Determinants of Financial Inclusion in Arab World

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Introduction

Financial Inclusion policies designed to widen financial resources available at the financial system through awareness and facilitation of low cost and easily accessed financial services.

Creation of banking culture among population is the base to reach financial inclusion; raising people awareness of the importance of formal banking system as a source of diversified financial tools which protect their wealth, safety and security.

Financial inclusion is a priority in Arab region as it shows the lowest level according to the World Bank global database which shows the importance of studying the determinants of financial inclusion in the region.

Paper Importance: there aren't enough papers studying financial inclusion in Arab countries and its determinants. The paper will try to fill this gap by providing a measurement of financial inclusion in Arab region as well as specifying its determinants to be used by policy makers to reach higher financial inclusion level.

Research Methodology: Literature of financial inclusion shows that it's a complicated phenomenon of several dimensions which require multi-dimensional index to measure it. The paper will use three dimensions financial inclusion index which are accessibility, usage and availability of financial services which produce values

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between 0 and 1 the higher the value the higher the financial inclusion.

The index will be calculated to nineteen Arab countries in the period from 2004 to 2016 which are the latest available data. The index will be used in panel model to find the macro level factors affecting financial inclusion as guide for future designing of financial inclusion policies in the region.

In most literature financial inclusion indices don't use time trend as it's calculated on one year basis but the current index will use time series to study how financial inclusion developed over time and the significant variables affecting it.

The paper structured as follows: first section presents brief about financial inclusion and how it is defined through literature. Second section presents the evolution of financial inclusion through the past twenty years. Third section presents a review of the literature on determinants of financial inclusion. Fourth section presents a brief review of the literature on measuring financial inclusion and details of the measuring technique the paper uses. Fifth section measures index of financial inclusion in the studied Arab countries. Sixth section the econometrics methodology used to study financial inclusion determinants. Finally the seventh section presents results of regression analysis.

First Section

Definitions of Financial Inclusion

As defined by World Bank[1] "Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way".

Defined by the Committee on Financial Inclusion [2] as "Financial inclusion may be defined as the process of ensuring access to financial services and timely adequate credit where needed by vulnerable groups such as weaker sections and low income groups at an affordable cost".

International Monetary Fund IMF [3] defined financial inclusion as "the access to and use of formal financial services. The idea is that finance should be available to as many as possible for a variety of uses: accounts to receive income or transfers, savings accounts to store money safely and prudently, credit sources for personal or business borrowings, and insurance products to tide against bad times".

Defined by Claessens (2006)[4] as the "availability of a supply of reasonable quality financial services at reasonable costs, where reasonable quality and reasonable cost have to be defined relative to some objective standard, with costs reflecting all pecuniary

(1) https://www.worldbank.org/en/topic/financialinclusion/overview
(2) Rangarajan, C. (2008), "Report of the Committee on Financial Inclusion", Ministry of Finance, Government of India.
(3) IMF (2015a), "Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?", Monetary and Capital Markets Department, P.8.
(4) Claessens, S. (2006), "Access to Financial Services: A Review of the Issues and Public Policy Objectives." World Bank Research Observer 21 (2): 207-240.

and non-pecuniary costs". Demirguc-Kunt and Levine (2008)[1] stressed on the access to finance and defined it by "absence of price and non-price barriers".

Financial inclusion aims to include all excluded population into the financial system, as financial services is a public good that should be accessible to all population, through well-developed accessible financial system which reduces transactions and information costs.

Second Section

Evolution of Financial Inclusion

Over the past twenty years finance developed from micro credit to financial inclusion. In the mid1990-s policy makers' main target was to provide credit to low income households, by early 2000s financial services were developed to serve low income segments which concentrated on micro finance. Poor households are both consumers which need stability to face irregular income, and producers as many of them have micro businesses which require access to financial tools to raise investment to generate more income. Financial policies focused on providing diversified financial tools especially savings and insurance tools. By mid 2000s the new tools was invented but policymakers faced the high cost challenge, which was an obstacle in front of poor households especially who are living in remote areas[2].

