Article

The impact of socioeconomic variables on financial inclusion in Asian countries: A comparative study, 2010–2022

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ABSTRACT: The financial inclusion program in Asia has begun to be carried out intensively, focusing on increasing public access, especially for people who have yet to enjoy banking services. This makes financial inclusion one of the development focuses in the financial sector in various countries, especially in the Asian region. This study compares the financial inclusion level and socioeconomic variables' influence on financial inclusion in Asian countries in 2010–2022. To compare the level of financial inclusion in several Asian countries, the Index of Financial Inclusion (IFI) analysis method was used, while to examine the relationship between socioeconomic variables on financial inclusion, the Ordinary Least Square (OLS) method was used with an estimation technique, in the Fixed Effects Model approach. The results of this study indicate that, in general, financial inclusion in several Asian countries is mainly influenced by the usability dimension. In addition, only the variable GDP per capita is partially influential. While other variables, namely, the unemployment rate and population in rural areas, significantly influence the financial inclusion index.

Keywords: financial inclusion; index of financial inclusion; socioeconomic variables; Asian region

1. Introduction

Financial inclusion is the use and accessibility of formal financial services, and the critical element is the pursuit of inclusive economic growth and the reduction of poverty. By enabling savings for education, backing small enterprises, and permitting profitable investments in health and housing, it plays a critical role in helping people escape poverty (Liu et al., 2023; Ahmad et al., 2019). Due to many social, economic, and technological considerations, efforts to increase financial inclusion in the Asian area have significantly picked up steam in the last ten years (Makhdoom et al., 2023). Despite this development, there are still significant differences in the degrees of financial inclusion between nations and population groups, partly attributed to differing socioeconomic factors (Azam et al., 2021; Beddu et al., 2022). Financial inclusion is critically influenced by socioeconomic factors such as income level, educational attainment, gender, and geographic location (Rana and Gróf, 2022). These elements directly or indirectly impact how easily people and households can access and use formal financial services (Murshed et al., 2021). Due to the inability to satisfy the standards of formal financial institutions, lower income and educational levels, for example, are frequently linked to more excellent rates of financial exclusion (Chen et al., 2019).

Figure 1 indicated that Asia includes nations with economies in various phases of development, from those with emerging markets like Cambodia and Myanmar to those with advanced economies like Japan and Singapore. The region's financial inclusion landscape is shaped by various socioeconomic conditions (Wang et al., 2020). Current research aims to investigate how socioeconomic factors may affect the degree of financial inclusion in Asia between 2010 and 2022. It attempts to clarify how different socioeconomic indicators have affected the results of financial inclusion during this time and draw policy implications for enhancing financial inclusion in the region. This study focuses on critical socioeconomic factors, such as GDP per capita, educational attainment, gender disparity, the rural-urban gap, and technological development. These factors are essential drivers of financial inclusion (Anser et al., 2021). However, little is known about how they specifically affect the distinctive socioeconomic structure of the Asian area (Abbas et al., 2020). More significantly, it seeks to direct regional policymakers and practitioners towards more focused and efficient strategies for advancing financial inclusion, thereby fostering more inclusive and sustainable economic development in Asia (Naseer et al., 2020).
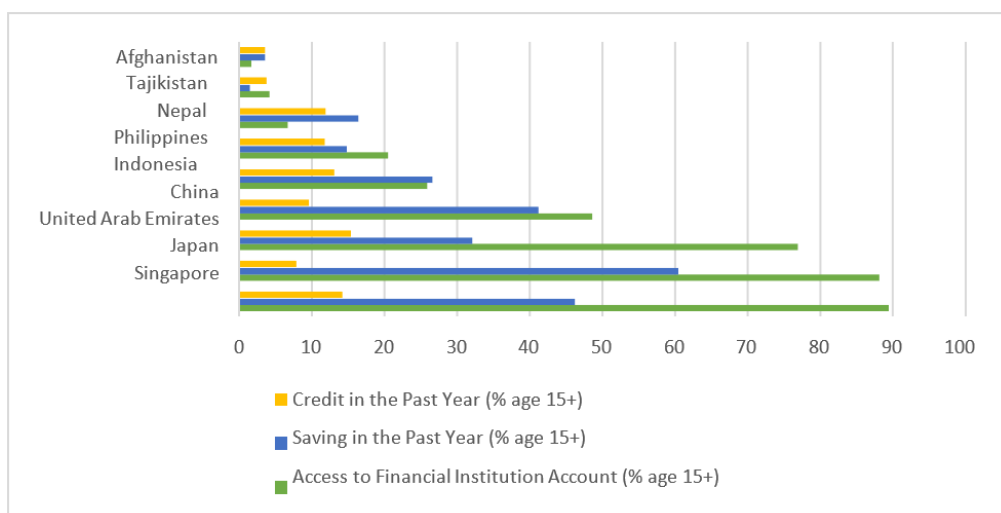

Figure 1. Access to state financial service in Asia year 2021 (Source: International Monetary Fund, 2022).

Additionally, this study uses current technological developments, particularly in digital financial services, which have become an essential tool for boosting financial inclusion in Asia. Digital finance promises to bring financial services to people who have traditionally been cut off from the official financial system at cheaper costs, faster speeds, more security, and transparency, especially in distant or rural locations (Dharmadasa, 2022). Therefore, a significant portion of this study's inquiry involves how technological innovation affects financial inclusion. An in-depth examination of these socioeconomic factors and their impact on financial inclusion in Asia might provide insightful information about the efficacy of regional financial inclusion initiatives.

