# Economic Effects of Foreign Bank Liberalization and E-Payment: A Comparative Study of the Philippines and Singapore

Renz Angelo F. Danao[1]
Business Economics Department
College of Commerce and Business Administration
University of Santo Tomas

Garyzaldy T. Delos Santos, Jr.[2]
Business Economics Department
College of Commerce and Business Administration
University of Santo Tomas

Marie Antoinette L. Rosete[3]
Business Economics Department
College of Commerce and Business Administration
University of Santo Tomas

**Abstract:- This study investigates the impact of bank liberalization on economic growth in the Philippines and Singapore. Additionally, the economic implications of electronic payments, brought about by deregulation and technological advancements, are examined within the framework of Financial Activities under the System of National Accounts. The research strategically selects countries—specifically, the Philippines and Singapore—to represent varying economic statuses and classifications. When observing the effects of bank liberalization, it was found that the Philippines exhibits a significant and positive correlation between deposit rates and GDP growth, while financial share shows a negative correlation. On the other hand, Singapore's exchange rate, FDI, and lending rate were the significant variables. An inverse relationship exists between the exchange rate and the growth in an economy, while FDI and lending rates exhibit a positive correlation. The effect of e-payment also indicated the significance of these emerging systems on economic growth. In the Philippines, card-based payment and money supply significantly correlate with the dependent variable, showing a negative and positive coefficient, respectively. Conversely, Singapore showed a positive coefficient with card-based payment and a negative coefficient with money supply.**

*Keywords:- Bank Liberalization; E-Payment; Economic Growth.*

## I. INTRODUCTION

The attainment of sustained economic growth, a shared objective for both developed and developing nations, involves a complex interplay of economic and financial variables. Key elements in this dynamic include the facilitation of foreign direct investments (FDI) and the promotion of financial inclusivity. Notably, within the United Nations Sustainable Development Goals (SDGs), inclusive finance occupies a central role, particularly in underdeveloped countries, serving as a pivotal driver for reducing extreme poverty and fostering shared prosperity. This is realized through the provision of accessible financial products and services catering to diverse global needs, encompassing transactions, payments, savings, credit, and insurance (World Bank, 2018).

In the context of expanding financial goals and global initiatives, foreign direct investment (FDI) has experienced a significant surge. According to the UNCTAD's World Investment Report (2022), global FDI escalated by 64% in 2021, reaching nearly $1.6 trillion. This substantial increase is primarily attributed to heightened financial FDI, reflecting streamlined procedures, improved incentives, reduced taxes, and increased openness to foreign investors (UNCTAD, 2006, cited by Manlagñit, 2011). Concurrently, relaxed regulations regarding foreign bank entries, as highlighted in the World Bank's 2006 Global Development Finance report, have led to notable increases in FDI in the banking sector, particularly in developing countries.

Amid evolving foreign policies and technological innovations, Financial Technology (Fintech) continually introduces new tools that enhance efficiency in the financial market. This digital innovation has revolutionized financial services, giving rise to various financial technologies such as mobile money, peer-to-peer lending, robo-advice, insurtech, and crypto-assets (Feyen et al., 2021), positioning Fintech as the fastest-growing sector in both developed and developing countries (Pant, 2021). Furthermore, electronic payment systems, including credit cards, debit cards, digital wallets, and mobile payments, have become integral to business transactions, particularly in e-commerce (Bezhovski, 2016).

Within the ASEAN countries, the ASEAN Economic Community (AEC) Blueprint 2025 underscores the significance of inclusive finance in its vision for financial sector integration. This initiative encompasses financial integration, financial inclusion, and financial stability, with a focus on financial services liberalization, capital account liberalization, capital market development, harmonized payments and settlement systems, financial inclusion, and

capacity-building (ASEAN Secretariat, 2019). Consequently, foreign participation in domestic banking systems has witnessed a substantial increase.

In the Philippines, a member of ASEAN, financial liberalization was achieved through legislative policies such as Republic Act No. 7721 and Republic Act No. 10641, allowing full entry of foreign banks. These changes aim to establish a competitive and efficient financial system, promoting economic growth, attracting foreign direct investments, and preparing for ASEAN financial integration. Similarly, in Singapore, the Monetary Authority of Singapore (MAS) implemented a program from 1999 to 2004, liberalizing the banking sector and subsequently improving it over time, creating new avenues for financial inclusion and accessibility.

Foreign bank presence, as indicated by foreign bank numbers and shares, plays a pivotal role in gauging the impact of changes in economic growth. The study utilizes indicators such as the ratio of foreign banks to total banks, the ratio of foreign bank assets to total bank assets, deposit rate, exchange rate, foreign direct investment, interest rate spread, and lending rate to assess the effects of bank liberalization on GDP growth in Singapore and the Philippines. Additionally, the study examines the impact of e-payment on growth using variables proposed by Tee & Ong (2016) and Prykaziuk (2021), specifically focusing on card-based payment, interbank transactions, and money supply. Therefore, Finance under the system of national accounts serves as the dependent variable and proxy for economic growth for e-payment models.

This research extends its analysis to the Philippines and Singapore, representing different economic statuses and classifications within ASEAN, with the aim of scrutinizing the effects of bank liberalization on economic growth and assessing the program's effectiveness. E-payments are studied as an independent variable, addressing claims that variations in economic levels impact the growth opportunities resulting from bank liberalization (Misati & Nyamongo, 2012). Furthermore, this paper limits the study of the adoption of electronic payment to card-based payment, interbank transactions, and money supply, while considering foreign bank assets and share, deposit rate, exchange rate, foreign direct investment, interest rate spread, and lending rate as indicators for bank liberalization.

## II. LITERATURE REVIEW

### A. Effect of Bank Liberalization on Banking System and Economic Growth

The effects of foreign bank entry on local banking systems have been extensively studied in various contexts. However, the results of these cross-country and single-country studies differ between developed and developing countries. In the Philippines, foreign bank entry has been found to negatively impact the profitability and overhead costs of domestic banks (Manlagñit, 2011). This suggests that increased foreign bank competition pressures domestic banks

to improve their efficiency by upgrading their production technologies and techniques.

Similar findings have been reported in other Asian economies. Foreign-owned banks in Korea have been found to outperform domestic banks (Jeon & Miller, 2005). Chantapong (2005) also found that foreign banks in Thailand are more profitable than domestic banks, and that both foreign and domestic banks have experienced significant reductions in overhead expenses. In Indonesia, foreign de novo banks have been found to be more competitive than their domestic counterparts due to their lower overhead costs, which allow them to offer lower interest rates and disburse more loans (Mulyaningsih et al., 2015).

