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What Effect does Financial Inclusion have on Economic Development
within Sweden, Botswana, and India?
- A comparison

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Period: Spring 2022

Abstract

This study examines the relationship between financial inclusion and income level by identifying three different countries' income levels. It also investigates the differences as well as the similarities between these countries' to add further knowledge. Data from the World Bank and Financial Access Survey [FAS] over the period 2018 – 2020 period is applied to a two-staged Principal Component Analysis. Six variables that help to explain financial inclusion are divided into three dimensions which contain two variables each. The findings show that Sweden as a high-income country performs best with the highest score of financial inclusion. India with the lowest income level performs second best and thereafter Botswana, as the upper-middle-income country, is the country with the lowest level of financial inclusion. The results suggest that there is a relationship between financial inclusion and income level. However, it also implies that other factors than financial inclusion may have an essential effect on income level depending on the country's condition.

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1. Introduction

1.1 Background

Financial inclusion is a broad concept that includes the factors of availability, quality, and equality within the financial system of nations. The primary purpose of financial inclusion is to offer every individual in society fundamental financial services without discrimination (Sarma, 2012). Over the years, financial inclusion has become a more essential factor for enduring development. It's believed that access to financial services and economic opportunities are linked and thus can have a positive effect on the poor since it allows them to invest, save and take out credits. When the majority of people have access to formal financial services, the efficiency of economic development increases as well as the financial system (Truc Huong Nguyen, 2020). There is plenty of research that discusses the impact of financial services on income and development. It is vital to raise this question mainly for regulators, policymakers, and non-governmental organizations to increase awareness and further improve the lives of the poor. These different formal institutions offer financial services but in many poor countries, it's rather informal financial services that are more accessible, such as moneylenders (Pande, Cole, Sivasankaran, Bastian, Durlacher, 2010).

A high level of financial inclusion is believed to promote a higher level of economic welfare within countries. To assess whether this statement is correct, the economic landscapes of Sweden, Botswana, and India are examined. The reason for these three countries is because the interest lies in finding differences, if there are any, between countries in different stages of their economic development. This analysis is conducted by constructing an index of financial inclusion and thereafter analyzing whether there is a relationship between the measured level of financial inclusiveness and the countries' level of income. In order to do so, we closely evaluate earlier studies and their interventions, methodologies, and most importantly their process of analysis. The financial inclusion index is derived from earlier studies by Sarma (2012), Cámara et al. (2014), and Thi Truc Huong Nguyen (2020). The aim is to further comprehend what is known about financial inclusion but also look at what remains to be learned.

1.2 Purpose

The purpose of this study is to examine whether the level of financial inclusion within countries affects the level of income in these countries. It is of interest to analyze countries with different economic backgrounds, and this is the reason behind the selection of the countries Botswana, India, and Sweden. Since the area of financial inclusion is vague, it is believed among economists that the different aspects of the subject are difficult to capture in models. Therefore, empirical results may differ depending on which countries and variables that are examined. Our study aims to fill the empirical gap concerning the relationship between financial inclusion and economic development within Sweden, India and Botswana.

Earlier studies have shown that multiple factors, such as economic development, affect income level. The reason behind this is that increases in GDP is related to increased output levels and thereby increased income levels. Several economists also believe that financial inclusion affects the level of income within nations and this study aims to answer whether or not this statement is accurate. By focusing on one factor, financial inclusion, a more detailed explanation of income level has been made. This has led to a better comprehension and awareness of how to change behavior for the better and tackle different problems that might arise.

Further, since it is believed that there is a relationship between the level of financial inclusion and the level of economic development within countries, it is of interest to examine countries with different historical and economical backgrounds. Therefore, the countries that have been chosen to be examined in this study are Botswana and India and Sweden. Sweden is a high-income economy, India is a lower-middle-income economy and Botswana is considered an upper-middle-income economy (World Bank, 2022). The purpose is to analyze similarities and differences concerning the level of financial inclusion between these countries. It is also of interest to give rise to a discussion about the relationship between financial inclusion and economic development. .

1.3 Research Question

As previously stated, the purpose of this study is to gain a greater understanding of how financial inclusion affects income levels. To answer this question, the following research question has been asked:

- What effect does financial inclusion have on economic development within Sweden, Botswana, and India?

1.4 Structure of the study

This study is structured as a standard academic research paper with the following titles stated in the table of content. The next section is the theoretical framework and literature review where two of the main sources used in this study are discussed more thoroughly.

Understanding the theory helps to easily follow along the method as well as the results since these researches have laid the foundation for this study. The countries' landscapes and current and past states and conditions are touched upon briefly as well as the concept of financial inclusion, and the relationship between financial inclusion, and economic development, so readers can get a better view of what to expect from the results. Then data and methodology are discussed and provide information about where the data is collected and the method being used. The results are then presented with tables and a discussion is made to further analyze the results and connect it with earlier studies. A conclusion is drawn from the analysis and lastly, future studies are mentioned to shed light on the limitations of the studies and inspire further studies on this topic.

2. Theoretical Framework and Literature Review

This section contains a review of previously made studies on the topics of economic development and financial inclusion. First, a definition of the concept of financial inclusion is provided followed by a description of the economic landscape of the countries Botswana, Sweden, and India. Thereafter, the concept of financial inclusion is discussed in relation to financial development and economic growth. Lastly, previously made studies on the concept and creation of a financial index are presented.

2.1. The Concept of Financial Inclusion

According to the World Bank (2022), financial inclusion is defined as the usage, accessibility, and affordance of financial products within nations. Financial inclusion is believed to be of high importance for many nations around the world and as reported by the World Bank, financial inclusion is considered necessary for the achievement of 7 of the 17 sustainable development goals. In addition, a sustainable level of financial inclusion is believed to promote growth within families and businesses and the World Bank Group believes it will help reduce poverty and also promote profitability nationwide.

When there is a well-functioning financial system, financial integration can contribute to developing a culture among the rural population to save more and create a good foundation for nurturing prosperity. More low-income groups get into the perimeter of formal banking sectors and financial inclusion can help to protect their financial wealth. Access to formal credit becomes easier with the help of financial integration as the exploitation of vulnerable lenders is reduced.

