TRADE OPENNESS, FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN NORTH AFRICAN COUNTRIES

Imen Mohamed Sghaier  
PhD., University of Sfax, Tunisia  
medsghaier.imen@gmail.com

Zouheir Abida  
Prof. University of Sfax, Tunisia  
zouheir.abida@gmail.com

Abstract

This contribution investigates the relationships between financial development, trade openness and economic growth on a panel of four North African countries (Tunisia, Morocco, Algeria and Egypt), over a 5-year period from 1992 to 2016. Using system Generalized Method of Moment (GMM) in a panel data analysis, we found strong evidence of a positive link between trade openness and economic growth. We also found that trade openness appears to be working as a complement to financial development and, moreover, that the effect of trade openness is more pronounced in the presence of the financial development variable. The policy implications of this study appeared clear. Improvement efforts need to be driven by local-level reforms to ensure the development of domestic financial system in order to take full advantage of the technology transfer induced by international trade.

Keywords: Financial development, Trade openness, Economic growth, Dynamic panel data analysis

JEL Classification: F13, O16, F43, C23

1. Introduction

Among the macroeconomic variables that the empirical economic growth literature has identified as being highly correlated with economic growth across countries are the level of financial development and the degree of trade openness (Beck, 2002). Financial constraints prevent developing countries from taking the fullest advantage of the technology transfer. This can cause some countries diverge from the world technology frontier in terms of their per capita GDP levels or growth rates (Aghion et al., 2005). Developing countries with an underdeveloped financial system tend to experience a slower growth in both per-capita GDP and financial development, and are more likely to be trapped in poverty. This phenomenon can be interpreted as evidence that the developing countries are trapped in a vicious cycle – an underdeveloped financial system prevents a poor economic from taking full advantage of financial services to promote economic growth on the one hand, and slow economic growth does not generate enough demand for financial services required for financial development on the other (Fung, 2009). In contrast, countries with better-developed financial systems tend to grow faster over long periods (e.g. Levine, 2005; Baltagi et al., 2009).

Moreover, the endogenous growth theory as articulated by Romer (1990) and Grossman and Helpman (1991) and others also underlined that financial development is an important factor in promoting economic growth as finance is able to facilitate growth by improving the efficiency of resource allocation, capital accumulation and technological innovation (see King and Levine, 1993a, b; Beck et al., 2000). Furthermore, Blackburn and Hung (1998) also showed that both financial development and trade liberalization jointly promote economic growth by reducing information redundancy in search results and increasing markets for new products. What is unclear, however, is whether these potential benefits of financial development and trade openness are reaped by North African countries. However, not all researchers are convinced about the importance of financial system in the growth process. Lucas (1988) argued that economists tend to over-emphasize the role of financial factors in economic growth. Development of the financial markets may well turn out to be an impediment to economic growth when it induces volatility and discourage risk-averse investors from investing (Singh, 1997). This paper, therefore, seeks to explore whether or not trade in the growth process in North African countries in the region of North Africa with the presence of the limited and inconclusive results of previous studies.

The contribution of this paper to the literature is threefold. First, we believe that this study is the first to analyze the relationship between trade openness, financial development and economic growth in the North Africa region. Second, the empirical method involves regressing economic growth on trade openness, financial development, interactions between these two variables, and other growth determinants recommended in the literature. However, the trade openness and financial development variables are likely to be endogenous, possibly because of feedback from economic growth to trade openness and financial development. Therefore, this study uses generalized method of moments (GMM) estimation to deal with endogeneity and simultaneity bias. Last, in terms of policy implications, the results of this research will guide policy makers in designing policies aimed at better-developed financial system is potent in ensuring the effectiveness of trade openness and improving the economic growth.
The main purpose of this paper is to examine the role of financial development in mediating the impact of trade openness on economic growth on a panel of four North African countries, namely Tunisia, Morocco, Algeria, and Egypt, over a 5-year period from 1992 to 2016. Our dynamic panel regression analyses show that trade openness positively and significantly effects economic growth in the countries of North Africa. This study also highlights the positive complementarities between financial development and trade openness. This implies that improvement efforts need to be driven by local-level reforms to ensure the development of domestic financial system in order to take advantage of trade liberalization.