Studies in developing countries have also consistently found that foreign banks are more profitable, have higher interest margins, and lower overhead costs than domestic banks (Grigorian & Manole, 2006; Micco et al., 2007). This is likely due to the fact that foreign banks are often more efficient and have access to better technology and expertise. Al-Harbi (2019) found that foreign ownership positively impacts the profitability of the financial sector in Organization of Islamic Cooperation countries. Claessens et al. (2001) found that foreign banks have higher profits than domestic banks in developing countries, while the opposite is true in developed countries. They also found that foreign bank entry improves the efficiency of domestic banks by reducing costs, profits, and net interest margins. Yin (2021) found that increased foreign bank entry leads to increased competition in developed countries but decreased competition in developing countries.

Sub-Saharan African countries that allow foreign bank entry have been found to have better banking service access, competition, and depth than those that restrict foreign bank ownership (Hunegnaw et al., 2021). In Tanzania, foreign banks have been found to have higher returns on equity and assets than domestic banks, due to their higher interest margins (Lotto, 2016). This suggests that foreign banks in Tanzania have better cost management and higher financial leverage. However, a study by Pham & Nguyen (2020) found that increased foreign bank presence in Vietnam negatively impacts the overall financial stability of the domestic banking system. This is likely due to the fact that the increase in foreign bank numbers increases the operating costs of the domestic market, leading to a combination of spillover effects and competition effects with no positive impact on the Vietnamese banking industry.

With all these effects in domestic banking system in various countries, there were also a significant number of studies that shows the effect of foreign bank liberalization to the overall economy specifically on Gross Domestic Product (GDP). Several studies have examined the relationship between banking liberalization and economic growth, with varying results. Some studies have found a positive relationship between the two, while others have found no significant relationship or even a negative relationship.

Saqib (2016) established a direct link between banking liberalization and economic growth, supported by banking sector development indicators. The study incorporated variables such as financial depth, the ratio of government expenditure on health to GDP, and the ratio of foreign direct investments to GDP. Human capital and openness were also measured using alternative indicators, namely the ratio of government expenditure on education to GDP and the trade-to-GDP ratio.

Naveed & Mahmood (2017) corroborated claims on economic growth using the multivariate co-integration technique by Johansen (1988) and Johansen and Juselius (1990), along with the error-correction mechanism. They found a positive long-term impact of bank liberalization on economic growth, despite an inverse relationship in the short run. The development of the financial sector was identified as influencing growth by expanding the capacity of financial intermediaries to provide funds for spending and investing. Ilugbusi (2020) utilized the vector error correction mechanism (VECM) and obtained similar long-term growth results. Contrary to an alleged inverse relationship in the short term, the integration of coefficients in VECM showed a direct relationship, indicating a shred of solid evidence supporting the positive impact of liberalization on growth. However, Levchenko et al. (2007) challenged this by suggesting that the positive effects of liberalization are temporary, vanishing after six years.

In a meta-analysis involving 60 countries, Bumann et al. (2013) recognized a positive relationship between liberalization and economic growth. Despite this, they identified a weak link between the variables. The loosening of government controls on the financial sector, according to Kose et al. (2010), was not considered a standalone remedy for economic growth but could complement other changes in fiscal or monetary policies. Andersen & Tarp (2003) supported this view, highlighting substantial negative implications of government intervention in the financial sector.

Owusu & Odhiambo (2014) demonstrated that financial liberalization policies and private investment have both long-run and short-run positive effects on economic growth in Nigeria, a finding supported by Orji et al. (2015). However, in Pakistan, Hye & Wizarat (2013) indicated a direct short-run link between the financial liberalization index and economic growth, but the significance diminished in the long run. Greenwood et al. (2013) stressed the vital role of financial intermediation in economic development, and Munir et al. (2013) found that financial liberalization positively impacts economic growth in Pakistan.

In a similar study, Muhammad & Malavarzhi (2014) studied Sub-Saharan African countries, revealing that financial liberalization influences economic growth but does not directly impact poverty alleviation. Real interest rate reforms in financial liberalization were found to decrease the probability of financial crises (Moyo & Roux, 2020), a finding supported by Barrel et al. (2017), suggesting that interest rate liberalization has a crisis-reducing effect through capital buffers.

Negative implications of liberalization, such as financial fragility, were explored in the research of Misati & Nyamongo (2012). They found a positive relationship between banking crises and financial liberalization, a result corroborated by Rancerie et al. (2006). Andersen & Tarp (2003) agreed that countries tend to underestimate the financial fragility of liberalization, emphasizing that while financial fragility may occur in the short run, long-term growth is inevitable (Kaminsky & Schmukler, 2002; Loayza & Ranciere, 2004; Tornell & Westermann, 2004).

Igbinovia & Igbinovia (2023) focused on the 15 members of the Economic Community of West African States, finding a positive relationship between financial liberalization and economic growth. However, they stressed the potential for financial instability, emphasizing the importance of carefully managing the financial system. Huang and Ji (2017) employed a Barro-type growth equation, obtaining positive results supporting the notion that financial liberalization can increase GDP. Misati & Nyamongo (2012) used a financial liberalization augmented standard Barro growth equation, which was also used by Ranciere et al. (2006), Olaf et al. (2008), and Rousseau and Wachtel (2007). In the equation, real per-capita GDP growth is the dependent variable of the financial liberalization dummy, banking crisis dummy, control variables from GDP, and the idiosyncratic error term. Their study supported the conditional convergence hypothesis wherein there is a tendency for poorer countries to grow faster since the initial level of the economy was considered valuable data. The proponents of the study also added that they obtained similar results to the study of Barro (1997), Easterly and Levine (1997), and Sachs and Warner (1997). It significantly stressed the recommendation of making the financial liberalization of a country at a controlled or managed level to avoid retarding effects of growth. The findings on the conditional convergence were further supported by the meta-analysis study of Bumann et al. (2013), by stating that countries with less developed financial systems would benefit from liberalization since there is growth potential.

Gamara (2009) found that partial liberalization had more outstanding results for East Asian countries than complete openness in the banking sector. However, this finding was contradicted by Clarke et al. (2006), who argued that more foreign bank presence meant fewer financial obstacles for developing countries. They acknowledged limitations in their data from a survey of 3000 enterprises in 35 developing countries, suggesting that time-series data would be optimal.

While some studies show a positive relationship between liberalization and economic growth, it is not universally necessary. Countries like China and Vietnam, with less liberalized banking systems, exhibit high levels of economic growth. In the East Asian model of econometric development, there was no significant effect of bank deregulation (Andersen & Tarp, 2003).

- H01: The liberalization of banks has a negative impact on the economic growth of the Philippines.
- H02: The liberalization of banks has a negative impact on the economic growth of Singapore.

*B. Effect of E-Payment on Economic Growth*

The progression of technology has undergone continuous and significant expansion, impacting not only the business and financial sectors but also the overall economy. The adoption of digital and information technology has been noted to enhance enterprise resilience against external shocks, as highlighted by Wang & Chen (2022). This includes leveraging electronic payment platforms for online transactions of goods and services (Roy & Sinha, 2014), leading to improved customer financial services, secured payment transactions, and reduced costs in exchanging goods and services (Kaur & Pathak, 2015).