Financial inclusion is a multidimensional concept and therefore only applying some indicators and variables will not capture the entire definition of financial inclusion. These indicators can give out some information about the financial system. Multiple studies have tried to set a measurement that would be able to capture the financial inclusion system by

using a Financial inclusion index. Sarma (2012) has used this method to produce an index that would engage a multidimensional approach. Although, the study has been criticized because the weights are assigned to all variables based on the experience and intuition of the authors.

2.2 The Economic Landscape in Botswana, India, and Sweden

Further, to be able to provide a relevant discussion of financial inclusion in relation to economic development, it is believed to be of relevance to discuss the economic landscape of the chosen countries of Botswana, India, and Sweden. According to data provided by the World Bank (2022), India is classified as a lower-middle-income economy while Botswana is considered to be an upper-middle-income economy and Sweden is a high-income economy. This classification is based on the gross national income [GNI] per capita during the year 2020 and the range within these classifications is as follows,

- A GNI per capita of between \$1,046 and \$4,095 is associated with lower-middle-income economies.
- A GNI per capita between \$4,096 and \$12,695 is associated with upper-middle-income economies.
- A GNI per capita of \$12,696 or more is associated with high-income economies.

In this study, the classification of the countries of interest has been made accordingly.

2.2.1 Sweden

Sweden, as stated before, is a high-income country and has been relatively stable over the last few decades. Although, between the late 1980s and early 1990s there was high inflation and low growth which caused the local currency, the krona, to devalue. Because of the crisis in the early 1990s, Sweden suffered from high unemployment rates and government spending, as well as the national debt increased sharply as the banks were unstable. It took time and a strong dedication to reinvest in its economic governance by setting multiple regulations. Today, Sweden is highly competitive and is an open economy. Sweden has been able to be successful because of its liberal and open approach to trade and its way of doing business (World Bank, 2022).

Further, The financial sector in Sweden has become of fundamental importance for the economy regarding business as well as private life. For the system to be successful, it needs

to be reliable and efficient. Because the population has trust in the government, it results in a higher level of trust against several kinds of transactions associated with i.a. saving and lending. The level of financial inclusion is very high in Sweden and most people can reach and use different kinds of financial services easily. Yet, new issues have come to the surface resulting in a new form of financial exclusion. Manisha Patel (2018) mentions that the number of cash users is decreasing sharply and that more stores and shops no longer offer cash payments. Consequently, many elders and disabled people have found it hard to adapt to the new system, as they, according to Patel, mostly rely on cash. This cause is quite paradoxical because it results in exclusion within a high financial inclusion society.

2.2.2 Botswana

Botswana is ranked as a middle-income country according to the World Bank (2022). Since 1966, when Botswana was considered to be one of the world's poorest countries, the country has elevated and become instead one of the world's most successful stories of development. Despite this fact, the economic transformation has been slow. Reasons for that are believed to be due to the stagnant economic diversification and partly because of minerals, such as diamonds, affecting revenue negatively. However, together with development, poverty has reduced significantly and the living condition has improved. The cause of this upturn is believed to be linked to improved shared prosperity (World Bank, 2022).

Further, because of the robust growth, a sizable market can be made for financial services such as insurance, banking, and so on. According to BITC (Botswana investment and trade center), (2021), Botswana has an international services center (IFSC) that promotes regional and international banks, insurance companies, international business firms, and investment funds. At the beginning of 2015, banking assets stood for almost 50% of the country's GDP. Compared to other countries in Africa, Botswana has a more developed banking sector with a higher level of penetration among its population. The banks in Botswana ensure money stability and a stable financial system creating financial well-being in the country.

2.2.3 India

Lastly, India represents a low-income nation but has recently shown remarkable progress in reducing its poverty level. India has also had a strong record of economic growth which reaches over four decades. However, due to weaknesses within the financial sector, growth in

private consumption decelerated to 4%, resulting in a decline of 3.2% percentages between 2017 and 2020 (World Bank, 2021).

Due to India's large population, it is ranked as one of the largest non-bank populations where i.e. only 35% of adults have an account in financial institutions (World Bank, 2021). There are multiple reasons for this and one of them is the lack of enough money while the second most common reason is that at least one family member already has an account. Due to high costs, large distances, and lack of necessary documentation, a barrier is created for these non-banked people who would otherwise have acquired an account.

Further, the Post Bank of India has addressed the country's lack of bricks and building infrastructure. This is discussed by Shamika Ravi (2019) as he presents this lackness as one of the reasons for the high level of financial exclusion within the Indian population. According to Ravi, Self Help Group (SGHs) and microfinance organizations (MFIs) play an important role in providing loans to the poor in India. Therefore, interventions and innovations have been proposed in the hope of reducing the barriers to accessing financial institutions while also creating banking services near people that need them (Shamika Ravi, 2019).

Ravi (2019) continues by explaining that to understand why there might be financial exclusion, certain sections of society need to be taken into consideration. Vulnerable people, such as women, the poor, and rural populations, are usually not included in wage-earning employment opportunities. Consequently, these sections have minimal access to formal financial services which makes them dependent on informal mechanisms. These informal mechanisms include friends and family, and these sources are usually insufficient and unreliable. As a result, substantial opportunity costs are imposed on those who suffer from it the most and this is highly prevalent in India where a large part of the population lacks financial inclusion. Lastly, Ravi also mentions that a bad equilibrium can occur when there are high transaction costs as well as information asymmetries and this will make it difficult to escape. This has been the case in India for a long while and extensive changes need to be done to prevent the financial inclusion that prevails within the nation.

2.3 Financial Inclusion in Relation to Economic Development

A further discussion on the topic is made by Omar and Inaba (2020) and in their study, they focus on the counteracting impact financial inclusion has on poverty and inequality within societies. Omar and Inaba begin by explaining the huge negative impact financial exclusion has on the excluded groups within society in the form of i.a. loss of accumulation of wealth. Further, they explain how a higher level of financial inclusion may help to reduce these inequalities and this is specially made by offering vulnerable groups such as low-income families and women access to financial services. They also state that there is evidence supporting that financial inclusion reduces inequalities and poverty within societies.

