Research Article

Received: 24 December 2022 / Accepted: 10 February 2023 / Published: 5 March 2023

Does Financial Inclusion Enhance Economic Output? Evidence from North Africa

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DOI: https://doi.org/10.36941/ajis-2023-0031

Abstract

The aim of this study was to investigate the impact of two dimensions of financial inclusion -namely availability of banking services and usage of banking services- on national economic output in four North African economies; Egypt, Algeria, Tunisia and Morocco. Availability of banking services was proxied by number of commercial bank branches. Usage of banking services was proxied by the sum of outstanding deposits and outstanding loans with commercial banks. National economic output was proxied by real gross domestic product. Using panel data for the years 2004-2020, panel regression analysis results revealed significant positive effects of both, availability and usage of banking services on national economic output when no time-lagging of the predictors was used, and also when the predictors were one and two year lagged. Theoretical contributions, practical implications and study limitations are discussed.

Keywords: *Financial inclusion, economic output, Egypt, Algeria, Tunisia, Morocco*

1. Introduction

In the context of the present research, financial inclusion (FI) refers to the extent of availability of banking services (ABS) and usage of banking services (UBS) in a given economy. Other dimensions of FI -such as affordability and timeliness of financial services- are definitely of great importance. However, data pertaining to those other dimensions are not readily available for most economies, and thus, incorporating such dimensions in economics research would generate incomparable findings. In line with this view, the International Monetary Fund's 2012 FI survey exclusively covered: (a) penetration of the banking sector, as measured by numbers of deposit and credit accounts; (b) access to banking services, as measured by numbers of ATMs and bank branches per land area; and

(c) the usage of those services by the general public (Sharma, 2016).

Consistent with the finance-led growth hypothesis, a positive relationship between FI and national economic output (NECOT) is highly evident in the literature (*e.g.* Musau, Muathe & Mwangi, 2018; Chinoda, Kwenda & McMillan, 2019; Nada, 2019; Oladimeji & Adegbite, 2019; Hu, Liu & Peng, 2020; Huang, Kale, Paramati & Taghizadeh-Hesary, 2020; Sayed, Abbas & Touny, 2020; Patron & Pekhalskii, 2021). However, two knowledge gaps exist. First, there are no sufficient studies addressing the FI-NECOT link in North African economies. This knowledge gap is substantial, given the fact that the nexus between FI and NECOT depends on a number of effect channels, the specifics of which significantly vary across the different economies (Sarma, 2008). The second knowledge gap is signified by the fact that almost all of the studies that investigated the FI-NECOT nexus in developing economies have done so without time-lagging of FI. This constitutes a methodological flaw, given the expected response lag in the relationship between FI and NECOT. Per se, the present study aims to fill the two aforementioned voids in knowledge through investigating the relationships between ABS and UBS as independent variables, and NECOT as a dependent variable in four North African economies (Egypt, Algeria, Tunisia and Morocco), when ABS and UBS are not time-lagged, and also when they are one year, and two year lagged.

2. Theoretical Framework and Study Hypotheses

In academic literature, the most commonly held view is that a positive relationship exists between FI and NECOT. In line with this view, the vast majority of studies that addressed the linkage between FI and NECOT reported a positive association between the two constructs, in both developing and developed economies. For example, using Kenyan time series data for the years 2007-2015, Musau, Muathe and Mwangi (2018) investigated the relationship between FI -as measured by Sarma's (2008) index of financial inclusion, and GDP. Findings reported by Musau et al. disclosed a significant positive effect of FI on GDP. Similarly, using 2004-2016 panel data from 49 African countries, Chinoda and Kwenda (2019) examined the relationship between FI -again as measured by Sarma's (2008) IFI, and GDP, and reported a positive link.

Further, Nada (2019) examined the link between FI and real GDP per capita in Egypt using time series data for the time period 2004-2017, inclusive. In this study by Nada, FI was measured in terms of number of consumer bank branches per 100K adults, number of automated teller machines (ATMs) per 100K adults, average household deposits per capita, and average household loans per capita. Nada's findings revealed a strong positive relationship between each of those indicators of FI and real GDP per capita in Egypt.

