How Does Financial Openness Impact Economic Growth in Tunisia? Insights from an ARDL Model

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Abstract*:* This paper examines the short and long run dynamics between capital account liberalization and economic growth in Tunisia over the period 1984-2019. Based on the AutoRegressive Distributed Lag (ARDL) method of Pesaran *et al.* (2001) and causality tests of Toda and Yamamoto (1995), we find evidence supporting a long-run cointegration relationship between capital account liberalization and economic growth. However, the short-run effects are more limited, with causality running from economic growth to financial liberalization. This result is explained by the importance of the Tunisian authorities continuing to adopt financial and institutional reforms in a prudent, gradual, and orderly manner, in order to meet some of the preconditions required for the implementation of external financial liberalization. Moreover, the study also analyzes the role of institutions, as both the level and quality of institutional development condition the impact of financial liberalization on economic growth. In fact, in our study, one of the two main channels through which capital account liberalization affects economic growth is precisely the level of financial development resulting from the various reforms undertaken.

Keywords: financial openness; institutional development; financial instability; economic growth; ARDL; Tunisia.

JEL classification: F36; O43; E44; O40; C32; O55.

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1. INTRODUCTION

Tunisia launched, in the late 1980s, an ambitious program of economic reforms aimed at correcting the chronic imbalances inherited from the 1986 debt crisis and modernizing its productive fabric. Under the auspices of the IMF, the country embarked on a macroeconomic stabilization and structural-adjustment process which, as early as 1990, culminated in the gradual liberalization of its capital account. This opening entailed the removal of restrictions on foreign direct investment and the facilitation of portfolio inflows, while requiring the authorities to implement new regulatory measures (the 1993 FIPA law and the establishment of the Foreign Investment Promotion Agency in 1995) to ensure market transparency and legal security for operators. Although these initiatives succeeded in attracting capital and sustaining average annual growth of approximately 3 percent over the following two decades, external imbalances remained significant and the country's financial depth stayed limited, despite progressive reforms of both the public and private banking sectors. It is precisely to the analysis of the institutional conditions necessary for the effectiveness of this opening that Mnasri *et al.* (2025) devote their study. By revisiting the period 1984–2020, these authors demonstrate that the impact of financial liberalization on Tunisia's economic growth is closely dependent on the maturity of regulatory institutions, the quality of governance, and the authorities' capacity to manage capital flows in a prudent and coordinated manner. According to them, a robust institutional framework is the key to transforming foreign capital inflows into an opportunity for endogenous and resilient development.

In this context, this article aims to examine the relationship between capital account liberalization and economic growth in Tunisia, with a specific focus on the long-term relationship. The hypothesis is that the opening of the capital account positively contributes to economic development. This leads us to conduct a dual econometric analysis. First, we test for the presence of a cointegrating relationship by estimating an autoregressive model with distributed lags (ARDL) Pesaran and Shin (1998). Second, we investigate whether there is a long-term causal relationship between these variables, using the method developed by (Toda and Yamamoto, 1995).

The debate on strategies for ensuring financial development in both developing and developed countries continues to be a focal point in numerous analyses and recommendations. Among the measures taken, capitaland financial account liberalization, which encompasses foreign direct investment (FDI), portfolio investment, and bank lending, has been a pivotal lever for developing countries Kose and Prasad (2017). At a theoretical level, several arguments have been advanced to support the idea that capital accountliberalization positively influences growth dynamics. Firstly, it can enhance the attractiveness of foreign direct investment and more effectively allocate savings by directing resources toward the most productive investments. Secondly, it can facilitate portfolio diversification and risk management. Finally, capital account liberalization can instill greater discipline in fiscal consolidation and inflation control.

However, several works Mussa *et al.* (1998); Stiglitz (2000); Eichengreen and Leblang (2003); Stiglitz (2004), Eichen Green. B, (2001), have not conclusively established a significant relationship betweenexternal financial liberalization and growth. This is primarily attributed to overall macroeconomic instabilityand the challenge of balancing monetary policy autonomy with exchange rate stability, as external capital inflows have emerged as the primary source of fragility and contagion in financial and exchange rate crises.Furthermore, McKinnon

and Pill (1997) have noted that capital account liberalization has facilitatedthe influx of short-term foreign capital. While this may lead to an initial investment boom and temporary growth, the country may subsequently experience a recession or financial crisis when this prosperity becomes unsustainable. Consequently, these authors argue that the advantages of financial liberalization areprimarily evident in the short term.

Conversely, Kaminsky and Schmukler (2008) have found that financial liberalization in emergingcountries leads to short-term stress but ultimately contributes to market stabilization in the long run. Consequently, the international financial integration strategies of many emerging countries have yielded mixed results at best.

Moreover, the South Asian region has witnessed a series of financial crises that have spread to various partsof the world (Brazil, Argentina, Russia, etc.) through contagion. This has drawn attention to a crucial factor:the need to establish an appropriate framework for financial openness, or in other words, institutional structures that facilitate the transition to sound and secure financial liberalization must be in place. Additionally, a gradual and phased approach that avoids haste is necessary. Thus, the debate regarding the impact of financial liberalization on economic growth is far from settled, particularly given the limited research on the subject.

Our work is organized into four sections. Section 2 provides a brief review of the literature, aiming to emphasize the advantages of successful international financial integration for developing countries. Section 3 addresses the issues related to the opening of the capital account in Tunisia. Section 4 theoretically examines the ambiguity of financial liberalization and its impact on economic growth. Sections 5 and 6 seek to analyze the role of institutions in the relationship between capital account liberalization and economic growth in the case of Tunisia. Finally, in Section 7, we present our conclusions.

2. BRIEF LITERATURE REVIEW

Financial development and economic growth can be enhanced through financial openness, which can amplify the impact of the latter on growth rates. A substantial body of research Barro (1995); Rappaport (2000)demonstrates that developing economies encounter capital constraints and a shortage of domestic savings. Consequently, financial openness leads to an acceleration in capital inflows, which, inturn, stimulates the rate of capital accumulation and, consequently, economic growth.