To test whether this statement is accurate, Omar and Inaba (2020) continue by presenting their model that is used for defining whether a positive relationship between financial inclusion and poverty reduction exists in developing countries. By using different models based on regression analysis, they determine the factors that affect the level of financial inclusion and also examine the relationship between poverty and financial inclusion and also between income inequality and financial inclusion. The results from their study are that variables such as real GDP per capita and the ratio of internet users have a positive impact on the level of financial inclusion in developing countries while variables such as inflation and income inequality have the opposite effect. The conclusion that is made from these results is that countries with a higher level of financial inclusion reduce income inequality and poverty in developing countries. However, they clearly state that their conclusion is merely accurate for nations as a group and that further research must be made for understanding the disparity among individual countries.

Another important aspect of the subject concerns the relationship between financial inclusion and economic development and whether the further impacts the latter or vice versa.

According to Musembi and Chun (2020), some economists believe that financial inclusion drives economic development while others believe that economic development creates the path for a higher level of economic development due to a higher demand for financial services. According to Musembi and Chun, there exists a mutual relationship between the two concepts, but it is believed that financial inclusion plays an important role considering long-term economic growth.

To examine whether this statement is accurate or not, Musembi and Chun (2020) have made a study on the relationship between long-term economic development and financial inclusion in

Kenya. They do this by conducting a regression where the real *GDP per capita* is the response variable whereas variables such as i.a. *bank claims on the private sector*, *broad money*, *mobile money*, and *investment* are the explanatory variables. The results from the study show that there exists an evident relationship between financial inclusion and economic development in the long run in Kenya. Their result suggests that some variables such as i.a. *bank claims on the private sectors* have a positive impact on economic growth because a higher level of availability of banking credit is believed to stimulate investments and economic activity. However, other factors such as *broad money* have a negative impact on long-term economic development due to excess money supply. Therefore, Musembi and Chun believe that the relationship between financial inclusion and economic development is mutual and that policymakers must keep this in mind while creating future strategies in developing countries.

2.4 The Creation of an Index of Financial Inclusion - Earlier Made Studies

As mentioned, the concept of financial inclusion is of importance in many countries around the world. However, according to Sarma (2012), there have not previously existed any widely recognized measurements suitable for calculating the level of financial inclusion within nations. In her study, *Index of Financial Inclusion – A measure of financial sector inclusiveness* (2012), she attempts to fill this scientific gap by presenting a method of calculating an index of financial inclusion. She starts by discussing the relationship between financial development and financial inclusion and she states that there is evidence suggesting that these concepts can not be used interchangeably. The reason for this is that there are nations that are considered to be financially developed while lacking an extensive financial system that reaches the entire population. Further, Sarma continues her discussion by describing the concept of financial exclusion. This concept can be viewed from different aspects and these are access-, condition-, price-, marketing- and self-exclusion. According to Sarma, the existence of these aspects is one of the reasons behind the multi-dimensionality of financial inclusion.

Thereafter, Sarma (2012) states that a suitable approach would be to create an index that captures different aspects of financial inclusion and this is discussed to a further extent by her creation of dimensions. While constructing these dimensions, she uses data from the Global Findex Database provided by the World Bank in 2012. The first dimension is called “Banking

Penetration” and this captures the extent to which the financial system is spread among its users. The variable that is contained by Sarma in this dimension is “the number of deposit bank accounts per 1000 adult population”. The index of this dimension is believed to be 1 if every person in a nation has a bank account and 0 if nobody has an account. The second dimension is named “Availability of banking services” and this captures the accessibility of banking services. The index of this dimension will be 0 if there is no way of accessing financial services within a nation and 1 if the accessibility is infinite. The variables used by Sarma in this dimension are “The Number of Bank Branches per 100,000 Adults” and “The Number of ATMs per 100,000 Adults”. Lastly, the third dimension is named “Usage” and this is believed to capture the extent to which individuals use banking services and also the utilization of this usage. The variables used by Sarma while constructing this dimension are “the volume of credit to adult individuals as % of GDP” and “the volume of deposit to adult individuals as % of GDP”.

Lastly, Sarma (2012) use these dimensions and conducts the test for the index financial inclusion by using the following formula:

$$d_i = w_i \frac{A_i - m_i}{M_i - m_i} \quad (\text{Eqs. 1})$$

where,

w_i is equal to the weight attached to the dimension

A_i is equal to the observed value of the dimension

m_i is the pre-specified value of the lower limit

M_i is the pre-specified value of the upper limit.

Thereafter, the index of financial is calculated by using the following formulas:

$$X_1 = \frac{\sqrt{d_1^2 + d_2^2 + \dots + d_n^2}}{\sqrt{w_1^2 + w_2^2 + \dots + w_n^2}} \quad (\text{Eqs. 2})$$

$$X_2 = 1 - \frac{\sqrt{(w_1 - d_1)^2 + (w_2 - d_2)^2 + \dots + (w_n - d_n)^2}}{\sqrt{w_1^2 + w_2^2 + \dots + w_n^2}} \quad (\text{Eqs. 3})$$

$$IFI = \frac{1}{2} [X_1 + X_2] \quad (\text{Eqs. 4})$$

While assigning the weights to each dimension, Sarma uses a nonparametric approach and assigns weights based on her own assumptions. The index for banking penetration is assigned the weight of 1 while the other indexes for availability and usage are assigned the weight of 0.5 each. After constructing the analysis, Sarma presents a table of the results where the index of financial inclusion between the years 2004 and 2012 is presented for 94 countries.

Another study made on the topic is the one conducted by Huong Nguyen (2020). His study is based on the one made by Sarma but he uses a two-stage PCA while constructing his index of financial inclusion. To understand and present an index, Huong Nguyen's study on financial inclusion has been used as a valuable source. Measuring FI is one step towards increasing awareness of FI and thus studying the effect of different initiatives by stakeholders is important. In the study, mobile phones and their services are highlighted and seen as important tools for financial inclusion. In many developing countries, mobile money accounts have become essential for conducting financial transactions. With new data, it made it possible to conduct a FI index that includes mobile money indicators and in that way fill in the research gap.

