “Vologrechensky”, “Rabochiy Metallist”, TASED “Galich”;

- Kursk region: industrial parks “Ponyrevsky”, “AgroPark” and others;

- Lipetsk Region: Special Economic Zone (SEZ) “Lipetsk,” SEZ “Chaplyginsk,” and over 10 strategically located industrial parks focused on metallurgy, machinery, and advanced manufacturing;

- Moscow Region and Moscow: Skolkovo SEZ (a high-tech innovation cluster), Technopolis Moscow SEZ, industrial parks in Yesipovo, Zhukovsky, Korolev, and Dubna SEZ (specializing in science-intensive industries);

- Tambov Oblast encompasses Tambov and Michurinsky TASED zones, an industrial park, and projects focused on agro-processing and light manufacturing;

- Tver Region: Zavidovo SEZ (a tourist-recreational zone), alongside over 5 TASEDs prioritizing logistics, food processing, and machinery.

2. Northwestern Federal District:

- Leningrad Region and St. Petersburg: Territorial Development Zone (TOESR) “Leningrad Region,” over 10 industrial parks, and St. Petersburg Special Economic Zone of the Technical and Innovation Type (TVT SEZ) (specializing in export-oriented manufacturing).

3. Southern Federal District:

- Republic of Crimea and Sevastopol: 13 industrial parks, including zones in coastal and moun-

tainous areas to support tourism-linked industries and agricultural exports;

- Volgograd Region: Volgograd TASED, 13 industrial parks with a focus on energy infrastructure, heavy machinery, and logistics;
- Karachay-Cherkess Republic: Agro-industrial Park (targeting agricultural exports and food processing);
- Republic of North Ossetia-Alania: 3 industrial parks specializing in food processing and small-scale manufacturing.

4. Volga Federal District:

- Republic of Mari El: Southern Industrial District industrial park (specializing in wood processing and chemical industries);
- Udmurt Republic: Glazov TASED, Sarapul industrial park, and over 10 sites supporting small and medium-sized enterprises (SMEs), machinery, and IT-enabled manufacturing;
- Chuvash Republic: TASED “Kanash”, more than 10 industrial parks;
- Samara Region: Togliatti TASED, AvtoVAZ and Chapaevsk industrial parks, etc.;
- Ulyanovsk region: “Ulyanovsk” SEZ production type (PT), more than 10 industrial parks.

5. Ural Federal District:

- Sverdlovsk region: Titanium Valley SEZ — a specialized hub for aerospace, metallurgy, and high-tech manufacturing — alongside over 20 industrial parks, including the Ural Industrial-Industrial Park (UIIP), which supports SMEs and export-oriented production.

6. Siberian Federal District:

- Novosibirsk Region: SEZ “Novosibirsk” (under development during the study period), paired with TASED zones and more than 20 industrial parks. This region emphasizes information technology (IT), biotechnology, and innovation clusters, leveraging its proximity to Akademgorodok (a major scientific center);
- Omsk Region: Omsky Industrial Park, five additional sites, and Avangard SEZ — a strategic zone focused on heavy industry, petrochemicals, and logistics. The region also serves as a critical transport hub connecting Siberia to Central Asia and Europe.

7. Far Eastern Federal District:

- Sakhalin Oblast: “Mountain Air” TASED and six more industrial parks, SEZ on the Kuril Islands.

As the data reveal, the majority of Cluster 0 regions are predominantly concentrated in the

European part of the Russian Federation. This geographic pattern highlights the critical role of institutional frameworks, particularly human capital characterized by skilled labor access, educational infrastructure, and innovation ecosystems. Such concentration may also reflect historical advantages in urbanization and industrial development, distinguishing these regions from those in Siberia or the Far East, where economic growth is often driven by natural resources rather than human potential. The regions are among the most populated, close to major scientific and financial centers, and do not present infrastructural difficulties for the relocation of trained personnel.

There is only one region in Cluster 1 — Chukotka AO. This region has no TASEDs and only two industrial parks: Beringovsky and Anadyr. At the same time, the region is located in the Arctic Zone of the Russian Federation (AZRF) — the largest special economic zone in the world. The special feature of the AZRF is a 50% deduction of the current tax rate applicable to new solid mineral deposits.

At the same time, the economic problems of the Chukotka Autonomous Okrug in 2023 were of a complex nature:

- climate change, destruction of infrastructure due to permafrost erosion;
- renewable energy and fish processing projects (e.g., the creation of the Beringovsky TOR) have faced delays in financing and technology supply;
- fall in investment in the mining sector: sanctions against Russian companies involved in the extraction of gold, coal and rare earth metals (e.g., Tenkerin and Sopka Rudnaya deposits) led to a 15–20% drop in production volumes. Foreign equipment required for deep processing became unavailable;
- decrease in subsidies from the federal budget. In the conditions of deficit of federal funds for 2024, the funding of Chukotka AO was reduced by 8%;
- due to the high cost of energy and logistics, small businesses (especially in trade and services) are losing money. In 2024, the number of closed trade organizations increased by 12%.