According to Mishkin (2009), increasing competition in domestic banking and financial markets by openingdomestic financial markets to foreign capital and allowing foreign financial institutions to invest in domestic financial institutions is likely to enhance financial development in a given country. As a result of financial integration, when domestic firms can access credit from international institutions, domestic financial institutions face the risk of losing market share. To compensate for these potential losses, companies seek new, profitable consumers to lend to. To achieve this, these banks will require specific information about potential borrowers to better monitor them and reduce credit risk. Consequently, domestic financial firms will support institutional reforms aimed at enhancing accounting standards, financial reporting platforms, and the legal framework related to bankruptcy and guarantees.

Similarly, Kose et al. (2011) argue for a fresh perspective on the relationship between financial integrationand development in emerging countries. They contend that the true advantages of financial integration are not solely derived from the increase in the volume of capital inflows but also from the reforms and innovations resulting from these inflows. They

refer to these as 'collateral benefits,' which are not the primary objectives of governments that permit international financial integration. Consequently, domestic financial institutions will advocate for legal reforms, enhancements in institutional infrastructure, as well as macroeconomic and financial reforms. This not only enhances their profitability but also strengthens their property rights, thereby promoting investment immediately. Figure no. 1 elucidates this novel view of the relationship between financial integration and growth.
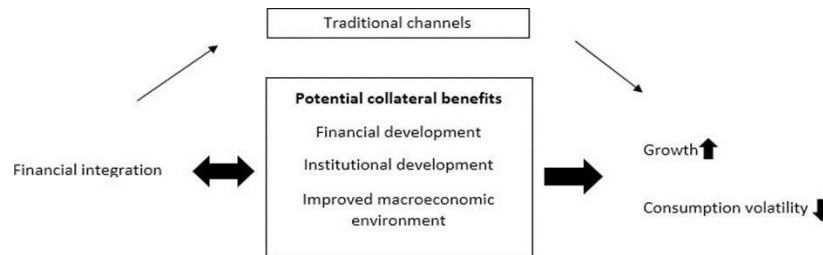

Figure no. 1 – The new perspective
Source: Kose et al. (2009), p.42

Given these findings, the question of sequencing and the speed at which the liberalization process occurs becomes central in the analysis. Indeed, a gradualist approach has gained prominence in contrast to the 'bigbang' therapy. In light of the crises in emerging countries, it is argued that measures for the liberalization of external accounts and full convertibility should not be considered in isolation. Instead, they should be integrated into a comprehensive program of macroeconomic reform that includes exchange rate policy andthe stability of the financial sector. This perspective is widely supported by Johnston R. B. and Sundarajan V. (2005), based on comparative experiences in Chile, Indonesia, and Thailand. It has also been adopted byIshii S. et al. (2002) and requires the rationalization of prudential supervision and the stability of the bankingand financial system, alongside macroeconomic adjustment and trade liberalization as 'discipline effects' and prerequisites for the liberalization of capital movements. According to Beji and Queslati (2013), gradualism in the approach to regional financial integration and the various stages can be illustrated by Figure no. 2.
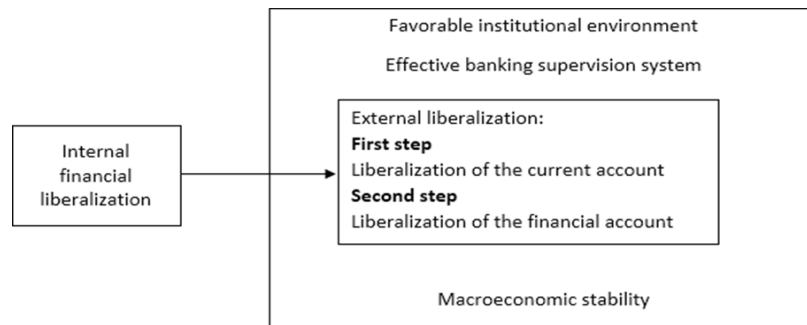

Figure no. 2 – The conditions and stages of regional financial integration
Source: Beji and Queslati (2013)

The primary challenge that may hinder some developing countries from reaping the direct and indirect benefits of financial integration is their inability to meet the necessary threshold of institutional development. Empirical research in this field has demonstrated that a swift opening of the financial sector without a robust and regulated financial system, dependable institutions, and a stable macroeconomic environment can have detrimental effects on the overall economy of developing countries, leaving them vulnerable when capital flow subsides or diminishes Beji and Queslati (2013). These studies primarilyemphasize the need for a strong institutional environment in establishing financial systems, as this is often the weakest aspect of developing countries' economies. This implies that they lag behind other nations in terms of economic growth.

Furthermore, the form of foreign investment can vary significantly depending on the quality of a country's institutional infrastructure, including factors such as the quality of public and private governance, legislative authority, government transparency, and levels of corruption, among others. Faria and Mauro (2005) foundthat good institutional quality in emerging economies helps attract more foreign direct investment at the expense of riskier portfolio investment, which should be avoided during periods of panic. With the Figure no. 3 below, Kose *et al.* (2011), on page 150, sought to illustrate this new perspective on the importance of reaching a minimum threshold of development.
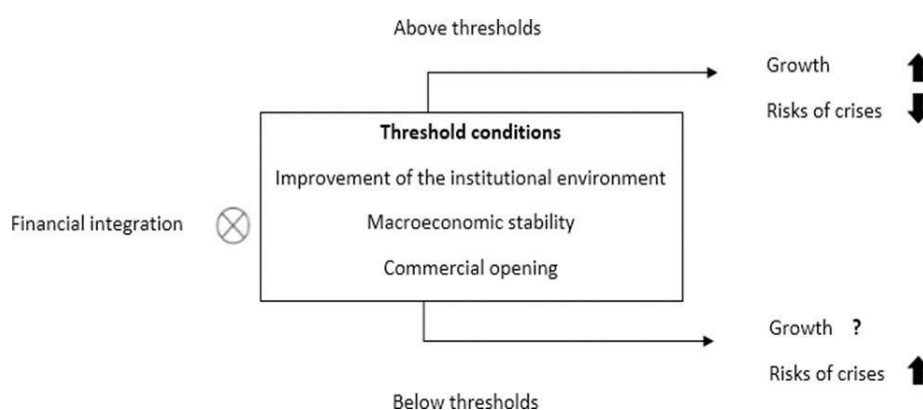

Figure no. 3 – The development thresholds approach
Source: Beji and Queslati (2013)

The threshold requirements are identical to the collateral benefits of financial integration, as depicted in thediagram above. This clarifies how the latter can serve as a catalyst for collateral benefits, with potential risksarising if specific conditions are not met.