Further, Huong Nguyen's study attempts to construct a FI index that will measure the level of FI in 41 different developing economies and rank them. A two-stage PCA method is used to answer the main research question and conduct a FI index. The data used is from Financial Access Survey (FAS) and Global Findex database of WB for the period 2012-2018. Because of missing data these years have been selected so that more complete and consistent variables are presented. FI is often measured using the nonparametric method or the parametric method. The difference lies in how the weights are chosen. Non-parametric assign the relevant of indicators by having the weights exogenously. In his study, a parametric method has been chosen to find appropriate weights because weights are sensitive.

The FII is linearly and determined as the following:

$$FII_i = w_1 Y_i^p + w_2 Y_i^a + w_3 Y_i^s + e_i \quad (\text{Eqs. 1})$$

Three dimensions are being used, penetration, availability, and usage. Penetration represents access to financial inclusion and emphasizes the importance of it penetrating broadly among

those who use it. The variables used to measure this dimension are outstanding deposit and mobile money accounts. The formula is the following:

$$Y_i^p = \beta_1 \textit{outstanding deposit} + \beta_2 \textit{mobile money accounts} \quad (\text{Eqs. 2})$$

The second dimension represents availability which means the financial system and services must be easily available to users. The variable presented for this dimension is the number of branches and ATMs per 100,00 adults and mobile money agent outlets per 100,00 adults. The following formula is used:

$$Y_i^a = \theta_1 \textit{branches} + \theta_2 \textit{ATM} + \theta_3 \textit{mobile money agents} \quad (\text{Eqs. 3})$$

The last dimension is usage which tells us how people take advantage of different financial services. Variables used in his study are outstanding deposits (% of GDP), outstanding loans (% of GDP), and mobile money transaction value (% of GDP). The formula used is:

$$Y_i^s = \gamma_1 \textit{deposit} + \gamma_2 \textit{loans} + \gamma_3 \textit{mobile money transactions} \quad (\text{Eqs. 4})$$

In the first stage PCA, the study estimates the three dimensions. Get calculation on eigenvalues for each sub-index and the highest eigenvalue, an eigenvalue higher than, is used in the analysis. The weights are later assigned to the equations given for the three dimensions. To examine if the factors are appropriate, a Kaiser-Meyer-Olkin (KMO test) is performed where the test is believed to be suitable when the KMO-score is higher or equal to 0.5. The second stage PCA is performed in the same way but instead, the weights are assigned to the equation that gives the FI index Huong Nguyen (2020).

In conclusion, Huong Nguyen's study sheds light on the importance of FI in the economy and can help policymakers and communities to see it that way too. Mentioned that the World Bank has revealed that enhancing FI can boost the GDP for the economies used in the study by 6% which results in 3.7 trillion dollars by 2025. Due to the growing financial market in terms of financial revenue and value, a lot of people are excluded from the financial system where most of these consist of the population in developing countries. It is therefore important to improve access to and build FI systems that also include the poorest population in the financial flow.

3. Data

This study is constructed using data from the Financial Access Survey [FAS] made by the International Monetary Fund [IMF]. This survey contains data from 190 countries and it ranges from the year 2004 until 2020. However, due to the lack of data from several countries, this study has its basis on data from 65 countries within the period 2018-2020. However, in this study, the FII is only calculated for the countries of Sweden, Botswana, and India. The reason behind this selection within the full dataset is that it is believed to be more accurate to construct an index that is merely based on a complete and consistent sample set. The countries that are contained in the sample data are listed in Appendix - Table A1.

4. Methodology

4.1 Principal Component Analysis - A Two-Stage PCA

As stated before, this study develops a financial inclusion index (FII) using Principal component analysis (PCA). PCA is described by Abdi and Williams (2010) as a method of analyzing a large data set consisting of inter-correlated dependent variables and transforming these into new variables, named principal components. The information captured by the several original variables is captured by the new principal components. While conducting a factor analysis, several principal components may appear as a result. However, the ones that are believed to capture the input data most accurately are the ones with an eigenvalue higher than one. Therefore, the only principal components used in this study are the ones that give a value higher than one. To summarize the PCA method, it can be described as the transformation of a large data set into a smaller one that still contains most of the information from the larger set.

In this study, a two-stage PCA is conducted. This means that a first-stage PCA is conducted using dimensions and thereafter an additional PCA is constructed where the results from the first stage-PCA are weighted and used as input. The two-stages can be described as follows:

- *The first stage of PCA:* An estimate of the three different dimensions; banking penetration, availability and additional services is done. The three dimensions

Y_i^p, Y_i^a, Y_i^s are unobserved endogenously and β, Θ, γ represents the parameters. This is used to estimate the index through the principal components that represent a linear function of the explanatory variable. For a clearer understanding, a table of the variables used in this study is provided below.

- *The second stage of PCA:* In this stage, the same approach and method is used, as stated previously. By replacing Y_i^p, Y_i^a, Y_i^s with the assigned weights from PCA into the first equation, the FI index is given.

To be able to perform a PCA, an important criteria needs to be filled and determines if the method can be used. Therefore while conducting these analyses, a Kaiser-Meyer-Olkin (KMO) score is provided as a part of the results. These scores represent how suitable the method of factor analysis is for the current data set. Scores over 0.5 are believed to prove suitability of factor analysis for data sets (Huong Nguyen, Thi Truc (2020)).