Furthermore, Oladimeji and Adegbite (2019) investigated the nexus between credit to private sector, aggregate micro-credit and aggregate micro-deposits (as predictors), and real GDP (as a response) in Nigeria using time series data for the period 1982-2017. In line with the findings of the studies discussed above, Oladimeji and Adegbite's findings disclosed significant positive relationships between the three employed proxies of FI and real GDP. Moreover, Sayed, Abbas and Touny (2020) examined the impact of FI (as measured by number of ATMs and total deposits at commercial banks) on GDP, and reported that those two indicators of FI exhibited a significant positive impact of economic growth.

Hu, Liu and Peng (2020) addressed the FI-economic growth link in China using time series data (2009-2018). Hu et al. measured FI using a composite index of rural FI, and used agricultural total factor productivity growth as a proxy for economic growth. Consistent with the above-discussed studies, Hu et al. found that rural FI is a positive driver of agricultural productivity growth.

In an attempt to address the link between FI and economic growth in developed economies, Huang, Kale, Paramati and Taghizadeh-Hesary (2020) studied the link in 27 European Union countries. In Huang et al.'s study, FI was measured using four types of indicators (financial access indicators, financial depth indicators, financial inclusion efficiency indicators, and development of financial institutions indicators). The findings of Huang et al. revealed that FI has a significant

positive impact on economic growth. A similar attempt to tackle the FI-economic growth nexus in developed countries was made by Patron and Pekhalskii (2021), who examined the relationship between multiple FI indicators and real GDP per capita in the US. Consistent with Huang et al.'s findings, Patron and Pekhalskii's findings indicated a significant direct relationship between FI and economic growth in the US.

A number of justifications for the above-reported direct relationship between FI and NECOT exist. First, FI provides convenient, affordable access to deposit and saving accounts with banks (which act as financial intermediaries between the surplus and deficit units within an economy), and thus can facilitate efficient channeling of funds from savers to individual and enterprise investors who are in need for those funds (Sarma, 2008; Boitan, 2016). As a result, FI can lead to more investment and production in an economy, which would increase NECOT (Lu, Guo, & Zhou, 2021). This notion is based on the 'finance-growth hypothesis', which was coined by Schumpeter (1912) and popularized by Fry (1988) and Pagano (1993). Second, FI provides economy-wide affordable access to loan and credit services, which would enhance consumption, and consequently increase NECOT (Sarma, 2008; Sharma, 2016). Third, FI is believed to reduce unemployment -and consequently poverty- through facilitating investment and production in an economy (Sadharma & Venkatachalapathy, 2018; Sakanko & David, 2020; Odugbesa *et al.*, 2022). As such, FI can help shift governmental spending from subsidizing the poor towards investing in infrastructure and productive activities, which would consequently lead to an upsurge in NECOT. Based on those three rationales, and given the high poverty rates in those four countries, a direct relationship between FI and NECOT in Egypt, Algeria, Tunisia and Morocco is expected. Thus the six following hypotheses were tested:

- **Hypothesis 1:** There is a statistically significant positive relationship between ABS and NECOT in Egypt, Algeria, Tunisia and Morocco, when ABS is not lagged (H_{1a}), when it is one year lagged (H_{1b}), and when it is two year lagged (H_{1c}).
- **Hypothesis 2:** There is a statistically significant positive relationship between UBS and NECOT in Egypt, Algeria, Tunisia and Morocco, when ABS is not lagged (H_{2a}), when it is one year lagged (H_{2b}), and when it is two year lagged (H_{2c}).

3. Methodology

3.1 Sample

The sample involved panel data for the years 2004-2020 from the four countries of Egypt, Algeria, Tunisia, and Morocco. The choice of these four particular economies was primarily motivated by the relative availability of FI data pertaining to these countries, as contrasted to other African nations.

3.2 Operationalization of the study variables

Regarding the independent measures in the present study, ABS was proxied by the number of commercial bank branches, while UBS was proxied by the sum of outstanding deposits and outstanding loans with commercial banks. With regards to the dependent measure, NECOT was measured by real GDP per capita in constant 2015 US$. ABS and UBS data were retrieved from the International Monetary Fund's 2021 Financial Access Survey, while NECOT data were obtained from the World Bank's database.