3. THE OPENING OF THE CAPITAL ACCOUNT IN TUNISIA

Before the 1990s, monetary authorities maintained strict control over export earnings and capital account activities, with the exception of inflows of Foreign Direct Investment (FDI), which were at times tolerated and even encouraged. In contrast, Tunisia began easing restrictions on current transactions by adopting current convertibility of the dinar in 1992. Furthermore, in 1995, some degree of liberalization was introduced for portfolio investment

inflows. Administrative constraints on export earnings and FDI inflowscontinued to limit liberalization in the subsequent years. Only non-residents have the option to repatriate invested capital, as well as the net investment income, in foreign currency (as shown in Table no. 1).

Table no. 1 – Restrictions on the capital account in Tunisia

Capital transactions	Subject to controls
Portfolio investments	Portfolio investments and money market instruments are subjectto controls.
Credit operations	Except for certain money market loans, loans from premises tonon-residents require central bank authorization.
	Credits from non-residents to residents are limited. Tunisian banks and companies, for example, can borrow 10 MTD and 3 MTD(million Tunisian dinars) each year.
Foreign direct investments	Foreign direct investment outflows must be approved by the central bank. In most economic sectors, foreigners are free to invest.

Source: IMF, Annual Report on Exchange Arrangements and Exchange Restrictions & BCT

The Tunisian authorities initiated the liberalization of the capital account in 2005 with the aim of attractingforeign savings, diversifying balance of payments financing, enhancing portfolio composition, and improving the efficiency of domestic financial markets. According to Boulila Gh. (2008), the monetary authorities developed a three-phase strategy for gradual capital account liberalization.

Table no. 2 – Phases of progressive capital account liberalization

The 1st phase	The 2nd phase	The 3rd phase
It consists of implementing reforms aimed at liberalizing medium and long-term capital flows - such as direct investment and long-term credits by non- residents to listed companies, investments limited by non-residents in public titles in national currency - as well as other measures aimed at improving the overall efficiency of financial intermediation and diversifying sources of the balance of payments financing.	It involves the liberalization of Tunisian direct investment abroad, allowing institutional investors to make portfolio investments abroad and particularly in North African countries, and non- residents' portfolio investments under the form of debt securities. This phase requires the transition to a floating exchange rate, as well as the deepening of the foreign exchange market and the development of a banking system capable of resisting international competition.	It provides for full convertibility of the currency by the end of 2009. It requires the liberalization of portfolio investments by residents abroad and loans by residents to non-residents. To enter this phase, the financial sector must be sound and the balance of payments situation must be stable. Tunisian monetary authorities are aware of the need to improve macro-economic stability, financial institutions, and prudential supervision in this regard. It provides for full convertibility of the currency by the end of 2009. It requires the liberalization of portfolio investments by residents abroad and loans by residents to non-residents. To enter this phase, the financial sector must be sound and the balance of payments situation must be stable. Tunisian monetary authorities are aware of the need to improve macroeconomic stability, financial institutions, and prudential supervision in this regard.

Source: Boulila G. (2008)

However, due to the fragility of the Tunisian banking sector on one hand, and the challenging democratic transition on the other, stages 2 and 3 were not completed by the beginning and end of 2009, respectively. A retrospective examination of the last two decades reveals that the Tunisian economy has stagnated and insecurity has increased due to terrorism. While the restoration of major macroeconomic balances is crucial, it alone cannot guarantee the political stability of the State in the face of poverty, injustice, and the absence of the rule of law. Therefore, institutional consolidation is planned to bolster the sources of growth.

In conclusion, the debate in Tunisia on the liberalization of the capital account is linked to the concept of a critical threshold, and full convertibility of the Tunisian dinar can only be achieved if the ongoing restructuring of the banking sector is strengthened, combining profitability and the ability to withstand liquidity shocks, which requires a higher level of market capitalization Mouley S. (2012). These considerations can be seen as by-products of liberalization, stemming from the benefits of competition and foreign direct investment. Ultimately, these two factors are intertwined, as the success of banks is intrinsically linked to the opportunities for risk diversification offered by the financial markets.

4. FINANCIAL LIBERALIZATION - ECONOMIC GROWTH: A MIXED RELATIONSHIP

Some politicians and economists believe that the financial and banking crises that have affected many countries in recent years reflect the failure of financial liberalization policies, which raises questions about the relationship between financial integration and economic growth. Grilli and Milesi-Ferretti (1995) used a heterogeneous sample of 61 countries over the period 1986-1989. They used shared variables to measure financial openness and argued that financial liberalization has no impact on economic growth.

Rodrik (1998) and Kraay (1998) found that financial liberalization has no significant effect on the rate of economic growth. They used broader and more diverse samples of both developed and developing countries. Some economists suggest that this mixed effect of financial liberalization on growth can be explained by the heterogeneity, study period, estimation techniques, and institutional development of each country (Arteta et al. (2001)).

In a similar context, Edison et al. (2002) used six indicators to measure financial openness and applied three econometric estimation methods. They concluded that regardless of the method or indicator used for liberalization, financial liberalization has no significant effect on economic growth. Kose et al. (2006) examined 20 articles written during the period 1994-2005, testing the relationship between financial liberalization and growth. Their results show that 80% of these articles reveal no significant effect or have a limited mixed effect, which demonstrates that detecting a positive and robust effect of financial openness on growth is a challenging task, particularly in developing countries.

Given the abundance of cross-country analyses, numerous studies have examined the direct and indirect effects of financial integration on economic growth. For instance, Bekaert et al. (2005) and De Nicolò and Juvenal (2014) explore the direct effect of the financial-growth nexus and discover that financial integration leads to increased economic growth across various sets of variables. Several studies have also investigated the indirect effects. Mmolainyane and Ahmed (2015) analyze both the direct and indirect effects of financial integration on growth. They find that integration has a direct and positive impact on growth, while their findings also indicate that integration influences growth through greater levels of

financial access. In a similar vein, Brezigar-Masten et al. (2010) postulate that after a certain degree of financial development, financial integration exerts a positive effect on growth. Edison et al. (2002) demonstrate that the integration-growth link depends on factors such as GDP per capita, the development of the banking sector, and low levels of corruption.

