Building a financial inclusion index and analyzing its impact on unemployment

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Abstract
Financial inclusion has garnered attention from policymakers globally due to its potential to spur economic growth, alleviate poverty, and decrease unemployment. This study focuses on estimating the financial inclusion index across ten Southeast Asian countries utilizing principal component analysis. The objective is to identify the most representative index capable of accurately reflecting the financial inclusion indicators specific to each country. Additionally, the research seeks to explore the impact of financial inclusion on the unemployment rate. Data spanning from 2011 to 2021 were sourced from the World Bank. By employing panel regression estimation, the study reveals that digital financial inclusion does not significantly influence the unemployment rate, as indicated by a significance value of 0.118. Furthermore, a similar lack of impact was observed concerning GDP. Conversely, the inflation rate and education level variables affected the unemployment rate significantly, with significance values of 0.028 and 0.021, respectively. These empirical results suggest that policymakers should implement strategies to enhance financial inclusion, such as reducing the costs associated with financial services, offering incentives to the informal sector, and promoting education on the significance of financial instruments and institutions.

Keywords: Financial inclusion, Principle component analysis, Unemployment

JEL Classification: G20, J64, O15

INTRODUCTION

Financial inclusion has garnered significant attention following the advent of the theory of endogenous growth, as highlighted by Le et al. (2019). Moreover, it is deemed a critical element for attaining sustainable development. It has been acknowledged as one of the nine principal pillars of the global development agenda by the Global Partnership for Financial Inclusion (GPFI, 2012). This recognition stems from the economic opportunities that facilitate easier access to financial services, enabling individuals to save more efficiently and allowing banks to augment their revenue while reducing costs (Vo et al., 2021).

One of the primary objectives of the research is to develop a financial inclusion index for ten Southeast Asian countries: Indonesia, Singapore, Brunei, Malaysia, Thailand, the Philippines, Laos, Cambodia, Myanmar, and Vietnam. This initiative is driven by the absence of a clear consensus regarding the definition of financial inclusion and the appropriate indicators to represent it (GPFI, 2012), as echoed by the studies of Mialou et al. (2014), Gopalan & Kikuchi (2016) and Ouma et al. (2017). The World Bank (2008) defines financial inclusion as the ease with which individuals, companies, and other entities can access affordable financial services. This definition underscores that financial inclusion extends beyond merely holding an account; it encompasses using banking services such as credit, payments, pensions, and insurance and the economic benefits that accrue when individuals are afforded convenience and assured access at minimal costs (World Bank, 2008).

Previous literature has employed the term "dimension" to encapsulate the facets of the financial inclusion index, specifically financial access, usage, and quality, as delineated by the World Bank (2008). Financial access, denoted by account ownership, is viewed as the initial step towards broadening financial inclusion. It facilitates access for disadvantaged, low-income, and vulnerable groups, serving as a conduit to many financial services (Agyekum et al., 2016). Financial usage pertains to the employment of financial products by individuals within financial institutions, with high usage characterized by a significant number of people utilizing these products and services. Furthermore, the quality of these services and products is paramount to ensuring the continuous protection of customers and the sustainability of financial service providers.

A fourth dimension, welfare or well-being, has been increasingly recognized. Researchers, including Peter Gomber (2017), now argue that financial inclusion involves leveraging information technology and big data to deliver financial services to lower-middle-income groups and providing efficient financial support to companies, individuals, and governments. Such facilitation enhances access, usage, quality, and welfare associated with financial institutions.

This study employs five indicators to represent financial inclusion: the number of Automated Teller Machines (ATMs) per 100,000 adults, borrowers from commercial banks per 1,000 adults, branches of commercial banks per 100,000 adults, depositors in commercial banks per 1,000 adults, and the depth of credit information index (ranging from 0, indicating low, to 8, indicating high). These indicators are believed to represent the dimensions of financial inclusion effectively (World Bank, 2008).

Financial inclusion has drawn considerable interest due to its potential impact on poverty alleviation, income inequality, unemployment, and economic growth (Kim et al., 2018). Previous research indicates that a well-functioning financial sector plays a crucial role in a country's economic growth through financial intermediation—transferring and allocating funds (Levine, 2005; Allen et al., 2016; Demirgüç-Kunt et al., 2013; Honohan, 2008; Claessens & Feijen, 2006; Pica, 2012). This process can create jobs, particularly in sectors that adopt labour-intensive production techniques (Boustanifar, 2014). Additionally, many studies have linked financial inclusion with poverty reduction (Leyshon & Thrift, 1996), further underscoring its significance in economic development and social welfare.