The organization of the paper is as follows. Section 2 provides a detailed literature review. Section 3 describes the used data and the empirical methodology. Section 4 presents the empirical results. Section 5 presents the concluding remarks and policy implications.

2. Trade openness, financial development and economic growth: An overview

2.1. Trade openness and economic growth

The recent endogenous growth theories give attention to the implications of trade openness on economic growth. The models of Rivera-Batiz and Romer (1991) and Grossman and Helpman (1991) provided a sound theoretical framework linking trade policy to economic growth. According to these models, trade openness offers four different opportunities that may lead to economic growth:

i) Communication effect: Trade openness provides opportunities for communicating with foreign counterparts, which in turn facilitate the diffusion of technologies.

ii) Duplication effect: In the absence of trade openness, some ideas and technologies are duplicated in multiple countries. Openness encourages local firms to invent new and distinct ideas and technologies and, consequently, prevent duplication of R&D efforts.

iii) Integration effect: International trade instantly increases the size of the market available each firm. Assuming intermediate goods as well as final goods are traded across countries, larger market size of the R&D sector raises R&D activity and, consequently, economic growth as this sector is subject to increasing returns to scale.

iv) Allocation effect: According to the theory of comparative advantage, trade openness allows countries to specialize in the production of goods and services in which they are relatively most efficient. In the other words, trade openness enables countries to maximize output from a given input of resources - which is a movement in the direction of environmental sustainability.

The openness-growth nexus has been the subject of a large number of empirical studies. Indeed, this issue drew renewed interest in the early 1990s, partly because of new analytical tools provided by endogenous growth theories and a considerable number of liberalization reforms in developing countries during the 1980s. Consistent with earlier cross-country studies, they affirmed the positive correlation between trade openness and economic growth. For instance, Barro and Sala-i-Martin (1997) argued that in the long run, trade openness may contribute to economic growth by diffusing technical
knowledge by importing high-tech import items and from the spillover effects of foreign direct investment i.e. financial openness, from the collaboration with the sources of innovations (Almeida and Fernandes, 2008), increasing market size to reap fruits from trade openness by increasing returns to scale and economies of specialization (Bond et al., 2005). Rajan and Zingales (2003) pointed out that trade openness pushes the governments to launch a reforms program to face the competition in international market. Similarly, Redding (1999) showed that trade openness might contribute adversely to long-run growth; if an economy specializes in those sectors where dynamic comparative disadvantages hold. In such scenario, Young (1991) found that selective protection policies can promote technology development and hence economic growth.

Santos-Paulino and Thirlwall (2004) demonstrated that trade liberalization caused both imports and exports to grow faster, but the growth of imports was faster than that of exports for a panel of 22 developing countries. Rassekh (2007) used the empirical model of Frankel and Romer (1999) for a sample of 150 countries to investigate the impact of trade openness on levels of income and the rate of income growth, and concluded that trade openness benefits the developing countries (i.e. low-income countries) more than the developed ones. Economidou and Murshid, (2008) used the data of 12 OECD countries found out the impact of trade on manufacturing productivity, the results from their study indicated that there is a positive effects of trade on productivity growth of manufacturing industries, the relationships is tenuous.

Chang et al., (2009) concluded that trade openness is positively related to economic growth for 82 countries. They also showed that this association can be enhanced significantly, particularly for developing countries, if trade reforms are combined with financial development, public infrastructure, and governance reforms. Kim and Lin (2009) concluded that a stable relationship exists between international trade and economic growth for 61 countries. Dufrenot et al., (2010) indicated that developing countries are obtaining more fruits of trade openness as compared to developed economies.