Ambiguous results can be found in the deluge of past empirical studies on the effects of financial integration on economic growth. Previous empirical studies on the integration-growth nexus have focused on the effects of capital restrictions on economic growth (Alesina et al., 1994; Grilli and Milesi-Ferretti, 1995), and both suggest that there is no robust impact of financial integration on growth. Klein (2003) finds that capital account openness benefits 85 middle-income countries, but this effect is not observed in high-income and least developed countries. Interestingly, Prasad et al. (2007) measure the effect of financial integration in developed and developing countries, and the results indicate that financial integration increases consumption activities in several developing countries. Along these lines, De Nicolò and Juvenal (2014) provide evidence of the positive link between financial integration and macroeconomic stability. It's worth mentioning that studies such as Pungulescu (2013) demonstrate an increased degree of financial integration before the crisis; however, a significant reversal of integration is occurring in the post-crisis period in new and old EU member states. Coeurdacier et al. (2020) find an ambiguity in the finance- economic growth nexus, meaning that the effectiveness of financial integration is heterogeneous and depends on factors such as country size, risk levels, and capital deficiencies.

In the short term, while financial liberalization can theoretically promote economic growth through various channels, there is no robust empirical evidence indicating that this causal link is quantitatively significant. The literature on this subject has not provided conclusive results. These observations lead to two main hypotheses:

H1: Financial openness negatively impacts economic growth in the short/long term.

H2: Financial openness has a positive effect on economic growth in the short/long term.

5. METHODOLOGY

In our empirical analysis, we employ an Autoregressive Model with Distributed Lags (ARDL), which is used to test the existence of a long-term relationship between variables characterized by different levels of integration. This approach entails a bounds test to identify a long-term relationship between financial integration and economic growth.

The process begins by conducting unit root tests on the variables using the Augmented Dickey-Fuller (ADF) test to assess the stationarity and integration properties of the variables. Subsequently, we apply the ARDL methodology to uncover the specific findings related to both long-term and short-term relationships. The selection of the appropriate number of lags for the dependent variable and the explanatory variables is determined using the Schwartz Information Criterion (SIC).

We construct a model that examines the relationship between economic growth, financial integration, and financial stability for the case of Tunisia over the period from 1984 to 2019. Additionally, we account for institutional development, which involves considering financial development (FD). The general form of the model is as follows:

$$GDPt = f(DFt; KAOPENt; INSTITt; INSTABt) \tag{1}$$

with: *GDP*: the per capita GDP growth rate;

KAOPEN: an indicator proposed by Chinn-Ito (2008) makes it possible to measure the degree of restrictionof international financial transactions for each country and to give a fairly clear idea of the intensity of financial liberalization. Its value varies between -2 and 2.6. A high value is synonymous with a high degree of financial integration.

DF: an indicator of financial development. It is measured by the ratio of domestic loans granted by the banking sector to GDP. This ratio is one of the most used indicators to measure the development of the banking sector.

INSTIT: an indicator that measures institutional quality (INSTIT): this indicator is constructed from 12 institutional indicators: * Corruption control; * The stability of the government; * The rule of law; * Socio-economic conditions; * External conflicts; * Internal conflicts; * The military presence in political life; * The quality of the administration; * Religious tensions * Ethnic tensions; * The accountability of political leaders; * The investment profile.

INSTAB: Two proxy indices are generally used to measure the instability "V" of any variable "x", either the standard deviation of the growth rate of the variable or the mean of the absolute values of the residuals. In the context of our analysis, it is the standard deviation of the growth rate of the indicator used to measure financial development, calculated over each period. That is:

$$Vt^x = \frac{1}{n}\sum_{t=1}^{n}|gt^x - \overline{gt^x}| \tag{2}$$

with **gx** is the annual growth rate of the ratio of domestic loans granted by the banking sector to GDP.

Data is collected from the World Bank for GDP and DF, Annual Report on Trade Agreements and Restrictions (AREAR) for KAOPEN, ICRG (International Country Risk Guide) database for INSTIT, and authors' calculations for the INSTAB variable.

5.1 Determining the order of integration of the variables

Before proceeding with the co-integration analysis, we check the stationarity properties of the data set usingunit root tests. For this, we apply the classic unit root tests, such as the ADF (Augmented Dickey-Fuller) stationarity test, and the more robust PP (Phillips Perron) stationarity test. We judge that a series is stationaryif the test statistic (ADF, PP) is greater in absolute value than the critical value at 5%. The results of the various tests carried out are shown in Table no. 3.

The results of the augmented Dickey-Fuller and Philipe Perron unit root tests obtained indicate that all the variables are stationary in the first difference, except the variable INSTAB which is stationary in level.

Table no. 3 – Results of stationarity tests: ADF and PP

Variables	Test ADF		TestPP		Conclusions
	At level	*In 1st difference*	*At level*	*In 1st difference*	
GDP	-0.509414 (0.8775)	-5.572497 (0.0001)	-0.514633 (0.8765)	-5.668140 (0.0000)	I(1)
DF	-1.613529 (0.4652)	-5.071424 (0.0002)	-1.671711 (0.4364)	-5.028284 (0.0002)	I(1)
KAOPEN	-1.774847 (0.3854)	-4.415808 (0.0015)	-2.502521 (0.1235)	-5.656785 (0.0000)	I(1)
INSTIT	-2.486447 (0.1273)	-5.172944 (0.0002)	-2.506556 (0.1226)	-5.154889 (0.0002)	I(1)
INSTAB	-4.882246 (0.0003)	-	-4.760555 (0.0005)	-	I(0)