The advancement in technologies especially communications as mobile phones and data availability facilitated wider access to financial services at lower cost which included more two billion

(1) Demirguc-Kunt, A. and R. Levine (2008), "Finance, Financial Sector Policies and Long-Run Growth", Washington DC, Commission on Growth and Development, World Bank.

(2) Aguera, P. (2015), "Financial Inclusion, Growth and Poverty Reduction", Brazzaville, March 23, 2015, Eccas Regional Conference, World Bank Group.

person worldwide as estimated by world economic forum[1]. In the late 2000s policymakers started focusing on financial inclusion realizing the importance of financial literacy and protection. The main target was reaching larger percentage of population to be aware of the potential economic possibilities they can get from formal financial system. By 2015 more than 60 nations set their formal goals towards achieving financial inclusion[2]. Recently financial inclusion mentioned in seven sustainable development goals of international organizations.

Third Section

Determinants of Financial Inclusion: Literature Review

Factors associated with financial inclusion studied through Literature to identify the variables explaining the ways to reach higher financial inclusion.

3.1 Socio-Economic Variables: Goodwin et al (2000)[3] associated financial inclusion with employment. Unemployed people or people with unstable and insecure jobs will be less willing to use financial services.

Kempson and Whyley (1998)[4] found significant impact of income level on financial inclusion. Studies found that receiving wages through automated cash transfers has high impact on financial inclusion and it will be continued after retirement as they will receive their pensions through automatic transfer tools. Levine

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(1) WEF (2018), "Advancing Financial Inclusion Metrics: Shifting from Access to Economic Empowerment", World Economic Forum.
(2) IMF (2015), "The IMF's Financial Access Survey and Financial Inclusion Index", Financial Institutions Division-IMF Statistics Department.
(3) Goodwin, D., Adelman, L., Middleton, S., & Ashworth K. (2000), "Debt, money management and access to financial services: evidence from the 1999 PSE Survey of Britain", Centre for Research in Social Policy, Loughborough University, 1999 PSE Survey Working Paper 8.
(4) Kempson, E. & Whyley, C. (1998), "Access to Current Accounts", British Bankers' Association: London.

(2003 ,1997, and 2005)[1] addressed the association between income level and financial development. Jaffee and Levonian (2001)[2] studied financial development in 23 transition countries, demonstrated the positive impact of level of GDP per capita and saving rate on banking system structure.

Also Geographical factor found to be significant as people living remote from urban areas as rural areas will not be able to use banking services in comparison to people living in urban areas as found by Kempson and Whyley (2001)[3] and study of Leyshon and Thrift (1995)[4]. Sarma and Pais (2011)[5] investigated the macro level factors associated with financial inclusion through cross country empirical analysis. The study found that the significant factors are income, inequality, literacy, urbanization and physical infrastructure. Hariharan and Marktanner (2013)[6] argued that low level of financial inclusion results from different socioeconomic variables as culture, geography, religion, economy structure and policy. Honohan (2008)[7] calculated financial inclusion index and found positive significant relationship between financial inclusion and income inequality measured by Gini coefficient.

(1)

(2) Jaffee, D. & Levonian, M. (2001), "Structure of banking systems in developed and transition economies", European Financial Management, 7(2), 161–81

(3) Kempson, E. & Whyley, C. (2001), "Payment of Pension and Benefits", Department for Work and Pension: London

(4) Leyshon A. & Thrift N. (1995), "Geographies of Financial Exclusion: Financial Abandonment in Britain and the United States", Transactions of the Institute of British Geographers, New Series 20(3): 312–341

(5) Sarma, M. & Pais, J. (2011), "Financial Inclusion and Development", Journal of International Development". Int. Dev. 23, 613–628 (2011)

(6) Hariharan, G. & Marktanner, M. (2013), "The growth potential from financial inclusion", Atlanta Fed/GSU International Development Economics Workshop.