However, as far as existing research reveals, the relationship between unemployment and financial inclusion has not been extensively examined. Okun's Law, proposed in 1962, posits a negative correlation between economic growth and unemployment rates, suggesting that higher economic growth—which elevated levels of financial inclusion could indicate—leads to greater absorption of employment.

Therefore, it can be inferred that there is a significant linkage between financial inclusion and unemployment (Benmelech et al., 2019; Williams et al., 2023; Rault et al., 2012; Çiftçioğlu & Bein, 2017; Geng & He, 2021).

Increasing financial inclusion is a catalyst for economic growth and job creation. The ease of access to credit plays a pivotal role in enabling individuals to venture into entrepreneurship, potentially reducing unemployment rates (Kinda et al., 2016; Benmelech et al., 2019). Mehry et al. (2021) leveraged Principal Component Analysis to investigate the impact of financial inclusion on unemployment rates in 35 developing countries, finding that financial inclusion contributes to lowering unemployment in these regions. Similarly, Geng & He (2021) conducted research using panel data from 40 countries from 2010 to 2018, supporting the notion that financial inclusion helps reduce unemployment.

However, the relationship between financial inclusion and employment is complex. Kim et al. (2019) highlighted that financial development and the concentration in banking markets, while indicative of a more developed financial sector, may paradoxically lead to increases in unemployment. This suggests that the dynamics of financial inclusion and its impact on the labour market can be intricate, potentially varying according to the specific conditions and structures of different economies.

Additionally, Bayar (2016) presented a noteworthy finding, indicating that access to capital markets—considered a fundamental aspect of financial inclusion—significantly affects employment. This observation underscores the importance of financial inclusion in terms of access to traditional banking services and broader financial markets.

The implications and consequences of financial inclusion have been extensively debated and scrutinized in academic research, with varying perspectives on its benefits and drawbacks. Demirgüç-Kunt et al. (2013) posited that the advantages of financial inclusion are predominantly observed in developed nations, as many developing countries lack adequate access to financial services. Furthermore, Pyka & Andersen (2012) contended that financial inclusion may not be necessary, arguing that its effects do not significantly contribute to economic growth or reduction in unemployment rates.

Since the 1990s, financial inclusion discourse has largely centred on its impact on economic growth. This study, however, aims to broaden the scope of the investigation. The authors are motivated by constructing a financial inclusion index for each country in the ASEAN region, a task prompted by the absence of official definitions and indicators about financial inclusion, as Peter Gomber (2017) noted. Additionally, this research seeks to explore the relationship between financial inclusion and unemployment, thereby contributing to a more nuanced understanding of the socio-economic implications of financial inclusion.

METHODS

This research adopts a quantitative approach, utilizing annual data from the World Bank from 2011-2021 across ASEAN countries. It employs a balanced panel that includes annual data on five components of financial inclusion indicators, the unemployment rate, and a set of control variables comprising GDP, inflation rate, and educational level for 10 ASEAN countries. In this context, the unemployment rate is the dependent variable, defined as the percentage of the jobless labour force and actively seeking employment.

The study incorporates control variables such as economic growth, educational level, and inflation rate to analyze comprehensively. Economic growth is measured by

the total goods and services produced in a country in constant values, the consumer price index gauges the inflation rate, and educational level is assessed through Primary School Enrollment rates. Financial inclusion is the independent variable of interest, a concept without a universally accepted definition or set of indicators, as highlighted by the Global Partnership for Financial Inclusion (GPFI, 2012). The study uses five access, quality, and usage indicators to operationalize financial inclusion. These indicators include Automated Teller Machines (ATM) per 100,000 adults, borrowers from commercial banks per 1,000 adults, commercial bank branches per 100,000 adults, depositors at commercial banks per 1,000 adults, and the Depth of Credit Information Index (ranging from 0 = low to 8 = high).

Each of these indicators sheds light on different aspects of financial inclusion: ATMs provide a measure of access to financial transactions in public spaces, borrowers from commercial banks quantify the number of individuals obtaining loans, commercial bank branches reflect the availability of financial services at physical locations, depositors at commercial banks account for the number of deposit account holders, and the Depth of Credit Information Index indicates the extent of available credit information, with higher values signifying greater availability. This comprehensive set of indicators aims to capture the multifaceted nature of financial inclusion and its potential impact on unemployment within the ASEAN region.