Note :(.) p value

5.2 Test of the Co-integration relationship

The advantage of the ARDL model is that it applies to small sample sizes to examine the co-integrating relationships between economic growth and international financial integration as well as long- and short- term parameters. Other advantages are also obtained from this modeling ARDL takes a sufficient number of delays to capture the data generation process. Therefore, to study this relationship, the ARDL representation of equation [1] is written as follows:

$$\Delta PIB = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta PIB_{t-i} + \sum_{i=1}^{k} \alpha_{2i} \Delta DF_{t-i} + \sum_{i=1}^{k} \alpha_{3i} \Delta KAOPEN_{t-i} + \sum_{i=1}^{k} \alpha_{4i} \Delta INSTIT_{t-i}$$
$$+ \sum_{i=1}^{k} \alpha_{5i} \Delta INSTAB_{t-i} + \beta_1 PIB_{t-1} + \beta_2 DF_{t-1} + \beta_3 KAOPEN_{t-1} + \beta_4 INSTIT_{t-1}$$
$$+ \beta_5 INSTAB_{t-1} + \varepsilon_t$$

In this equation, all the variables are expressed in a natural logarithm, which makes it possible to avoid theproblems of heteroscedasticity.

- Δ denotes the first difference operator;
- $i = 1$ then, k, the number of delays,
- α_0 represents the constant,
- α_1 to α_6 represent the short-term dynamics of the economic growth function,
- β_1 to β_6 represent the long-term dynamics of the model,
- and, ECT_{t-1} is the error correction term. Estimating the ARDL model requires two steps:

   - The first step is to determine the optimal Lag, using the Schwartz Information Criterion (SIC), which allows us to select the optimal ARDL model that gives statistically significant results with the fewest parameters. Figure no. 4 characterizes the different specifications of the ADRL model in terms of minimizationof the Schwartz criteria. We notice that the ARDL model (1, 2, 5, 4, 5) is optimal among the 19 other modelsbecause it presents the smallest value of the AIC.
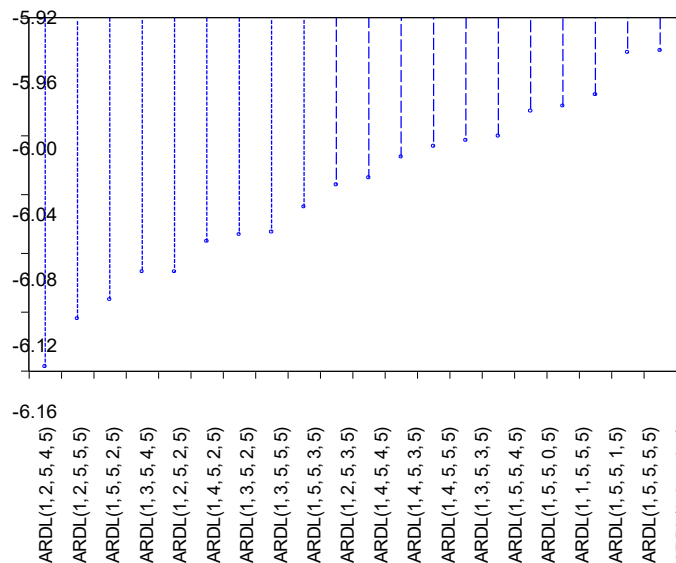
Figure no. 4 – Optimal ARDL Model: AIC Value
Akaike Information Criteria (top 20 models)

- The second step is to verify the presence of a co-integration relationship using the Fisher test which consists in verifying the following assumptions:

H0: $\beta1=\beta2=\beta3=\beta4=\beta5=0$: *Existence of a co-integration relationship.*
H1: $\beta1 \neq \beta2 \neq \beta3 \neq \beta4 \neq \beta5 \neq 0$: *Absence of a co-integration relationship.*

The procedure of this test involves comparing the F-statistics obtained with the critical values (both lower and upper bounds) simulated for various scenarios and different thresholds, as proposed by Pesaran *et al.* (2001). If the calculated F-statistic surpasses the upper bound, the null hypothesis is accepted, indicating the presence of a cointegrating relationship. Conversely, if the calculated F-statistic falls below the lower bound, the null hypothesis is rejected, signifying the absence of cointegration between the variables. Therefore, if the calculated F-statistic falls between the two bounds, the cointegration test yields inconclusive results.

The results of the cointegration test are presented in Table no 4. Two sets of critical values (lower and upper bounds) are determined for a specific level of significance, following Narayan (2005). The first set is computed under the assumption that all the variables included in the ARDL model are integrated at order I(0), whereas the second set is calculated under the assumption that the variables are integrated at order I(1).The null hypothesis is accepted when the test F-statistic exceeds the upper bound, while it is rejected if theF-statistic falls below the lower bound.

Table no. 4 – Cointegration tests of Pesaran *et al.* (2001)

Variables	GDP, DF, KAOPEN, INSTIT, INSTAB	
F-stat calculated	21.67494	
Criticalthreshold	I0 Bound	I1 Bound
1%	4.093	5.532
5%	2.947	4.088
10%	2.46	3.46

Source: Authors

6. ESTIMATION OF THE ARDL MODEL

After establishing the order of integration, selecting the optimal lag for our ARDL model, and confirming the presence of a long-term relationship among the variables of interest, we proceed to estimate the ARDL model to analyze both short-term and long-term dynamics.

The estimation results of the ARDL model are presented in Table no. 5. It is worth noting that the overall goodness of fit is quite satisfactory and statistically significant at conventional levels. The coefficient of determination, R^2, stands at an impressive 99.9%, indicating that 99.9% of the variation in GDP is explained by the dependent variables. Furthermore, the Durbin-Watson statistic of 2.37 suggests an absence of serial correlation.

Moreover, most of the short-term and long-term coefficients, including the coefficients of the error- correction term (in absolute value), fall within the theoretically acceptable range of 1 to 0. The value of the error correction term was -0.106754, which can also be referred to as the adjustment speed, and it is significant at a 1% significance level and correctly signed. The result indicates that the convergence speed towards equilibrium is 10.6%. This can also be interpreted as 10.6% of short-term variations are adjusted and integrated into the long-term relationship, suggesting that the current value of GDP will correct changes in DF, KAOPEN, INSTIT, and INSTAB.