Kim et al., (2012) provided evidence that trade openness promotes economic growth in high-income, low-inflation, and non-agricultural countries but has a negative impact in countries with the opposite attributes. For a panel of 46 countries, Huang and Chang (2014) indicated that in countries with higher stock market development more trade openness enhances economic growth, while in countries with less stock market development the ability of trade to facilitate growth is feeble. Sakyi et al., (2015) showed a positive bi-directional relationship between trade openness and income level in the long run, thus suggesting that trade openness is both a cause and a consequence of the level of income for a sample of 115 developing countries. Recently, Zahonogo (2016) investigated how trade openness affects economic growth in countries within sub-Saharan Africa (SSA) using a dynamic growth model with data from 42 SSA countries. The empirical results suggested that trade openness may impact growth favorably in the long run, but the effect is not linear. Additionally, the results confirmed that trade openness has a positive and significant effect on economic growth only up to a threshold, above which the effect declines.
2.2. Trade openness and financial development

Study that looks into the relationship between trade openness and financial development is now emerging (see Baltagi et al., 2009; Kim et al., 2010a, 2010b). The most direct channel through which openness would affect financial development is through increases in the size of markets and demand for financial services. In this context, an increase in trade openness may lead to a supply of new financial instruments; in such an environment, financial institutions are expected to evolve so as to provide more adequate insurance and risk diversification (Svaleryd and Vlachos, 2002).

Political economy factors are also thought to be an important channel. Rajan and Zingales (2003) argued that special interest groups (incumbents) oppose financial development because the ensuing greater competition erodes their rents, given that these groups can finance themselves with retained profits whereas potential competitors need external finance to begin operations. According to Rajan and Zingales (2003), when a country opens its borders to trade and capital flows, it is more likely to benefit from this dual openness because both can promote competition and threaten the vested interests of the incumbents. In other words, open borders help to check the political and economic elites and preserve competitive markets. Consistent with this, Braun and Raddatz (2008) found that established groups are more likely to oppose financial development if potential competition poses an immediate threat to their profitability. These incumbents appear to regard financial underdevelopment as a way to protect their rents.

The empirical findings confirm the existence of a finance-trade nexus, although the subject has not been studied exhaustively. For instance, Beck (2002) showed that countries with better-developed financial systems have higher shares of manufactured exports in GDP and in total merchandise exports, concluding that finance is a determinant of trade. Similarly, Svaleryd and Vlachos (2005) found that financial sectors significantly determine industrial specialization across Organization for Economic Cooperation and Development (OECD) countries. More recently, Law and Demetriades (2006) argued that financial development is enhanced when a country’s borders are simultaneously open to both capital flows and trade. In a similar vein, Baltagi et al., (2009) showed that both trade and financial openness are statistically significant determinants of banking sector development and that opening up either trade or finance without opening up the other could still generate gains in financial development.

Few empirical studies that investigated a direct relationship between trade openness and financial development were done. Niroomand et al., (2014) examined the relationship between financial development and trade openness in 18 emerging economies. They showed that in the majority of these countries, either banking sector development or stock market development or both have had significant impact on trade openness, implying that a well-developed and well-functioning financial market creates more international trade opportunity for emerging economies. Kim et al., (2010b) investigated whether trade openness and financial development complement each other or are substitutes for 87 countries. They noted that long-run complementarity between financial development and trade openness coexists with short-run substitutionarity between the two policy variables. But when splitting the data into OECD and non-OECD country groups, this finding can be observed only in non-OECD countries. For OECD countries, financial development has negligible effects on trade. In
contrast, Gries et al., (2011) were not able to identify any prominent relationship between trade openness and financial development or vice-versa for 13 Latin American and Caribbean countries.