A report by Moody's Analytics, as published by Visa Inc., delved into the impact of electronic payments on global economic growth, revealing a substantial addition of $983 billion from 2008 to 2012 (Zandi et al., 2013). The study indicated a 0.8% increase in GDP in emerging markets and a 0.3% increase in developed markets. Tee & Ong (2016) focused on five EU countries, emphasizing the short and long-run effects of the shift from cash to cashless payments such as card payment, cheques, telegraphic transfer, and electronic money. It suggested that policies promoting cashless payments may not have an immediate impact on the economy.

Aldaas (2021) observed a negative correlation between POS terminals and GDP growth in Canada and Australia, while the UK and Saudi Arabia showed a positive correlation. The study indicated a high correlation coefficient between GDP growth and electronic transactions in Saudi Arabia for the medium and long term. However, in Jordan, this relationship weakened in the short term, suggesting heterogeneous effects of e-payment on economic growth.

Khiewngamdee & Yan (2019) noted significant benefits of Fintech e-payment during low levels, reducing price volatility and income inequality and improves low labor productivity in APEC countries. In China, Li et al. (2023) found that e-payment had a positive impact on household consumption, reducing transaction costs. However, Wasiaturrahma & Kurniasari (2021) in Indonesia revealed that only Card-Based Payment Instruments significantly affected economic growth among non-cash payments. E-money and GI-RTGS instruments have no significant effect on economic growth. On the other hand, using the periods 2011 to 2019, electronic retail payment is the only independent variable that impacts economic growth significantly in India (Ravikumar et al., 2019).

Hamid & Cheng (2013) observed a notable impact of credit Interbank GIRO and credit cards on Malaysia's GDP, emphasizing the significance of specific payment types. Tayibnap et al. (2018) highlighted the contribution of e-payment to the increase in GDP through the facilitation of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. Similar positive effects on SMEs were identified in the studies of Adebayo & Ojo (2017), Makee et al. (2014), Puspitawati & Gurning (2019) Kurian et al. (2020). Obi (2023), however, found negative effects of cashless transaction policies on SMEs in southeast Nigeria.

Mushkudiani (2018) acknowledged challenges hindering the shift to e-payments but believed in its potential contribution to economic growth. By using mathematical models and regression analysis, it was found that non-cash transactions could contribute to the economy's development. Karim et al. (2022) defined FinTech as advancements in technology to enhance financial services through automation. Under this new type of technology is the facilitation of digital transactions. Because of the COVID-19 pandemic, there is an evident shift from the traditional mode of payments to FinTech, which includes e-payments. When the researchers assessed the performances of 5 ASEAN countries, namely Indonesia, Malaysia, the Philippines, Singapore, and Thailand, during the peak of the pandemic, it was found that there was a significant difference regarding the economic impact of countries with more excellent adaptation to FinTech which includes the use of digital transactions as compared to those with low to no FinTech at all. One limitation of these findings is using SMEs as primary data in the data collection process.

Oyelami et al. (2020) in Nigeria demonstrated that adopting e-payment could increase consumer spending and stimulate economic growth. Andrea et al. (2022) found a significant positive relationship between electronic payment methods such as ATM payment, Point of Sales (POS) system, and mobile application payments and economic growth in Nigeria, while Okereke (2016) contradicted these findings using OLS regression with POS being the only significant contributor. Furthermore, when using correlational analysis, volume of e-payment shows a direct relationship with growth on GDP (Slozko & Pelo, 2014). Additionally, Yusuf (2016) supported the findings with OLS Multiple Regressions. Cheque, POS, web, and mobile payments were said to positively contribute to economic growth.

Trütsch (2014) explored the link between contactless payment and spending, revealing a positive relationship. These findings aligned with studies by the Bank of England and the Federal Reserve Bank, indicating increases in spending with contactless payment methods (10% and 7%, respectively). However, it is essential to consider potential risks associated with cashless systems, such as cyberattacks, data privacy concerns, and financial exclusions (Yakean, 2020).

The shift to electronic payments has diverse and dynamic effects on economic growth, contributing positively to many instances but showing variations in outcomes based on regions, payment methods, and levels of adoption. The studies collectively underscore the importance of carefully evaluating the impact of e-payment strategies on specific contexts and demographics to harness its potential benefits for economic development.

- H03: E-payment has a negative impact on the economic growth of the Philippines.
- H04: E-payment has a negative impact on the economic growth of Singapore.

*C. Synthesis*

Extensive research on the impact of financial liberalization and e-payment on economic growth reveals diverse outcomes globally.

In the Philippines, foreign bank entry negatively affected domestic banks, prompting efficiency upgrades (Manlagñit, 2011). Similar findings were reported in other Asian economies (Jeon & Miller, 2005; Chantapong, 2005; Mulyaningsih et al., 2015). Sub-Saharan Africa experienced better banking service access and competition with foreign bank entry (Hunegnaw et al., 2021), but Vietnam faced financial stability issues (Pham & Nguyen, 2020).

Conversely, Saqib (2016) established a positive link between banking liberalization and economic growth. Bumann et al. (2013) recognized a positive relationship in a meta-analysis, emphasizing complementary financial sector changes.

The adoption of digital technology transformed various sectors, enhancing resilience (Wang & Chen, 2022). Electronic payments significantly contributed to global economic growth (Zandi et al., 2013), with regional variations (Aldaas, 2021). Research by Tee & Ong (2016) suggested that the shift from cash to cashless payments in five EU countries may not have an immediate impact on the economy. Regional variations were identified by Aldaas (2021), showing a negative correlation between POS terminals and GDP growth in Canada and Australia but a positive correlation in the UK and Saudi Arabia. Heterogeneous effects of e-payment on economic growth were suggested in Jordan.

Fintech e-payment had significant benefits in APEC countries (Khiewngamdee & Yan, 2019), with positive impacts on household consumption in China (Li et al., 2023). Studies explored FinTech impacts during the COVID-19 pandemic (Karim et al., 2022; Oyelami et al., 2020), while some noted potential risks (Yakean, 2020).

Overall, the relationship between electronic payment methods and economic growth is evident (Andrea et al., 2022; Okereke, 2016; Yusuf, 2016; Trütsch, 2014; Slozko & Pelo, 2014). Researchers emphasize considering risks associated with cashless systems (Yakean, 2020).

*D. Theoretical Framework*

McKinnon-Shaw's 1973 framework highlights the role of financial reforms, one of which is financial liberalization, to aid in financial repressions and stimulate economic growth. For the past 50 years, this has faced criticisms stating that liberalization is more complex.

Liberalization functioned as the independent variable in this study, aligning with the regression models utilized by Gamra (2009), Misati & Nyamongo (2012), Ranciere et al.