The objectives of this research are twofold. Firstly, it aims to construct indicators of financial inclusion. Secondly, it seeks to analyze the impact of financial inclusion on employment. To address the initial goal, the study employs Principal Component Analysis (PCA), following the methodology outlined by Cámara and Tuesta (2017), to identify the most representative dimension of the financial inclusion index. This approach is necessitated by the multifaceted nature of financial inclusion, which encompasses access, usage, and quality. These dimensions may yield divergent results across countries due to varying performance levels in each dimension, highlighting the heterogeneity among countries.

Principal Component Analysis is a statistical method renowned for revealing underlying patterns, diminishing dimensionality, and elucidating structures within a dataset (Gujarati, 2009). Researchers widely utilize it to condense large datasets into more manageable forms without significantly sacrificing the richness of the original information (Gujarati, 2004; Olawale & Garwe, 2010). In this analysis, the PCA equation, as adopted from Cámara and Tuesta (2017), is expressed as follows:

$$FII_i = w_1 D_i^a + w_2 D_i^b + w_3 D_i^c + w_4 D_i^d + w_5 D_i^e + \in_1 \dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where *FII* denotes the Financial Inclusion Index. The variables D_i^a , D_i^b , D_i^c , D_i^d represent Automated Teller Machines (ATMs) per 100,000 adults, borrowers from commercial banks per 1,000 adults, branches of a commercial bank per 100,000 adults, depositors in commercial banks per 1,000 adults, and the depth of credit information index (ranging from 0 for low to 8 for high), respectively.

Upon determining the most representative index for financial inclusion within the ASEAN region, this research proceeds to examine the impact of financial inclusion on employment utilizing panel data. Panel data amalgamates cross-sectional and time series data, offering a comprehensive view by combining observations of different entities (such as countries or regions) at multiple time points (e.g., yearly, monthly, or daily). Time series data is organized sequentially over these periods, while cross-sectional data captures information from various entities at a single point in time (Gujarati, 2009).

The econometric model employed to analyze this relationship is specified as follows:

$$Y = \beta_0 + \beta_i FII_{it} + \beta_2 X_{it} + \epsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(2)$$

In this model, Y represents unemployment, FII_{it} denotes the financial inclusion index at time t for individual i, and Xit encompasses control variables, including inflation, constant GDP, and education level, potentially influencing unemployment.

Before estimating the model's results, conducting a unit root test to ascertain the stationarity of the data is imperative, thereby preventing spurious regression outcomes. Stationarity is a crucial assumption for time series analysis, indicating that the statistical properties of the series (mean, variance, and autocovariance at various lags) remain constant over time. Non-stationary data, which lack these stable properties, can lead to misleading regression results characterized by artificially high R^2 values, suggesting a strong relationship when, in fact, the variables may not be meaningfully related (Gujarati, 2009).

Once the unit root test confirms the stationarity of the data, the next step in the research process involves selecting an appropriate estimation technique to analyze the variables effectively. There are three primary estimation methods available for consideration:

1. The Pooled Least Squares Model: This method amalgamates time series and cross-sectional data, disregarding the individual and temporal variations within the dataset. It enables the application of the Ordinary Least Squares (OLS) method for estimation, treating all observations as if they come from a single pool without distinguishing between different individuals or periods.
2. The Fixed Effects Model: Also known as the Least Squares Dummy Variable Model, this approach incorporates dummy variables to account for intercept differences across entities or over time. It assumes that while the intercept may vary across entities or time, the slope of the regression coefficients remains constant. This model is particularly useful for analyzing effects specific to individuals or entities, assuming these effects do not change over the study period.
3. The Random Effects Model posits that while the slope coefficient is constant, the intercept may vary across individuals and over time due to random effects. The variability in the intercept is considered to be a result of random variation that is uncorrelated with the independent variables in the model.

The choice between the Fixed Effects and Random Effects statistical tests guide models: the Likelihood Ratio Test and the Hausman Test. The Likelihood Ratio Test determines the suitability of the Fixed Effects model over the Pooled Least Squares Model, with significance at the 5% level indicating a preference for the Fixed Effects model. The Hausman Test further discriminates between the Fixed and Random Effects models, based on the assumption that if it is significant at the 5% level, the Fixed Effects model is preferred due to the systematic differences between entities correlated with the independent variables. Conversely, a non-significant % Hausman Test result at the 5% level suggests the Fixed Effects model's suitability, indicating that each entity's unique error component is not correlated with the regressors, making the Random Effects model an inappropriate choice.

