



Exploring the Relationship Between Financial Inclusion and Macroeconomic Stability in North Africa: Evidence from Algeria, Egypt, Morocco, and Tunisia (2007-2022)

Madouri Hadda

*LEPPESE laboratory, University Centre Maghnia
(Algeria)*

h.madouri@cu-maghnia.dz

Abstract

Financial inclusion is considered a means to improve individuals' quality of life, reduce poverty, and foster economic development. It involves providing individuals and small enterprises with affordable access to financial services. This paper examines the relationship between financial inclusion and macroeconomic stability in four distinct North African countries from 2007 to 2022. The research investigated the impact of financial inclusion on financial stability and inflation stability. Financial inclusion was evaluated by the proliferation of bank branches. The analysis utilised the fixed effects panel data estimation method. The results indicate that financial inclusion does not improve financial stability and has no effect on inflation stability.

Article info

Received

Novembre 04.2024

Accepted

February 05.2025

Keyword:

- ✓ *Financial inclusion*
- ✓ *Macroeconomic stability*
- ✓ *Panel data estimation.*

1. *Introduction*

In recent years, financial inclusion (FI) has gained significant attention from economists, financial experts, and political scholars. It is crucial for achieving sustainable development goals, particularly in alleviating poverty and reducing inequality. Access to financial services empowers economically disadvantaged individuals by enhancing their ability to save and invest effectively. This increased financial access not only expands entrepreneurial opportunities but also enables more individuals to support themselves and their families, thereby fostering economic development. Thus, financial accessibility is vital for ensuring inclusive and sustainable economic growth. It involves making formal financial services available, affordable, and timely for diverse populations, improving credit access, enhancing savings options, and mitigating risks. A robust financial infrastructure promotes greater participation in the economy while safeguarding the rights of users. Overall, access to financial resources boosts efficiency and well-being by delivering adequate financial services.

Financial inclusion strengthens the financial system and ensures a smooth flow of finances within a country, meeting the needs of customers through formal financial services. The degree of access to these services is influenced by factors such as per capita income, effective governance, and institutional quality (Franklin et al., 2012). Limited financial services can lead to potential market volatility. María José Roa García (2016) noted that rapid credit

growth, fueled by easy access to funds without proper oversight, can increase risks, while broader access to deposits enhances the public financial system's resilience to shocks and promotes stability. Sahay et al. (2015) also highlighted the need for rigorous oversight in expanding credit access.

Furthermore, financial access serves as a vital source of capital, offering small and medium-sized enterprises opportunities to secure working capital, enhancing their operational efficiency. Access to financing has emerged as a global political goal aimed at achieving economic stability, prompting North African nations to make significant efforts to promote FI and development.

This study aims to investigate the relationship between financial inclusion and economic stability in North African countries, emphasizing the importance of access to and utilization of financial products and services for economic growth. However, there is a lack of comprehensive research examining the effects of financial inclusion on inflation and production volatility.

1.1 Hypothesis

The study hypothesizes that financial inclusion positively influences economic stability in North African countries by improving access to financial services, which in turn enhances savings, investment opportunities, and overall economic growth. However, it posits that the effects of financial inclusion on inflation and production volatility may be limited or not statistically significant.

1.2 Importance of the Study

1. **Economic Development:** Understanding the relationship between financial inclusion and economic stability is crucial for policymakers aiming to foster sustainable economic growth and development in North Africa, where many individuals remain financially underserved.

2. **Poverty Alleviation:** By investigating how access to financial services affects economic conditions, this study can provide insights into strategies for alleviating poverty and reducing inequality, aligning with global sustainable development goals.

3. **Policy Formulation:** The findings can inform policymakers and financial institutions on the effectiveness of financial inclusion initiatives, guiding them in designing targeted interventions to enhance financial access and improve economic resilience.

4. **Risk Management:** By exploring the dynamics of financial inclusion in relation to inflation and production volatility, the study can help identify potential risks and challenges, enabling better risk management strategies within the financial system.

5. **Contribution to Literature:** This research addresses a gap in existing literature regarding the effects of financial inclusion on macroeconomic stability, providing a foundation for future studies in this area and contributing to the broader understanding of financial systems in developing regions.