The empirical evidence that looks into the link between trade openness and financial development for Africa is rather very limited. In a study based on Kenya, Wolde-Rufael (2009) found some evidence to support the hypothesis that financial development causes both imports and exports growth but the causality relationship was weak in the opposite direction. On the other hand, Gries et al., (2009) noted that financial development and trade openness do not appear to have been crucial preconditions of economic growth in 16 SSA countries. Menyah et al., (2014) investigated the causal relationships between financial development, trade openness and economic growth for 21 SSA countries. They showed limited support for the trade-led growth hypothesis. The trade-led growth hypothesis holds only for Benin, Sierra Leone, and South Africa. Moreover, Polat et al., (2015) confirmed the existence of a feedback effect between trade openness and financial development was observed in South Africa both in the short and long run.

2.3. Trade openness and the finance-growth link

The impact of trade openness on the finance-growth link emanates from the effect of trade liberalization on macroeconomic performance. Therefore, as trade openness could have positive and negative effects on economic growth, it could also have contrasting impacts on the finance-growth nexus. On the one hand, Trade openness may lead to enhanced macroeconomic efficiency by providing access to new products and inputs, low-cost intermediate goods, bigger markets and advanced technologies (Yanikkaya, 2003). The increased efficiency - both at the firm and the aggregate level - likely leads to efficient allocation of funds channeled through domestic intermediaries. Hence, trade openness could strengthen the positive effect of financial development on economic growth. On the other hand, openness might weaken the finance-growth link stifles infant industries as trade protectionists such as Young (1991) argued. Trade openness could also induce macroeconomic instability (Rodrik, 1992) and raises vulnerability to foreign shocks (Yilmazkuday, 2011) and, hence, could negatively effect on the finance-growth nexus. Therefore, the possible impact of trade openness on the finance-growth link is not clear at the outset. Rather, it seems to depend on how well an economy performs in international trade, i.e., the finance-growth relationship is likely to be stronger in economies which perform better in terms of international trade.

Yilmazkuday (2011) considered trade openness as a possible factor to affect the finance-growth relationship for 84 countries. He found that trade openness strengthens the finance-growth link in low-income economies, but its effect is minimal in high-income economies. He argued that increased access to low-cost intermediate inputs, large and high-income markets, and technologies benefits open low-income economies. However, the finance-growth link in high-income economies is less affected by trade openness as those economies have their own large domestic markets. Instead, higher financial development coupled with high trade and financial openness might lead to higher vulnerability to international shocks.

Another study that has examined the impact of trade openness on the finance-growth link is that of Herwartz and Wall (2014). Using annual data for 73 countries, they found significant variations in the results across the four income groups they have considered.
While a moderate level of trade openness is beneficial to lower-middle-income economies and being extremely open is found to induce a negative finance-growth relationship. The negative finance-growth nexus might highlight the failure of domestic firms in extremely open low-and lower-middle-income economies to withstand foreign competition. In contrast, upper-middle-income economies show a marked finance-growth nexus when they are highly open to trade. This might be because of the better allocation of credits by firms in those economies when they are given access to international markets and/or when they face increasing competitive pressure from foreign firms. They also showed that the effect of trade openness on the finance-growth relationship varies between lower middle and upper-middle-income economies. Upper-middle-income economies show a pronounced finance-growth nexus when they are highly open to international trade. Yet, only a moderate level of trade openness is beneficial to lower-middle-income economies and being extremely open is found to induce a negative finance-growth relationship.

More recently, Pradhan et al., (2017) investigated the linkages between banking sector depth, trade openness, and economic growth using a panel data set covering the ASEAN regional forum countries for the period 1961-2012. The results indicated a general long-run equilibrium relationship among trade openness, banking sector depth and economic growth as well as a short-run relationship between these variables. This paper is motivated by similar considerations and attempts to test the complementarities between trade openness and financial development in the North African countries over the period 1992-2016.