RESULTS AND DISCUSSION

Building a financial inclusion index using PCA

In constructing a Financial Inclusion Index for the ASEAN region, the authors identify the most representative financial inclusion indicators across 10 ASEAN

countries. This endeavour is propelled by the absence of universally accepted indicators or a singular, conceptual definition of financial inclusion. To comprehensively depict financial inclusion, the study focuses on five indicators, encapsulating access, usage, and quality dimensions.

Dimension reduction, a critical step in the analysis, employs several methods: analyzing variance values, examining eigenvalues greater than one, and observing scree plots. This study specifically utilizes eigenvalues for dimension reduction. To further refine the results, the study employs the Kaiser-Meyer-Olkin (KMO) measure to determine which indicators most representatively measure financial inclusion levels. The KMO test evaluates the adequacy of sampling data by comparing the magnitude of observed correlation coefficients to those of partial correlation coefficients across the variables analyzed. A KMO value ranging from 0.5 to 1 indicates the suitability of factor analysis, with higher KMO values signifying a better representation of financial inclusion by the indicators (Cámara & Tuesta, 2017).

KMO values for financial inclusion indicators are provided in Table 1 in detail.

Table 1. KMO values for financial inclusion indicators

Countries	Variables	KMO
Indonesia	Depositors with commercial banks (per 1,000 adults)	0.8245
Singapore	Depositors with commercial banks (per 1,000 adults)	0.7732
Brunei Darussalam	Borrowers from commercial banks (per 1,000 adults)	0.7782
Malaysia	Depth of credit information index (0=low to 8=high)	0.7746
Thailand	Borrowers from commercial banks (per 1,000 adults)	0.9000
Filipina	Depositors with commercial banks (per 1,000 adults)	0.7480
Laos	Depositors with commercial banks (per 1,000 adults)	0.8178
Kamboja	Depth of credit information index (0=low to 8=high)	0.9271
Myanmar	Depositors with commercial banks (per 1,000 adults)	0.7985
Vietnam	Commercial bank branches (per 100,000 adults)	0.6620

The findings reveal significant variations in the most representative financial inclusion indicators across different ASEAN countries. For Indonesia, Singapore, the Philippines, Myanmar, and Laos, the number of depositors with commercial banks per 1,000 adults emerges as the leading indicator, with KMO values of 0.8245, 0.7732, 0.748, 0.7985, and 0.8178, respectively. Conversely, the depth of credit information index is the most representative indicator for Malaysia and Cambodia, boasting KMO values of 0.7746 and 0.9271, respectively. In Vietnam, the presence of commercial bank branches per 100,000 adults, with a KMO value of 0.6620, is highlighted. Lastly, the number of borrowers from commercial banks per 1,000 adults is determined as the paramount indicator for Thailand and Brunei Darussalam, with KMO values of 0.900 and 0.7782, respectively.

These outcomes underscore the diversity in financial inclusion landscapes across the ASEAN countries, with different indicators serving as the best representation of financial inclusion in each country. Such variability reflects these nations' unique economic, social, and banking structures, necessitating tailored approaches to regional financial inclusion.

Estimating the effect of financial inclusion on employment

After identifying the variables that best represent financial inclusion in 10 ASEAN countries, the research examines the impact of financial inclusion on employment using panel data. The preliminary step in this analysis involves determining the most appropriate panel data model. The available methods include Common, Fixed, and Random Effect models. The selection process for the most suitable model entails conducting the Chow and Hausman Test.

The Chow Test is applied to discern between the Common Effect and Fixed Effect models. This test relies on comparing the F-statistic to a critical F value. An F statistic higher than the critical value suggests the superiority of the Fixed Effect model over the Common Effect model. According to the results, the F-test statistic is 0.0000, below the significance level of 0.05, indicating the initial preference for the Fixed Effect model.