6. **Enhanced Financial Infrastructure:** The study underscores the importance of a robust financial infrastructure, which can

facilitate greater participation in the economy and improve the overall stability of financial markets.

By highlighting these aspects, the study aims to demonstrate the critical role of financial inclusion in promoting economic stability and enhancing the well-being of individuals and communities in North Africa.

2. Literature Review

While there is an increasing body of global literature exploring the relationship between access to finance and macroeconomic stability, research specifically focused on North African countries remains limited. The demand for more macroeconomic evidence linking financial inclusion can largely be attributed to a past scarcity of reliable data on financing access at the macroeconomic level. This study seeks to address this gap by examining the relationship between resource accessibility and macroeconomic stability in North African nations.

Numerous studies indicate a connection between financial instability and macroeconomic indicators, highlighting the causal relationship between the financial sector and the real economy. Most research has concentrated on the correlation between access to financial services and economic growth. Era (2015) stated that the availability of money stimulates growth by increasing savings and credit through financial development channels. Promoting financial access also necessitates establishing suitable legal, regulatory, and institutional frameworks, along with improving the information landscape. Government involvement is essential in enhancing financial capacity

through the implementation of laws that protect property rights and creditors. Collateral is crucial in easing borrowing constraints and lowering intermediary costs. Enhancing the documentation of mobile assets can significantly improve funding access for businesses (World Bank, 2014).

Research on the impact of financial inclusion on macroeconomic stability is limited. This study employs a modest amount of cross-sectional data, adhering to existing research that has established a connection between financial inclusion and economic fluctuations. Contrary to some studies, evidence supports a positive relationship between financial access and macroeconomic stability, as financial capability can mitigate financial risks and promote growth.

Jérôme et al. (2015) examined the impact of financial stability on the economic performance of EU member countries, employing both microeconomic and macroeconomic perspectives. The findings suggest that implementing macro prudential policies effectively reduces financial crises, systemic bankruptcies, and risks faced by enterprises. Macro prudential policies aim to mitigate risks for the broader economy. A study by Anh et al. (2019) investigated the influence of financial inclusion on macroeconomic stability in 22 emerging and frontier nations, using panel threshold estimation methods to analyze the optimal level of financial inclusion from 2008 to 2015. The study found that financial stability was positively influenced up to a certain threshold and that access to financial services helps stabilize inflation rates and promote economic growth. Badr and

Halima (2021) explored potential connections between financial inclusion and macroeconomic stability indicators in nine Middle Eastern and North African countries from 2005 to 2016. Their findings indicate that greater inclusion in the financial system reduces the likelihood of defaults in the banking sector, though it may negatively impact price stability and economic growth.

Rajesh and Ashis Kumar (2021) argued that financial inclusion has a significant and adverse effect on financial stability, as evidenced by the rapid growth of credit to the private sector, weakened credit standards, difficulties in assessing creditworthiness, increased non-performing assets, borrower defaults, and insufficient oversight of the banking sector. Their study found that inflation negatively affects financial stability, while GDP growth positively impacts it in BRICS nations.

Velenkosini and Johannes (2022) analyzed the correlation between financial inclusion and macroeconomic stability in South Africa using quarterly time series data from 2004 to 2019. Their findings suggest that financial inclusion significantly impacts output and inflation, offering essential policy implications for sustaining macroeconomic stability and fostering economic growth, living standards, and poverty reduction.

3. Theoretical Framework of Financial Inclusion and Financial Stability

Financial inclusion refers to the ability of households and enterprises to access and utilize formal financial services (Sahay et al., 2015). Policymakers view it as a means to enhance well-being, alleviate poverty,

and stimulate economic growth. Financial inclusion is a multifaceted concept, with its overall impact on the economy determined by its specific characteristics.

Various metrics are used to assess financial inclusion, including access, usage, and quality indicators. Access indicators measure the availability of financial services, considering factors like the presence of branches and ATMs relative to the population. Usage indicators quantify client behavior regarding financial services, including average savings amounts, transaction volumes, and electronic payment counts. Quality indicators evaluate how well financial products meet consumer needs, the range of available options, and customer awareness of financial products.