At the same time, as early as 2024, auctions for the purchase of deposits with development prospects of up to 25–30 years were held, which were favorable for subsoil users. Rusnano invested in projects for the production of components for wind

farms in the Far North, and Rosatom projects were developing. In particular, Rosatom discovered in Chukotka the largest gold reserves in Russia since 1991 (“Sovinoe” deposit). Rosatom and Chukotka AO are planning projects to develop energy infrastructure, landing strips, highways, sea berth, as well as construction of the world’s first nuclear power plant of small capacity (ASMM) with a Shelf-M reactor plant with a capacity of up to 10 MW.²

Cluster 2 includes regions remote from federal centers (cities of federal significance). At the same time, TASEDs and SEZs are also active on the territory of the regions:

- Republic of Karelia, Murmansk region: part of the SEZs located in the territory of the AZRF include industrial parks “Karelia”, “Nadvoitsy”, “Petrozavodskmash”, SEZ PT “Murmansk”, “Monchegorsk”, “Alakurtti”. The regions are rich in minerals and renewable resources;

- Kaliningrad Oblast: over 10 industrial parks, including the strategically vital SEZ “Kaliningrad” (Russia’s only ice-free Baltic port), which facilitates maritime trade and logistics. The region also benefits from Free Customs Zone procedures and the Special Administrative Region (SAR) “Oktyabrsky Island”, designed to attract foreign investment through tax incentives and streamlined regulations;

- Kabardino-Balkarian Republic: home to a Tourist and Recreational Special Economic Zone (TR SEZ) spanning the Elbrus and Zolsky districts. This zone leverages the region’s mountainous landscapes and alpine tourism potential, aiming to develop eco-tourism, hospitality infrastructure, and outdoor recreation industries;

- Republic of Tyva: features industrial parks “AgroTyva” (focused on agricultural processing) and “Kyzyl” (logistics and trade), alongside the conceptual SEZ “Khandagaity” project at the Mongolia border. This initiative aims to capitalize on transboundary trade routes and natural resource exports (e.g., minerals) to strengthen economic ties with countries of Asia;

- Primorsky Krai hosts the Vladivostok SEZ, seven industrial parks, the Free Port of Vladivostok (a pivotal Asia-Pacific trade hub), and the Russky Island Special Administrative Region, housing the

Russky Innovation Science and Technology Center. This cluster emphasizes international collaboration, high-tech industries, and marine research, positioning the region as a technology and innovation hub for the Far East;

- Amur Region: 6 industrial parks, Amurskaya Territory of advanced development (TAD).

Notably, the cluster demonstrating the most significant recovery growth during the sanctions period encompassed regions featuring Special Administrative Regions (SARs). These zones were established to attract transnational corporate holding entities by excluding specific income and expense items from the profit tax base of International holding companies (IHCs). Exemptions included:

- Gains or losses from exchange rate fluctuations on foreign currency assets, receivables, and payables (excluding foreign-denominated securities).

- Earnings or costs from geological exploration, mineral extraction, and related activities under international agreements (e.g., production sharing, concessions, licenses) with foreign governments, subject to specified conditions. Additionally, the profits of Controlled Foreign Company (CFC) are tax-exempt at the International holding companies (IHCs) level under the international tax treaty of the Russian Federation, excluding states (territories) that do not provide information exchange for tax purposes with the Russian Federation.

Analysis of Cluster 3’s institutional features identifies the absence of a homogeneous tax regime among its regions. This cluster comprises the Smolensk Region, home to SEZ “Stabna,” and the Republic of Sakha (Yakutia), located within the Arctic zone of the Russian Federation. It also includes the Vladimir Region with SEZ “Vladimir,” as well as the Irkutsk Region, Krasnoyarsk Krai, Tyumen Region, and Magadan Region — all characterized by substantial natural resource reserves. Additionally, the cluster encompasses the concept of border regions: the Jewish Autonomous Oblast and the territories of Khabarovsk Krai, Kamchatka Krai, and Zabaikalsky Krai, which currently lack free port zones or SEZs but host industrial parks and TADs.

The key institutional drivers for high-tech production growth in Russian regions include:

- Targeted tax incentives and regulatory mechanisms encompassing economic zones with tailored conditions, duty-free customs areas, Ad-

² Rosatom discovered the largest gold reserves in Russia since 1991 in Chukotka. URL: https://www.vedomosti.ru/business/articles/2024/01/12/1014823-rosatom-otkril-zolota?from=copy_text (accessed on 25.03.2025).

vanced Development Territories, and industrial clusters;

- Workforce accessibility and potential for human capital enhancement;
- Financial allure of the region, amplified by its strategic proximity to federal administrative hubs and enhanced accessibility to centralized governance structures. This geographic advantage supports streamlined regulatory engagement, improved infrastructure connectivity, and greater alignment with national policy initiatives;
- The presence of promising mineral reserves or strategic geographic positioning along key trade and logistics corridors are crucial factors. Apparently, it is the presence of factors related to human capital and the presence of a special tax and customs climate for doing business that became decisive in the distribution of regions into clusters according to the Production Index. Establishing a supportive institutional environment for tax incentives targeting technological sovereignty enables tax mechanisms to effectively foster innovation across Russian regions, strengthening national technological sovereignty.

Analysis of the regulatory framework of regional clusters. An analysis of the legal framework for tax incentives in Russian regions reveals significant divergence in approaches to stimulating technological development. Across the identified clusters, regions employ diverse tax mechanisms, including tailored income tax rates, property and transport tax incentives, and benefits for enterprises in Special Economic Zones (SEZs), Priority Development Areas (PDAs), Priority Social and Economic Development Areas (PSEDAs), and Special Administrative Regions (SARs).