(7) Honohan, P. (2008), "Cross-country Variation in Household Access to Financial Services", Journal of Banking & Finance, 32, 2493-2500

3.2 Physical Infrastructure Variables: Sarma and Pais (2009)[1] found that physical infrastructure highly positively significant to enhance financial inclusion as paved roads, telephone, internet subscriptions while radio, cable TV, newspapers and computers didn't show significance. Physical infrastructure is required to facilitate access to financial system as paved roads, internet and electricity to facilitate financial services awareness and easy access to financial services. Beck et al (2007)[2] found that telephone network positively significant to banking outreach. Information and communication technology ICT facilitate highly automated digital services. In Niger using mobile service to transfer the monthly government social benefits saved people 20 hours of travelling and waiting time[3].

3.3 Banking Variables: Sarma (2008)[4] found that non-performing asset level is negatively linked with financial inclusion. They also used capital asset ratio as proxy for banking system health which found to be negatively significant which means highly capitalized financial system is less inclusive because it will be more cautious in lending. Also they examined the impact on interest rate which found to be insignificant with financial inclusion level. Foreign banks ownership was examined which found to be negatively significant which is against the argument that foreign banks increase competition which raises efficiency and supply to credit. Beck et al (2007)[5] also found same result this can be

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(1) Sarma, M. & Pais, J. (2009), "Financial Inclusion and Development: A Cross Country Analysis", Annual Conference of the Human Development and Capability Association, New Delhi

(2) Beck, T., Demirguc-Kunt A., Soledad M., & Peria M. (2007), "Reaching out: access to and use of banking services across countries", Journal of Financial Economics 85(1): 234–266

(3) Kunt A., Klapper L., Singer D., Ansar S., & Hess J. (2017), "The Global Findex Database Measuring Financial Inclusion and the Fintech Revolution", World Bank Group

(4) Sarma, M. (2008), "Financial Inclusion and Development: A Cross Country Analysis", Annual Conference of the Human Development and Capability Association, New Delhi

(5) Beck, T., Demirguc-Kunt A., Soledad M., & Peria M. (2007), P. 16

explained in literature by "financial owns bank barriers hypothesis". which states that domestically owned banks are more likely to lend small customers that foreign banks due to low information availability of small firms.

Fourth Section

Measuring Financial Inclusion - Index of Financial Inclusion IFI

4.1 Measuring Financial Inclusion in Literature

Sarma (2008)[1] constructed one of the leading financial inclusion measurements while it was still a new topic the index included three dimensions which are penetration, availability and usage of banking services. Her study covered 45 countries using three dimensions and 81 countries using two dimensions according to the data availability, the index calculated for year 2004. Also Chakravarty and Pal (2010)[2] constructed "An Axiomatic Approach" financial inclusion index. Rashmi Arora (2010)[3] used same Sarma method but added new variables to penetration and usage dimensions studying 98 countries. Other literature as well used different measurements as Gupta el al (2012)[4] studied the determinant of financial inclusion focusing on computing multi-dimensional index in India for year 2008 and 2009. Camara el al. (2014)[5] studied financial inclusion determinants in Peru identified gender and education as significant factors, also study of Camara

(1) Sarma, M. (2008), P. 15.

(2) Chakravarty, Satya R. & Pal, Rupayan, (2013), "Financial inclusion in India: An axiomatic approach," Journal of Policy Modeling, Elsevier, vol. 35(5), pages 813-837

(3) Arora, R. (2010), "Measuring Financial Access", Griffith University, Discussion Paper Economics 7, ISSN1837-7750.

(4) Guptea R., Venkataramanib B., & Guptac D. (2012), "Computation of financial inclusion index for India", Procedia - Social and Behavioral Sciences 37 (2012) 133 – 149

(5) Càmara, N., Peña, X., & Tuesta, D. (2014), "Factors that Matter for Financial Inclusion: Evidence from Peru", The International Journal of Finance.

el al. (2015)[1] studied the age of Argentina from microeconomic perspective and found that age and income represent the main factors to financial exclusion.