Financial development entails the expansion of financial institutions and markets concerning their volume, liquidity, accessibility, efficiency, and capital market activity. Account ownership is a key measure of financial inclusion, enabling individuals to access financial services and supporting overall financial development. Account holders can store, transmit, and receive money through various channels, allowing investments in health, education, and business. Accounts provide a secure way to save money, make payments, access credit, and conduct financial transactions. Approximately 76% of the global population has a bank account or access to a regulated financial institution, including mobile money providers. Individuals with bank accounts are better equipped to avoid poverty, relying on savings or financial assistance from relatives in times of crisis, such as income loss or crop failure. Research shows that individuals and

businesses with access to financial services like savings and credit accounts can better withstand financial disruptions than those without (Danielle et al., 2019). Those without accounts often manage their finances through informal, less secure, and more costly means.

Financial stability, as defined by the European Central Bank, refers to a financial system's ability to absorb shocks and manage financial imbalances. Financial stability is crucial for the smooth functioning of the financial system, supporting economic activities like investment, growth, and employment (Bank, 2012). The European Central Bank outlines three essential prerequisites for ensuring financial stability:

1. The financial system should effectively allocate resources from savers to investors.
2. Financial risks must be thoroughly evaluated and managed.
3. The financial system must possess sufficient resilience to withstand unexpected shocks and disruptions (Bank, 2012).

4. Development of Financial Inclusion and Financial Development Indicators in North African Countries

According to the findex 2021 report, there has been a global increase in bank account ownership, with the percentage of adults holding accounts rising from 51% in 2011 to 76% in 2021. In developing economies, account ownership increased by eight percentage points from 63% in 2017 to 71% in 2021, with the gender gap narrowing from nine to six percentage points. Despite these advancements,

disparities in financial service access persist for marginalized groups.

Access to finance in Algeria and Tunisia remains limited, as shown in Figure 1 (Annex 1), indicating fragile financial development. In 2021, Algeria and Tunisia had financial development indices of 0.14 and 0.23, respectively, while Morocco and Egypt had indices of 0.35 and 0.31. Additionally, Algeria's financial markets are underdeveloped, as illustrated in Figure 2 (Annex 2), which displays financial development indicators since 1980.

Financial inclusion is increasingly prioritized in Algeria, with growth opportunities evident in Figure 3 (Annex 3). The percentage of account ownership (adults over 15) rose from 33.29% in 2011 to 50.48% in 2014, but then fell to 42.78% in 2017 due to an imbalanced strategy for promoting financial inclusion. However, this rate increased again to 44.10% in 2021. Accessible and affordable financial services play a critical role in poverty reduction, economic growth, and crisis resilience, particularly for women. Currently, 57% of the adult population in Algeria, and 71% of women, lack access to basic transaction accounts, hindering their ability to send and receive payments securely and access other essential financial services like savings accounts and insurance.

In Tunisia, Morocco, and Egypt, account ownership among individuals aged 15 and over increased from 27.43% in 2014 to 36.85% in 2021, from 28.64% in 2017 to 44.

5. Data & Methodology

Based on empirical research, we develop a regression model for cross-sectional data, specifically the fixed effects model proposed by Greene (2012). The aim of this model is to analyze the correlation between financial inclusion (FI) and macroeconomic stability.

5.1 Model Specification

The regression model is specified as follows:

$$Y_{ti} = aFI_{ti} + bX_{ti} + \sum_i^n \alpha_i d_i + c_i + \varepsilon_t$$

Where:

Y_{ti} : Macroeconomic stability of the country i , $i=1.2.3.4$

d_i : Dummy variables.

5.2 Data

The primary source of data for this research is the Database (GFDD) provided by the World Bank and the IMF. The metric for macroeconomic stability is measured by the bank's Z-score and the volatility of inflation. Financial inclusion, on the supply side, is quantified by the number of bank branches serving more than 100,000 adults, reflecting the likelihood of individuals having real access to financial services.

The Bank Z-score, commonly employed in various studies as a measure of financial stability (Peter & Victor, 2014; Sahay et al., 2015; Cihak et al., 2016; Anh, Loan, & Duc, 2019), quantifies the banking sector's ability to endure financial gains or losses. The annual swings in inflation are calculated using the standard deviation of monthly shifts in the Consumer Price Index (CPI).