(2006), Saqib (2016), and Ilugbusi et al. (2020). The degree of liberalization had been proxied by deposit rate, foreign direct investment, interest rate spread, lending rate, the ratio of foreign bank numbers over the total number of banks, and the ratio of foreign banks' assets to total assets. Furthermore, real GDP growth had served as the dependent variable and had proxied the GDP to add specificity to the study.

In evaluating the impact of e-payment on growth, the researchers incorporated the model proposed by Tee & Ong (2016), encompassing telegraphic transfer, card payment, electronic money, and cheque payment. Although Tee & Ong (2016) had concluded that card payment would not contribute to the long-term impact on growth, the researchers sought to observe if a developing and a developed country in ASEAN would yield similar results. Additionally, the researchers integrated a proxy variable from the study of Prykaziukre (2021). Cash usage in developed and developing countries was changed as money supply. Interbank was also added as an independent variable, as used in the study by Afaha (2019). To add specificity to the study, Finance, a system of national accounts, was used as the dependent variable.
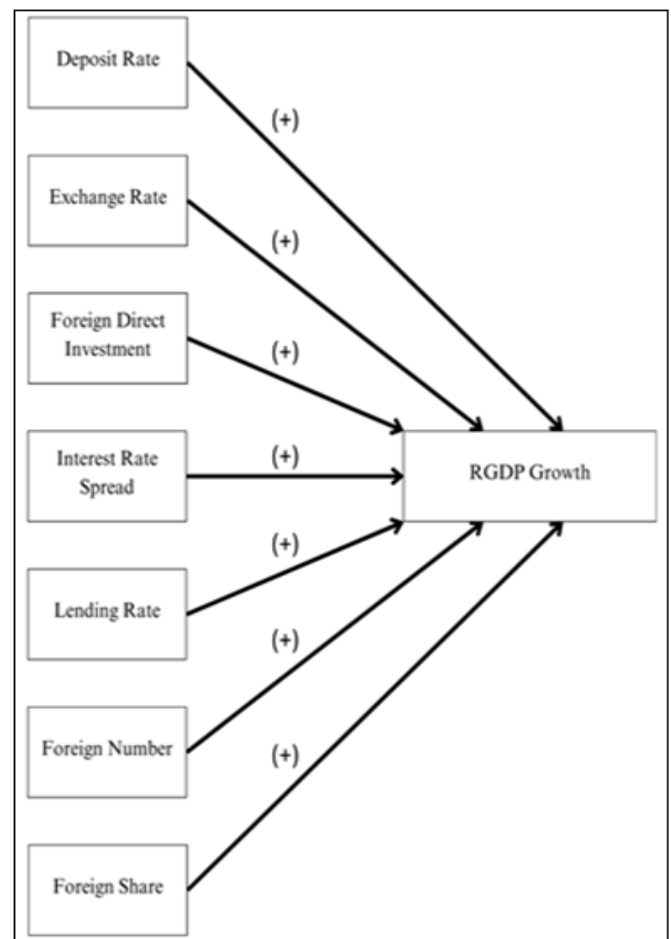
*E. Simulacrum*



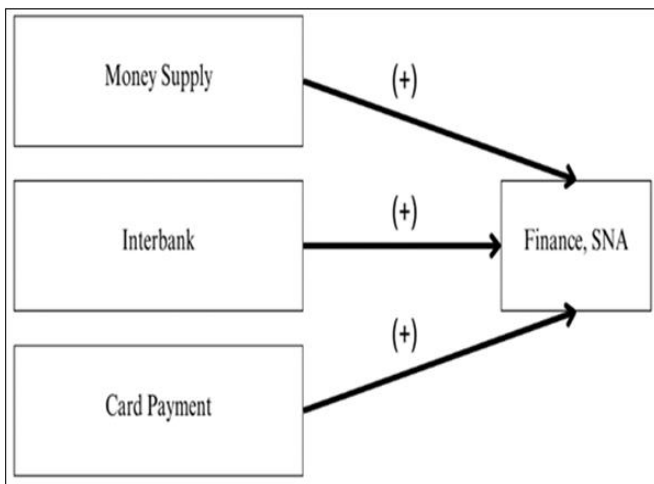Fig 1 Simulacrum of Bank Liberalization on Real GDP Growth

Fig 2 Simulacrum of E-Payments on Finance, SNA

The figures above summarize the whole concept of the study, which evaluates the effect of bank liberalization on Real GDP growth and e-payment on Financial Services under the System of National Accounts to assess economic growth.

## III. RESEARCH METHOD

The researchers discuss the study's data and data sources, the research methodology used, and the estimating approach, also known as the statistical treatment, that was used to carry out explicit data analysis and interpretations in this chapter.

*A. Data and Sources*

The researchers opted not to include other ASEAN countries, focusing solely on the Philippines and Singapore to represent distinct economic statuses and classifications. According to the World Bank's classification system, the Philippines falls under the category of a lower-middle-income country (LMC), while Singapore is classified as a high-income OECD country (World Bank, 2013). This approach facilitates a streamlined examination of the impact of Foreign Bank Liberalization and E-payment on the economic growth of these two ASEAN economies, each exemplifying a different economic status. Moreover, considerations were given to the availability and cost of the data.

The study incorporated a total of ten (10) exogenous variables spanning the period from 1988 to 2022 for bank liberalization model, while 2013 to 2022 for e-payment model, aligning with the research objective of evaluating the long-term economic effects of liberalization and e-payment. Secondary data collection involved obtaining Financial Accounts from each country's respective national statistics offices, specifically from the Philippine Statistics Authority (PSA) and the Singapore Department of Statistics (DOS). On the other hand, Real GDP Growth from the World Bank database. Independent variables, such as the ratio of foreign banks and the ratio of foreign bank assets, were sourced from the Bangko Sentral ng Pilipinas (BSP) and the Monetary Authority of Singapore (MAS) while exchange rates, saving deposit rates, lending rates, interst rate spread, and foreign direct investment were extracted from the World Bank database.

To gauge the impact of e-payment, variables including money supply, interbank, and card payment were gathered from central bank databases, specifically Bangko Sentral ng Pilipinas (BSP) and the Monetary Authority of Singapore (MAS).

*B. Method of the Study*

This research investigates the direct link and effects between foreign bank entry on the domestic bank system and the economic growth of Singapore and the Philippines. Moreover, it also aims to find the effects of e-payment on economic growth in the same countries. With that, this study applied a correlational research design as to examine the relationship and effects of the following variables: foreign bank liberalization on economic growth and e-payment on economic growth.

In order to improve the regression model's fit, bank liberalization variables used the decimal form of percentages in the Philippines, while the percentage form was used in Singapore. On the other hand, the same format of values was used with the effects of e-payment on growth.

The Multiple Linear Regression Model was used to identify whether the independent and dependent variables mentioned have a direct or indirect relationship with one another. This allows researchers to assess and investigate the relationship's strength between the dependent variables and various predictor variables (Petchko, 2018). Furthermore, GRETL Software was used to generate the Multiple Regression Model and run different econometric tests. This is the first complete econometric software package to be released under the GNU software license (Baiocchi and Distaso, 2003).