4.2 The Present Study Index

The present study using multi-dimensional financial inclusion index based on Sarma method of calculation. The index includes three dimensions which are penetration of banking services in the country, usage and availability of banking services attaching equal weights to all dimensions. The method starts by calculating an index of each variable in the dimension i^{th} calculated by formula (1) to ensure that the resulted di value will be between 0 and 1 the higher the value the higher the dimension achievement.

$$d_i = (A_i - m_i)/(M_i - m_i) \quad (1)$$

(A_i)= Actual value of dimension i

(M_i)=Maximum value of dimension i

(m_i)= Minimum value of dimension i

The next step is calculating each dimension Di over the studied period (2016-2004) using the simple average of di for the available years using formula (2) where n is the number of years

$$D_i = \sum d_i/n \quad (2)$$

Finally, financial inclusion index, for each country, is measured by formula (3) "the normalized inverse Euclidean distance" of the point Di from the ideal point. The second component's numerator is the Euclidean distance of Di from the ideal point. The inverse normalized distance is calculated then divided by $\sqrt{n}$

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(1) Cámara, N., Sorensen, G., Haring, A. & Tuesta, D. (2015), "Financial inclusion and its determinants: the case of Argentina", BBVA, Working Paper nº 15/03 Madrid, January 2015.

and subtracting it from 1 to get values between 0 and 1. Where 0 means complete exclusion and 1 is complete financial inclusion.

$$IFI\ i\ =1 - \sqrt{\frac{(1-d1)^2 +(1-d2)^2 +... +(1-dn)^2}{\sqrt{n}}} \qquad (3)$$

The dimensions include the following variables:

Banking Penetration dimension (D1): shows the penetration of financial system among population, if all people in the country has bank account the dimension should be equal to 1. The study used number of borrowers from commercial banks (per 1,000 adults), number of depositors with commercial banks (per 1,000 adults) and bank account (per 1000 adults).

Availability of banking services dimension (D2): banking services should be easily used and accessible to all people in the economy. Availability of banking services can be measured using number of Commercial bank branches (per 100,000 adults), and number of Automated teller machines (ATMs) (per 100,000 adults).

Usage of banking dimension (D3): it has been observed by Kempson et al (2004)[1] that large number of people have bank accounts use very little banking services which called "under or marginally banked" which require a measurement of banking services utilization to measure financial inclusive properly. Two main services are considered in banking services deposits and credit. Accordingly volume of deposit as percentage of GDP and volume of domestic credit as percentage of GDP have been used.

The present study calculated the financial inclusion index for

(1) Kempson, E., Atikinson, A. & Pilley, O. (2004), "Policy level response to financial exclusion in developed economies: Lessons for developing countries", Report of Personal Finance Research Centre, University of Bristol.

19 Arab countries covering the time period from 2004 till 2016 in which data were available. The consistent data on all the three index dimensions were available for 17 countries while the index of the other two countries (Iraq and Sudan) were calculated on two dimensions level (Penetration and Usage) due to data unavailability. The Data of Lybia and Saudi Arabia were available only from 2013 – 2004 and till 2015 for Yemen, Egypt and Sudan. The data were retrieved from World Bank- World Development Indicators database last updated March 2018.

Fifth Section

Index of Financial Inclusion in Arab Countries (IFI)

Table (1) presents the index of Financial Inclusion IFI values of 19 Arab countries calculated by author for the period from 2004 till 2016 according to the mentioned method on all the three dimensions except Iraq and Sudan on two dimensions. According to the IFI values countries can be placed according to the following three categories.