Financial inclusion (FI) is assessed by the expansion of bank branches (atmg), while factors X_t include the logarithm of real GDP and inflation volatility. We expect that the logarithm of real GDP indicates the economy's size, with developing economies likely showing lower financial development and integration into the global financial system, making them less resilient to financial disruptions.

High inflation and its fluctuations are expected to contribute to financial instability, as increased inflation often leads to economic uncertainty and volatile expectations (Armand, 2017).

5.3 Experimental Results

This study focuses on four North African countries: Algeria, Tunisia, Morocco, and Egypt, from 2007 to 2022, as illustrated in Table 1. The comprehensive statistical analysis of the variables is displayed in Table 2.

The fixed effects panel model was employed after conducting the Hausman test, which confirmed the fixed effects model's suitability based on the Fisher significance statistic. Fictitious variables were also utilized in the model.

Table 3 illustrates a detrimental effect of FI on the likelihood of financial institutions defaulting (as indicated by the Bank Z-scores). Furthermore, FI does not significantly impact inflation volatility, although a negative correlation exists between the two.

The estimates of the Bank Z-score indicate a positive correlation between real GDP and financial stability, while a negative correlation is observed with inflation rates. These findings align with prior studies (Rajesh & Ashis Kumar, 2021; Badr &

Halima, 2021; Anh, Loan, & Duc, 2019), suggesting that FI significantly and negatively affects financial stability. This adverse effect may arise from rapid loan growth to the private sector, leading to deteriorating lending standards and increased non-performing loans, alongside inadequate banking sector supervision.

Moreover, high inflation negatively impacts financial stability, while GDP growth positively correlates with it, indicating that strong economic growth can bolster financial resilience.

6. Discussion:

The study underscores the growing importance of financial inclusion (FI) in North Africa, highlighting its critical role in achieving sustainable development goals by alleviating poverty and reducing inequality. By providing access to affordable and timely financial services, FI empowers economically disadvantaged individuals to save, invest, and support their families, fostering economic development. However, the relationship between FI and macroeconomic stability is complex, as evidenced by mixed findings regarding its impact on financial stability, particularly with rising non-performing loans and insufficient regulatory oversight. The research employs a fixed effects model using cross-sectional data from four North African countries, emphasizing the need for robust legal and regulatory frameworks that promote financial inclusion while ensuring stability. Ultimately, the study advocates for balanced policies that enhance access to financial services while mitigating potential risks associated with rapid credit growth, suggesting that

promoting economic growth can bolster financial resilience in the region.

7. Conclusion

In summary, this manuscript underscores the critical importance of financial inclusion as a catalyst for enhancing macroeconomic stability in North African nations. Over recent years, financial inclusion has garnered significant attention from economists and policymakers, recognized for its pivotal role in attaining sustainable development objectives related to destitution reduction and inequality. By providing economically disadvantaged persons and small enterprises with access to economical financial services, financial inclusion not only empowers them to save and invest

However, the outcomes reveal that the economic progress of North African countries is fragile, hampered by challenges such as rising non-performing but also fosters a broader entrepreneurial landscape, ultimately driving economic growth.

assets and insufficient regulatory oversight. While financial inclusion can enhance financial services accessibility and contribute to economic resilience, it is essential to implement rigorous oversight to mitigate potential risks associated with rapid credit expansion.

Moreover, the research indicates a positive relationship between the size of the economy and financial stability, suggesting that stronger economic growth correlates with enhanced financial resilience. The implications of these findings are vital for policymakers, emphasizing the need to establish robust legal and regulatory frameworks that promote financial inclusion while ensuring stability within the financial system. As North African countries strive to advance financial inclusion, a balanced approach is crucial to secure sustainable economic growth and stability in the region.