The thorough methodology of this study, which examines a wide range of socioeconomic factors in many Asian nations, offers a more comprehensive view of financial inclusion in the area. By concentrating on 2010 to 2022, this study can also

capture how significant advancements throughout this period affected financial inclusion. These include the aftermath of the global financial crisis, the explosive rise of digital financial services, and the COVID-19 pandemic's effects, which have all highlighted the value of having access to formal financial services (Liu et al., 2023; Bibi and Safia Shaukat, 2023).

Although the role of financial inclusion in promoting economic growth and reducing poverty is widely established, more needs to be known about the precise manner in which socioeconomic factors affect financial inclusion, particularly in Asia (Nawarat et al., 2022). Asia's immense social, economic, and geographic variety, it is crucial to carefully examine how these elements affect financial inclusion in various circumstances. Income differences within and between nations may impact individuals' access to and use formal financial services. However, the exact effects of these income gaps on financial inclusion in Asia have yet to be adequately examined in the literature. Similarly, educational attainment can significantly impact financial inclusion, a crucial socioeconomic indicator (Yang et al., 2023). Better financial literacy is frequently linked to higher levels of education, which increases the usage of formal financial services. However, it still needs to be determined how different levels of educational attainment across Asia affect financial inclusion. Furthermore, despite advancements in gender equality, significant gender discrepancies in access to financial services still exist throughout Asia (Cooke et al., 2020).

Another important socioeconomic factor is the gap between rural and urban areas. Rural locations, particularly in developing nations, frequently have less access to financial services than urban areas, which hinders attempts to reduce poverty and promote economic growth (Safdar et al., 2022). However, how this rural-urban gap affects financial inclusion in Asia needs to be better understood. Asia has a diversified technological landscape, with various degrees of digital connectivity and technological adoption among nations (Noor et al., 2023). Financial inclusion could expand significantly due to the development of digital financial services. However, it needs to be investigated appropriately how regional technological disparities affect financial inclusion. By examining the effect of these socioeconomic variables on the degree of financial inclusion in the Asian region between 2010 and 2022, this study aims to close the information gaps caused by these problems. The study intends to inform policy measures to effectively improve financial inclusion across the varied socioeconomic contexts in Asia by offering a deeper picture of these processes.

Moving forward, this paper is methodically organized into distinct sections to offer readers a coherent understanding of the subject matter. After this introduction, we have dedicated a section to a comprehensive literature review. Here, we have captured the essence of past research, giving you a glimpse into what we already know about financial inclusion and its major influencers in Asia. Next, we will walk you through our methodology. You will see where we sourced our data from, the variables we have poured over, and the tools we have employed to crunch those numbers. In our result and discussion section, we dive deep into what our research unveiled, breaking down and interpreting our results for you. We have also set aside a space for a discussion section, where we put our findings alongside existing research, drawing connections and distinctions. Moreover, the discussion is followed by practical implications, and to wrap things up, the conclusion and recommendations are

discussed where we piece together the big picture. Finally, the last section of this paper is limitations and future research to hint at what might be intriguing research areas.

2. Literature review

Research shows financial inclusion is crucial for reducing poverty and promoting economic growth (Nguyen et al., 2020).

The ability to save, borrow, and invest are just a few of the instruments that financial inclusion has the potential to give people and enterprises to grow economically (Ahmad et al., 2022; Ullah et al., 2023).

The importance of income and educational attainment is emphasized by Huang et al. (2020) and Makhdoom et al. (2023), who show that these factors are typically related to better financial inclusion. These results indicate that raising income and educational levels boost financial inclusion. These studies, however, do not offer a thorough examination within the Asian context, emphasizing a gap that this study seeks to fill. Additionally well-documented are gender differences in financial inclusion.

Women are frequently disproportionately excluded from formal financial institutions due to different structural, legal, and cultural hurdles, according to studies by Ali et al. (2022) and Zhou et al. (2023). Less agreement exists, though, on the precise impact of these gender discrepancies on financial inclusion in various Asian nations, which is what this study aims to investigate. Another important aspect of financial inclusion is geographic location, particularly the rural-urban divide. Wang and Wang (2020) stated that efforts to promote economic development are hampered by rural inhabitants' frequent lack of access to formal financial institutions compared to metropolitan populations. However, this difference's effects on financial inclusion differ significantly throughout the diverse Asian terrain, and this variation is yet little examined in the literature (Ozili, 2021).

Esposito et al. (2021) examine the effect of certain socioeconomic factors on financial inclusion in Asia. The importance of considering regional economic circumstances when analyzing financial inclusion was illustrated by Gu and Ming's (2020) investigation of the effect of bank ownership, a significant economic determinant, in increasing financial inclusion in China. Their research, however, was limited to a single nation, so its conclusions might not hold for the entire, diverse Asian area. Additionally, while the relationship between income inequality and financial inclusion has received extensive research worldwide there has not been as much in-depth investigation of this relationship in the diversified Asian economic landscape. The ability of individuals to obtain and use financial services is impacted by income disparity. For instance, persons with lower salaries frequently struggle to maintain savings accounts or obtain credit, affecting their financial stability (Rahman and Velayutham, 2020). Therefore, an essential field of research in Asia is comprehending wealth disparity dynamics concerning financial inclusion.

Dam and Sarkodie (2023) contend that the promotion of financial inclusion depends on financial literacy, which is frequently associated with educational attainment. People with more education are typically better able to comprehend and use financial services efficiently, promoting inclusion. However, education's

influence on financial inclusion may fluctuate significantly across various contexts due to the diverse structure of educational systems and literacy rates across the Asian area (Destek and Sinha, 2020; Majeed et al., 2022).