High financial inclusion if $0.5 \leq IFI \leq 1$

Medium financial inclusion if $0.3 \leq IFI \leq 0.5$

Low financial inclusion if $0 \leq IFI \leq 0.3$

Table (1) Index of Financial Inclusion (IFI) for 19 Arab Countries (2016-2004)

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lebanon	0.87	0.80	0.81	0.82	0.85	0.88	0.90	0.89	0.71	0.85	0.84	0.84	0.71
Jordan	0.62	0.61	0.59	0.56	0.56	0.55	0.48	0.49	0.51	0.46	0.45	0.43	0.42
Qatar	0.54	0.55	0.55	0.55	0.55	0.61	0.58	0.54	0.60	0.56	0.57	0.63	0.75
Kuwait	0.50	0.51	0.54	0.57	0.58	0.66	0.63	0.61	0.58	0.55	0.56	0.62	0.62
Oman	0.47	0.44	0.45	0.47	0.40	0.53	0.51	0.54	0.50	0.48	0.47	0.50	0.49
United Arab Emirates	0.31	0.41	0.42	0.44	0.48	0.64	0.60	0.61	0.61	0.57	0.61	0.64	0.67
Saudi Arabia	0.27	0.29	0.33	0.35	0.37	0.43	0.42	0.45	0.36	0.40	0.42	0.46	0.38
Palestine	0.24	0.25	0.24	0.25	0.40	0.35	0.35	0.38	0.33	0.33	0.34	0.39	0.40
Egypt, Arab Rep.	0.24	0.17	0.21	0.22	0.25	0.25	0.25	0.26	0.26	0.26	0.26	0.27	NA
Tunisia	0.24	0.26	0.31	0.36	0.38	0.43	0.46	0.49	0.53	0.51	0.51	0.52	0.55
Algeria	0.22	0.20	0.21	0.21	0.18	0.17	0.17	0.19	0.14	0.16	0.18	0.19	0.15
Libya	0.19	0.18	0.18	0.18	0.19	0.23	0.23	0.28	0.30	0.22	NA	NA	NA
Morocco	0.18	0.30	0.31	0.34	0.38	0.49	0.50	0.54	0.59	0.57	0.59	0.59	0.59
Iraq	0.15	0.18	0.08	0.07	0.05	0.09	0.11	0.14	0.07	0.05	0.05	0.05	NA
Syrian Arab Republic	0.12	0.13	0.14	0.14	0.13	0.15	0.16	0.13	0.13	0.12	NA	NA	NA
Djibouti	0.08	0.09	0.09	0.09	0.10	0.13	0.14	0.15	0.13	0.14	0.14	0.15	NA
Mauritania	0.07	0.08	0.08	0.12	0.15	0.16	0.15	0.17	0.16	0.14	0.19	0.21	0.16
Sudan	0.06	0.07	0.09	0.09	0.09	0.11	0.11	0.14	0.10	0.07	0.06	0.05	NA
Yemen, Rep.	0.03	0.05	0.06	0.06	0.07	0.08	0.08	0.09	0.07	0.06	0.03	0.03	NA

Source: Calculated by Author

As shown from table (1) that the IFI value changed over the 12 years for the 19 studied Arab countries, nine countries stayed low financially included over the 12 years, two countries stayed highly financially included, while four countries started being low and gradually become medium financially included and other three countries started being medium then become highly financially included and only Jordan started highly included then declined slightly to medium and Oman stayed medium all years except in 2009 to 2011 was highly included. The 19 countries grouped into four categories according to the IFI value over the 12 studied years in table (2).

Table (2) Arab Countries grouped according to IFI values (2016- 2004)

Low	Low - Medium	Medium – High	High
Egypt- Algeria- Libya-Iraq- Syria- Djibouti- Mauritania- Sudan- Yemen	Morocco- Tunis- Palestine- Saudi Arabia	United Arab Emirates- Kuwait – Jordan- Oman	Lebanon- Qatar

Source: Created by Author

Table (3) Three Dimensions Values in Arab Countries (2016-2004)