As can be seen from *Table 3*, the most comprehensive tax incentive systems are found in the regions of Cluster 0, home to the country's main industrial and innovation centers. These regions actively utilize both federal instruments (SEZs, PDAs, and PEDAs) and their own regional incentives. In Cluster 3, which encompasses the majority of Russian regions, the legal framework is less uniform but includes some effective mechanisms to support high-tech production. Regional legislation places particular emphasis on tax incentives for investment activities and support for small and medium-sized businesses. In Cluster 2 regions, which demonstrate sustainable growth in high-tech industries, federal support instruments (SEZs, priority development ar-

eas, and regional administrative areas) predominate, while regional tax incentives are complementary.

The analysis demonstrates that Cluster 0 regions feature the most advanced regulatory systems for technological advancement, employing comprehensive tax incentives across regional and federal tiers. In Cluster 3, regional regulations prioritize individual investment initiatives and small business growth, with federal mechanisms such as SEZs, priority development zones, and the Arctic zone serving as critical drivers for investment attraction. Clusters 1 and 2 rely more heavily on federal support instruments (the Arctic zone, SEZs, priority development areas, unified administrative areas, and the Free Port of Vladivostok), demonstrating the strategic importance of these regions for the national economy. Furthermore, all clusters demonstrate a trend toward establishing reduced corporate income tax rates and property tax exemptions for organizations implementing investment projects in priority economic sectors.

Comparison with international experience. Russia's tax incentive framework for technological sovereignty, encompassing SEZs, Special Investment Contracts, and regional tax regimes, exhibits parallels and significant distinctions compared to global standards. An analysis of international experience shows that most developed and developing countries actively use specialized tax instruments to attract investment in high-tech sectors of the economy.

Russia's territorial tax regime contrasts with global practices emphasizing sector-specific and functional incentives, such as R&D tax credits, patent box systems for intellectual property income, and innovation-oriented tax deductions. The so-called Patent Box, which is used in 13 of the 27 European Union (EU) countries and provides preferential taxation of intellectual property income, holds a special place in international practice. This mechanism is not prominently featured in the Russian tax system but is widely used in the United Kingdom (UK), the Netherlands, Luxembourg, and Belgium.

Russian SEZs and TADs have much in common with China's special economic zones, the United Arab Emirates' (UAE) free zones, and Taiwan's science parks. However, their foreign counterparts often offer longer-term tax incentives, including a complete exemption from corporate income tax for up to 10–15 years. A comparative analysis of international tax regimes for stimulating technological development is presented in the following *Table 4*.

Table 3

Analysis of the regulatory framework for tax incentives and preferences in benchmark regions within clusters

Cluster	Region	Description of the norm content
0	Kostroma Oblast	Regional laws establish preferential property tax rates (up to 0.1%) and transport tax for certain categories of taxpayers, as well as a reduced income tax rate (13.5%) for organizations implementing investment projects. Residents of the Galich Priority Social and Economic Development Area (PSEDA) are granted benefits on insurance premiums, income tax, property tax, and land tax ¹
	Samara Oblast	Regional laws provide for property tax breaks for organizations implementing investment projects, as well as a 15.5% corporate income tax rate for organizations. SEZ residents are entitled to tax breaks on corporate income tax, property tax, land tax, and transport tax ²
1	Chukotka Autonomous Okrug	Special support measures for the Arctic zone: a mineral extraction tax rate of up to 0.5% of the current rate, tax breaks on profit taxes, land and property taxes, benefits on insurance premiums, a simplified tax system, and other taxes ³
2	Kaliningrad Oblast	The Kaliningrad SEZ offers tax breaks on profit, property, land, and transport taxes. Oktyabrsky Island offers a special administrative regime with a 0% profit tax for transnational corporations (TNCs) ⁴
	Primorsky Krai	Residents of the priority development areas and the Free Port of Vladivostok enjoy tax breaks on insurance premiums, income taxes, property taxes, and land taxes, and enjoy a special customs regime. On Russky Island, there is a 0% profit tax for TNCs ⁵
3	Republic of Khakassia	5% tax rate for IT organizations under the simplified tax system. Land and property tax breaks ⁶
	Krasnoyarsk Krai	0% property tax for organizations implementing investment projects in priority economic sectors. Income, land, and property tax breaks for residents of the Special Economic Zone (SEZ) and the Arctic Zone ⁷

Source: Compiled by the authors.

¹ Law of Kostroma Oblast of 24.11.2003 No. 153-ZO. On Property Tax of Organizations in the Territory of Kostroma Oblast. URL: https://www.nalog.gov.ru/rn44/about_fts/docs/5852697/?ysclid=lrjygg999f135315736 (accessed on 25.05.2025); Law of Kostroma Oblast of 28.11.2002 No. 80-ZKO. On Transport Tax. URL: https://www.nalog.gov.ru/rn44/about_fts/docs/7263807/ (accessed on 25.05.2025); Law of Kostroma Oblast dated 29.12.2011 No. 172-5-ZKO. On a Reduced Tax Rate for Corporate Income Tax for Certain Categories of Taxpayers. URL: https://www.nalog.gov.ru/rn44/about_fts/docs/6955148/ (accessed on 11.08.2025); Law of Kostroma Oblast dated 20.04.2019 No. 545-6-ZKO. On Establishing a Reduced Tax Rate for Corporate Income Tax, Subject to Transfer to the Regional Budget, for Organizations That Have Received the Status of a Resident of an Advanced Development Area Created on the Territory of a Single-Industry Municipal Formation of Kostroma Oblast (Single-Industry Town)" (as amended on 24.10.2022 No. 278-7-ZKO). URL: https://www.nalog.gov.ru/rn44/about_fts/docs/10399712/ (accessed on 11.08.2025).