4.2 Measurement Variables and the Creation of Dimensions

There are two measures of FII that are used to obtain the index, non-parametric and parametric methods. As Hougng Nguyen (2020) mentioned, the difference between these two is that non-parametric methods use weights exogenously by assigning the indicators with the most influence. Although, evidence has shown that indices can be very vulnerable to subjective weight allocation. The reason for that is that a change in weights, even minimal change, can rub the results easily and change the outcome of the study. Using a PCA method will help to solve the issue. This study therefore uses a PCA to find weights to fit the indicators and produce a FI index, parametric method. The linear equation that will be used is the following:

$$FII_i = w_1 Y_i^p + w_2 Y_i^a + w_3 Y_i^s + e_i \quad (\text{Eqs. 1})$$

where FII_i represent the combined FI index of country i

The weights are w_1, w_2, w_3 for each dimension

The error term is e_i

To compute FII, three separate dimensions were needed to be assigned:

$$Y_i^p = \beta_1 \textit{outstanding deposit} + \beta_2 \textit{loans}$$

(Eqs. 2)

$$Y_i^a = \Theta_1 \textit{branches} + \Theta_2 \textit{ATM} \quad (\text{Eqs. 3})$$

$$Y_i^s = \gamma_1 \textit{insurance} + \gamma_2 \textit{mobile and internet transaction} \quad (\text{Eqs. 4})$$

Dimension 1 - Banking Penetration

According to Sarma (2012), an important aspect of the financial system within countries is the one that captures the extensiveness and inclusiveness within the financial system. This can be measured by examining the number of people that are, in some way, included in the financial system. In this study, this aspect is believed to be captured by examining the level of outstanding deposits and loans from commercial banks and in the data, this is measured as a percentage of GDP. This measurement is believed to be suitable since it keeps into account the overall economic development within countries. Therefore, a high percentage of these variables indicates a high level of banking penetration concerning the countries' overall economic status.

Dimension 2 - Availability of bank services

Financial inclusion serves the purpose of easy access to banking services for those who want to use it. The indicators involved are banking outlets such as ATMs, branches, offices, and so on. This study has therefore used several ATM and bank branches to represent the availability of different bank services. According to Sarma (2012) ATMs have played a significant role in today's banking system in many different countries. ATMs allow deposit and withdrawal of cash and cheques as well as customers' bank account details. Consequently, both banks and other financial institutions are needed to measure access to the financial system. The more users, the better ground it sets for the financial system since the penetration is widely spread.

Dimension 3 - Additional services

There are additional services that affect the financial system within countries and the ones that are to be included in this study are the number of insurance corporations and the number of mobile and internet transactions made during the reference year. In the study made by Sarma (2012), she describes the third dimension as a usage dimension that captures how people use financial services. Further, in his study, Huong Nguyen (2020), chooses to capture

this dimension by also adding the aspect of mobile money transactions. In this study, the third dimension has been created by examining two additional variables while keeping the original purpose of the dimension in mind. Therefore, this dimension will differ from the studies made by Sarma (2012) and Huong Nguyen (2020) and this is the reason behind the selection of a different name for the dimension. These additional variables are believed to provide further depth to the discussion of financial inclusion by adding a technological variable and a social variable.

Table 1 - Summary of Variables Used in the Model		
Dimension / Variable	Description	Data Sources
1. Banking Penetration		FAS - IMF
- Outstanding Deposits	Outstanding deposits with commercial banks (% of GDP)	
- Outstanding Loans	Outstanding loans from commercial banks (% of GDP)	
2. Availability of bank services		FAS - IMF
- Bank Branches	Number of commercial bank branches per 100,000 adults	
- ATMs	Number of ATMs per 100,000 adults	
3. Additional Services		FAS - IMF
- Insurance Corporations	Number of insurance corporations per 100,000 adults	
- Mobile and Internet Transactions	No of mobile and internet banking transactions (during reference yr) per 1,000 adults	

5. Empirical Results

5.1 Limitation of the study

Before discussing the results, it is crucial to represent the limitations that have had to be taken into account while conducting the study. The limitations are as follows;

- *Limitation 1* - It is difficult to measure income levels in some countries.
 - From this study, the result should help to give an understanding of the impact that financial inclusion can have on the income level. But measuring income level is difficult, especially in developing countries where various income sources fluctuate a lot and not all earnings are measured. This can affect the results of the study because although financial inclusion increases, income level might not, or vice versa. Therefore, as higher incomes are associated with higher education or other characteristics that affect financial inclusion, it is difficult to justify causality in a cross-sectional analysis.

- *Limitation 2* - It is difficult to develop a model for calculating an index of financial inclusion.
 - Since there is no concrete definition of what financial inclusion is, the whole area is a question of interpretation. Therefore, it is difficult to find merely a few variables that are suitable to explain such a diversified area. In this study, this limitation has been accounted for by the creation of dimensions.

- *Limitation 3* - Lack of data
 - The dataset lacks data from different countries within different periods. This has been accounted for by merely studying the 65 countries that have data for all the variables that are of interest in this study.

- *Limitation 4* - Assigning appropriate weights to the dimension indexes is a difficult task.

- Weights are important to use when a Principal Component Analysis method is applied. PCA gives us loadings that represent the weight (how much) each variable contributes to the corresponding component. These loadings are sensitive, and a small change can rub the results and significantly alter the outcome. It is therefore important to be careful while assigning weights as they are delicate to small changes. Earlier studies have also shown that indexes are sensitive to weight assignments.
- Limitation 5 - It is difficult to conclude the direction of the relationship between financial inclusion and economic development.
 - Due to the broad aspect of financial inclusion, a lot of different factors matter and can thus display different effects. Financial inclusion has shown to have an impact on economic development as it sets a good foundation and ground for prosperity. On the other hand, it is well known that developed economies usually have more advanced services, less inequality, and a higher level of income that makes it more affordable for the population to use financial services. From this perspective, good economic development lays the foundation for higher financial inclusion. Hence, it's hard to conclude whether financial inclusion drives the development of economies or if the development of economies contributes to increasing financial inclusion in a country.

5.2 Results of the Study

In this part, the results from the conducted two-stage PCA are presented. The tables and calculations presented are based on data from the year 2018. The two-stage PCA based on data from 2019 and 2020 has been conducted in a similar manner.

Firstly, Table 2 presents the descriptive statistics of the data set over the chosen explanatory variables. These explanatory variables are presented in relation to their dimensions, *banking penetration, and availability of banking services* or *additional services*. Important to note is that the table of descriptive statistics covers the data set of 65 countries. This data set is used as a basis for the construction of the index of financial inclusion. However, the focus of this study is to calculate an index merely for the countries of interest, which are Sweden, Botswana, and India.