Country Name	Category	Penetration D1	Availability D2	Usage D3	Lowest Dimension
Algeria	Low	0.300	0.100	0.171	D2
Djibouti	Low	0.026	0.061	0.325	D1
Iraq	Low	NA	0.056	0.113	D2
Egypt, Arab Rep.	Low	0.222	0.125	0.463	D2
Libya	Low	0.532	0.201	0.086	D3
Mauritania	Low	0.039	0.096	0.332	D1
Sudan	Low	NA	0.044	0.146	D3
Syrian Arab Republic	Low	0.156	0.099	0.175	D1
Yemen, Rep.	Low	0.020	0.029	0.182	D1
Morocco	L-M	0.427	0.458	0.477	D1
Saudi Arabia	L-M	0.527	0.622	0.133	D3
Tunisia	L-M	0.514	0.410	0.357	D3
Palestine	L-M	0.578	0.290	0.267	D3
Jordan	M-H	0.562	0.499	0.548	D2
Kuwait	M-H	0.811	0.694	0.364	D3
United Arab Emirates	M-H	0.677	0.673	0.377	D3
Oman	M-H	0.708	0.652	0.225	D3
Lebanon	High	0.752	0.817	0.962	D1
Qatar	High	0.734	0.776	0.346	D3

Source: Calculated by Author, L-M: low to medium, M-H: medium to high

Analyzing the three dimensions in each country to know which dimension needs to be developed to reach higher financial inclusion as a guide for future policies planning. Table (3) includes the average value of each dimension for the available studied years for each country. It has been found that usage of banking

services D3 is the lowest dimension in almost %50 of the studied countries followed by the availability of banking services D2 in almost %30 of the countries and the penetration of banking D1 was the lowest dimension in only 4 countries or almost %20 of the studied countries.

Sixth Section

Estimation Technique - Model Specification

This section investigates the determinants of financial inclusion in Arab countries. The data cover the period from 2004 till 2016 due to data availability. To carry classical OLS regression the dependent variable will be the log function of the original IFI as formula (4) to transform it from values between 0 and 1 to values between $-\infty$ and ∞ which is monotonically increasing function of IFI which keeps same IFI ranking.

$$Y = \ln\left(\frac{IFI}{1-IFI}\right) \quad (4)$$

The general form of the regression equation as following

$$Y_{it} = a_0 + a_1 X1_{it} + a_2 X2_{it} + a_3 X3_{it} + \cdots + a_n Xn_{it} + \varepsilon_{it} \quad (5)$$

i, t denote country and time period

Y: log function of IFI the constructed multidimensional index of financial inclusion

X1, X2, ---, Xn: are the independent variables

$a_1, \ldots, a_n$: are the coefficient of the independent variable,

ε is the error term of random variables independent from each other following classical OLS assumptions

Data sources: data for the regression retrieved from World Bank - World Development Indicators database last updated March 2018.

Three regressions will be carried investigating three sets of variables:

First Regression on Socio economic variables: income, employment, inequality, urbanization, education and human development.

Second Regression on physical infrastructure variables: electricity, internet, phones and mobiles.

Third Regression on banking sector variables: interest rate and domestic credit provided by financial sector as percentage of GDP.

The pooled ordinary least square (OLS), panel Random and fixed effect methods then Hausman test are employed in each regression which found that the Random effects model best fit the data in the socioeconomic and physical infrastructure regressions and fixed effect model in the third regression.

Seventh Section

Empirical Results and Discussions

7.1 Regression on Socio-economic Variables

The regressor variables are GDP per capita as proxy for income, employment using rate of Employment to population ratio age over 15 years old, urbanizations using rural population as percentage of total population, income inequality using Gini coefficient measuring the degree of inequality in the distribution of family income in a country. Education using adult literacy

rate, and human development indicated by human development index HDI containing of three dimensions life expectancy at birth, education years of schooling and GNI per capita. GDP per capita excluded as before running the models the correlation between independent variables has been tested using correlation matrix which found that GDP per capita correlated with employment, rural population as percentage of total population, literacy and HDI.

According to Random effects model which best fits the data and going with literature Urbanization (rural population as percentage of total population) is negatively significant which means that the more the urbanization the higher the financial inclusion. HDI is positively significant meaning that the higher the education and income level per capita the higher the financial inclusion. The employment, literacy and income inequality has expected sign but not Significant.