Following the Chow Test, the Hausman Test is utilized to decide between the Fixed Effect and Random Effect models. This test compares a statistical value against the critical value of the Chi-Square distribution. Acceptance of the null hypothesis—implying a statistical value lower than the critical Chi-Square value—would typically suggest the Random Effect model is more appropriate. However, in this case, the statistical value obtained from the Hausman Test is 0.0013, which is below the threshold of 0.05. Contrary to the usual interpretation where a lower value would favour the Random Effect model, the context provided indicates that the Fixed Effect model is deemed most suitable, likely due to a misunderstanding in explaining the test's outcome. Typically, a significant Hausman Test (i.e., a p-value less than 0.05) supports using the Fixed Effect model because it indicates systematic differences in the unobserved effects across entities that correlate with the regressors.

Therefore, based on the described outcomes of the Chow and Hausman tests, the conclusion is that the Fixed Effect model is the most appropriate for analyzing the impact of financial inclusion on employment within the ASEAN context. This model allows for the control of unobservable individual heterogeneity, which might be correlated with the explanatory variables, thus providing a more accurate estimation of the effects of financial inclusion on employment.

Table 2. Regression estimation results using the fixed effect model

R-sq:			Obs. per group		
within	= 0.1412		min	= 11	
between	= 0.0702		avg	= 11.0	
overall	= 0.0528		max	= 11	
			F(4, 96)	= 3.95	
Corr(u_i, Xb) = -0.4824			Prob > F	= 0.0052	
Unemployment Rate	Coef	Std error	t	P>|t|	[95% Conf. Interval]
Financial Inclusion	-.0008174	.0005178	-1.58	0.118	-.0018451	.0002104
Inflation Rate	-.456639	.0205179	-2.23	0.028	-.0863915	-.0049362
Education Level	.0173597	.0073829	2.35	0.021	.0027047	.0320146
GDP Constant	-8.06e-13	1.06e-12	-0.76	0.450	-2.92e-12	1.30e-12
_cons	1.564901	.8865029	1.77	0.081	-.1947933	3.324595
Sigma_u	2.4975039				
Sigma_e	.44525461				
rho	.96919538	(fraction of variance due to u_i)			

This paper delves into the impact of financial inclusion on the unemployment rate, building on the premise that access to finance, particularly for small enterprises, is pivotal in fostering innovation and job creation. As noted in previous research, a robust financial sector is instrumental in providing various financial products and services, stimulating investment and regional funding. This dynamic infrastructure facilitates the growth and development of Micro, Small, and Medium Enterprises (MSMEs), enhances the competitiveness of production sectors, and ultimately leads to the creation of new business ventures, thereby influencing employment positively (Alshyab et al., 2020; Sykes et al., 2016).

Further supporting this assertion, Mehry et al. (2021) conducted an empirical

study across 35 developing countries, finding that financial inclusion significantly impacts labour absorption. The mechanism underlying this relationship is that financial inclusion broadens access to financial services, which directly boosts investment and, consequently, has the potential to generate employment opportunities. Similarly, Alshyab et al. (2020) observed that financial inclusion negatively affects unemployment, corroborating their findings with a modified version of Okun's law. Utilizing a random effect model, their study highlighted a significant inverse relationship between financial inclusion and real output growth on unemployment, suggesting that unemployment rates tend to decline as financial inclusion and economic growth enhance.

Zulfiqar Hyder (2004) also explored this relationship and concluded that there is a significant and positive correlation between financial inclusion and employment absorption. He argued that financial inclusion increases the availability of financial services to the underserved and the poor, creating opportunities for entrepreneurship and employment.

However, This research presents findings that diverge from the initial hypothesis, indicating that digital financial inclusion does not significantly impact employment, as evidenced by a significance value of 0.118 in the panel regression estimation using the fixed effect model (Table 2). This result aligns with studies by Allen et al. (2016) and Geng & He (2021), concluding that digital financial inclusion does not significantly influence employment levels in lower-middle-income countries.

Grimm & Paffhausen (2015) offer a perspective that microfinance, often considered a component of financial inclusion, has not been successful in job creation. They argue that microfinance programs aim to generate employment, stabilize individuals' incomes, and prevent widening income disparities. This viewpoint underscores a fundamental difference in objectives, suggesting that the impact of financial inclusion on employment may be contingent upon the specific goals and designs of financial inclusion programs.

Barnes et al. (2001) provide further insight into the complex relationship between financial inclusion and employment, pointing to the macroeconomic environment as a critical factor. They argue that high inflation and high-interest rates can negate the potential benefits of financial inclusion in reducing unemployment. High inflation can strain the economy, making it challenging for companies to increase profits and, consequently, to hire new employees. Similarly, high interest rates may deter entrepreneurs from borrowing, limiting investment and expansion efforts that could create jobs.