Table no. 5 – ARDL model estimation results

Regressor	Coefficient	Std-Error	t-Stat(p-value)
Short TermEstimates			
ΔDF	-0.122675	0.032357	-3.791285(0.0043)
ΔDF(-1)	0.083527	0.033743	2.475412(0.0353)
ΔINSTIT	0.035108	0.049859	0.704149(0.4992)
ΔINSTIT(-1)	-0.164166	0.037716	-4.352667(0.0018)
ΔINSTIT(-2)	0.085914	0.033355	2.575749(0.0299)
ΔINSTIT(-3)	-0.036538	0.034111	-1.071130(0.3120)
ΔINSTIT(-4)	0.171796	0.034288	5.010365(0.0007
ΔKAOPEN	-0.041249	0.007774	-5.305876(0.0005)
ΔKAOPEN(-1)	0.034003	0.009829	3.459422(0.0072)
ΔKAOPEN(-2)	0.005141	0.008334	0.616831(0.5526)
ΔKAOPEN(-3)	0.016295	0.007798	2.089599(0.0662)
ΔINSTAB	-0.011162	0.001393	-8.014786(0.0000)
ΔINSTAB(-1)	0.025667	0.002924	8.779061(0.0000)
ΔINSTAB(-2)	0.013962	0.002782	5.019013(0.0007)
ΔINSTAB(-3)	0.010863	0.001806	6.013485(0.0002)
ΔINSTAB(-4)	0.007815	0.001514	5.162179(0.0006)
ECT(-1)	**-0.106754**	**0.007506**	**-14.22320(0.0000)**

Regressor	Coefficient	Std-Error	t-Stat(p-value)
Long Term Estimates			
DF	0.485315	0.460763	1.053284(0.3197)
INSTIT	0.531600	0.546108	0.973434(0.3558)
KAOPEN	-0.776671	0.217600	-3.569265(0.0060)
INSTAB	-0.405411	0.104724	-3.871244(0.0038)
Constante	1.699802	3.768186	0.451093(0.6626)
ARDL selected (1,2,5,4,5) residual model			
$R^2 = 0.999496$	F-statistic=850.3339		RSS = 0.000930
Adjusted $R^2 = 0.998321$	Prob(F-stat) =0.000000		DW = 2.372928

Source: authors

6.1 Interpretation and discussion of results

6.1.1 Short term results

The estimation results of our model yield conclusive findings regarding the impact of financial dynamics induced by the opening of the capital account on economic growth in Tunisia. Notably, we observe that financial development has a significantly negative effect on economic growth but becomes significantly positive at t-1. A 1% increase in the DF indicator results in a 0.122% decline in growth. However, this negative effect transitions to positive after one year, contributing to a growth increase of 0.083%. This can be explained by the fact that financial development in Tunisia does not necessarily enhance the efficiency of productive investments. The inadequate distribution of loans by the banking sector has led to an accumulation of bad debts and weakened their positions, subsequently slowing down growth.

In terms of financial integration, our results reveal an immediate, statistically significant negative effect. A 1% increase in the KAOPEN financial openness indicator leads to a 0.041% decrease in growth. However, this effect becomes positive by the end of the first year, contributing to a growth increase of 0.34%, 0.005%, and 0.016%. This suggests that the initial opening generates short-term tensions in financial markets and banks. As banks adapt to their new environment, they gain efficiency in allocating financial resources, thus stimulating growth.

Regarding institutional development, our findings demonstrate that the introduction of financial reforms hasan immediate positive effect on economic growth. In the short term, a 1% increase in the INSTIT indicatorresults in a growth increase of 0.035%. However, this positive effect becomes negative by the end of the subsequent period, leading to a decrease in growth of 0.16% at the end of the first year and 0.03% at the endof the third year. After the fourth year, this effect becomes significant, contributing to a growth increase of 0.17%. The reason for this lies in the fact that institutional reforms are conducive to improving the business climate and enhancing the performance of the financial sector. However, their implementation is delicate and may lead to issues in adapting to new institutional constraints such as corruption, bribery, and circumvention of regulations, which could hinder growth. Once these problems are resolved (at the end of the fourth year), institutional reforms begin to have positive effects on banks' and financial markets' functioning, the implementation of productive investments, and subsequently, economic growth.

The increase in competition heightens market volatility, and the post-deregulation and liberalization climateof uncertainty amplifies risks, necessitating authorities to strengthen

prudential regulation and supervisory practices, including concerns regarding capital ratio requirements and the extent of bank supervision (Amaira, 2017).

During the 1990s, many authors considered that a successful gradualism process required a sound banking system, admitting effective prudential regulation before lifting restrictions on capital mobility. Thus, the importance of gradualism lies in preventing the occurrence of crises in countries wishing to liberalize theirfinancial borders. Opting to remove restrictions on capital operations hastily, before addressing certain aspects concerning the domestic financial system, can lead to a financial crisis coupled with a foreign exchange crisis. This is particularly significant, even for developed countries that have robust banking systems and structured regulation; the removal of restrictions on flows entering and transiting through the banking system can prove to be harmful and destabilizing.

Several empirical studies (Kose *et al.*, 2011)(Abiad et al. (2007); Ito (2006); Chinn, Ito (2002)) focus on the relationship between financial integration and growth by exploring the concept of threshold effects. These studies suggest that the liberalization of capital movements seems to have positive effects on the economy only after reaching a certain level of development. Institutional development, along with the legaland legislative framework, is considered essential. Additionally, appropriate banking regulations to controlrisk-taking and low-corruption political institutions are crucial elements to fully benefit from the advantagesof financial integration (Rey (2004)).

6.1.2 Discussion of long-term results

We find that the long-term impact of international financial integration on Tunisian economic growth is significantly negative. Specifically, for every 1% increase in the rate of capital account liberalization, Tunisia's growth rate decreases by 0.77%. This result suggests that external financial openness reduces the level of competition in the banking sector, subsequently diminishing the quality and availability of financial services in the domestic market. However, Caprio and Honohan (1999) proposed that financial efficiency could be improved by reducing the cost of acquiring and processing prospect information. Therefore, the financial development resulting from the opening of the capital account does not stimulate long-term economic growth. This contradicts the findings of Bailliu (2000); Levine (2001); Reisen and Soto (2001), who indicated that financial liberalization boosts economic growth, though the magnitude of the gain varies based on the level of financial development. Elhmedi and Kammoun (2024) demonstrated that in the process of economic development, developing countries should not rely solely on domestic savings but should also encourage international capital inflows.