Table 2 - Descriptive Statistics for 2018					
Variable	Obs	Mean	Std. Dev.	Min	Max
Banking Penetration (Yp)					
Outstandingdeposits	65	50.06562	26.41224	16.21689	169.874
Outstandingloans	65	44.78797	27.48065	8.384013	164.4369
Availability of bank serv. (Ya)					
Bankbranches	65	18.90159	14.31661	2.198232	69.16977
ATMs	65	58.29087	40.08582	2.496197	169.4052
Additional services (Ys)					
Insurancecorporations	65	1.080663	2.436379	0.0068916	17.79377
Mobileinternettransations	65	1311978	1.02E+07	0.7610694	8.25E+07

Before conducting the first stage of PCA, all explanatory variables are normalized to take values between zero and one. This is done to ensure that the values that are generated by the PCA will be suitable to fit the financial index that takes values between 0 and 1.

After the normalization, the first stage PCA is conducted. When conducting PCA, new components are generated and each of these components is associated with a specified eigenvalue. Eigenvalues give out important information about the behavior of the linear model in the long run. This is presented in Table 3. Dimension 1, *Banking Penetration*, is associated with two components which have eigenvalues of 1,83 and 0,17 respectively. Dimension 2, *Availability*, is associated with two components which have eigenvalues of 1,583 and 0,417 respectively. While dimension 3, *Additional Services*, is associated with two components with eigenvalues of 1,096 and 0,904.

When observing this data, it is noticeable that only the first principal component of each dimension has an eigenvalue of 1. Therefore, only weights generated for the first principal components will be assigned. The reason for this is that these eigenvalues hold a more normalized variance. The weights associated with the first principal component of each variable are represented in Table A2 - Appendix. To summarize, the weights associated with the first dimension are 0,523 for *outstanding deposits* and *outstanding loans* respectively. The second dimension is related to the weights of 0,562 respectively for *bank branches* and *ATMs*. Lastly, the third dimension is associated with the weights of 0,675 for *insurance*

corporations and -0,675 for mobile and internet transactions.

Table 3 - Principal Components Estimates for Dimension (PCA1) for 2018				
Component	Eigenvalue	Difference	Proportion	Cumulative
(1) Banking Penetration				
Comp1	1.83	1.66	0.9151	0.9151
Comp2	0.17		0.0849	1
(2) Availability				
Comp1	1.583	1,166	0.7917	0.7917
Comp2	0.417		0.2084	1
(3) Additional Services				
Comp1	1.096	0,192	0.5478	0.5478
Comp2	0.904		0.4521	1

Further, the results of the first stage PCA also contained information about the Kaiser-Meyer-Olkin (KMO) test that was simultaneously conducted. The results showed a KMO-score of 0.5 for each dimension, which meets the requirement. This implies that the factor analysis method is suitable for this data set. The KMO-score for each dimension is presented in Table A3 - Appendix.

The final results from the first stage of PCA are presented in Table 4. By observing these results, it is noticeable that Botswana has a high level of additional services while lacking in the other two dimensions. India, on the other hand, has a high level of Banking Penetration while not scoring as high within the dimensions of availability and additional services. Lastly, Sweden has the highest score within all dimensions but there is an evident difference between the score of the availability dimension compared to that of the other dimensions.

Table 4 - Results from PCA 1 - FII Indicators by dimension for 2018			
	Banking Penetration	Availability	Additional Services
Botswana	0.1742	0.251	0.7635
India	0.6886	0.2147	0.2517
Sweden	0.7102	0.2704	0.9641

After performing the first stage PCA, the second stage PCA was conducted. This was executed in a similar way to that of the first-stage PCA but this time the weighted values of the dimensions were used. Table 5 represents the values of the principal components created

by the PCA. As notable, the only principal component that provides an eigenvalue higher than 1 is the first one, and therefore this component is the only one used while assigning the financial inclusion index to each of the countries. Therefore, once again, weights will only be assigned to the first principal components. The weights associated with the first principal component of each dimension are represented in Table A4 - Appendix.

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	1.817	1.129	0.6057	0.6057
Comp2	0.688	0.193	0.2293	0.835
Comp3	0.495		0.165	1

The results from the second stage of PCA present the final index of financial inclusion. As regards the first stage PCA, the second stage PCA is also associated with a KMO-score and for this data set the score is 0.643. Since this score is higher than 0.5, factor analysis is suitable for this data set.

The final scores assigned to each of the countries of interest between the years 2018-2020 are presented in Table 6. These results show that the scores of Botswana and India are quite similar while Sweden has a perceptibly higher score for each year. Although Botswana and India continue to increase the level of financial inclusion as the years go by, Sweden on the other hand demonstrates a slight decline in 2020.

Country	Income-level	2018	2019	2020
Botswana	Upper-Middle	0.3312	0.3448	0.365
India	Lower-Middle	0.3453	0.3664	0.3747
Sweden	High	0.7497	0.7591	0.7463

6. Discussion

The purpose of this study is to analyze if there exists a relationship between financial inclusion and different countries' level of income. The results show that Sweden, which is a high-income country, has the highest level of financial inclusion. As anticipated, a high-level income country should indicate a relatively high level of financial inclusion. As previously discussed, financial inclusion provides financial services that are important and a necessity for society. Providing affordable and useful financial services increases financial stability as it encourages saving and investment to a higher extent within society. Thus, increasing capital formation results in an economic boost. The results also show that Botswana and India have scores relatively close to each other but that India displays a somewhat higher level of financial inclusion. Although Botswana is ranked as an upper-middle-income, India demonstrates a higher score of financial inclusion, despite having a lower-income level. To understand and explain this, it might be useful to further interpret the different dimensions.