Van Rooyen et al. (2012) echo these sentiments, concluding that microfinance does not affect unemployment. Their findings suggest that external factors, such as economic crises, can overshadow financial inclusion initiatives' potential job creation benefits.

This research incorporated control variables such as GDP, inflation, and educational level into the panel regression analysis to assess their effects on unemployment. The results indicated that GDP does not significantly influence unemployment, with a significance value of 0.45, thereby contradicting Okun's law, which posits that an increase in GDP leads to a reduction in the unemployment rate. Conversely, the educational level and inflation rate variables demonstrated significant impacts on unemployment, with significance values of 0.028 and 0.021, respectively, below the threshold of 0.05. These findings are congruent with Mehry et al. (2021), supporting the Phillips curve theory, which suggests a negative relationship between inflation and unemployment.

The diverse outcomes from various studies on the impact of financial inclusion on unemployment highlight the complexity and inconsistencies within this area of research. While some empirical studies advocate for the significant role of financial inclusion in decreasing unemployment, others conclude that financial inclusion does not have a noticeable effect on unemployment rates. This discrepancy stems from the lack of a universal consensus on the indicators used to measure financial inclusion, as Mehry et al. (2021) and Alquradaghi (2016) noted. The varied definitions and measures of financial inclusion across different studies contribute to the mixed results and interpretations concerning its impact on employment.

The significant influence of educational level on unemployment suggests that higher education levels may equip individuals with better skills and qualifications, thereby enhancing their employability and reducing unemployment rates. On the other hand, the relationship between inflation and unemployment, as indicated by the significant impact of inflation, aligns with the Phillips curve, underscoring the potential trade-offs between inflation and unemployment in the short term.

These findings underscore the multifaceted nature of economic phenomena and the importance of considering various factors, including macroeconomic indicators and educational attainment, when analyzing unemployment dynamics. Moreover, the inconsistency in the results across different studies calls for a more standardized approach to defining and measuring financial inclusion to understand better its role in the broader economic context and its potential impact on employment.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This research aimed to achieve two primary objectives regarding financial inclusion and its impact on unemployment rates. These topics are intricately linked to the Sustainable Development Goals (SDGs) set by the United Nations. The first objective was constructing a financial inclusion index using Principal Component Analysis (PCA). The analysis revealed that the most representative indicator of financial inclusion across several ASEAN countries was the number of depositors with commercial banks, as evidenced by the highest KMO values in Indonesia, Singapore, the Philippines, Laos, and Myanmar. Conversely, in Malaysia and Cambodia, the depth of credit information index emerged as the most significant indicator, while in Vietnam, the presence of commercial bank branches was notable. For Brunei Darussalam and Thailand, the number of borrowers from commercial banks was identified as the best indicator of financial inclusion.

The second objective focused on examining the impact of financial inclusion on unemployment rates using the fixed effect model. The study found that digital financial inclusion did not significantly affect employment in ASEAN countries, as indicated by a significance value of 0.118. However, education level and inflation significantly influence employment, underscoring the complex relationship between financial inclusion, economic factors, and unemployment.

Recommendations

In light of the findings from this research, it is imperative for policymakers to adopt a multifaceted approach to enhance financial inclusion and thereby positively influence employment absorption in ASEAN countries. One of the primary strategies involves reducing the costs associated with financial services. A wider population could be encouraged to engage with the formal financial sector by lowering these barriers, thereby increasing financial inclusion levels. Simultaneously, incentivizing the informal

sector to integrate into the formal financial system can be crucial in expanding financial inclusion. This approach benefits individuals and businesses within the informal sector and contributes to the broader economy by bringing more economic activities into the formal realm.

Moreover, enhancing the public's understanding of financial instruments and institutions through comprehensive educational programs is vital. Educating the populace about the benefits and mechanisms of financial services can lead to increased usage, particularly among those traditionally excluded from the financial system. This education should extend to simplifying mobile banking and digital payments, making these services more accessible and user-friendly. As digital financial services become increasingly integral to financial inclusion, ensuring these technologies are easily navigable for the general population is essential.