The impact of institutional development on economic growth is mixed. Indeed, it is not significant in the long term. The lack of a significant link between institutional development and economic growth can be attributed to the slow evolution of some components defining the institutional variable, which means they have a minimal detectable impact on economic growth in Tunisia. In this context, Farjallah and Abdelhamid (2017) estimated the relationship between the instability of political institutions and economic growth in Tunisia from 1984 to 2014 using the ARDL model. Unlike corruption, political stability,democratic accountability, public order, and ethnic tensions have a positive effect on economic growth. However, the institutional environment plays a crucial mediating role in the relationship between financial integration and economic growth. Strong institutions can enhance the efficiency of financial

markets by enforcing property rights, reducing transaction costs, and ensuring transparency and contract enforcement. Conversely, weak institutions may not only fail to channel financial flows productively but can also amplify financial vulnerabilities.

In this regard, financial integration in a context of institutional fragility may increase exposure to external shocks, speculative capital movements, and banking crises, which in turn hinder sustainable growth. The risk is particularly salient in emerging economies like Tunisia, where institutional capacities to monitor and regulate financial flows remain limited. Thus, the quality of institutions is not only relevant for growth per se, but also conditions the benefits and risks of financial integration. The presence of sound regulatory frameworks, effective governance, and stable political environments mitigates the adverse effects of financial volatility and fosters a more stable trajectory of economic development.

Furthermore, our estimates show that financial development has a positive but insignificant impact on economic growth. This result contradicts previous studies on the Tunisian economy, such as Ghali (1999); Ben M'rad (2000); Ben M'rad and Jacques (2000). These studies use Tunisia as an example to demonstrate that finance is a driving sector and that there is a stable long-term relationship between financial development and economic growth.

Our results reveal that financial instability has a negative and significant impact, with a 1% increase in instability reducing economic growth by 0.40%. This outcome can be explained, in part, by Guillaumont Jeanneney and Paraire (1991), who posited that the instability of the real exchange rate accompanying financial instability is one of the primary manifestations of relative price instability. Real exchange rate instability is often cited as a factor leading to reduced productivity, as it obscures market signals and results in resource misallocation, which, in turn, should lead to lower returns on investment. It can also decrease investment rates due to the uncertainty it generates. Additionally, Guillaumont and Deméocq (1989); Guillaumont (1994) argue that financial development instability often leads to fluctuations in investment rates. It is commonly recognized that in many developing countries, during periods of economic boom andeasy financing, ill-conceived, large-scale, and low-productivity projects are undertaken, often with government assistance or oversight.

6.2 Diagnosis of the Estimated ARDL Model

6.2.1 Diagnostic Tests

Based on the results of the diagnostic tests (Table no. 6) using the Breusch-Godfrey LM test, no evidence of serial correlation is found (0.1942 > 0.05).

Table no. 6 – Estimated ARDL Model Diagnostic Tests

Test Hypothesis	Testing	Values	Probability
Auto-correlation	Brusch-Gaufrey	2.534654	0.1942
Heteroscedasticity	Brusch-Pagan-Gaufrey	0.448230	0.9376
	ARCHTest	0.018624	0.9998
Normality	Jarque-Bera	0.580635	0.748026
Specification	Ramsey(Fisher)	2.737001	0.1324

Source: authors

Furthermore, there is no heteroscedasticity, as indicated by the Breusch-Pagan-Godfrey and ARCH tests, with probabilities of 0.9376 and 0.9998 exceeding the 5% threshold. It can be concluded that the model is well-specified in the ARDL models. Additionally, the Jarque-Bera test suggests that the errors follow a normal distribution (0.748026 > 0.05). The Ramsey specification test supports the conclusion that our model is well-specified (Prob Fisher 0.1324 > 0.05).

6.2.2 Stability Diagnosis

The stability of the model parameters was examined using the two statistics:
-   The cumulative sum of recursive residuals (CUSUM), this first test was used to study the systematicchanges in the estimated coefficients.
-   Cumulative sum of squares of recursive residuals (CUSUMSQ), this second test was used to examinesudden and accidental changes in the stability of the coefficients.
Figure no. 5 indicates the stability of the coefficients over the study period, as they are in the critical region(significance level of 5%).
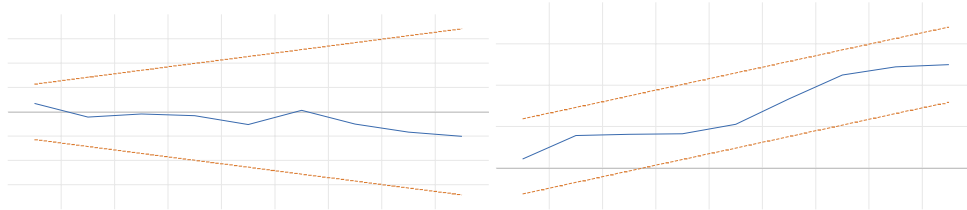

Figure no. 5 – CUSUM & CUSUMSQ Stability Diagnosis
Source: Eviews 12

6.3 Long Term Causality Study

The advantage of the Toda Yamamoto Granger causality test by Toda and Yamamoto (1995) over the ARDLapproach, which is based on the Wald "W" statistic according to the chi-square law, is that it can detect thedirection of causality while ARDL can only detect long and short term interactions between variables.