Table 1. Selected countries

Country Group	Countries
Northern Africa	Algeria, Tunisia, Morocco and the Egyptian Arab Republic

Table 2. Statistical Characteristics of the Study Variables

variables	Number of observations	Median	Standard deviation	Maximum value	Minimum value
Financial Stability Index (Zs)	64	25.87	9.42	49.5	8,89
Inflation volatility (seinf1)	64	81.17	3.07	12.81	1.72
Financial Inclusion (atmg)	64	8.53	11.99	78.07	- 13.48
Inflation Rate (inf)	64	5.46	4.88	29.5	0.3
Logarithm of real GDP (lpib)	64	27.84	1.93	30.58	24.91

Table 3 Estimates for Fixed Effects Regression Model

	ZS EQ07	Seinfl EQ06
Financial Inclusion (atmg)	-0.112**	-0.010 no
Inflation.	-0.168	+ 0.014 no
Lpib	12.42**	-3.345***
C	-357.99**	102.47***
d_2	69.99**	-18.36***
d_3	57.77***	-10.76***
d_4	25.89***	-4.49***
Fisher test (F)	39.44	36.70
Number of Observations	64	64
R-squared	0.805	0.794
Number of countries	4	4

Notes: Asterisks (***), (**), (*) denote noteworthy transactions at the 1%, 5%, and 10% levels, respectively. The dependent variables, macroeconomic stability, are quantified using the Bank-Z score.

Source: Prepared by researcher using Eviews12

Table 4 Hausmann and Wolde test results

Hausmann Test(Cross-section random effect)		Wald Test	
Equation 6	Equation 7	Equation 6	Equation 7
100.055***	160.156***	F _{-st} =35.35	F _{-st} =53.75
		Chi-Square=100.055	Chi-Square=160.156

Source: Prepared by researcher using Eviews12

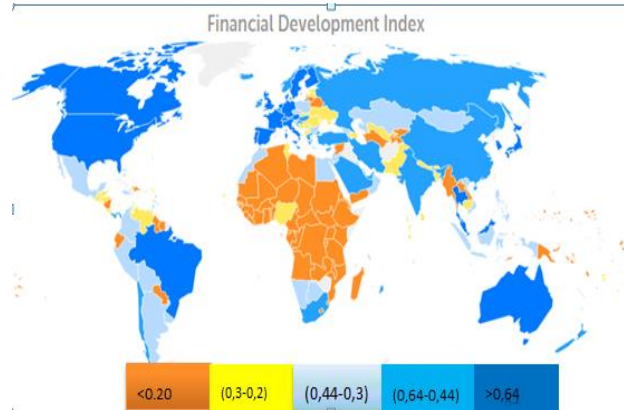
8. Bibliography List:

- Allen, Franklin, Demirgüç-Kunt, A., Klapper, L. F., & Maria Soledad, M. P. (2012). Martinez Peria, Maria Soledad, The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts (December 1, 2012). World Bank Policy Research Working Paper No. 6290, (No. 6290; pp. 1–58). Retrieved from World Bank Policy Research Working Paper website: SSRN: <https://ssrn.com/abstract=2188803>.
- Anh, T. V., Loan, T.-H. V., Duc, H. V., & Michael, McAleer. (2019). Financial Inclusion and Macroeconomic Stability in Emerging and Frontier Markets. Working Paper UNIVERSIDAD COMPLUTENSE MADRID, (1901), 1–23.
- Armand, F. (2017). Inflation targeting and financial stability in emerging markets. *Economic Modelling*, 60(5), 51–70. <https://doi.org/10.1016/j.econmod.2016.08.020>
- Badr, M., & Halima, J. (2021). Inclusion financière et stabilité macroéconomique : le cas de la zone MENA. *International Journal of Accounting, Finance, Auditing, Management and Economics (IJAFAME)*, 2(3), 375–389. <https://doi.org/10.5281/zenodo.4869584>.
- Danielle, M., Zahra, Niazi, Rebecca, Rouse, & Berber, K. (2019, January) Building Resilience through Financial Inclusion: A Review of Existing Evidence and Knowledge