Implementing these strategies requires a coordinated effort from various stakeholders, including government bodies, financial institutions, and civil society organizations. By focusing on these key areas, policymakers can significantly enhance financial inclusion, creating an environment conducive to job creation and economic growth. This approach not only addresses the immediate goal of reducing unemployment but also aligns with the broader objectives of the Sustainable Development Goals, promoting inclusive and sustainable economic development across ASEAN countries.

REFERENCES

Agyekum, F., Locke, S., & Hewa-Wellalage, N. (2016). Financial inclusion and digital financial services: Empirical evidence from Ghana. *Munich Personal RePEc Archive*, (82885), 1–20. https://mpra.ub.uni-muenchen.de/82885/

Allen, F., Demirgüç-Kunt, A., Klapper, L., & Martinez Peria, M. S. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation*, 27(December), 1–28. https://doi.org/10.1016/j.jfi.2015.12.003

Alquradaghi, B. A. (2016). *Financial Inclusion – Access to Finance, Silatech Qatar as a Model*. Hamad bin Khalifa University Press (HBKU Press). https://doi.org/10.5339/qfarc.2016.sshapp2946

Alshyab, N., Sandri, S., & Daradkah, D. (2020). Financial inclusion in the Middle East and North Africa and its effect on unemployment. *World Bank*. https://www.worldbank.org/en/topic/financialinclusion/overview

Barnes, C., Keogh, E., & Nemarundwe, N. (2001). Microfinance program clients and impact: An assessment of Zambuko Trust, Zimbabwe. *Assessing the Impact of Microenterprise Services (AIMS)*, (October), 1–202.

Bayar, Y. (2016). Financial development and unemployment in emerging market economies. *Scientific Annals of Economics and Business*, 63(2), 237–245. https://doi.org/10.1515/saeb-2016-0119

Benmelech, E., Frydman, C., & Papanikolaou, D. (2019). Financial frictions and employment during the Great Depression. *Journal of Financial Economics*, 133(3), 541–563. https://doi.org/10.1016/j.jfineco.2019.02.005

Boustanifar. (2014). Finance and employment: Evidence from U.S. banking reforms. *Journal of Banking & Finance*. (2014) 46(1) 343-354. 10.1016/j.jbankfin.2014.06.006.

Cámara, N., & Tuesta, D. (2017, July). Bank of Morocco – CEMLA – IFC Satellite Seminar at the ISI World Statistics Congress on "Financial Inclusion." Marrakech, Morocco.

Çiftçioğlu, S., & Bein, M. A. (2017). The relationship between financial development and unemployment in selected countries of the European Union. *European Review*, 25(2), 307–319. https://doi.org/10.1017/S1062798716000600

Claessens, S., & Feijen, E. (2006). Financial sector development and the millennium development goals. *World Bank Working Paper*, (89), 1–106. https://doi.org/10.2139/ssrn.950269

Demirgüç-Kunt, A., Klapper, L., & Singer, D. (2013). Financial inclusion and legal discrimination against women: Evidence from developing countries. *World Bank Policy Research Working Paper*, (6416). http://dx.doi.org/10.1596/1813-9450-6416

Geng, Z., & He, G. (2021). Digital financial inclusion and sustainable employment: Evidence from countries along the belt and road. *Borsa Istanbul Review*, 21(3), 307–316. https://doi.org/10.1016/j.bir.2021.04.004

Gopalan, S., & Kikuchi, T. (2016). *Financial inclusion in Asia: Issues and policy concerns*. Palgrave macmillan

GPFI. (2012). *The first G20 Global Partnership for Financial Inclusion (GPFI) Forum Report*. GPFI

Grimm, M., & Paffhausen, A. L. (2015). Do interventions targeted at micro-entrepreneurs and small and medium-sized firms create jobs? A systematic review of the evidence for low and middle income countries. *Labour Economics*, 32, 67–85. https://doi.org/10.1016/j.labeco.2015.01.003

Gujarati, D. N. (2009). *Basic econometrics* (5th ed.). McGraw-Hill.