*C. Estimation Procedure*

OLS models are generated to study the effect of bank liberalization and e-payments using GDP growth and Finance, SNA.

➤ *The models that were used in this study are derived from the following functions:*

$$RGDPg_{PH} = \beta_0 + \beta_1 DR_{PH} + \beta_2 ER_{PH} + \beta_3 FDI_{PH} + \beta_4 IRS_{PH} + \beta_5 LR_{PH} + \beta_6 FN_{PH} + \beta_7 FS_{PH} + \varepsilon$$

Eq. 1. Equation on the Effect of Bank Liberalization on Real GDP growth in the Philippines

Where:

- $RGDPg_{PH}$ – Real GDP growth in the Philippines
- $\beta_0$ – y-intercept
- $\beta_1 DR_{PH}$ – Regression Coefficient of Deposit Rate in the Philippines
- $\beta_2 ER_{PH}$ – Regression Coefficient of Exchange Rate in the Philippines
- $\beta_3 FDI_{PH}$ – Regression Coefficient of Foreign Direct Investment in the Philippines
- $\beta_4 IRS_{PH}$ – Regression Coefficient of Interest Rate Spread in the Philippines

- $\beta_5 LR_{PH}$ – Regression Coefficient of Lending Rate in the Philippines
- $\beta_6 FN_{PH}$ – Regression Coefficient of Foreign Number in the Philippines
- $\beta_7 FS_{PH}$ – Regression Coefficient of Foreign Share in the Philippines
- $\varepsilon$ – Residual

$$RGDPg_{SG} = \beta_0 + \beta_1 DR_{SG} + \beta_2 ER_{SG} + \beta_3 FDI_{SG} + \beta_4 IRS_{SG} + \beta_5 LR_{SG} + \beta_6 FN_{SG} + \beta_7 FS_{SG} + \varepsilon$$

Eq. 2. Equation on the Effect of Bank Liberalization on Real GDP growth in Singapore

Where:

- $RGDPg_{SG}$ – Real GDP growth in Singapore
- $\beta_0$ – y-intercept
- $\beta_1 DR_{SG}$ – Regression Coefficient of Deposit Rate in Singapore
- $\beta_2 ER_{SG}$ – Regression Coefficient of Exchange Rate in Singapore
- $\beta_3 FDI_{SG}$ – Regression Coefficient of Foreign Direct Investment in Singapore
- $\beta_4 IRS_{SG}$ – Regression Coefficient of Interest Rate Spread in Singapore
- $\beta_5 LR_{SG}$ – Regression Coefficient of Lending Rate in Singapore
- $\beta_6 FN_{SG}$ – Regression Coefficient of Foreign Number in Singapore
- $\beta_7 FS_{SG}$ – Regression Coefficient of Foreign Share in Singapore
- $\varepsilon$ – Residual

$$FSNA_{PH} = \beta_0 + \beta_1 MS_{PH} + \beta_2 IB_{PH} + \beta_3 CBP_{PH} + \varepsilon$$

Eq. 3. Equation on the Effect of E-Payments on Financial Services under the System of National Accounts in the Philippines

Where:

- $FSNA_{PH}$ – Financial Services in the Philippines
- $\beta_0$ – y-intercept
- $\beta_1 MS_{PH}$ – Regression Coefficient of Deposit Rate in the Philippines
- $\beta_2 IB_{PH}$ – Regression Coefficient of Exchange Rate in the Philippines
- $\beta_3 CBP_{PH}$ – Regression Coefficient of Foreign Direct Investment in the Philippines
- $\varepsilon$ – Residual

$$FSNA_{SG} = \beta_0 + \beta_1 MS_{SG} + \beta_2 IB_{SG} + \beta_3 CBP_{SG} + \varepsilon$$

Eq. 4. Equation on the Effect of E-Payments on Financial Services under the System of National Accounts in Singapore

Where:

- $FSNA_{SG}$ – Financial Services in Singapore
- $\beta_0$ – y-intercept
- $\beta_1 MS_{SG}$ – Regression Coefficient of Deposit Rate in Singapore
- $\beta_2 IB_{SG}$ – Regression Coefficient of Exchange Rate in Singapore
- $\beta_3 CBP_{SG}$ – Regression Coefficient of Foreign Direct Investment in Singapore
- Residual

The Augmented Dickey-Fuller Test was utilized to know the stationarity of the data set. To further examine the reliability of the generated OLS model, the researchers then utilized Belsey-Kuh Welsch Test, Breusch-Godfrey Test, Normality of Residual, Ramsey's RESET, Breusch-Pagan-Godfrey, and White Test to test for multicollinearity, autocorrelation, non-normality, specification errors, and heteroskedasticity.

## IV. RESULTS AND DISCUSSION

This study examined the effects of bank liberalization and e-payment on economic growth of the Philippines and Singapore. By using the multiple linear regression, the authors were able to determine the significant effects of these exogenous variables to real GDP growth for the period 1988 to 2022 and 2013 to 2022 per semester for bank liberalization and e-payment respectively. Moreover, the data were extracted from the Monetary Authority of Singapore, Bangko Sentral ng Pilipinas, Singapore Department of Statistics, and Philippine Statistics Authority, and The World Bank Organization.

*A. Ordinary Least Squares Model of Bank Liberalization in the Philippines*

➢ *Model 1: OLS, using observations 1990-2022 (T = 33)*
Dependent Variable: $RGDPg_{PH}$

Table 1 Regression Result for Bank Liberalization in the Philippines

| Variables | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 4.52744 | 0.505897 | 8.949 | <0.0001 | *** |
| d_l_DR$_{PH}$ | 6.30449 | 3.00420 | 2.099 | 0.0461 | ** |
| d_d_l_ER$_{PH}$ | −3.56092 | 5.93507 | −0.6000 | 0.5539 | |
| d_l_FDI$_{PH}$ | 0.737507 | 0.969768 | 0.7605 | 0.4541 | |
| d_l_IRS$_{PH}$ | 3.8463 5 | 4.24287 | 0.9065 | 0.3733 | |

| | | | | | |
|---|---|---|---|---|---|
| d_l_LR$_{PH}$ | −2.16499 | 8.31556 | −0.2604 | 0.7967 | |
| d_d_l_FN$_{PH}$ | −1.49294 | 1.99792 | −0.7472 | 0.4619 | |
| d_l_FS$_{PH}$ | −5.26709 | 2.47093 | −2.132 | 0.0430 | ** |

| | | | | |
|---|---|---|---|---|
| **Mean dependent var** | **4.283112** | | **S.D. dependent var** | **3.306091** |
| Sum squared resid | 191.1672 | | S.E. of regression | 2.765264 |
| R-squared | 0.453445 | | Adjusted R-squared | 0.300410 |
| F(7, 25) | 2.963011 | | P-value(F) | 0.020949 |
| Log-likelihood | −75.80954 | | Akaike criterion | 167.6191 |
| Schwarz criterion | 179.5911 | | Hannan-Quinn | 171.6473 |
| rho | 0.240623 | | Durbin-Watson | 1.508044 |

The positive value of the constant at 4.527 implies that the Real GDP Growth is upward-sloping. The following patterns were observed using the different indicators to detect bank liberalization's effect on economic growth. Deposit Rate, a financial indicator, has a positive and significant impact at 6.304. Foreign share and foreign number, both an assessment of the effect of foreign participation, negatively impact economic growth. Additionally, only the former shows a significant result. This contradicts that of Hunegnaw (2021), which claims that foreign participation positively affects economic growth.