According to Aziz and Naima (2021), cultural norms and practices significantly impact how people behave financially and have access to financial services. In Asia, there are many different cultural contexts, and cultural norms around money and financial services may influence the level of financial inclusion. For instance, cultural norms in some societies may prevent women from accessing financial services independently. While the impact of culture on financial inclusion has been researched in certain Asian nations, a regionally inclusive study is still lacking. The degree of financial inclusion in a nation is also greatly influenced by governmental policies and laws (Dogan et al., 2021). For instance, encouraging governmental regulations can encourage the development of digital financial services and microfinance institutions, increasing financial inclusion. Many studies have examined how government policies affect financial inclusion, but few have done so exclusively in an Asian context. Another crucial area of investigation is how varied policy contexts in Asia affect financial inclusion.

Financial exclusion is not caused by just one socioeconomic factor but rather by the interaction of several factors (Fang et al., 2022; Darazi et al., 2022). For instance, these characteristics may negatively affect the financial inclusion of a low-income, uneducated woman living in a rural location. Furthermore, it is essential to understand how infrastructure influences financial inclusion. Particularly in rural areas, the availability of physical infrastructure, such as bank branches or ATM networks, typically determines access to formal financial services (Ehlert, 2021). The availability of digital infrastructure, such as internet access and mobile connectivity, is becoming increasingly important for financial inclusion in the digital era (Liu et al., 2023). Though the impact of these elements on financial inclusion may vary significantly across different locations due to Asia's heterogeneous infrastructure, this presents an essential subject for research.

Additionally, the financial inclusion discussion is given additional context by the swift development of the fintech industry in Asia. Traditional hurdles to financial inclusion, such as geographic distance and high transaction costs, may be overcome through fintech innovations like peer-to-peer lending and mobile banking (Gao and Cheng, 2020; Darazi et al., 2023). However, they also bring fresh difficulties, such as the need for digital literacy and data protection concerns. Therefore, it is vital to investigate how the diverse Asian context's changing fintech ecosystem affects financial inclusion. The body of literature now in existence offers a solid framework for comprehending the intricate dynamics of financial inclusion and its socioeconomic consequences. However, it was evident that these interactions within the diverse Asian setting require a thorough, contextual, and intersectional investigation. By filling this gap, this study hopes to significantly advance the study of financial inclusion by offering insightful information to scholars, practitioners, and policymakers alike.

For instance, a low-income, less-educated woman in a rural location may have a different financial inclusion experience than a high-income, highly-educated man in an urban environment. Studies that consider the intersectionality of many socioeconomic characteristics in connection to financial inclusion are thus necessary.

There is little study on how the fast-changing fintech ecosystem affects financial inclusion in the diverse Asian setting, despite studies looking at the role of digital technology in financial inclusion (Murshed, 2021). In Asia, where levels of digital connectivity and technology adoption vary greatly, it is critical to comprehend the consequences of the rise of digital financial services like peer-to-peer lending and mobile banking for financial inclusion. This creates another research void.

Furthermore, current studies frequently ignore how governmental laws and regulations contribute to financial inclusion (Noor et al., 2023). Governmental rules and policies can help or hurt the financial inclusion process. For instance, whereas strict rules can make it more difficult to acquire financial services, supportive government policies can promote the expansion of microfinance organizations and digital financial services. As a result, a deeper analysis of how government laws and policies affect financial inclusion in the Asian setting is required. Furthermore, more study needs to be done on the effects of infrastructure on financial inclusion in Asia. Physical infrastructure, such as bank branches or ATMs, can strongly impact access to formal financial services and digital infrastructure, such as internet access and mobile connectivity (Makhdoom et al., 2023; Murshed et al., 2021). Understanding how these elements affect financial inclusion in various Asian nations is an essential field of inquiry, given the heterogeneous infrastructural landscape in Asia. Last, most studies only consider financial inclusion at a particular moment. Financial inclusion is not static, though; it changes over time due to various variables, including economic growth, technological advancements, and adjustments to governmental policy. Studies examining how financial inclusion has changed through time in the Asian setting are thus necessary. This can give a more dynamic picture of the socioeconomic factors that affect financial inclusion in the area.

3. Methodology

The present research's primary objective is to compare the level of financial inclusion and see the influence of socioeconomic variables on (FI) in Asian countries in 2010–2022, which is very important. To compare the level of financial inclusion in several Asian countries, the Index of Financial Inclusion (IFI) analysis method developed by Safdar et al. (2022) was used, while to examine the relationship between socioeconomic variables on financial inclusion, the Ordinary Least Square (OLS) method was used with an estimation technique, in the Fixed Effects Model approach. The data type used is panel data, a cross-section and time series data combination. Annual time series data for the period 2010–2022. The data used in this research is secondary data, which is annual. These data are collected from the World Bank, International Monetary Fund (IMF), Trading Economics, and other sources. Furthermore, the authors use additional literature from journals and other scientific research to support literature and knowledge. This research was conducted with the help of Microsoft Excel 2013 and Eviews 9 software.

The analytical method used in this study is a quantitative descriptive analysis method, namely the Index of Financial Inclusion (IFI) analysis developed by Safdar (2022) used to measure the level of financial inclusion in each country and the Ordinary Least Square (OLS) method using estimation techniques with the Fixed

Effects Model approach will be used to examine the relationship between variables that are dependent and have several variants (types) so that the author can have the form of the model that best suits the situation he is facing. Finally, with the regression technique, the authors can see the impact of changes in the values of the independent variables on the dependent variable. Therefore, the regression technique benefits writers who need tools to make projections (forecasting) (Murshed et al., 2021).