- Gaps. . Retrieved May 7, 2024, from <https://poverty-action.org/publication>.
- 6.David, M., Steven, H. D., & Tankiso , M. (2020). FINANCIAL INCLUSION AND POVERTY ALLEVIATION AMONG SMALLHOLDER FARMERS IN ZIMBABWE. *Eurasian Journal of Economics and Finance*, 8(3), 168–182. <https://doi.org/10.15604/ejef.2020.08.03.004>.
- 7.Bank, E. C. (2012). Financial Stability Review (pp. 1–158). Retrieved from European Central Bank website: <https://www.ecb.europa.eu/pub/pdf/fsr/financialstabilityreview201206en.pdf>.
9. Demircuc-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2022). The Global Findex Database 2021 : Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19 - Chapter 1: Financial Access (English). (No. 173780). Retrieved from Financial Access (English): World Bank Group website: <http://documents.worldbank.org/curated/en/099833507072223098/IDU0f917b4120aa0f042270bbd10c8b257c99a54>.
- 8.Era, D.-N., Yan, J., Robert, T., & D, F. U. (2015). Identifying Constraints to Financial Inclusion and Their Impact on GDP and Inequality: A Structural Framework for Policy. *IMF Working Paper Strategy, Policy, and Review Department*, 15(22), 1–49.
- 9.Greene, W. H. (2012). *ECONOMETRIC ANALYSIS* (7th ed.). New York University: Pearson.
- 10.Jérôme, C., Paul, H., & Fabien , L. (2015). Financial stability and economic performance. *Economic Modelling*, 48, 25–4. <https://doi.org/10.1016/j.econmod.2014.10.025>.
- 11.International, M. F. (2023, December 31). IMF. Retrieved Jun 20, 2024, from <https://data.imf.org/>.
- 12.María José, R. G. (2016). Can financial inclusion and financial stability go hand in hand? *Economic Issues*, 21(2), 1–23.
- 13.Martin, Č., Davide, S. M., & Martin, Melecky. (2016). The Nexus of Financial Inclusion and Financial Stability A Study of Trade-Offs and Synergies. *World Bank Group: Policy Research Working Paper*, 7722, 1–45.
- 14.Peter J, M., & Victor, Pontines. (2014). Financial Stability and Financial Inclusion (No. 488; pp. 1–18). Retrieved from ADBI Working Paper website: <http://www.adbi.org/workingpaper/2014/07/07/6353.financial.stability>.
- 15.Rajesh , B., & Ashis , K. P. (2021). Does financial inclusion affect financial stability: Evidence from BRICS nations? *The Journal of Developing Areas*, 55(1), 1548–2278. <https://doi.org/https://dx.doi.org/10.1353/jda.2021.0023>.
- 16.Ratna, S., Martin, Č., Papa, N., Adolfo, B., Srobona, M., Annette, K., Seyed Reza, Y. (2015). Financial Inclusion: Can It Meet Multiple Macroeconomic Goals? (pp. 1–33). *International Monetary Fund, Washington. : I M F S T A F F D I S C U S S I O N N O T E* 15/17.
- 17.World, B. G. (2014). *Global financial development report 2014: financial inclusion* (No. 82556; pp. 1–224). <http://documents.worldbank.org/curated/en/225251468330270218/Global-financial-development-report-2014-financial-inclusion>.
- 19.Velenkosini , M., & Johannes, P. S. S. (2022). Velenkosini , M., & Johannes, S. Financial Inclusion and Macroeconomic Stability in South Africa. *International Journal of Economics and Financial Issues*, 12 (4), 56–64. *International Journal of Economics and Financial Issues*, 12(4),56–64. <https://doi.org/10.32479/ijefi.13053>.

Annex1:

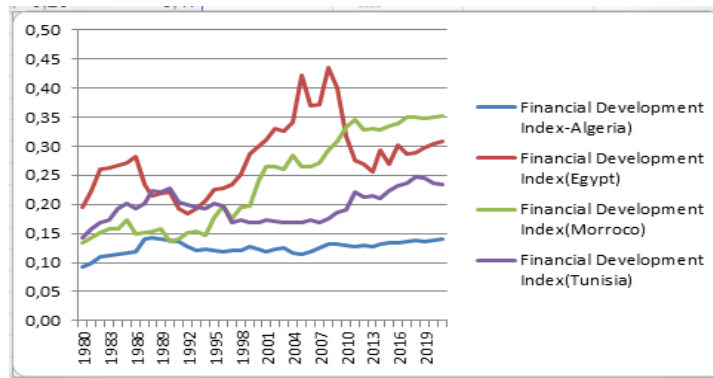
Figure1: Financial Development Index map of the world's countries in 2020