Though exchange rate, foreign direct investment, interest rate spread, and lending rate show insignificant p values, their coefficients' coefficients still show similar patterns with published journals. In line with the study of Igbinovia et al. (2023), the exchange rate is negatively correlated with economic growth. On the other hand, d_l_FDI$_{PH}$ positively contributes to RGDPg$_{PH}$, similar to the quantitative results of Saqib (2016), Huang et al. (2017), and Ilugbusi et al. (2020),

which highlights the variables' direct relationship with growth. Classens et al. (2001) did claim that the coefficient for Foreign Share exhibits a negative relationship with growth; however, based on the p-value of the regression, it was insignificant.

It can also be noted that most variables exhibit an insignificant p-value. This trend was also observed by Hye & Wizarat (2023) when observing liberalization's effect in the long run. Additionally, the negative relationship with economic growth can be backed up by Gamra (2009), which claims that full liberalization negative growth is associated with economic growth.

### B. Ordinary Least Squares Model of Bank Liberalization in Singapore

> *Model 2: OLS, using observations 1994-2022 (T = 29)*
> Dependent variable: RGDPgSG

Table 2 Regression Result for Bank Liberalization in Singapore

| Variables | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 4.30444 | 0.624039 | 6.898 | <0.0001 | *** |
| d_l_DR$_{SG}$ | 1.90890 | 3.60667 | 0.5293 | 0.6022 | |
| d_l_ER$_{SG}$ | −53.3016 | 13.6152 | −3.915 | 0.0008 | *** |
| d_l_FDI$_{SG}$ | 3.73686 | 1.17453 | 3.182 | 0.0045 | *** |
| d_IRS$_{SG}$ | 3.38625 | 4.46677 | 0.7581 | 0.4568 | |
| d_d_d_l_LR$_{SG}$ | 8.75269 | 3.97957 | 2.199 | 0.0392 | ** |
| d_d_d_l_FN$_{SG}$ | −27.6210 | 49.3955 | −0.5592 | 0.5820 | |
| d_d_d_d_d_d_FS$_{SG}$ | −0.119781 | 0.0914003 | −1.311 | 0.2042 | |

| | | | | |
|---|---|---|---|---|
| **Mean dependent var** | **5.170091** | | **S.D. dependent var** | **4.106516** |
| Sum squared resid | 192.5233 | | S.E. of regression | 3.027833 |
| R-squared | 0.592265 | | Adjusted R-squared | 0.456353 |
| F(7, 21) | 4.357717 | | P-value(F) | 0.004007 |
| Log-likelihood | −68.59658 | | Akaike criterion | 153.1932 |
| Schwarz criterion | 164.1315 | | Hannan-Quinn | 156.6189 |
| rho | 0.008094 | | Durbin-Watson | 1.901887 |

The regression outcomes presented in Table 4.2 highlight significant insights. The constant, standing at 4.304, signifies a baseline positive value for the dependent variable, holding all other variables constant. Conversely, the Exchange Rate coefficient (d_l_ER$_{SG}$) displays a noteworthy negative impact on Singapore's economic growth. This aligns with the findings of Igbinovia et al. (2023), which assert that an ascending exchange rate typically exerts an adverse influence

on economic growth. The study argue that the depreciation of the domestic exchange rate escalates production costs, curtails production capacity through the exchange rate pass-through effect, and suppresses the crucial potential for investment capacity vital to economic development. This outcome is further substantiated by Karahan (2020) in accordance with the perspectives of structuralist economists. On the other hand, Foreign Direct Investment (d_l_FDI$_{SG}$) and Lending

Rate were significant determinants of GDP Growth at 5 percent level of significance, implying that an increase in FDI and Lending Rate will directly increase the GDP Growth. This result with the findings of Saqib (2016), Huang et al. (2017), Ilugbusi et al. (2020), and Igbinovia et al. (2023). Moreover, both Deposit Rate ($d\_l\_DR_{SG}$) and Interest Rate Spread ($d\_IRS_{SG}$) has a positive and insignificant effect on economic growth. These findings were supported by Ilugbusi et al. (2020) and Munir (2013). Additionally, contrary to the study of Hunegnaw (2021) variables that considered foreign bank presence and penetration such as Foreign Numbers

($d\_d\_d\_l\_FN_{SG}$) and Foreign Share ($d\_d\_d\_d\_d\_FS_{SG}$) has a negative and significant effect on economic growth. This result was supported by Gamra (2009) which explains that full liberalization is associated with negative growth.

*C. Ordinary Least Squares Model of E-Payment in the Philippines*

➢ *Model 3: OLS, using observations 4-20 (T = 17)*
  Dependent variable: $d\_l\_l\_FSNA_{PH}$

Table 3 Regression Result for E-Payment in the Philippines

| Variables | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 0.00397014 | 0.000899921 | 4.412 | 0.0007 | *** |
| $d\_d\_d\_l\_l\_MS_{PH}$ | 0.687430 | 0.243716 | 2.821 | 0.0144 | ** |
| $d\_d\_d\_l\_l\_IB_{PH}$ | −0.00868611 | 0.0468721 | −0.1853 | 0.8558 | |
| $d\_d\_d\_l\_l\_CBP_{PH}$ | −0.170681 | 0.0462711 | −3.689 | 0.0027 | *** |

| | | | | |
|---|---|---|---|---|
| **Mean dependent var** | **0.003472** | | **S.D. dependent var** | **0.005253** |
| Sum squared resid | 0.000176 | | S.E. of regression | 0.003677 |
| R-squared | 0.601867 | | Adjusted R-squared | 0.509990 |
| F(3, 13) | 6.550793 | | P-value(F) | 0.006177 |
| Log-likelihood | 73.45342 | | Akaike criterion | −138.9068 |
| Schwarz criterion | −135.5740 | | Hannan-Quinn | −138.5755 |
| rho | −0.436539 | | Durbin-Watson | 2.514899 |

The positive and significant value of the constant at 0.00397 implies that the Philippine finance industry exhibits an upward trend under the system of national accounts, even when other factors are held constant. This suggests an inherent resilience and potential for sustained growth within the industry. To examine the effects of emerging e-payment methods on economic growth, different variables were analyzed, revealing distinct patterns. Card-based payments ($d\_d\_d\_l\_l\_CBP_{PH}$) demonstrated a significant negative correlation with economic growth, indicating that an increase in CBP transactions leads to a 0.171 decrease in the Philippine financial industry. This finding aligns with studies conducted in countries like the United Kingdom and Australia (Yusuf, 2016; Ravitumar et al., 2019; Aldaas, 2021). Conversely,

interbank transactions ($d\_d\_d\_l\_l\_IB_{PH}$) showed an insignificant negative impact on economic growth, while money supply ($d\_d\_d\_l\_l\_MS_{PH}$) exhibited a significant positive effect. These findings suggest that while interbank transactions may not directly influence economic growth, money supply plays a crucial role in fostering financial industry expansion. Moreover, this finding aligns with the study of Afaha (2019).