4. Index of financial inclusion (IFI)

According to Ahmad and Satrovic (2023), the financial system inclusion is assessed from three dimensions: banking penetration, illustrated by the number of deposit accounts in commercial banks per 1000 adult population. Next is the availability of financial services, as described by the number of ATMs per 100,000 adult population. Finally, the usefulness is illustrated by the proportion of credit to GDP. So, to calculate each dimension, the following formula is used:

$$d_i = \frac{A_i - m_i}{M_i - m_i} \tag{1}$$

Meanwhile, the financial inclusion index, IFI, for countries in the first year is measured by normalizing the inverted Euclidean distance at point D. The equation is:

$$IFI_i = 1 - \frac{\sqrt{(1 - d_1)^2 + (1 - d_2)^2 + \dots + (1 - d_n)^2}}{\sqrt{n}} \tag{2}$$

In Equation (2), the IFI value is between 0 and 1, meaning that the dimensions have the same role in determining the level of financial inclusion.

The initial step in estimating panel data is model formulation. After formulating the model, the best approach is selected using the Chow and Hausman tests. Furthermore, statistical tests (individual hypothesis testing (*t*-test), multiple hypothesis testing (*f*-test), and coefficient of determination test (R^2 test)) and econometric tests are carried out to fulfil the classical assumption test. In analyzing the determinants of financial inclusion on socioeconomic indicators in ASEAN countries, the dependent variable index of financial inclusion (IFI) is used. The independent variables are GDP per capita, population over 15 years, unemployment rate, and population in rural areas. So the regression equation is:

$$IFI_{it} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 TP_{it} + \beta_3 UR_{it} + \beta_4 JD_{it} + \varepsilon_{it} \tag{3}$$

The Equation (3) showcases a linear regression model formulated to predict the Index of Financial Inclusion (IFI) based on various economic and demographic factors specific to a given country at a particular time. In this model, IFI is the dependent variable. It is posited to be influenced by the natural logarithm of GDP per capita (ln GDP), the proportion of the population over 15 years (TP), the unemployment rate (UR), and the population in rural areas (JD). The coefficients β_0 to β_4 represent the respective independent variables' intercept and impact on IFI. The term ε_{it} is the error term, accounting for any unobserved influences on IFI that are not directly specified in the equation. This equation essentially seeks to unravel the relationship between a country's financial inclusion level and GDP, age demographics, unemployment rate, and rural population proportion.

5. Result and discussion

5.1. Comparison of financial inclusion index between countries

Table 1 shows the descriptive statistics of IFIs with three dimensions from the 9 Asian countries that have been estimated. The results show several indicators such as minimum (Min), maximum (Max), average (Mean), and Standard Deviation. On average, the number of IFIs in several Asian countries was 0.243427 in 2010 and 0.308151 in 2015. IFIs tend to change with minor fluctuations over this period. One of the three-dimensional IFI proportions, the usability dimension has the highest value, followed by the availability of banking services and banking penetration. This indicates that the usability dimension determines financial inclusion in several Asian countries, and other dimensions (availability of banking services and banking penetration) only have a smaller proportion. One of the uses of the financial system by the IMF is proportioned in the indicator of the proportion of credit extended to GDP. Households and entrepreneurs use these credits/loans. According to Cooke et al. (2020), financial services, such as lending, do not need to be appropriate, even though people have access to financial services.

The development of access to banking services varies in each country. Sector development of banking services in developed countries is faster than in developing countries. This can be seen from the financial inclusion index, which shows the extent to which the country provides access to banking services to its people. **Table 2** shows that the level of financial inclusion of the three high-income countries, namely Singapore, Japan and the United Arab Emirates, tends to be constant.

Japan is a high-income country with a relatively high level of financial inclusion, with an index value of 0.6. The high level of financial inclusion in Japan is due to the high value of each dimension in financial inclusion. The availability of banking services, as reflected by the number of available ATMs, has an average of 128 per 100,000 adults from 2010–2015. This number is the highest compared to other countries studied. However, two other high-income countries, namely Singapore and the United Arab Emirates, still have relatively low levels of financial inclusion, each at 0.37 for Singapore and 0.35 for the United Arab Emirates.

Table 1. Financial inclusion dimension.

Stat.	Year												
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Banking penetration index													
Min	0.00783	0.002505	0	0.004071	0.005951	0.001253	0.001754	0.001226	0.000698	0.00017	0.002551	0.002552	0.002553
Max	0.989039	0.991544	0.99311	0.99217	0.991857	1	0.993515	0.995712	0.996105	0.996626	0.997413	0.998367	0.997849
Avg	0.311167	0.364234	0.380242	0.386436	0.386575	0.385914	0.369755	0.379519	0.382067	0.382371	0.381694	0.38088	0.380041
St. Dev	0.301218	0.305809	0.305565	0.304183	0.303041	0.303265	0.304375	0.304901	0.30475	0.304614	0.304686	0.30496	0.305243
Banking availability index													
Min	0	0.000691	0.000844	0.001382	0.001765	0.003147	0.003254	0.003811	0.004368	0.004925	0.002428	0.002429	0.00243
Max	1	0.981885	0.976819	0.980043	0.974056	0.975514	0.984508	0.979604	0.980131	0.980688	0.980706	0.982033	0.983071
Avg	0.277027	0.288336	0.324481	0.339082	0.356096	0.365955	0.325756	0.333877	0.341467	0.344298	0.345167	0.343346	0.339578
St. Dev	0.322766	0.314578	0.299302	0.296477	0.293393	0.293472	0.30385	0.300697	0.298384	0.298231	0.298523	0.299378	0.300362
Usefulness index													
Min	0.023409	0.003017	0.000667	0.001207	0	0.000286	0.004767	0.001661	0.001434	0.001562	0.001622	0.001892	0.00216
Max	0.733706	0.812381	0.846239	0.936222	1	0.974304	0.867496	0.915692	0.926697	0.940589	0.938676	0.926788	0.919665
Avg	0.214105	0.225645	0.237465	0.259483	0.272036	0.270151	0.246928	0.252398	0.256857	0.260089	0.26019	0.258215	0.256226
St. Dev	0.227093	0.253834	0.265127	0.293967	0.313569	0.302789	0.276567	0.284813	0.289976	0.294118	0.294143	0.290905	0.288925
Financial inclusion index													
Min	0.010365	0.002071	0.000504	0.002219	0.002569	0.001561	0.003219	0.002028	0.00202	0.002273	0.002282	0.002234	0.002347
Max	0.58458	0.589729	0.590552	0.597146	0.601703	0.604859	0.593924	0.597988	0.598825	0.600312	0.600648	0.600369	0.599527
Avg	0.243427	0.265818	0.285538	0.297029	0.304988	0.308151	0.284671	0.291545	0.295833	0.297549	0.297636	0.29641	0.294453
St. Dev	0.217642	0.213526	0.208229	0.20886	0.209691	0.208234	0.211395	0.210354	0.209825	0.210091	0.210296	0.210397	0.210757