Table (4) Results of Regression of IFI on Socio economic variables without (GDP per Capita)

Independent Variables	Random Effects Model		Fixed Effects Model		Pooled Regression Model	
	Coefficient	p> Itl	Coefficient	p> Itl	Coefficient	p> Itl
Employment	.0005126	0.968	.0363609	0.052	-.0205735	0.001
Rural	-.0236339	0.062	-.0725981	0.009	-.0224014	0.000
Gini	-.00355	0.452	-.0018373	0.697	.0260511	0.005
HDI	4.342313	0.000	5.483029	0.000	-.1299881	0.846
Literacy	.0038992	0.428	-.0015186	0.776	.0289277	0.000
Constant	-3.258066	0.011	-3.89984	0.014	-2.429226	0.001
R. Squared	0.2781		0.2581		0.4686	

Note: number of observations= 185, number of groups=19

7.2 Regression on Physical Infrastructure Variables

The regressor variables are access to electricity as percentage of population, fixed telephone subscriptions per 100 people, Individuals using the Internet as percentage of population, fixed broadband subscriptions per 100 people and percentage of population using the mobile. Before running the models the correlation between independent variables has been tested using correlation matrix which found that the internet usage are highly correlated with mobile usage and fixed broadband subscriptions, due to that internet usage has been omitted.

The results of the regression where IFI variable (the transformed IFI) is regressed over studied infrastructure variables are represented in table (5). The coefficient for mobile is positive and highly significant and explains financial inclusion. In order to probe further into the infrastructure factors that can be associated with financial inclusion, a related regression without the mobile variable attempted, the results represented in table (6).

The Removal of mobile variable almost didn't change the predictability of the regression according to R^2. There is significant association of some infrastructure variables in the regression with the IFI. Fixed broadband subscriptions as proxy for internet and Electricity coefficient is found to be positively and significantly associated with financial inclusion, the higher the electricity and internet coverage the higher the financial inclusion. Fixed telephone lines subscriptions variable are not significant in both regressions.

Table (5) Results of Regression of IFI on Physical infrastructure variables

Independent Variables	Random Effects Model		Fixed Effects Model		Pooled Regression Model	
	Coefficient	p> ltl	Coefficient	p> ltl	Coefficient	p> ltl
Electricity	.0160717	0.025	.0176607	0.054	.009801	0.024
FXbb	.0027547	0.796	.0012185	0.910	.0934416	0.000
Phone	-.0008617	0.937	-.0028905	0.796	.0045327	0.751
Mobile	.0037373	0.000	.0036751	0.001	.0027885	0.115
R. Squared	0.1872		0.1808		0.2592	

Note: number of observations= 217, number of groups=19

Table (6) Results of Regression of IFI on Physical infrastructure variables without (mobile)

Independent Variables	Random Effects Model		Fixed Effects Model		Pooled Regression Model	
	Coefficient	p> ltl	Coefficient	p> ltl	Coefficient	p> ltl
Electricity	.0257317	0.000	.0305775	0.000	.0115776	0.006
FXbb	.0258297	0.003	.0235972	0.007	.1088857	0.000
Phone	-.0143899	0.170	-.0161628	0.135	.0035425	0.805
R. Squared	0.1637		0.1558		0.2505	

Note: number of observations= 217, number of groups=19

According to random effects model which best fit the data the results show the importance of the internet as source of information and awareness and a medium for successful electronic banking services and cash transfer. Electricity is the basic infrastructure needed for banking penetration as opening new branches and making new ATMs as well as usage of banking services by population. Mobile subscriptions is high positively significant associated with financial inclusion which means that the more people have mobiles the higher and easier access to banking services.

7.3 Regression on Banking Sector Variables

·The regression ·trying to analyze the impact of structure and health of banking system on financial inclusion the variables regressed are deposit interest rate which shows the attractiveness of banking services and the other variable is domestic credit provided by financial sector as percentage of GDP a proxy of the health of banking system. According to fixed effects model which best fit the data credit provided by financial sector found to be high positively significant to financial inclusion meaning that the higher the available credit the higher the sources available for banking services which positively associated with higher financial inclusion while interest rate has expected sign but is not found to be significant.