Gujarati, D. N. (2004). *Basic Econometrics* (3rd ed.). McGraw-Hill Companies. https://doi.org/10.1126/science.1186874

Honohan, P. (2008). Cross-country variation in household access to financial services. *Journal of Banking and Finance*, 32(11), 2493–2500. https://doi.org/10.1016/j.jbankfin.2008.05.004

Kim, D. H., Chen, T. C., & Lin, S. C. (2019). Finance and unemployment: New panel evidence. *Journal of Economic Policy Reform*, 22(4), 307–324. https://doi.org/10.1080/17487870.2018.1451750

Kim, D. W., Yu, J. S., & Hassan, M. K. (2018). Financial inclusion and economic growth in OIC countries. *Research in International Business and Finance*, 43, 1–14. https://doi.org/10.1016/j.ribaf.2017.07.178

Kinda, T., Mlachila, M., & Ouedraogo, R. (2016). Commodity price shocks and financial sector fragility. *IMF Working Papers*, 16(12). https://doi.org/10.5089/9781498328722.001

Le, T. H., Chuc, A. T., & Taghizadeh-Hesary, F. (2019). Financial inclusion and its impact on financial efficiency and sustainability: Empirical evidence from Asia. *Borsa Istanbul Review*, 19(4), 310–322. https://doi.org/10.1016/j.bir.2019.07.002

Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic Growth*. Elsevier

Leyshon, A., & Thrift, N. (1996). Financial exclusion and the shifting boundaries of the financial system. *Environment and Planning A: Economy and Space*, 28(7), 1150–1156. https://doi.org/10.1068/a281150

Mehry, E.-B., Ashraf, S., & Marwa, E. (2021). The impact of financial inclusion on unemployment rate in developing countries. *International Journal of Economics and Financial Issues*, 11(1), 79–93. https://doi.org/10.32479/ijefi.10871

Mialou, A., Amidžić, G., & Massara, A. (2014). Assessing countries' financial inclusion standing: A new composite index. *IMF Working Papers*, 14(36). https://doi.org/10.5089/9781475569681.001

Okun, A. (1962). Okun's law. In *Proceedings of the Business and Economics Statistics Section* (pp. 98–104). American Statistical Association

Olawale, F., & Garwe, D. (2010). Obstacles to the growth of new SMEs in South Africa: A principal component analysis approach. *African Journal of Business Management*, 4(5), 729–738.

Ouma, S. A., Odongo, T. M., & Were, M. (2017). Mobile financial services and financial inclusion: Is it a boon for savings mobilization? *Review of Development Finance*, 7(1), 29–35. https://doi.org/10.1016/j.rdf.2017.01.001

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2017). Digital finance and fintech: Current research and future research directions. *Journal of Business Economics*, 87(5), 537–580. https://doi.org/10.1007/s11573-017-0852-x

Pica, M. P., & Gatti, G. (2012). Finance and employment. *Journal of Economic Policy*, 69. (2012) 27(69) 5-55. 10.1111/j.1468-0327.2011.00276.x

Pyka, A., & Andersen, E. S. (2012). Introduction: Long term economic development - demand, finance, organization, policy, and innovation in a Schumpeterian perspective. *Journal of Evolutionary Economics*, 22(4), 621–625. https://doi.org/10.1007/s00191-012-0279-z

Rault, C., Gatti, D., & Vaubourg, A.-G. (2012). Unemployment and Finance: How do Financial and Labour Market Factors Interact? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1567634

Sykes et al. (2016). Exploring the linkages between youth financial inclusion and job creation. *INternational Labour Office Work 4 Youth Publicatin Series*, *42*. International Labour Office

van Rooyen, C., Stewart, R., & de Wet, T. (2012). The impact of microfinance in Sub-Saharan Africa: A systematic review of the evidence. *World Development*, 40(11), 2249–2262. https://doi.org/10.1016/j.worlddev.2012.03.012

Vo, D. H., Nguyen, N. T., & Thi-Hong Van, L. (2021). Financial inclusion and stability in the Asian region using bank-level data. *Borsa Istanbul Review*, 21(1), 36–43. https://doi.org/10.1016/j.bir.2020.06.003

Williams, T. H., Iriobe, G. O., Ayodele, T. D., Olasupo, S. F., & Aladejebi, M. O. (2023). Do illiteracy and unemployment affect financial inclusion in the rural areas of developing countries? *Investment Management and Financial Innovations*, 20(2), 89–101. https://doi.org/10.21511/imfi.20(2).2023.08

World Bank Policy Research Report. (2008). *Finance for All? Policies and Pitfalls in Expanding Access*. The International Bank for Reconstruction and Development / The World Bank. 10.1596/978-0-8213-7291-3

Hyder, Z., & Shah, S. (2004). Exchange rate pass-through to domestic prices in Pakistan. *State Bank of Pakistan*, 5, 2–19. Retrieved from https://www.jstor.org/stable/41260991