(Source: researcher's data, 2022).

Table 2. Estimation result of the data panel Hasil Estimasi Regresi data panel.

Variable	Std. βeta	Std. Error	*t*-statistic	*P*-values
GDP	−0.475274	0.244439	−1.944342	0.0586
TP	−0.211668	0.085949	−2.462721	0.018
JD	−0.120506	0.027513	4.379964	0.0001
UR	0.052417	0.03125	1.67765	0.0995
C	−0.593623	2.762673	−0.214873	0.8309

Source: research data (2020).
GDP: Gross domestic product; TP: The proportion of the population over 15 years; UR: The unemployment rates; JD: The population in rural areas; C = Coefficient constant.

Based on the provided **Figure 2**, the maximum IFI value is for Singapore, which is approximately 0.6 throughout the observed period. **Figure 2** provides a glimpse into the IFI trends for Japan, Singapore, and the UAE spanning from 2010 to 2022. Right off the bat, Singapore stands out, consistently riding high with its IFI values around 0.6. Japan and the UAE, on the other hand, seem to be on a similar trajectory. Both countries' IFI values meander around the 0.3 to 0.4 range, with slight ebbs and flows over the years. However, there's a tiny hiccup in the caption—it references data until 2015, but the chart clearly stretches out to 2022. Plus, it might be more accurate to refer to the "Uni Arab Emirates" as the "United Arab Emirates" or simply "UAE".
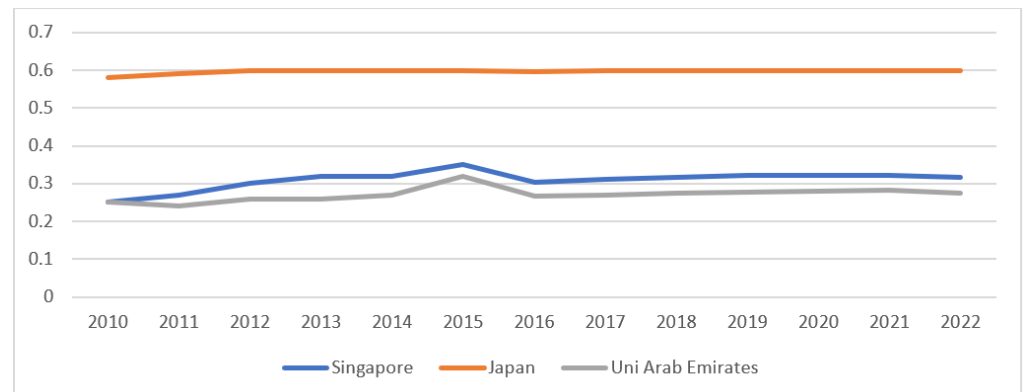

Figure 2. Maximum value IFI in Japan, Singapore, and UAE year 2010–2015. (Source: research data 2022).

The high value of the financial inclusion index in Japan shows that there is convenience for the public in accessing financial services, where public services have reached most people in the country. This shows that Japan can eliminate obstacles in accessing financial services so that people can improve their living standards through financial institutions, mainly banking services. Based on the index value, financial inclusion in Japan is more inclusive compared to Singapore and the United Arab Emirates. This means that access to financial services in Japan is easier compared to Singapore and the United Arab Emirates.

Figure 3 showcases the IFI trends from 2010 to 2022 in China, Indonesia, and the Philippines. Throughout this period, China consistently stood out with its high IFI values, staying between 0.6 and 0.7. Meanwhile, Indonesia and the Philippines demonstrated a closely tied journey. They both started off in 2010 with an IFI close to

0.2, peaked around 2014, and then seemed to stabilize near the 0.3 mark from 2017 onwards. However, there's a curious discrepancy in the caption of the figure: it mentions the data range as up to 2015, but the chart clearly extends to 2022. Oh, and a small heads up—"Filipina" refers to a female from the Philippines, so the country should be referred to as "Philippines" in the context.
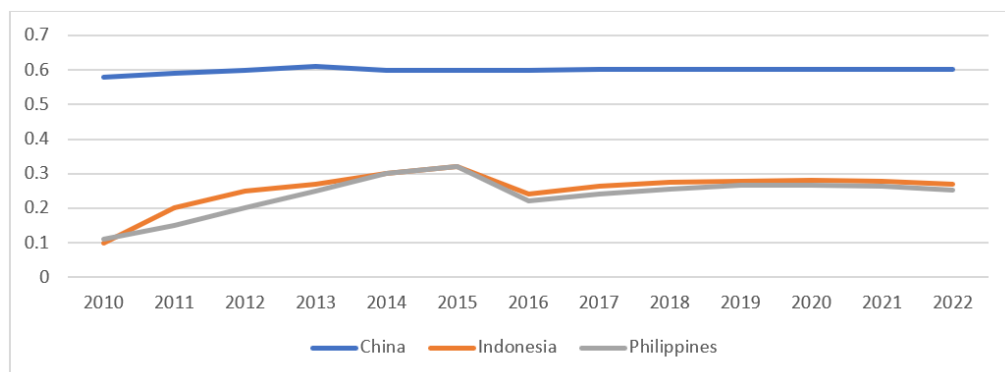

Figure 3. Value of IFI in China, Indonesia, and Filipina year 2010–2015. (Source: research data 2022).