² Law of Samara Oblast of 25.11.2003. On the Tax on Property of Organizations in the Territory of Samara Oblast. URL: https://www.nalog.gov.ru/rn63/about_fts/docs/4472960/ (accessed on 11.08.2025); Law of Samara Oblast of 07.11.2005. On Reduced Rates of Tax on the Income of Organizations Transferred to the Regional Budget. No. 187-GD (as amended on 27.12.2023 No. 121-GD) // FTS: documents. URL: https://www.nalog.gov.ru/rn63/about_fts/docs/4472959/?ysclid=lrkhuig9p659637580 (accessed on 11.08.2025); RF Government Resolution of 12.08.2010 N 621 (as amended on 03.06.2020) On the establishment of a special economic zone of an industrial and production type in the Samara Region. ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_103657/92d969e26a4326c5d02fa79b8f9cf4994ee5633b/ (accessed on 11.08.2025).

³ Federal Law On State Support for Entrepreneurial Activity in the Arctic Zone of the Russian Federation dated 13.07.2020 N 193-FZ. ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_357078/ (accessed on 11.08.2025); Law dated 18.05.2015 N 47-OZ. On Certain Issues of Tax Regulation in the Chukotka Autonomous Okrug. FTS: documents. URL: https://www.nalog.gov.ru/rn87/about_fts/docs/5576459/ (accessed on 11.08.2025).

⁴ Federal Law On Special Administrative Regions in the Territories of the Kaliningrad Region and Primorsky Krai dated 03.08.2018 N 291-FZ. ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_304082/ (accessed on 11.08.2025); Federal Law On Special Economic Zones in the Russian Federation dated 22.07.2005 N 116-FZ // ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_54599/ (accessed on 11.08.2025).

⁵ Federal Law On the Territories of Advanced Development in the Russian Federation dated 29.12.2014 N 473-FZ. ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_172962/ (accessed on 11.08.2025); Federal Law On Special Administrative Regions in the Territories of the Kaliningrad Region and Primorsky Krai dated 03.08.2018 N 291-FZ. ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_304082/ (accessed on 11.08.2025); Federal Law of July 13, 2015. No. 212-FZ. On the Free Port of Vladivostok. ConsultantPlus: legal reference system. URL: https://www.consultant.ru/document/cons_doc_LAW_182596/ (accessed on 25.08.2025).

⁶ Law of the Republic of Khakassia of 16.11.2009 No. 123-ZRH. On the tax rate when applying the simplified taxation system. FTS: documents. URL: https://www.nalog.gov.ru/rn19/about_fts/docs/5574747/ (accessed on 06.08.2025); Law of the Republic of Khakassia of 25.11.2002 No. 66. On transport tax // FTS: documents. URL: https://www.nalog.gov.ru/rn19/about_fts/docs/5600327/ (accessed on 06.08.2025).

⁷ Law of Krasnoyarsk Krai dated 16.03.2023. No. 5-1641. On the Tax on the Property of Organizations // ConsultantPlus: reference and legal system. URL: <https://www.consultant.ru/regbase/cgi/online.cgi?req=doc&base=RLAW123&n=306677#570X9xUgZlbP1YOX1> (accessed on 25.08.2025). Federal Law on Special Economic Zones in the Russian Federation dated 22.07.2005, N 116-FZ. ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_54599/ (accessed on 11.08.2025); Federal Law On State Support for Entrepreneurial Activity in the Arctic Zone of the Russian Federation dated 13.07.2020, N 193-FZ. ConsultantPlus: reference and legal system. URL: https://www.consultant.ru/document/cons_doc_LAW_357078/ (accessed on 11.08.2025).

An analysis of international experience indicates that the Russian system of tax incentives for technological sovereignty has its advantages, including a comprehensive approach to the development of territories and industries. However, to enhance the effectiveness of existing mechanisms, it would be advisable to consider implementing certain elements of international practice, such as strengthening the role of the “Patent Box” to stimulate the commercialization of intellectual property, extending tax holidays for residents of special economic zones and priority development areas, and strengthening tax incentives for R&D, similar to those used in Singapore and the UAE.

The Russian and Chinese models as export-driven developing economies may not inherently complement each other due to divergent technology transfer environments and domestic institutional frameworks for high-tech production. However, this does not exclude Russia’s potential for implementing broader, sustained regional income tax incentives. Developing nations also demonstrate a distinct advantage in deploying diverse incentives to advance high-tech sectors. For example, it can be noted that the EU and the US are much slower in developing possible tax incentives for high-tech industries, which may lead to a deterioration in the competitive status of companies from these jurisdictions.

Theoretical implications and policy perspective. Achieving technological sovereignty requires favorable institutional conditions — norms and rules shaping economic behavior. Modern tax regulation advances technological progress through three core elements: targeted taxation for technology-focused enterprises, adaptive mechanisms for economic shifts, and transparent benefit criteria that cultivate trust.