3.3 Statistical methods used to test the study hypotheses

Hypotheses $1_{a\text{-}c}$ and $2_{a\text{-}c}$ were tested using three panel regression analyses. In each of these regression analyses, the independent variables were ABS and UBS, and the dependent variable was NECOT. The first panel regression analysis was run with no lagging of ABS and UBS (to test H_{1a} and H_{2a}), the second regression analysis was run with a one year lag of both ABS and UBS (to test H_{1b} and H_{2b}), and

the third regression analysis was run with a two year lag of both ABS and UBS (to test H_{1c} and H_{2c}).

4. Findings

4.1 Descriptive statistics and correlations

Table (1) exhibits the descriptive statistics, and the correlations among the study variables. As shown in Table (1), all of the study variables exhibit skewness and kurtosis statistics of less than 3 in absolute value, which indicates that all the variables are normally distributed. In addition, as disclosed in Table (1), all of the ABS_t-UBS_t, ABS_{t-1}-UBS_{t-1}, and the ABS_{t-2}-UBS_{t-2} variable pairs exhibit non-significant correlations, indicating the absence of a multi-collinearity problem.

Table 1: Descriptive statistics and correlations matrix

Variables	Descriptive statistics				Correlations						
	Mean	Standard Deviation	Skewness	Kurtosis	ABS_t	UBS_t	ABS_{t-1}	UBS_{t-1}	ABS_{t-2}	UBS_{t-2}	$NECOT_t$
ABS_t	2596.54	1692.34	1.26	0.31	1						
UBS_t	4024369	5647857	1.79	2.91	-0.23	1					
ABS_{t-1}	2530.81	1648.12	1.33	0.58	0.99**	-0.24	1				
UBS_{t-1}	3792535	5358958	1.84	2.52	-0.25*	0.99**	-0.24	1			
ABS_{t-2}	2459.41	1594.71	1.41	0.88	0.98**	-0.26*	0.99**	-0.25	1		
UBS_{t-2}	3563671	5036371	1.85	2.58	-0.27*	0.99**	-0.26*	0.99**	-0.24	1	
$NECOT_t$	3475.77	608.43	-0.69	-0.67	-0.54**	0.46**	-0.58**	0.44**	-0.63**	0.42**	1

** Significant at the 0.01 level (2-tailed) * Significant at the 0.05 level (2-tailed)

4.2 The results of testing Hypotheses 1_a and 2_a

Table (2) reveals panel regression analysis results when ABS and UBS are not time-lagged using the fixed effect and random effect methods. As shown in Table (2), the results of Hausman test suggest that the fixed effect model is the model of best fit; Chi squared statistic = 466.23, $P < 0.05$. As disclosed by the fixed effect model results, the whole regression model is statistically significant; F (2, 65) = 165.71, $P < 0.05$, and 92% of the variance in $NECOT_t$ can be explained by the model; $R^2 = 0.92$. Further, the regression coefficients of ABS_t and UBS_t are both positive and statistically significant at the 0.05 significance level, suggesting statistically significant positive relationships between ABS_t and UBS_t as independent variables, and $NECOT_t$ as a dependent variable. Therefore, Hypotheses 1_a and 2_a were both supported.

Table 2: Panel regression analysis results when ABS and UBS are not time-lagged

Method Regression Results		Fixed effect method		Random effect method	
Predictors		**Coefficient (unstandardized)**	**t statistic**	**Coefficient (unstandardized)**	**t statistic**
Constant		2794.87*	44.96	3748.78*	86.34
ABS_t		0.22*	9.82	-0.16*	-13.25
UBS_t		2.36E-05*	3.40	3.80E-05*	10.24
Model Summary	R^2	0.93		0.41	
	Adjusted R^2	0.92		0.39	
ANOVA		F (2, 66) = 165.71*		F (2, 66) = 22.23*	
Observations		68		68	

Correlated Random Effects - Hausman Test Summary: Chi Squared Statistic = 466.23*, Degrees of freedom = 2; * Significant at the 0.05 level

4.3 The results of testing Hypotheses 1_b and 2_b

Table (3) reveals panel regression analysis results when ABS and UBS are one year lagged using the fixed effect and random effect methods. As shown in Table (3), the results of Hausman test suggest that the fixed effect model is the preferred model; Chi squared statistic = 447.04, $P < 0.05$. As revealed by the fixed effect model results, the whole regression model is statistically significant; F (2, 61) = 165.99, $P < 0.05$, and 92% of the variance in $NECOT_t$ can be explained by the model; $R^2 = 0.92$. The regression coefficients of ABS_{t-1} and UBS_{t-1} are both positive and statistically significant at the 0.05 significance level. This indicates that there are statistically significant positive relationships between ABS_{t-1} and UBS_{t-1} as independent variables, and $NECOT_t$ as a dependent variable, which provides support for Hypotheses 1_b and 2_b.