*D. Ordinary Least Squares Model of E-Payment in Singapore*

➢ *Model 4: OLS, using observations 2-20 (T = 19)*
  Dependent variable: $d\_l\_l\_l\_FSNA_{SG}$

Table 4 Regression Result for E-Payment in Singapore

| Variables | Coefficient | Std. Error | t-ratio | p-value | |
|---|---|---|---|---|---|
| const | 0.00135493 | 0.000361710 | 3.746 | 0.0019 | *** |
| $d\_l\_l\_l\_MS_{SG}$ | −0.0632359 | 0.134441 | −0.4704 | 0.6449 | |
| $d\_l\_l\_l\_IB_{SG}$ | 0.345557 | 0.211126 | 1.637 | 0.1225 | |
| $d\_l\_l\_l\_CBP_{SG}$ | 0.207002 | 0.0888415 | 2.330 | 0.0342 | ** |

| | | | | |
|---|---|---|---|---|
| **Mean dependent var** | **0.001519** | | **S.D. dependent var** | **0.000981** |
| Sum squared resid | 8.58e-06 | | S.E. of regression | 0.000756 |
| R-squared | 0.504501 | | Adjusted R-squared | 0.405401 |
| F(3, 15) | 5.090837 | | P-value(F) | 0.012541 |
| Log-likelihood | 111.8398 | | Akaike criterion | −215.6797 |
| Schwarz criterion | −211.9019 | | Hannan-Quinn | −215.0403 |
| rho | −0.024635 | | Durbin-Watson | 1.765413 |

The research findings indicate a positive and statistically significant constant value of 0.0014, suggesting an upward-sloping trend in the finance industry under the Singaporean national accounting system, all else being equal. Notably, in the context of the burgeoning e-payment landscape, akin to the Philippines, Card-Based Payment (d_l_l_l_CBP$_{SG}$) in Singapore demonstrates significance at a 5% level. This implies a direct and positive impact on economic growth. The robustness of this result finds support in the works of Aldaas (2021), Mushkudiani (2018), and Wong (2018). In contrast, both Money Supply (d_l_l_l_MS$_{SG}$) and Interbank (d_l_l_l_IB$_{SG}$) variables exhibit insignificance in relation to economic growth.

*E. Regression Diagnostics of Ordinary Least Squares Model of Bank Liberlization in the Philippines*

Table 5 Regression Diagnostic Result of Bank Liberalization OLS in the Philippines

| Diagnostic Tests | Results | Interpretation |
|---|---|---|
| Belsley-Kuh-Welsch collinearity diagnostic | - | No evidence of excessive collinearity |
| Augmented Dickey-Fuller Test | P-value is < 0.01 | No presence of unit root and the time series is stationary |
| Breusch-Godfrey test for first-order autocorrelation | P-value is > 0.01 | No presence of autocorrelation |
| Normality of Residual | P-value is > 0.01 | Residuals are normally distributed |
| Specification of Error | P-value is > 0.01 | No presence of misspecification |
| Heteroskedasticity - Breusch-Pagan-Godfrey Test | P-value is > 0.01 | No presence of heteroskedasticity |
| Heteroskedasticity - White Test | P-value is > 0.01 | No presence of heteroskedasticity |

*F. Regression Diagnostics of Ordinary Least Squares Model of Bank Liberlization in the Singapore*

Table 6 Regression Diagnostic Result of Bank Liberalization OLS in Singapore

| Diagnostic Tests | Results | Interpretation |
|---|---|---|
| Belsley-Kuh-Welsch collinearity diagnostic | - | No evidence of excessive collinearity |
| Augmented Dickey-Fuller Test | P-value is < 0.01 | No presence of unit root and the time series is stationary |
| Breusch-Godfrey test for first-order autocorrelation | P-value is > 0.01 | No presence of autocorrelation |
| Normality of Residual | P-value is > 0.01 | Residuals are normally distributed |
| Specification of Error | P-value is > 0.01 | No presence of misspecification |
| Heteroskedasticity - Breusch-Pagan-Godfrey Test | P-value is > 0.01 | No presence of heteroskedasticity |
| Heteroskedasticity - White Test | P-value is > 0.01 | No presence of heteroskedasticity |

*G. Regression Diagnostics of Ordinary Least Squares Model of E-Payment in the Philippines*

Table 7 Regression Diagnostic Result of E-Payment OLS in the Philippines

| Diagnostic Tests | Results | Interpretation |
|---|---|---|
| Belsley-Kuh-Welsch collinearity diagnostic | - | No evidence of excessive collinearity |
| Breusch-Godfrey test for first-order autocorrelation | P-value is > 0.01 | No presence of autocorrelation |
| Normality of Residual | P-value is > 0.01 | Residuals are normally distributed |
| Specification of Error | P-value is > 0.01 | No presence of misspecification |
| Heteroskedasticity - Breusch-Pagan-Godfrey Test | P-value is > 0.01 | No presence of heteroskedasticity |
| Heteroskedasticity - White Test | P-value is > 0.01 | No presence of heteroskedasticity |

*H. Regression Diagnostics of Ordinary Least Squares Model of E-Payment in Singapore*

Table 8 Regression Diagnostic Result of E-Payment OLS in Singapore

| Diagnostic Tests | Results | Interpretation |
|---|---|---|
| Belsley-Kuh-Welsch collinearity diagnostic | - | No evidence of excessive collinearity |
| Breusch-Godfrey test for first-order autocorrelation | P-value is > 0.01 | No presence of autocorrelation |
| Normality of Residual | P-value is > 0.01 | Residuals are normally distributed |
| Specification of Error | P-value is > 0.01 | No presence of misspecification |
| Heteroskedasticity - Breusch-Pagan-Godfrey Test | P-value is > 0.01 | No presence of heteroskedasticity |
| Heteroskedasticity - White Test | P-value is > 0.01 | No presence of heteroskedasticity |

Tables 5, 6, 7, and 8 show the regression diagnostics of the models utilized in this study. The diagnostic tests on every regression model revealed satisfactory results, indicating its robustness and reliability. Though the significance of the regression models is at 5%, the authors of this study wanted more convincing evidence for a Best Linear Unbiased Estimator.