Tax tools range from traditional incentives (e.g., tax holidays) to specialized mechanisms for talent and tech transfer, with regional regimes combining fiscal benefits and cluster infrastructure. These measures enhance technological sovereignty by freeing resources for R&D investment, boosting high-tech employment, and fostering self-sufficient regional ecosystems that reduce foreign dependency. Cluster-focused tax policies accelerate innovation by bridging businesses and research institutions, speeding up tech commercialization. However, their effectiveness hinges on careful design tailored to local needs, enabling synergy and rapid growth in the innovation economy.

The establishment of an optimal institutional framework for tax incentives supporting technological sovereignty is achieved through a comprehensive suite of tax mechanisms:

- R&D support via targeted tax incentives;
- preferential treatment for enterprises in special economic and technology innovation zones;
- expanded tax deduction capabilities;
- accelerated depreciation for science-intensive assets to expedite write-offs of critical R&D and high-tech production infrastructure;
- enhanced depreciation allowances for advanced machinery and technologies to drive private-sector innovation investment;
- reduced corporate tax rates for small high-tech firms to boost competitiveness in emerging markets;
- R&D tax credits enabling expense deductions from taxable income, reducing operational costs;
- customs exemptions and VAT relief for high-tech imports, including duty-free equipment lists and VAT refunds for robotics, microelectronics, and advanced manufacturing components;
- full corporate tax exemption on R&D-derived revenues to encourage sustained innovation and technology transfer investments;
- temporary tax holidays for science and technology startups, offering partial exemptions during early stages to foster entrepreneurship and scaling;
- venture capital stimulation tools;
- state-business collaboration through public-private partnerships and additional tax mechanisms.

These policies foster synergy among innovation stakeholders, speeding up commercialization and market entry of new technologies.

Tax incentives — including property and corporate tax exemptions for specific entities, targeted tax breaks, and investment tax credits — are employed to enhance investment in high-tech innovation projects. Paragraph 7 of Article 262 of the Tax Code of the Russian Federation suggests the possibility of reducing the tax base for corporate income tax for business entities engaged in scientific and technological research and development.³

³ Resolution of the Government of the Russian Federation of 29.10.2024 No. 1444. On Amendments to Certain Acts of the Government of the Russian Federation. URL: <https://www.consultant.ru/law/hotdocs/86833.html> (accessed on 25.03.2025).

Table 4

Summary of international tax practice of regional tax regimes for encouraging innovation

Country	Special tax regime	Description
China	Special economic zones (SEZs) and industry-specific exemptions for high-tech companies	A preferential 15% income tax rate instead of 25%, value added tax (VAT) exemption for technology transfer, and tax holidays for up to 5–10 years for SEZ residents ¹
Taiwan	Science parks (Hsinchu Science Park, Central Taiwan Science Park)	0% income tax for 5 years, exemption from customs duties and VAT on imported equipment, tax breaks for exporting companies ²
Singapore	Enterprise Innovation Scheme (EIS) for full-service companies in Singapore	400% tax deduction on R&D expenses per year, 100% tax exemption for startups on the first S\$ 100,000 of income ³
USA	Federal R&D Tax Credit, state-specific Patent Box credits (Massachusetts, California).	R&D Tax Credit, Alternative Simplified Credit, Energy Research Credit ⁴
EU countries	Patent Box	Lower corporate tax rate on income from intellectual property, tax credits and deductions for R&D, accelerated depreciation of assets ⁵
United Kingdom	Patent Box	Corporate tax of 10% on income from patents and other intellectual assets developed by the company ⁶
UAE	Free Zones	0% corporate tax on “qualifying income”, exemption from import and export duties, no exchange controls ⁷
Malaysia	Multimedia Super Corridor (MSC Malaysia)	Income tax exemption for 10 years or 100% investment tax deduction for 5 years, exemption from customs duties and sales tax on IT equipment ⁸
Israel	Development zones	7.5% corporate income tax for companies in development zones, tax exemption on interest payments made by Israeli high-tech companies to foreign financial institutions ⁹

Source: Compiled by the authors.

¹ Ivanova I.A., Gershman M.A., Brambila Martinez F.H. Tax incentives for science and innovation in China. URL: <https://issek.hse.ru/news/1032004690.html> (accessed on 03.25.2025).

² Central Taiwan Science Park. Investment incentives. URL: https://www.ctsp.gov.tw/english/01about/abo_incentive_measures.aspx?v=20&fr=1142&no=1148 (accessed on 03.25.2025).

³ Inland Revenue Authority of Singapore. Enterprise Innovation Scheme (EIS) URL: <https://www.iras.gov.sg/schemes/disbursement-schemes/enterprise-innovation-scheme-> (accessed on 03.25.2025).

⁴ OECD. United States – Inno Tax. URL: <https://stip.oecd.org/innotax/countries/UnitedStates> (accessed on 25.03.2025).

⁵ Proposal for a Regulation of the European Parliament and of the Council Establishing a Framework of Measures for Strengthening Europe's Semiconductor Ecosystem (Chips Act), COM/2022/46 Final. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52022PC_0046 (accessed on 25.03.2025).

⁶ HM Revenue & Customs. Use the Patent Box to Reduce Your Corporation Tax on Profits. URL: <https://www.gov.uk/guidance/corporation-tax-the-patent-box> (accessed on 25.03.2025).

⁷ UAE Federal Tax Authority. Basic Tax Information Bulletin: Free Zone Persons. URL: <https://tax.gov.ae/Datafolder/Files/Pdf/2024/CT%20Bulletin/Basic%20Tax%20Information%20bulletin-%20Free%20Zone%20Person-English.pdf> (accessed on 25.03.2025).