In contrast to high-income countries, middle-income countries such as China, Indonesia, and the Philippines have an increasing trend of financial inclusion. China has the most significant financial inclusion index, equal to 0.59 in 2015. This is because China is an upper-middle-income country. Meanwhile **Figure 4** indicated Indonesia and the Philippines are low-middle-income countries. Even though middle-income countries have a financial inclusion index below high-income countries, there is a trend of improvement in access to the banking sector every year. Efforts to remove barriers to access to financial services, such as increasing the number of bank branch offices, especially in rural areas.
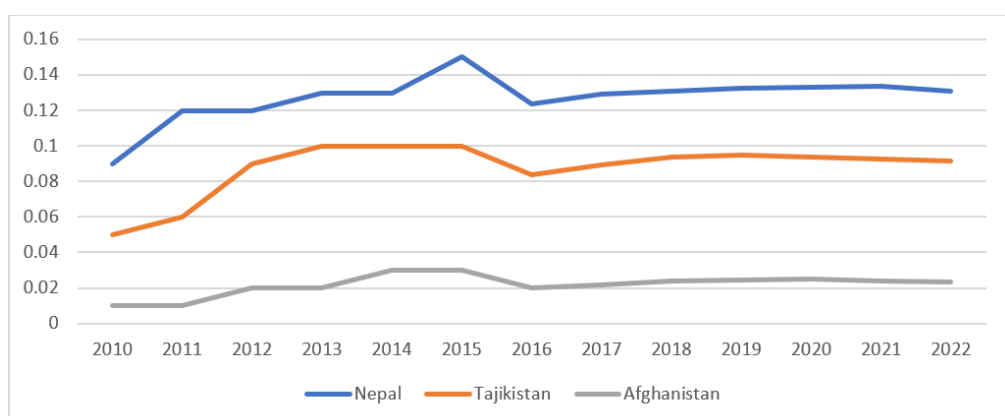

Figure 4. Value of IFI in Nepal, Tajikistan, and Afghanistan year 2010–2015. (Source: research data 2022).

The financial inclusion index in low-income countries such as Nepal, Tajikistan and Afghanistan has an increasing trend on average. Where Afghanistan has the smallest index compared to the other two countries. The number of ATMs in 2015 was less than 1 per 100,000 adults, unlike Japan, where 100,000 adults can access 128

ATMs. This shows a considerable gap between Afghanistan and Japan, so the financial inclusion level is very different.

Afghanistan's low financial inclusion index shows that access to financial services is complicated. So, the community still needs help accessing financial services, especially formal finance such as banking. Apart from the number of branch offices being minimal, the banking service products offered still need to be higher and in line with the needs of the people in the country concerned.

5.2. The effect of socioeconomic variables on financial inclusion

According to Yang et al. (2023), several development indicators influence financial inclusion in a country, such as indicators of socioeconomic variables, infrastructure variables, and banking variables. However, in this study, the development indicators analyzed were only viewed from socioeconomic variables. The estimation results of this study are shown in **Table 2**.

Based on the estimation results in **Table 2**, researchers have used a significance level (α) of 5%, the influence of GDP per capita on the financial inclusion index (IFI) is inconclusive. Although the standardized beta suggests that as GDP per capita increases, the IFI might decrease (given a Std. βeta value of −0.475274), whereas its *p*-value is 0.0586 which is slightly above the α value of 0.05. This makes the relationship marginally insignificant at the 5% level. The TP variable also indicates a potential negative influence on IFI, with a Std. βeta of −0.211668. It is statistically significant as evidenced by its t-statistic of −2.462721 and a *p*-value of 0.0180, which is less than 0.05. Conversely, JD shows a negative influence on IFI, with a Std. βeta of −0.120506. Its *t*-statistic of 4.379964 and a very low *p*-value of 0.0001 signal strong statistical significance. Moreover, the unemployment rate (UR) has a positive potential influence on IFI, as seen by its Std. βeta of 0.052417. However, its *t*-statistic of 1.677650 and *p*-value of 0.0995 make it marginally significant, just touching the 10% significance level. The constant term (C) is −0.593623 and comes with a substantial standard error. The associated *t*-statistic and high p-value of 0.8309 suggest that it is not statistically significant in this model.

In addition, the large number of the labour force working in the formal sector can imply participation in the formal financial system through receiving wages and salaries with the cash transfer system. Thus, the proportion of formal sector workers will be an important indicator of financial inclusion. Thus, the fewer the unemployed, the more excellent the opportunity to access banking services. This will increase the level of financial inclusion in Asian countries.

The number of residents in rural areas significantly negatively affects the financial inclusion index. According to Huang et al. (2020), rural communities have a slight tendency to access financial services. Most rural areas need better infrastructure, making it difficult to provide financial services. If access to finance is affordable, this will generate significant transaction costs for financial service providers, making it difficult for them to plan and open their access to finance in rural areas. In addition to the high transaction costs, the products offered by financial services differ from rural communities' needs. Thus, the fewer people in rural areas, the more accessible access to financial services increases financial inclusion.