Source: <https://data.imf.org>

Annex2:

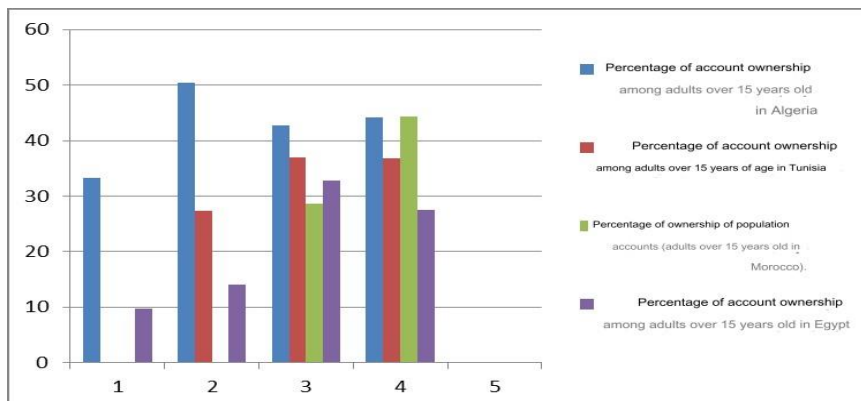
Figure 2: Evolution of financial development index in Algeria, Egypt, Morocco and Tunisia during the period 1980-2021



Source: from <https://data.imf.org>

Annex3:

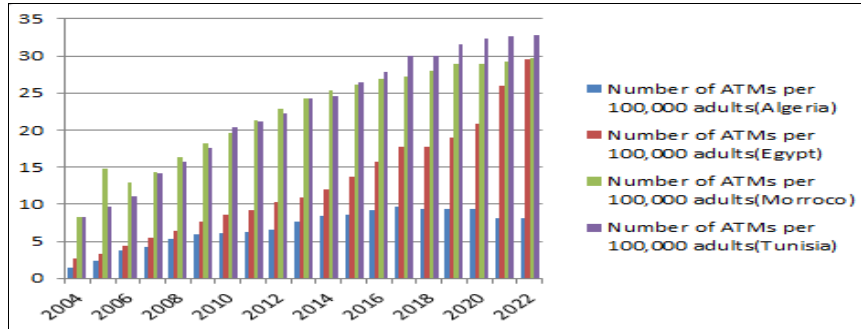
Figure 3: Evolution of the percentage of ownership of accounts (adult population over 15 years) in Algeria during the years 2011-2014-2017-2021



Source: <https://www.worldbank.org/en/publication/globalindex/Data>

Annex4:

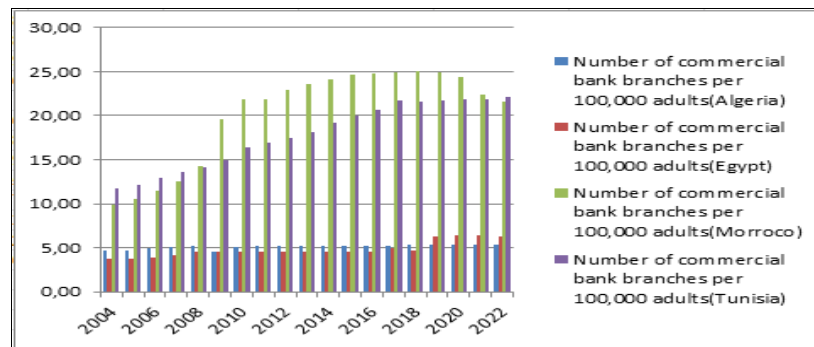
Figure 4: Evolution of the number of automated teller machines (ATMs) per 100,000 adults in North African countries for the period 2004-2022



Source: <https://www.worldbank.org/en/publication/globalindex/Data>

Annex5:

Figure 5: Evolution of commercial bank branches per 100,000 adults in North African countries for the period 2004-2022



Source: <https://www.worldbank.org/en/publication/globalindex/Data>