Table 3: Panel regression analysis results when ABS and UBS are one year-lagged

Method Regression results		**Fixed effect method**		**Random effect method**	
Predictors		**Coefficient (unstandardized)**	**t statistic**	**Coefficient (unstandardized)**	**t statistic**
Constant		2908.56*	47.32	3834.59*	90.22
ABS_{t-1}		0.20*	8.93	-0.18*	-14.56
UBS_{t-1}		2.19E-05*	3.03	3.53E-05*	9.24
Model Summary	R^2	0.93		0.43	
	Adjusted R^2	0.92		0.41	
ANOVA		F (2, 62) = 165.99*		F (2, 62) = 23.10*	
Observations		64		64	

Correlated Random Effects – Hausman Test summary: Chi Squared Statistic = 447.04*, Degrees of freedom = 2; * Significant at the 0.05 level

4.4 The results of testing Hypotheses 1_c and 2_c

Table (4) reveals the panel regression analysis results when ABS and UBS are two year lagged using the fixed effect and random effect methods. Again, as shown in Table (4), the results of Hausman test suggest that the fixed effect model is the preferred model; Chi squared statistic = 427.95, $P < 0.05$. As disclosed by the fixed effect model results, the whole regression model is statistically significant; F (2, 57) = 170.45, $P < 0.05$, and 94% of the variance in $NECOT_t$ can be explained by the model; $R^2 = 0.93$. The regression coefficients of ABS_{t-2} and UBS_{t-2} are both positive and statistically significant at the 0.05 significance level, signifying statistically significant positive relationships between ABS_{t-2} and UBS_{t-2} as independent variables, and $NECOT_t$ as a dependent variable. Thus, Hypotheses 1_c and 2_c were also supported.

Table 4: Panel regression analysis results when ABS and UBS are two year-lagged

Method Regression Results		**Fixed effect method**		**Random effect method**	
Predictors		**Coefficient (unstandardized)**	**t statistic**	**Coefficient (unstandardized)**	**t statistic**
Constant		3024.66*	50.17	3921.014*	95.47
ABS_{t-2}		0.18*	7.81	-0.20*	-16.23
UBS_{t-2}		2.22E-05*	2.96	3.28E-05*	8.36
Model Summary	R^2	0.94		0.47	
	Adjusted R^2	0.93		0.45	
ANOVA		F (2, 58) = 170.45*		F (2, 58) = 25.08*	
Observations		60		60	

Correlated Random Effects – Hausman Test summary: Chi Squared Statistic = 427.95* , Degrees of freedom = 2; * Significant at the 0.05 level

4.5 Summary of hypotheses testing results

As revealed by the results of testing the present study hypotheses in Tables (2), (3) and (4), the model with a two year lag of ABS and UBS has the highest adjusted R^2 value (0.93, as opposed to 0.92 in the cases of no lag and one year lag). This indicates that when ABS and UBS are two year lagged, their predictive power of NECOT is highest. As disclosed by the three panel regression analyses results presented, the best-fit regression models (1) when ABS and UBS are not time lagged, (2) when they are one year lagged, and (3) when they are two year lagged are represented by Equations 1, 2 and 3, below respectively.

$$NECOT_{it} = 2794.87 + 0.22\ ABS_{it} + 2.36E\text{-}05\ UBS_{it} + E \quad \textbf{(1)}$$

$$NECOT_{it} = 2908.56 + 0.20\ ABS_{it-1} + 2.19E\text{-}05\ UBS_{it-1} + E \quad \textbf{(2)}$$

$$NECOT_{it} = 3024.66 + 0.18\ ABS_{it-2} + 2.22E\text{-}05\ UBS_{it-2} + E \quad \textbf{(3)}$$