⁸ Malaysia Digital Economy Corporation (MDEC). Guidelines on Malaysia Digital (MD) Tax Incentive. URL: [https://mdec.my/static/pdf/malaysiadigital/20250709%20Published%20Guidelines%20on%20MD%20Tax%20Incentive%20\(Expansion\).pdf](https://mdec.my/static/pdf/malaysiadigital/20250709%20Published%20Guidelines%20on%20MD%20Tax%20Incentive%20(Expansion).pdf) (accessed on 25.03.2025).

⁹ PwC. Israel – Corporate – Tax Credits and Incentives. URL: <https://taxsummaries.pwc.com/israel/corporate/tax-credits-and-incentives> (accessed on 25.03.2025).

The geographical concentration of innovative companies in zones with special tax conditions contributes to the formation of self-developing ecosystems, which directly affects the reduction of dependence on foreign technologies. Tax advantages for Special Economic Zone (SEZ) residents feature complete relief from property, transport, and land taxes; corporate profit tax rates are cut to 2% (federal) and 0% (regional) for the initial five-year operational phase across zones like Technopolis Moscow, Dubna, Alabuga, Lipetsk, St. Petersburg, and Innopolis. Innopolis implements a tiered structure: 5% for four subsequent periods followed by 13.5% for ten. Additional perks include subsidized land leases, duty-free raw material imports for production and export, and reduced insurance contributions, driving investment inflows, cutting operational costs, and accelerating project profitability.

Investment tax deductions reduce taxable income by amounts spent on assets (equipment, facilities) and production upgrades. For example, IT firms can deduct 3% of income when investing in R&D, lowering profit taxes. “Yandex” applied investment tax deductions to lower its taxable base for AI algorithm development. Determines the parameters⁴ of the application of the federal investment tax deduction of 3% of expenses when investing funds in research and development.

Article 259.3 (paragraph 2) of Russia’s Tax Code allows applying a 3x accelerated depreciation coefficient for R&D-related assets and software registered in the national database.

Under Article 258 of Russia’s Tax Code, bonus depreciation enables firms to deduct up to 30% of fixed asset costs (3–20-year useful life) from taxable income, driving production modernization, enhancing investment appeal, and accelerating technological advancement through capital reallocation.

A special reduced rate of tax on profits of organizations is provided for small technology companies.⁵ In the period up to 2030, constituent entities of the Russian Federation have the right to establish a

reduced rate for tax credited to the regional budget. Under regional support programs, companies may receive a subsidy to compensate for part of the costs of modernizing production — up to 50% of confirmed costs.⁶

Russia’s Tax Code Article 67 outlines investment tax credits as deferred payment mechanisms for companies conducting R&D, production upgrades, or innovation projects. This tool helps businesses redirect funds from tax obligations to modernization efforts, particularly benefiting tech startups and material science ventures requiring upfront capital.

Customs privileges for technology imports involve expanding the list of technological equipment that can be imported into the territory of the Russian Federation VAT-free, except for VAT refunds on imports of components for robotics and microelectronics. These incentives allowed “Mikron” to reduce its expenditures on the purchase of foreign equipment by up to 15%.

Startups within the Skolkovo and VEB.RF programs, along with R&D project participants, can benefit from tax holidays featuring a decade-long corporate income tax exemption and VAT exemption on innovative product sales.

There are also tax mechanisms that incentivize venture capital investments in promising startups and companies expecting to receive high income in the future through business expansion. Based on paragraphs 17.2 and 17.2–1 of Article 217 of the Tax Code of the Russian Federation, until 2027 residents are exempt from personal income tax on income from the sale of securities of the high-tech (innovation) sector of the economy in the amount of the tax base up to 50 million rubles. For an investor, profits from the sale of shares and stakes in Russian companies are taxed at 0% if they have been in his ownership for more than 5 years.

Public-private partnerships (PPPs) in Russia leverage state resources and business efficiency for large-scale projects. In Moscow, integrated transport hubs involve private operators with guaranteed ROI models, while sewage treatment plants utilize 5-year tax holidays to offset innovative tech

⁴ Resolution of the Government of the Russian Federation of 28.11.2024 No. 1638. On the parameters of application of the federal investment tax deduction. URL: <https://www.consultant.ru/law/hotdocs/87212.html> (accessed on 25.03.2025).

⁵ In accordance with the Federal Law No. 478-FZ dated 04.08.2023. On the development of technology companies in the Russian Federation. URL: https://www.consultant.ru/document/cons_doc_LAW_454055/ (accessed on 25.03.2025).

⁶ More than 200 Moscow Region SMEs received subsidies for production modernization this year. URL: https://mosreg.ru/sobytiya/novosti/news-submoscow/bole-200-podmoskovnykh-msp-poluchili-subsidiyu-na-modernizaciyu-proizvodstva-v-etom-godu?utm_referrer=https%3A%2F%2Fwww.google.com%2F (accessed on 25.03.2025).

costs. Regional fiscal tools vary: Skolkovo Innovation Center offers 10-year income tax deferrals and accelerated R&D equipment depreciation for startups. Kazan's medical complex ties property tax rates to free healthcare quotas. Sverdlovsk's Urals Engineering School links corporate tax deductions to graduate employment rates, creating an "education-production" cycle. Kaluga SEZ combines 5-year profit tax exemptions with enhanced depreciation for digitalized equipment, fostering industrial modernization.