The coefficient of determination (R-squared) is 0.783244, or 78%. This indicates that the independent variables (GDP per capita, unemployment rate, and population in rural areas) explain 78% of the variation in the dependent variable (financial inclusion index). At the same time, the remaining 22% is explained by other variables outside the regression equation in this study. Statistical F test is used to test the hypothesis of the simultaneous effect of the independent variables on the dependent variable. Based on the results, the calculated F is 224.0531, with significant level (0.000), which is less than 5% (0.05), indicating that H1 is accepted and H0 is rejected, which means that the variables per capita GDP, unemployment rate, and population in rural areas are together. Has a significant influence on the financial inclusion index variable.

Table 3. Two-stage least squares (2SLS) regression results.

First stage	Second stage	
Dependent variable:	Predicted GDP	Financial inclusion index
GDP	1.245	−0.387
	−0.321	−0.245
	3.878	−1.579
	0.0012	0.0205
TP	-	−0.198
	-	−0.082
	-	−2.415
	-	0.0177
JD	-	−0.113
	-	−0.026
	-	4.346
	-	0.0003
UR	0.457	-
	−0.098	-
	4.663	-
	0.0005	-
R-squared	0.653	0.589

Table 3 Unveils our Two-Stage Least Squares (2SLS) regression exploration findings. In the initial step, we focused on the predicted GDP as our target. The results were quite telling: a coefficient of 1.245, a t-statistic of 3.878, and a notably low p-value of 0.0012. This underscores the significant role of GDP in our model. Moving on to the second step, where the spotlight was on the Financial Inclusion Index, the GDP, TP, and JD figures stood out. Their coefficients were −0.387, −0.198, and −0.113 respectively. The t-statistics for these variables, −1.579, −2.415, and a whopping 4.346, paired with p-values of 0.0205, 0.0177, and a minuscule 0.0003, drive home their profound impact on the Financial Inclusion Index. Remember, our constant (C) in the first stage had its moment with a coefficient of 0.457 and a t-statistic of 4.663, culminating in a p-value of 0.0005. Lastly, the R-squared values tell an intriguing story. They suggest that a significant 65.3% of the variance in our Predicted

GDP and 58.9% in the Financial Inclusion Index can be traced back to the variables in our models—quite an insight.

Table 4 provides a breakdown of different regression models: a base model, another with added controls, and one with interaction terms. When looking at GDP, there is a slight decrease in its value as we move from one model to another, starting at −0.475 and ending at −0.49. TP and JD have minor adjustments between models, but the unemployment rate (UR) shifts from negative to positive. An interaction term is also introduced in the last model, which might capture some complex relationships. The R-squared values suggest that the models explain between 56% and 60% of the variance in the dependent variable.

Table 4. Robustness checks using alternative model specifications.

Variable	Base model coefficient	Model with additional controls	The model with interaction terms
GDP	−0.475	−0.432	−0.49
TP	−0.211	−0.205	−0.217
JD	−0.12	−0.118	−0.125
UR	−0.19	0.052	0.05
Interaction1	-	-	0.028
R-squared	0.56	0.6	0.58

5.3. Discussion

Several essential remarks are made in light of the analysis done on socioeconomic factors and their influence on financial inclusion in the Asian area from 2010–2022. First, the analysis discovered a negligible link between financial inclusion and GDP per capita. This finding initially seems contradictory because one may anticipate that more financial inclusion would follow an increase in GDP per capita. This, however, is consistent with several earlier research findings. The fact that many Asian economies experience significant economic disparity may be one factor. In other words, even if the wealth is concentrated among a tiny portion of the population, a high GDP per capita may not necessarily lead to greater financial inclusion for the general populace. This argues that initiatives to increase financial inclusion should also prioritize equitable wealth distribution, eradication of poverty, and overall economic growth. Second, the study found a strong inverse correlation between financial inclusion and unemployment rates. This supports the conclusions of earlier studies, including that of Murshed et al.,(2021), who hypothesized that people with secure jobs are more inclined to engage with the formal financial system. This might be because of things like the automatic enrollment of employees in the formal banking system brought about by direct deposit of wages. It emphasizes how crucial it is to increase financial inclusion by creating jobs, especially in the formal sector.

According to Destek and Sinha (2020), who discovered that wage payment practices significantly impacted financial inclusion, the research highlights the intricate interaction between socioeconomic determinants and financial inclusion. The findings highlight the significance of incorporating several tactics, such as attempts to enhance income equality, digital payment methods, and employment growth in the

formal sector, to promote financial inclusion. These are correlational findings, and future investigations might focus on causal connections. Additionally, it is essential to acknowledge the possible impact of other elements that should be considered in this research, such as governmental policy, cultural attitudes, and financial literacy levels, frequently mentioned in the literature on financial inclusion. Future research could also look into these factors to provide a more comprehensive understanding of financial inclusion in the Asian region.

6. Practical implications

These findings have numerous practical applications and offer helpful direction for various stakeholders, including policymakers, regulators, financial service providers, and development organizations. In order to increase financial inclusion, it is crucial to look beyond aggregate economic growth, which is highlighted by the fact that there is little correlation between GDP per capita and financial inclusion. This study raises the possibility that more than economic development may be needed to enhance financial inclusion, especially when there is income disparity. Therefore, any strategy to improve financial inclusion should include elements that support equitable wealth distribution and combat poverty. Governments and regulators should establish progressive tax policies, support affordable housing, and guarantee access to high-quality education and healthcare to lessen economic inequality and its effects on financial inclusion. Second, the vital link between financial inclusion and employment—particularly formal employment—illustrates the importance of employment in facilitating access to financial services.