Where:

$NECOT_{it}$ → NECOT of country i at time t
ABS_{it} → ABS of country i at time t
ABS_{it-1} → ABS of country i at time t-1
ABS_{it-2} → ABS of country i at time t-2
UBS_{it} → UBS of country i at time t
UBS_{it-1} → UBS of country i at time t-1
UBS_{it-2} → UBS of country i at time t-2

5. Conclusions

Using 2004-2020 panel data from Egypt, Algeria, Tunisia and Morocco, our panel regression analysis results revealed that there are significant positive effects of both, ABS and UBS on NECOT: (a) when no time lagging of ABS and UBS was used, which provides support for Hypotheses 1_a and 2_a; (b) when ABS and UBS were one year lagged, which provides support for Hypotheses 1_b and 2_b; and (c) when ABS and UBS were two year lagged, providing support for Hypotheses 1_c and 2_c as well. Further, the results of our study disclosed that when ABS and UBS are two year lagged, their predictive power of NECOT is highest.

The results of testing the six hypotheses of the present study go in line with the finance-growth hypothesis (Schumpeter, 1912; Fry, 1988; Pagano, 1993), and also provide support for the prior studies that reported a positive relationship between FI and economic growth (such as Musau, Muathe & Mwangi, 2018; Chinoda, Kwenda & McMillan, 2019; Nada, 2019; Oladimeji & Adegbite, 2019; Hu, Liu & Peng, 2020; Huang, Kale, Paramati & Taghizadeh-Hesary, 2020; Sayed, Abbas & Touny, 2020; Patron & Pekhalskii, 2021; Cheumar & Yunita, 2022; Chuc *et al*., 2022; Ozturk & Ullah, 2022; Younas *et al.*, 2022). Two theoretical contributions are made by the present study. First, it further validates the findings of prior research that tackled the link between FI and NECOT using evidence from four large North African developing economies. Second, it considers the response lag in the nexus between FI and NECOT.

As suggested by the findings of the present study, the policy makers in Egypt, Algeria, Tunisia and Morocco are recommended to cautiously adopt strategies and policies which lead to higher FI, in order to increase economic output. Such strategies would include: (1) encouraging new electronic commerce business models; (2) expanding agent based banking and other cost effective financial services delivery channels; (3) moving wages and pension payments onto electronic channels, and ensuring that these channels are linked to accessible transaction accounts (Staschen & Nelson, 2013); and (4) ensuring that financial institutions do not undermine consumer protection by intentionally capitalizing on their advantages in information, knowledge, and power (Staschen & Nelson, 2013).

One limitation of the present study is that ABS was measured using one indicator only; number of commercial bank branches per 1000 km^2. As such, one recommendation for future research is to repeat the same analyses using more comprehensive measures of ABS, and UBS as well. One well-

established comprehensive measure of FI in the literature is Sarma's (2008) index of financial inclusion. Another recommendation for further research is to investigate the possible mediation effects in the link between FI and NECOT in North African economies. Possible mediators in the FI-NECOT nexus include poverty rate (Aracil *et al.*, 2022; Khan *et al.*, 2022), stock market development, banking sector development and sovereign credit risk (Pal & Bandyopadhyay, 2022).

References

Aracil, E., Gómez-Bengoechea, G., & Moreno-de-Tejada, O. (2022). Institutional quality and the financial inclusion-poverty alleviation link: Empirical evidence across countries. Borsa Istanbul Review, 22(1), 179-188.

Cheumar, M., & Yunita, P. (2022). Fintech Industry and Digital Financial Inclusion for Economic Development of an Inclusive Society in Indonesia. International Economic and Finance Review, 1(1), 1-31.

Chinoda, T., & Kwenda, F. (2019). Do mobile phones, economic growth, bank competition and stability matter for financial inclusion in Africa? Cogent Economics & Finance. Retrieved from https://doi.org/10.1080/233220 39.2019.1622180.

Chuc, A. T., Li, W., Phi, N. T. M., Le, Q. T., Yoshino, N., & Taghizadeh-Hesary, F. (2022). The necessity of financial inclusion for enhancing the economic impacts of remittances. Borsa Istanbul Review, 22(1), 47-56.