The augmented Dickey-Fuller (ADF) test, employed to assess stationarity, yielded p-values less than the 1% significance level for all variables, confirming that the time series data is stationary. From the p-values, it implies that the data's mean and variance remain constant, rendering it suitable for regression analysis. Though necessary, this was not used when analyzing the data in e-payment as seen in Table 4.7 and 4.8 due to the limited periods in data because it is still a new and emerging field in the banking industry.

Furthermore, the Belsey-Kuh Welsch test, utilized to detect multicollinearity, produced values below the 1% significance level, suggesting the absence of multicollinearity in the model, which indicates that the independent variables are not highly correlated, allowing for an accurate estimation of their effects on the dependent variable.

The Breusch-Godfrey test also examined the presence of autocorrelation in the residuals of the regression model. The obtained p-value exceeded the 1% significance level, implying the absence of first-order autocorrelation, upholding the assumption of independence of residuals.

In testing the residuals' distribution, the p-value surpassed the 1% significance level, indicating that the residuals are normally distributed. This assumption is crucial for the validity of various statistical tests, including the t-test and the F-test.

Moreover, the Ramsey RESET test was conducted to detect any misspecification in the regression model. The test revealed that the p-values for squares and cubes exceeded the 1% significance level, suggesting the absence of misspecification. This means that the model is correctly specified and incorporates all relevant variables.

The Breusch-Pagan-Godfrey test was employed to assess the presence of heteroskedasticity. The obtained p-value surpassed the significance level of 1%, indicating the absence of heteroskedasticity in the residuals of the regression model. This means that the variance of the residuals is constant, upholding the assumption of homoscedasticity.

Finally, the White test, another test for heteroskedasticity, was conducted. The resulting p-value exceeded the significance level of 1%, confirming heteroskedasticity's absence. This corroborates the findings of the Breusch-Pagan-Godfrey test.

## V. CONCLUSION AND RECOMMENDATION

This study focuses on the effects of Bank Liberalization on Economic growth. Since liberalization brought about the emergence of e-payment, the authors also analyzed its relationship with Finance SNA, a national account under GDP.

The proponents of this study used seven exogenous variables, namely deposit rate, exchange rate, foreign direct investment, interest rate spread, lending rate, foreign number, and foreign share, to capture the financial indicators and the foreign participation embedded in bank liberalization from periods 1988 to 2022 for to evaluate its long-term economic effects.

With the technological adoption associated with bank liberalization, money supply, interbank, and card-based payment were the variables used to analyze e-payments from 2013 to 2022 per semester due to considerations regarding the cost and availability of data.

The Philippines exhibits a complex relationship with bank liberalization since different indicators of deregulation show positive and negative associations. Significant findings show a positive correlation between deposit rates and GDP growth. Furthermore, the negative influence of financial share might indicate that financial market participation have its adverse effects. It deviates from many claims that bank liberalization is associated with the growth of an economy. However, it was observed that full and long-term and full liberalization is associated with negative effects.

In Singapore, the country's exchange rate, FDI, and lending rate were the significant variables. An inverse relationship exists between the exchange rate and the growth in an economy. On the other hand, FDI and lending rates both exhibit a positive correlation. These findings allow the authors to understand bank liberalization's implications further.

The effect of e-payment also exhibited the significance of these emerging systems on economic growth. In the Philippines, card-based payment and money supply significantly correlate with the dependent variable, showing a negative and positive coefficient, respectively. Interbank transactions, on the other hand, had an insignificant impact on FSNA.

Singapore showed a positive coefficient with card-based payment and a negative coefficient with money supply. Though the results differ from those of the Philippines, they are backed up by existing literature. In terms of significance, only the card-based payment variable exhibited this. Lastly, interbank also shows an insignificant correlation with FSNA.

Findings from this study highlight the possible varying effects on economic growth depending on the income category of a county. This research will allow for an understanding of the intricacies of the financial system and its impact on economic growth.

Future researchers should explore other areas of bank liberalization, such as market structure, financial inclusion, financial stability, and stock market indicators, to capture its complexity. The potential for a more extensive study could also be conducted on one area of bank liberalization, just like the technological adoption undertaken in this research focusing on e-payments. Furthermore, other variables for e-payments can also be explored such as FAST, swift, and QR code payments emergence.

Since the periods utilized in e-payment regression analyses are limited to only 2013-2022 due to the emergence of these new technological advancements, the authors suggest conducting another study with longer periods to validate the researchers' claim. The poverty gap index can also be used as the independent variable to measure the depth of poverty, substitute for GDP, and assess economic growth.

Lastly, when studying the effect of bank liberalization and e-payments on different countries, a middle-level income country can be added to create a solid grasp of its effects. ASEAN 5, namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand, can be simultaneously regressed to capture the possible effect of the diverse cultures and policies.

*A. Policy Implications: Bank Liberalization*

As measured by the deposit rate, the Philippines' bank liberalization effect exhibits a positive correlation. Through interest rate regulation, it can influence capital accumulation and encourage savings. However, when considering the foreign share, based on the regression results, it contradicted the expected higher economic growth. Policies related to financial market regulations and participation need to strike a balance to ensure that the expansion of the financial sector does not lead to negative externalities that hinder economic growth. Additionally, full and long-term bank liberalization are possible contributors to this adverse effect; therefore, countries still liberalizing their financial industry might consider a gradual and well-regulated process.

In terms of Singapore's exchange rate, another measure of bank liberalization, an inverse relationship exists with economic growth. As the exchange rate lowers, GDP growth increases. When foreign banks penetrate Singapore, exchange rate policies change along with the restrictions set by the central bank. These influence Singapore's international trade competitiveness. Furthermore, the positive correlation of FDI and lending rates may be due to the existing policies in Singapore, like their financial sector regulation and pro-business environments, which attract foreign investors.

*B. Policy Implications: Electronic Payment*

The study on the effects of electronic payments on economic growth revealed contrasting implications for Singapore and the Philippines. In the Philippines, the findings suggest that a reduction in card-based payments (CBP) could stimulate economic growth. Consequently, the government should consider implementing policies that discourage CBP and promote alternative payment methods like interbank transfers and mobile wallets. This could involve financial incentives and disincentives, along with infrastructure investments. Additionally, ensuring the accessibility of these methods in rural areas is crucial.

Conversely, the study demonstrated a significant positive correlation between CBP and economic growth in Singapore. This implies that an increase in CBP transactions fosters economic growth, aligning with findings from other countries like the United States and South Korea. In response, the Singaporean government should continue promoting CBP adoption through various financial incentives and disincentives, such as tax benefits for businesses that accept CBP. Furthermore, investing in CBP infrastructure, such as expanding card terminal networks and simplifying online payment acceptance, could further enhance economic growth.

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