First of all, Botswana scores high within the dimension of additional services. This means that insurance corporations and the overall technological development help with providing financial security. This is done through insurance and easier mobile availability to financial services through mobile and internet transactions. Meanwhile, India has a higher score within the dimension of banking penetration which suggests that there is broader access to financial services and the bank sector in India, thus leading to more users within the nation. However, while examining the score of Botswana, within the first dimension it is noticeable that the level of banking penetration is relatively low compared to that of India. This suggests that the financial services in Botswana are not penetrated among its population and that these services merely reach some parts of the nation. Therefore, the fact that Botswana and India score higher within different dimensions while scoring lower within others explains why their overall financial scores are quite similar. The reason behind these similarities and differences can be explained by examining different aspects of the financial systems. Therefore, in this case, it is more accurate to state that it is the differences among aspects of the financial systems rather than the difference in overall economic level within the nations that is of interest while examining the levels of financial inclusion in India and Botswana.

However, it is believed that the nations' performances in different areas affect their level of income differently. Botswana scores low within the dimensions of availability and banking

penetration and this is believed to be harmful to the country's future development. Due to the low access to financial services, their population can find it hard to easily make use of the numerous services provided. India, on the other hand, scores low within the dimensions of availability and additional services, and this fact may help with explaining why the country is still a low-level income economy. If the population does not have easy access to financial services, fewer people will be able to use the financial services. As discussed by Omar and Inaba (2020), vulnerable groups such as women and the poor are the ones who are mostly exposed to the lack of availability of financial services. This fact may help with finding a connection between the low score of financial inclusion and the overall low-income level within India. Further, as discussed by Omar and Inaba (2020), a higher level of financial inclusion is believed to reduce poverty and income inequalities. Since both India and Botswana are economies where these phenomena are a fact, the low level of financial inclusion partly helps with explaining why societal developments within these areas may not be possible without development of the whole financial system.

Further, it is believed that the level of insurance companies has an effect on the incentive of the population to use financial services. The reason behind this is that people are more willing to trust the overall financial system if they are assured that their capital is safe within the system. This aspect of the financial system is partly captured by the existence of insurance corporations, but overall credit protection is also crucial. To apply this to the results from India, Sweden and Botswana it is noticeable that India scores the lowest within the dimension of additional services while Sweden clearly has the highest score. The main reason for this is believed to be that the population of India is one of the largest in the world and therefore, the availability of both banking and insurance services does not reach every part of the population. Also, considering India is a low-income economy, a major part of the population may not find insurance affordable. As discussed by Ravi (2019), a reason for this may be the high transaction costs and the high prevalence of asymmetric information that causes a lack of trust and inability to take advantage of the insurance and banking systems.

Sweden, on the other hand, as a high-income economy, is considered to have a trustworthy financial system that is backed up by a strong insurance culture. This is clearly noticeable by the high score within both the dimension of banking penetration and that of additional services. In Sweden, almost the entire population has some form of connection to the banking system and everyone has access to the financial system. However, Sweden scores lower

within the availability dimension and the reason behind this is believed to be the development of technology within society. Nowadays, most people pay with credit cards and the need for ATMs is lower than before. For that reason, the availability of physical services may not be as prevalent as that of technical services within the nation. Therefore, it is also important to understand the different needs within nations while discussing the phenomenon of financial inclusion. This is also the case for Botswana and India and the nations' different cultures and the populations' inconsistent needs are important to keep in mind while examining the overall financial system.

Further, it is important to discuss particularly one of the main limitations of this study which is the lack of evidence considering the direction of the relationship between financial inclusion and economic development. As discussed by Musembi and Chun (2020), some economists believe that economic development drives financial inclusion while others believe that the latter is crucial for the former. According to Musembi and Chun, the relationship between the two phenomena is mutual, and therefore there exists an interplay between the overall economic welfare and the level of financial inclusion within societies. However, this can not be stated for every nation and it is important to examine each nation's historical development to be able to understand why nations differ concerning their levels of financial inclusion. Also, it is important to briefly exchange views to deeper understand how financial inclusion works. This can be made by examining the results of this study. First, as shown by the results, Sweden is a high-income country and has a well-working financial system. Also, since economic growth usually creates demands for financial development there is believed that the high economic welfare and financial inclusion in Sweden have developed simultaneously and conjointly.

However, the data from Botswana does not show the same result. Despite being an upper-income level country, it has a relatively low financial inclusion index. The reason for this may be that other factors such as overall welfare, the political climate, and the unemployment rates within the nation may have a more substantial impact on the economic landscape than that of financial inclusion. Another important factor considering Botswana is that the nation is highly dependent on its diamond industry and that this has a strong impact on the overall economic activity within the nation. Therefore, this example demonstrates the importance of shedding light on different aspects of a nation while examining financial

inclusion and economic development. Because although the level of financial inclusion does matter, there may exist other factors that are more dominant.

Lastly, another important aspect of this study concerns the limitations of the data set. For each dimension created, only two variables have been selected. As mentioned before by Hounng Nguyen (2020) and Sarma (2012), creating an index for financial inclusion is not easy due to the difficulty of finding appropriate factors to include in the dimensions. Therefore, by only applying six variables in total a bias is imposed through subjective selection and interpretation. This is noticeable when comparing this study to that of Hounng Nguyen (2020). In the study conducted by Hounng Nguyen, India got a relatively high score on the FI index (around 0,7) while Botswana got a significantly lower score (around 0,4). This demonstrates that different variables can have a different effect on the overall outcome since the results shown in our study are different than that of Hounng Nguyen. Therefore, the selection within a big dataset and the choice between different variables will affect the conducted FI index. For this reason, the study that has been made should be understood from the aspects described and be viewed as one of many possible outcomes.

7. Conclusion

Although this study has proven that economic welfare needs to be examined from different aspects for it to be accurately described, there are some conclusions that can be drawn considering the relationship between financial inclusion and economic development. First of all, there is evidence supporting that a high level of financial inclusion is often related to a higher level of economic welfare within nations. Second, a high level of financial inclusion is believed to counteract poverty and income inequalities, and therefore, financial inclusion may affect factors within societies that in turn affect economic development and welfare. Also, financial inclusion and economic development are believed to appear hand in hand as a higher economic activity gives rise to a higher need for financial services and vice versa.