Conclusion

The main results of the study confirm that effective tax regulation can become a strategic catalyst for technological progress and economic independence. The creation of clear and stable rules of tax preferences for innovative companies can significantly increase the level of business confidence. This promotes long-term investment in R&D and technological modernization. Targeted tax regimes for startups and residents of specialized zones create competitive advantages by providing access to necessary resources and infrastructure, forming self-developing ecosystems that promote the growth of high technologies. Implementing hybrid public-private collaboration frameworks with tax incentives for co-financing innovation projects minimizes financial risks and strengthens business-scientific partnerships. Digitalization of administrative procedures significantly reduces bureaucratic burdens on firms, optimizing tax instrument deployment. Harmonizing national tax laws with global standards creates new pathways for integration into worldwide innovation ecosystems. This study emphasizes the need for a systematic approach to tax regulation, which will ensure long-term competitive advantages and reduce dependence on foreign technologies.

The scientific novelty of the presented research lies in the development and application of a comprehensive methodological approach that integrates systematic-structural analysis of the regulatory and legal framework with empirical cluster analysis of regional data. Unlike existing studies, where tax instruments and the institutional environment are examined separately, this research proposes an integrated model that establishes a direct connection between specific tax mechanisms and actual outcomes in the develop-

ment of technological sovereignty at the regional level. The application of cluster analysis using the Python software tool for processing Rosstat data from 85 regions for 2022–2024 not only enabled the identification of regional typology based on the level of high-tech production development but also determined which specific combinations of tax instruments exert the most significant influence on technological growth in different regional contexts. A particularly valuable methodological aspect is the data normalization procedure that accounts for statistical outliers, which allowed avoiding distortions in result interpretation and obtaining a more accurate picture of regional development trajectories.

The theoretical significance of the research lies in the creation of a conceptual foundation for understanding the mechanisms of interaction between tax instruments and technological sovereignty under sanction pressure. For the first time, a model has been proposed and empirically validated, demonstrating how four critical components — regulatory transparency and global standard alignment, innovation ecosystem maturity, public-private collaborative frameworks, and digitized tax procedures — collectively form a favorable institutional environment for tax incentives supporting technological sovereignty.

The practical significance of the results is manifested in specific recommendations for regions of different clusters: regions from Cluster 0 should focus on stabilizing the tax environment after sanction shocks; Cluster 2 regions should concentrate on developing cross-border connections and utilizing special administrative regimes; Cluster 3 regions should prioritize modernizing existing instruments considering their resource specificity. The obtained data enable federal and regional authorities to purposefully adjust tax policy, enhancing its effectiveness in supporting technological sovereignty.

In terms of future research perspectives, it is advisable to deepen the analysis of causal relationships between specific tax instruments and indicators of technological development using regression analysis methods and econometric modeling. It is also necessary to expand the research time horizon by including data from a longer period to assess the long-term effects of tax incentives. A promising direction is the detailed study of the impact of individual tax instruments (such as investment

tax credits, bonus depreciation, and preferential rates for small technology companies) on various sectors of high-tech production. Additionally, research into the relationship between the level of digitalization of tax procedures and the speed of innovation implementation in regions is relevant, which will allow determining optimal pathways

for integrating digital technologies into the tax system to support technological sovereignty. These directions will enable the creation of more precise recommendations for forming a comprehensive tax regulation system capable of effectively supporting the technological development of the Russian economy under external constraints.