Table no. 7 – Results of the Toda-Yamamoto Causality Test

Dependent Variables	Causal Variables					Results
	GDP	**DF**	**KAOPEN**	**INSTIT**	**INSTAB**	
GDP	-	2.095884 (0.7181)	4.322852 (0.3641)	10.10263 (0.0387)	3.184050 (0.5275)	INSTIT → GDP
DF	5.075854 (0.2796)	-	0.383311 (0.9838)	2.000656 (0.7356)	1.954966 (0.7440)	NOT CAUSALITY
KAOPEN	12.68898 (0.0129)	4.713309 (0.3180)	-	4.848499 (0.3032)	8.668111 (0.0700)	GDP → KAOPEN INSTAB → KAOPEN
INSTIT	10.72800 (0.0298)	14.17582 (0.0068)	9.869959 (0.0427)	-	5.241717 (0.2634)	GDP → INSTIT DF → INSTIT KAOPEN → INSTIT
INSTAB	0.833655 (0.9339)	1.868721 (0.7599)	1.507092 (0.8254)	2.347123 (0.6722)	-	NOT CAUSALITY

Source: authors

Table no. 7 presents the results of Toda and Yamamoto (1995) causality tests. The results show that, on the onehand, unidirectional causal relationships ranging from economic growth (GDP) to financial openness (KAOPEN) and from the index of financial openness (KAOPEN) to the index of quality (INSTIT), and on the other hand, direct causal relationships ranging from financial development (DF) to institutional qualit y (INSTIT) and from the index of financial instability (INSTAB) to the index of financial openness (KAOPEN). Then, the relationship between economic growth (GDP) and institutional quality (INSTIT) is bi-directional. These Toda and Yamamoto causal links between variables are well summarized in Figure no. 6 and illustrate the need for a gradual approach to the transition to liberalization.
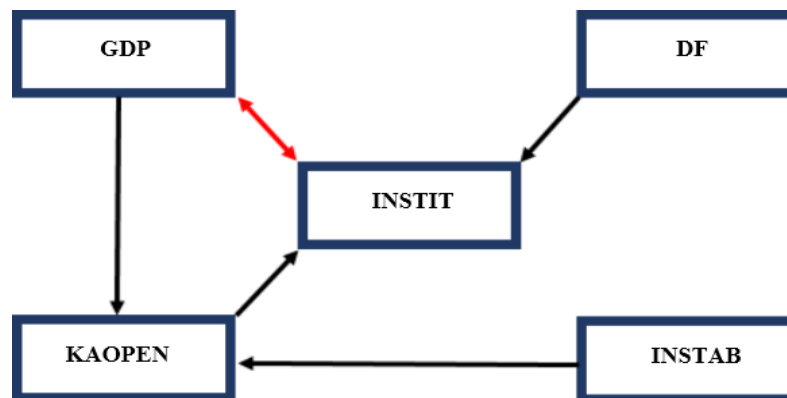

Figure no. 6 – Synthesis of causal links between the Variables
Source: authors

We propose a new perspective on the role of financial liberalization in the presence of indicators of financialinstability in the efforts of developing countries, based on the approach of economic development thresholds. The latter also presupposes an inadequate institutional environment and justifies global financialliberalization aimed at weakening and disrupting the country's financial sector, and at not meeting the financing and service needs of entrepreneurs.

The liberalization processes seem to depend on the specificities of the economies considered Prasad et al. (2007), so the removal of controls depends more on the degree of intermediation than on the country's income level Edison et al. (2002). National financial institutions will therefore encourage judicial, macroeconomic, and financial reforms, as well as the improvement of institutional infrastructure, This will allow them not only to increase their profits but also to strengthen their property rights, thus directly favoring "investment". Finally, when property rights are not protected or the judicial system is not effective, Foreign Direct Investment does not provide the benefits for which it is intended Beji and Queslati (2013).

Institutional factors according to Arestis and Demetriades (1997), can influence the relationship between finance and economic growth. This idea was confirmed by Law and Demetriades (2006), who stated that financial development did not affect the growth of countries with weak institutions in 72 countries during the period 1978-2000. The authors also found that in the face of financial instability, financial liberalization is not conducive to the development of the stock market, especially in middle-income countries, and thus to economic growth.

However, our results show that the liberalization of the capital account in the face of financial instability should aggravate the integration of capital markets in the international arena; this means that more emphasisshould be placed on improving the institutional structure of national financial sectors. Therefore, the assumption that financial openness is conducive to the development of the banking and stock exchange system, and subsequently to Tunisia's economic growth, is invalid.

7. CONCLUSION

The aim of this article is to examine, within a context of financial instability, the impact of capital account liberalization on economic growth in Tunisia. This econometric study, conducted over the period 1984–2019 using the Toda-Yamamoto long-term causality model and the ARDL model, reveals that the opening of the capital account has had a negative effect on economic growth. In fact, this liberalization remains limited. The findings suggest that Tunisian banks are not yet strong enough to fully benefit from financial liberalization, while the Tunisian stock market—characterized by a limited number of listed companies—lacks the depth to absorb incoming capital.

Moreover, the results confirm the existence of a cointegration relationship, indicating a long-term link between economic growth and financial openness. Causality tests based on the Toda and Yamamoto (1995) methodology reveal that economic growth has a reverse causal relationship with other variables. These findings can be interpreted through the lens of threshold effects, as highlighted by Kose *et al.* (2011) and Allegret and Azzabi (2012, 2013). It is therefore essential to assess how specific structural factors—such as financial development, the quality of local institutions, and trade openness—shape the response of economic growth to greater global financial integration. Such an approach would further clarify the critical role of financial openness in the development trajectories of emerging economies.

Given that financial development is the main channel through which capital account liberalization influences long-term growth (Allegret and Azzabi, 2014), strengthening the legal and regulatory framework, along with improving institutional quality, becomes vital. According to Gritli and Rey (2019), Tunisian authorities should be encouraged to adopt measures that promote the acquisition of financial assets by foreign (non-EU) investors. In parallel, the European Union is working to foster an institutional environment that supports the emergence of robust financial systems—an institutional pillar often missing in developing countries, thereby slowing their economic expansion. Such measures would help attract the foreign financial resources necessary for financial sector development and, consequently, for the productive investments needed to sustain long-term growth.

Finally, in light of the findings, several policy recommendations are necessary for Tunisia. Strengthening banking supervision and implementing structural reforms to modernize the financial sector are crucial. A better framework for capital flows, along with a gradual and selective liberalization of the capital account, could help mitigate negative impacts while maximizing potential benefits. Furthermore, closer coordination between monetary, fiscal, and trade policies would help establish a more stable macroeconomic environment, capable of effectively absorbing external shocks linked to financial integration. These measures are essential for making financial openness a genuine lever for sustainable economic development in Tunisia.

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