Lastly, the results of this study have given rise to additional evidence suggesting a mutual relationship between financial inclusion and economic development. However, as discussed, there are limitations that have affected the outcome of the study. Therefore, it is believed that future studies can be made after considering the limitations of this particular study. First, it would be interesting to change or add variables to the study as well as exploit data from a longer time period. By adding more variables and dimensions, more extensive research can be made. Also, by conducting this test using a panel unit root and panel cointegration analysis instead, results from a different aspect may appear. Furthermore, the FII conducted in this study may also be used in a future regression analysis. Then economic welfare can be analyzed by examining FII as well as education level, political climate, and other macroeconomic variables within different countries. All in all, future studies may give rise to a higher level of understanding of financial inclusion in relation to economic development and is therefore encouraged.

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Appendix

Table A1 - List of Countries			
Albania	Estonia, Rep. of	Luxembourg	Samoa
Argentina	Fiji, Rep. of	Malaysia	Saudi Arabia
Austria	Finland	Maldives	Serbia, Rep. of
Azerbaijan, Rep. of	France	Mauritius	Seychelles
Bangladesh	Georgia	Mexico	Slovak Rep.
Botswana	Ghana	Moldova, Rep. of	Slovenia, Rep. of
Brazil	Guatemala	Mongolia	Solomon Islands
Bulgaria	Guinea	Mozambique, Rep. o	Sweden
Cabo Verde	Honduras	Netherlands, The	Switzerland
Cameroon	Hungary	Nicaragua	Thailand
Chile	India	North Macedonia, Re	Tunisia
Colombia	Indonesia	Pakistan	Turkey
Costa Rica	Jamaica	Paraguay	Uruguay
Croatia, Rep. of	Kazakhstan, Rep. of	Poland, Rep. of	Zimbabwe
Czech Rep.	Latvia	Portugal	
Denmark	Lesotho, Kingdom o	Russian Federation	
Dominican Rep.	Lithuania	Rwanda	

Table A2 - Weights for variables from varimax rotation - PCA 1 for 2018	
Variable	Weight / Score
Banking Penetration	
zOutstandingdeposits	0.523
zOutstandingloans	0.523
Availability of Bank Serv.	
zBankbranches	0.562
zATMs	0.562
Additional Services	
zInsurancecorporations	0.675
zMobliefinternettransactions	-0.675
*negative scores implies a negative relation to the factor	

Dimension	Overall KMO
Banking Penetration	0.5
Availability of Bank Serv.	0.5
Additional Services	0.5

Variable	Weight / Score
Zbankingpenetration	0.443
Zavailabilityofbankserv.	0.449
Zadditional services	0.39

SPSS Output

Year 2018

Dimension 1

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.830	91.512	91.512	1.830	91.512	91.512
2	.170	8.488	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	73.060
	df	1
	Sig.	<.001

Component Score Coefficient Matrix

	Component 1
depositaccount	.523
loan	.523

Dimension 2

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.583	79.165	79.165	1.583	79.165	79.165
2	.417	20.835	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	25.993
	df	1
	Sig.	<.001

Component Score Coefficient Matrix

	Component 1
branches	.562
ATM	.562

Dimension 3

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.096	54.795	54.795	1.096	54.795	54.795
2	.904	45.205	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	.577
	df	1
	Sig.	.447

Component Score Coefficient Matrix

	Component 1
Insurance	.675
mobileninternet	-.675

Second- stage PCA

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.817	60.570	60.570	1.817	60.570	60.570
2	.688	22.930	83.500			
3	.495	16.500	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy.		.643
Bartlett's Test of Sphericity	Approx. Chi-Square	29.843
	df	3
	Sig.	<.001

Component Score Coefficient Matrix

	Component 1
Dimension..1	.443
Dimension..2	.449
Dimension..3	.390

Year 2019

Dimension 1

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.830	91.476	91.476	1.830	91.476	91.476
2	.170	8.524	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	72.815
	df	1
	Sig.	<.001

Component Score Coefficient Matrix

	Component 1
depositaccount	.523
loan	.523

Dimension 2

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.536	76.780	76.780	1.536	76.780	76.780
2	.464	23.220	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	21.131
	df	1
	Sig.	<.001

Component Score Coefficient Matrix

	Component 1
branches	.571
ATM	.571

Dimension 3

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.097	54.874	54.874	1.097	54.874	54.874
2	.903	45.126	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	.597
	df	1
	Sig.	.440

Component Score Coefficient Matrix

	Component 1
Insurance	-.675
Mobiletransaction	.675

Second stage PCA

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.814	60.462	60.462	1.814	60.462	60.462
2	.680	22.673	83.135			
3	.506	16.865	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.646
Bartlett's Test of Sphericity	Approx. Chi-Square	29.295
	df	3
	Sig.	<.001

Component Score Coefficient Matrix

	Component 1
Dimension__1	.441
Weight	.448
Weight	.395

Year 2020

Dimension 1

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.785	89.244	89.244	1.785	89.244	89.244
2	.215	10.756	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	59.827
	df	1
	Sig.	<.001

Component Matrix^a

	Component 1
Depositaccount	.945
loan	.945

Dimension 2

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.508	75.407	75.407	1.508	75.407	75.407
2	.492	24.593	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	18.667
	df	1
	Sig.	<.001

Component Matrix^a

	Component 1
branches	.868
ATM	.868

Dimension 3

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.099	54.963	54.963	1.099	54.963	54.963
2	.901	45.037	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.500
Bartlett's Test of Sphericity	Approx. Chi-Square	.619
	df	1
	Sig.	.431

Component Matrix^a

	Component 1
insurance	.741
Mobiletransaction	-.741

Second stage PCA

Total Variance Explained

Component	Total	Initial Eigenvalues		Extraction Sums of Squared Loadings		
		% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.786	59.536	59.536	1.786	59.536	59.536
2	.688	22.921	82.457			
3	.526	17.543	100.000			

Extraction Method: Principal Component Analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.644
Bartlett's Test of Sphericity	Approx. Chi-Square	27.128
	df	3
	Sig.	<.001

Component Score Coefficient Matrix

	Component 1
Dimension...1	.443
Weight	.451
Dimension..3	.400