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REFERENCES

1. Goncharenko L.I., Vishnevskaya N.G. Tax stimulation of innovative development of industrial production based on the analysis of advanced foreign experience. *Economics. Taxes. Pravo*. 2019;12(4):121–131. (In Russ.). DOI: 10.26794/1999–849X-2019–12–4–121–131
2. Golovchenko O.N. Tax incentives for the development of high-tech business entities. *Financial Law*. 2023;3:21–24. (In Russ.). DOI: 10.18572/1813–1220–2023–3–21–24
3. Goncharenko A.E. Tax stimulation of investment activity in Russia: problems and prospects of development. *Bulletin of the Altai Academy of Economics and Law*. 2024;3–1:32–36. (In Russ.). DOI: 10.17513/vaael.3281
4. Gross T., Klein P. Optimal tax policy and endogenous growth through innovation. *Journal of Public Economics*. 2022;209:104645. URL: <https://doi.org/10.1016/j.jpubeco.2022.104645>
5. Gurnak A.V., Nazarova N.A. Tax stimulation of economic growth in Russia: problems and prospects. *Taxes and Taxation*. 2023;1:1–16. (In Russ.). DOI: 10.7256/2454–065X.2023.1.39483
6. Vishnevsky V.P., Goncharenko L.I., Nikulkina I.V., Gurnak A.V. Taxes and technologies: past, present and future of the tax system of Russia. *Terra Economicus*. 2020;18(4):6–31. (In Russ.). DOI: 10.18522/2073–6606–2020–18–4–6–31
7. Staroverova O.V. Tax stimulation of investment activity. *Research and Development. Economy of the firm*. 2023;12(1):31–36. (In Russ.). DOI: 10.12737/2306–627X-2023–12–1–31–36
8. Antipina O.V. Tax stimulation of innovations as a method of state regulation of economic development. *Economics and Entrepreneurship*. 2023;3(152):326–328. (In Russ.). DOI: 10.34925/EIP.2023.152.3.065
9. Musaeva H.M. Tax stimulation of economic activity of regions in the context of realizing the potential of investment deduction. *Scientific Review. Series 1: Economics and Law*. 2024;1:136–146. (In Russ.). DOI: 10.26653/2076–4650–2024–01–13
10. Bogachev S.V., Vishnevsky V.P. Tax stimulation of economic growth in Russia: analysis from the perspective of tax dynamism. *Terra Economicus*. 2024;22(2):22–38. (In Russ.). DOI: 10.18522/2073–6606–2024–22–2–22–38
11. Mandroshchenko O.V. Tax incentives for enterprises of the high-tech sector of the economy: problems and solutions. *Property Relations in the Russian Federation*. 2024; 12(279):32–38. (In Russ.). DOI: 10.24412/2072–4098–2024–12279–32–38
12. Trofimov S.V. Tax incentives for Russian innovators. *Patents and Licenses. Intellectual Rights*. 2025;1:70–80. (In Russ.).
13. Appelt S., Galindo-Rueda F., Gonzalez Cabral A.C., O'reilly P. Five need-to-knows on income-based tax incentives for R&D and innovation. OECD. November 25, 2024. URL: <https://www.oecd.org/en/blogs/2024/11/five-need-to-knows-on-income-based-tax-incentives-for-rd-and-innovation.html> (accessed on 25.03.2025).
14. Saptono P.B., Khozen I., Mahmud G., Hodžić S., Pratiwi I., Purwanto D., Imantoro L.W. Flourishing MSMEs: The Role of Innovation, Creative Compliance, and Tax Incentives. *Journal of Risk and Financial Management*. 2024;17:532. URL: <https://doi.org/10.3390/jrfm17120532>
15. Mannan Z., Ahmed M.F., Uddin M.M. Critical success factors of public-private partnership (PPP) implementation: A study in Bangladesh. *Review of Business and Economics Studies*. 2024;12(2):28–41. DOI: 10.26794/2308–944X-2024–12–2–28–41

16. Hung To. N., Trung N.D. Factors shaping the future of the global economy and finance. *Review of Business and Economics Studies*. 2024;12(1):6–15. DOI: 10.26794/2308–944X-2024–12–1–6–15
17. Dębski M., Cieciora M., Pietrzak P., Bołkunow W. Organizational culture in public and non-public higher education institutions in Poland: A study based on Cameron and Quinn’s model. *Human Systems Management*. 2020;39:345–355. DOI: 10.3233/HSM-190831
18. Alvarado R., Deng Q., Tillaguango B., Méndez P., Bravo D., Chamba J., Alvarado-Lopez M., Ahmad M. Do economic development and human capital reduce non-renewable energy consumption? Evidence for OECD countries. *Energy*. 2021;215(B). DOI: 10.1016/j.energy.2020.119147
19. Mumin M.A., Yakubu I.N., Adam I.O. The synthesis of logistics performance and technological innovation on environmental quality. *Technological Sustainability*. 2025;4(1):114–129. DOI: 10.1108/TECHS-05–2024–0048.
20. Kochurova A.A. Methodology for assessing the logistics potential of the Northern Sea Route. The territory of new opportunities opens for investment projects of the future. 2025;1:7–16. DOI: 10.29039/2949–1258/2025–1/007–016
21. Couture S., Toupin S. What does the notion of “sovereignty” mean when referring to the digital? *International Organisations Research Journal*. 2020;15(4):48–69. DOI: 10.17323/19967845–2020–04–03
22. Calzada I. Technological sovereignty: protecting citizens’ digital rights in the ai-driven and post-GDPR algorithmic and city-regional European realm. *Regions Magazine*. 2019;35(1). DOI: 10.1080/13673882.2018.00001038
23. Da Ponte A., Leon G., Alvarez I. Technological sovereignty of the EU in advanced 5G mobile communications: An empirical approach. *Telecommunications Policy*. 2022;47(1):102459. DOI: 10.1016/j.telpol.2022.102459
24. Falck O., Falk S. Focus on critical key technologies: The race for leadership in industry and technology policy. *EconPol Forum*. 2024;25(3):42–46.
25. Mariotti S. “Open strategic autonomy” as an industrial policy compass for the EU competitiveness and growth: The good, the bad, or the ugly? *Journal of Industry, Competition and Trade*. 2025;52:1–26. DOI: 10.1007/s40812–024–00327-y
26. Belousov D.R., Matveev D.A., Ganichev N.A., Artemenko V.G., AblaevE.Yu., Volkov R.G., Solntsev O.G., Deshko A.V. Spatial aspect of scientific and technological development: Ecosystem approach and formation of interregional partnerships. Scientific report. Belousov D.R., ed. Moscow: Dynamic Print; 2025. 92 p.
27. Colmenero J.L.A., Portela Garcia-Miguel J.P. A Regionalization approach based on the comparison of different clustering techniques. *Applied Sciences*. 2024;14(22):10563. DOI: 10.3390/app142210563
28. Fabińska M. Regional capital dynamics and cluster development: Insights from Poland’s national key clusters. *European Research Studies Journal*. 2024;27(4):184–200. DOI: 10.35808/ersj/3513
29. Fan R., Nie C., Zhao Y., Hao C., Peng C. Spatiotemporal distribution and regional imbalance of China’s digital economy. *Sustainability*. 2024;16(16):6738. DOI: 10.3390/su16166738

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