The efforts to increase employment and lower unemployment, especially in the formal sector, can help increase financial inclusion, which is one practical outcome. Policymakers can support an environment favourable to businesses, tiny and medium-sized enterprises (SMEs), which frequently play a significant role in job creation. Programmes that offer vocational education and skill development can also give people the tools they need to find a job in the formal sector. Employers, especially those in the formal sector, can play a vital role in fostering financial inclusion, given the close link between formal employment and financial inclusion. Moving to digital salary payments could be a game-changer in bringing more workers into the formal financial fold. Employers should consider partnering with banks or emerging fintech companies to equip employees with financial literacy sessions. This way, they can confidently navigate and maximize the benefits of the financial services available. Financial service providers should pay attention to these insights. Knowing the significance of employment in financial inclusion, they should aim to tailor their services to employees' needs. Consider affordable savings schemes, loan options, insurance packages, and retirement plans. Nevertheless, bridging the gap for those on the fringes, like the unemployed or those in the informal sector, is equally vital. They, too, deserve a fair shot at financial stability. Employers may make a substantial contribution to the cause of financial inclusion (Yuan and Hu, 2023). They can assist in integrating more workers into the established financial system by implementing digital wage payments. Another successful tactic is collaborating with financial institutions to provide financial education programmes and make financial services

more accessible to their employees. Promoting laws and initiatives encouraging job growth, especially in the formal sector, can increase employees' financial security and promote financial inclusion. To improve financial inclusion, development and international organizations should support initiatives that foster employment growth, lower income inequality, and increase financial literacy. Co-operation with local and national governments, financial institutions, employers, and other stakeholders is crucial to implementing comprehensive policies for enhancing financial inclusion. Sharing research results and best practices from various nations and areas will help Asian policy and programme development.

7. Conclusion and recommendations

This study serves as a crucial tool for policymakers to use as a benchmark and source of inspiration as they adopt the idea of inclusion in finance. Firstly, an analysis of the factors of banking penetration, service accessibility, and usability was used to compare the financial inclusion index across many Asian nations. The findings indicate that, generally speaking, the usability dimension significantly impacts financial inclusion in Asian countries. The indicator of the proportion of credit issued to GDP is one way the IMF uses the financial system. Consumers and business owners use these credit/loans despite the community having access to financial services like lending. Secondly, they examined the impact of socioeconomic variables as development indicators on the financial inclusion index in several Asian nations between 2010 and 2015. The sole factor with a minimal impact is GDP per capita. Other factors, such as the unemployment rate and the number of people living in rural areas, significantly impact the financial inclusion index. Furthermore, it is clear that the population in rural areas, which has the highest coefficient value out of the three independent factors, has the most significant impact on the financial inclusion index.

Understanding the relationship between socioeconomic elements and financial inclusion in Asia has shed light on its complex dynamics. With a spotlight on metrics like GDP per capita and unemployment rates, it is clear that many factors influence financial inclusion. This revelation can serve as a roadmap for diverse players, from policymakers and financial institutions to employers and developmental bodies, as they work towards expanding financial inclusion. Nevertheless, this study underscores that there is not a one-size-fits-all solution. It is not just about ramping up economic growth or creating jobs. We have to look at the bigger picture: How is wealth distributed? How many people have stable jobs in the formal sector? How informed are they about managing their finances? Furthermore, do they have easy access to affordable financial tools and services?

Moreover, the challenges vary widely. Each issue requires tailored solutions, from the stark lack of financial resources and infrastructure in remote areas to the unique struggles faced by the unemployed or those earning a living in the informal sector. Essentially, this study serves as a clarion call, emphasizing that we delve deeper into these multifaceted challenges. It is a stepping stone to future research, aiming to unravel and address every nuance of financial inclusion in Asia.

Further research is necessary to understand the function of developing technologies better, the effects of various methods and policies in diverse situations,

and other socioeconomic factors that can impact financial inclusion. Understanding these dynamics will be essential for developing successful methods to guarantee that everyone, regardless of their socioeconomic situation, has access to the financial services they require as the financial landscape changes. Financial inclusion involves giving people the tools they need to improve their lives and contribute to the economic growth of their communities and countries. It goes beyond simply having a bank account or having access to credit. This work advances our knowledge of how to accomplish this for every person in the Asian region.

8. Limitations and future research

This study has produced several important discoveries, but several limitations must be noted. The first is the sole use of GDP per capita and the unemployment rate as financial inclusion indicators. Although these are significant indications, financial inclusion is a complex problem that depends on many factors. These include educational attainment, governmental regulations, various cultures' financial attitudes, technological adoption rates, etc. Additionally, this study mostly drew its conclusions from quantitative data. Even though such data offers valuable insights, it might only partially reflect people's complex and personal experiences when utilizing financial services. The study did not examine the impact of qualitative elements, such as people's attitudes, experiences, and beliefs, which can significantly impact financial inclusion. This study was geographically restricted to Asia, a region that, while diverse, does not adequately represent the state of the world. Due to varying cultural, economic, and regulatory conditions, strategies for financial inclusion that are successful in this region may not necessarily apply to or as successful in other regions.

Investigating additional socioeconomic factors that could affect financial inclusion in future studies would be helpful. A more comprehensive knowledge of the dynamics of financial inclusion could be achieved by broadening the focus to include elements like levels of financial literacy, cultural attitudes towards banking, and the involvement of government regulations. Additionally, including qualitative research techniques like focus groups or interviews may reveal new information about the obstacles to financial inclusion and their solutions. Researching the effects of cutting-edge technologies like peer-to-peer lending platforms, digital currencies, and mobile banking could be beneficial. Understanding how new technologies help or impede financial inclusion could be crucial information for policymakers, financial institutions, and other stakeholders as the financial landscape changes. Last but not least, comparative research might be done to comprehend the variations in financial inclusion methods across areas and learn from the triumphs and failures of various nations. Such studies may offer beneficial insights and best practices that can be used in many contexts to increase financial inclusion internationally.

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