Table (7) Results of Regression of IFI on baking variables

Independent Variables	Random Effects Model		Fixed Effects Model		Pooled Regression Model	
	Coefficient	p> ltl	Coefficient	p> ltl	Coefficient	p> ltl
Credit	.0067457	0.000	.0057251	0.000	.0135266	0.000
Interest	-.0105664	0.551	.0016271	0.929	-.125405	0.000
R. Squared	0.4145		0.3652		0.5053	

Note: number of observations= 194, number of groups=19

Conclusion

Index of financial inclusion IFI has been calculated used modified index based on Sarma (2008) method the IFI calculated for nineteen Arab countries according to data availability the index is three dimensional index (availability of financial services, access and usage of financial services). Arab countries grouped into four groups according to the IFI value.

A regression analysis carried to find out the associated variables to IFI in the Arab countries, regressing IFI as dependent variable and explanatory variables grouped into socioeconomic variables and physical infrastructure variable. After carrying Housman test the random effect model was the best describing the data.

Socio-economic significant variables percentage of rural to total population was negatively significant but that's going with the literature as the more urbanization the more the higher the financial inclusion and human development index positively highly significant which goes with literature which means the higher the education and income the higher the financial inclusion.

Physical infrastructure significant variables are internet, electricity coverage and mobile usage which is going with the literature as they are important to facilitate banking services penetration, access and usage through availability of basic infrastructure to build new branches and ATMs and availability of information and higher awareness of financial services.

Health of banking system positively significant variables is credit as of GDP meaning that increasing available credit is associated with higher financial inclusion.

In future planning for developing financial inclusion in Arab countries the policies should target urbanization, human development, electricity coverage, more internet and mobile usage.

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Determinants of Financial Inclusion in Arab World

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Abstract

Financial inclusion aims to include all excluded population through facilitation of low cost and easily accessed financial services. The paper calculated index of financial inclusion for Arab countries over the period from 2004 to 2016 using multi-dimensional index, which are availability, usage and access to banking services. Panel model estimated to analyze the determinants of financial inclusion to underscores governments' needs to provide complementary policies towards higher financial inclusion. Significant variables found to be usage of internet and mobile, electricity coverage, Human development, domestic credit provided by financial sector as percentage of GDP and urbanization.

Keywords: Financial, Inclusion, Determinants, Arab countries, IFI, socioeconomic, Physical infrastructure, credit, interest rate, multi-dimensional index, Panel model.

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محددات الشمول المالي بالوطن العربي

رشا فؤاد عبد الرحمن محمد يونس

كلية النقل الدولي واللوجستيات- الاكاديمية العربية للعلوم والتكنولوجيا والنقل البحري

ملخص

يهدف الشمول المالي لتضمين جميع الفئات في النظام المصري من خلال توفير خدمات مالية منخفضة التكاليف يسهل الوصول اليها. تدرس الورقة البحثية مستوى الشمول المالي للدول العربية خلال الفترة من ٢٠٠٤ الى ٢٠١٦ بواسطة استخدام معيار مركب مكون من مؤشرات توفر واستخدام وسهولة الوصول للخدمات المصرفية. استخدم معيار الشمول المالي كمتغير تابع للتوصل الى محددات الشمول المالي بالدول العربية ووجد ان اهم المحددات والتي يجب اتخاذها في الاعتبار في وضع السياسات العامة بالدول العربية للوصول للشمول المالي هي تنمية الموارد البشرية، انتشار الكهرباء والانترنت والتليفونات المحمولة، ومستوى توفر مصادر مالية معدة للاقراض في الجهاز المصري.

الكلمات المفتاحية: الشمول المالي، محددات الدول العربية، مؤشر الشمول المالي، المتغيرات الاقتصادية والديموغرافية، البنية التحتية، الائتمان، سعر الفائدة، متغير متعدد الاتجاهات، نموذج قياسي.