Fry, M.J. (1988). Money, Interest and Banking in Economic Development. Baltimore: The Johns Hopkins University Press.

GDP per Capita (Constant 2015 US$). The World Bank Database. Can be accessed at https://data.worldbank.org/in dicator/NY.GDP.PCAP.KD.

Hu, Y., Liu, C., & Peng, J. (2021). Financial inclusion and agricultural total factor productivity growth in China. Economic Modelling, 96(C), 68-82.

Huang, R., Kale, S., Paramati, S., & Taghizadeh-Hesary, F. (2021). The nexus between financial inclusion and economic development: Comparison of old and new EU member countries. Economic Analysis and Policy, 69, 1-15.

Khan, N., Zafar, M., Okunlola, A. F., Zoltan, Z., & Robert, M. (2022). Effects of Financial Inclusion on Economic Growth, Poverty, Sustainability, and Financial Efficiency: Evidence from the G20 Countries. Sustainability, 14(19), 12688.

Lu, X., Guo, J., & Zhou, H. (2021). Digital financial inclusion development, investment diversification, and household extreme portfolio risk. Accounting & Finance, 61(5), 6225-6261.

Musau, S., Muathe, S., & Mwangi, L. (2018). Financial inclusion, GDP and credit risk of commercial banks in Kenya. International journal of Economics and Finance, 10(3), 181-195.

Nada, R. (2019). Financial inclusion and sustainable growth in Egypt. Harvard University, Doctoral Dissertation.

Odugbesan, J. A., Ike, G., Olowu, G., & Adeleye, B. N. (2022). Investigating the causality between financial inclusion, financial development and sustainable development in Sub-Saharan Africa economies: The mediating role of foreign direct investment. Journal of Public Affairs, 22(3), e2569.

Oladimeji, J., & Adegbite, E. (2019). Financial inclusion and economic growth: Empirical evidence from Nigeria. Proceedings of the International Conference on Advanced Research in Management, Economics and Accounting - 2019.

Pal, S., & Bandyopadhyay, I. (2022). Impact of financial inclusion on economic growth, financial development, financial efficiency, financial stability, and profitability: an international evidence. SN Business & Economics, 2(9), 1-29.

Pagano, M. (1993). Financial markets and growth: an overview. European economic review, 37(2-3), 613-622.

Patron, P., & Pekhalskii, D. I. (2021). Financial inclusion as a factor of economic growth in the United States and other developed countries. USA & Canada: Ekonomika, Politika, Kultura, 10, 22-42.

Sadharma, E. K. S., & Venkatachalapathy, T. K. (2018). Does Financial Inclusion Reduce Poverty and Unemployment? Some Evidences from Indian States. The Microfinance Review, 10(1), 36-51.

Sakanko, M. A., David, J., & Onimisi, A. M. (2020). Advancing inclusive growth in Nigeria: The role of financial inclusion in poverty, inequality, household expenditure, and unemployment. Indonesian Journal of Islamic Economics Research, 2(2), 70-84.

Sarma, M. (2008). Index of financial inclusion. Indian Council for Research on International Economic Relations, Working Paper. Retrieved from https://www.econstor.eu/bitstream/10419/176233/1/icrier-wp-215.pdf.

Sayed, M., Abbas, N., & Touny, M. (2020). The impact of financial inclusion on GDP growth in Egypt. The Scientific Journal for Economics and Commerce, 50(2), 379-400.

Schumpeter, J. 1912. The theory of economic development. Cambridge, MA: Harvard University Press.

Sharma, D. (2016). Nexus between financial inclusion and economic growth: Evidence from the emerging Indian economy. Journal of financial economic policy, 8(1), 13-36.

The 2021 Financial Access Survey (FAS). (2021). International Monetary Fund. Can be accessed at https://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&sId=1412015057755.

Usman, A., Ozturk, I., Naqvi, S. M. M. A., Ullah, S., & Javed, M. I. (2022). Revealing the nexus between nuclear energy and ecological footprint in STIRPAT model of advanced economies: Fresh evidence from novel CS-ARDL model. Progress in Nuclear Energy, 148, 104220.

Younas, Z. I., Qureshi, A., & Al-Faryan, M. A. S. (2022). Financial inclusion, the shadow economy and economic growth in developing economies. Structural Change and Economic Dynamics.