3. Data and Empirical Methodology

3.1. Data

This paper considers a sample of four North African countries, namely Tunisia, Morocco, Algeria and Egypt. The choice of the selected countries for this study is primarily dictated by the availability of reliable data over the sample period. The panel covers the period 1992-2016, and is divided into five non-overlapping five-year periods.\(^1\) The dependent variable is economic growth, measured as the growth rate of real GDP per capita at 2010 USD prices. The main variable of interest (trade openness) and the other control variables are obtained from the World Development Indicators database (World Bank, 2018). Trade openness is measured by the ratio of total imports plus exports over GDP. Assuming that openness to international trade is beneficial to economic growth, a positive coefficient is expected.

In this study we use the credit provided by the banking sector to GDP to measure financial development. This indicator measures how much intermediation is performed by the banking system, including credit to the public and private sectors. Calderon and Liu (2003) suggested that this indicator has an advantage as it takes into account the credits to private sector only and isolates credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises. Furthermore,

\(^1\) Most panel studies on growth cycles are based on five-year averages as the time unit to eliminate the business cycle effect. Additionally, in this study we lacked annual data for some of the variables of interest. As such this did not allow us to use annual data.
it excludes credits issued by the central bank. They argued that the measure is even better than indicators used by previous studies such as King and Levine (1993a, b)\(^2\) and Levine (1999).\(^3\) Indeed, De Gregorio and Guidotti (1995) claimed that indicator is a better measure of financial development than measures of monetary aggregates such as M1, M2 and M3 because it reflects the more accurately on the actual volume of funds channeled into private sector. The ratio, therefore, is more directly linked to the investment and economic growth. Moreover, Calderon and Liu (2003) showed that a higher ratio credit provided by the banking sector to GDP indicates more financial services and hence, greater financial intermediary development.

The hypothesis that trade openness and other economic and institutional variables affect economic growth is tested by estimating dynamic panel data model for GDP per capita growth for consecutive, non-overlapping, 5-year periods, from 1992 to 2016.\(^4\) Our baseline model includes the explanatory variables common to most growth regressions found in the literature (all except initial GDP per capita are averaged over each 5-year period):

- Initial GDP per capita (log): log of real GDP per capita lagged by one 5-year period. A negative coefficient is expected, indicating the existence of conditional convergence among countries;
- Investment (% GDP) defined as the ratio of gross fixed capital formation to GDP. A positive coefficient is expected, as greater investment shares have been shown to be positively related to economic growth (Mankiw et al., 1992);
- Foreign direct investment (% GDP) measures the value of real gross foreign direct investment inflows to GDP ratio. The foreign direct investment is the net inflow of investment to acquire a lasting management interest in a company operating in an economy other than that of the investor. A positive coefficient is expected, as spillover effects may have been observed in the host countries.

In order to account for the effects of macroeconomic stability on economic growth, two additional variables will be added to the model\(^5\):

- Inflation rate measured as the annual percentage change in the consumption price index.\(^6\) A negative coefficient is expected, as high inflation has been found to negatively affect growth (Elder, 2004);
- Government spending defined as the ratio of central government expenditures to GDP. An excessively large government is expected to crowd out resources from the private sector and be harmful to economic growth. Thus, a negative coefficient is expected.

The extended model will also include the following institutional variable\(^7\):

\(^2\) King and Levine (1993a, b) use a measure of gross claims on the private sector divided by GDP. But, this measure includes credits issued by the monetary authority and government agencies.

\(^3\) Levine (1999) uses a measure of money bank credits to the private sector divided by GDP, which does not include credits to the private sector by non-deposit money banks and it only covers the period 1976-1993.


\(^5\) Here, we follow Levine et al., (2000), who accounted for macroeconomic stability in a growth regression by including the inflation rate and the size of government.

\(^6\) In order to avoid heteroskedasticity problems resulting from the high variability of inflation rates, Inflation was defined as log(1+Inf/100).
• The index of economic freedom from the Fraser Institute is used to measure the freedom of economic activities in a country. Higher indexes are associated with smaller governments (Area 1), stronger legal structure and security of property rights (Area 2), access to sound money (Area 3), greater freedom to exchange with foreigners (Area 4), and more flexible regulations of credit, labor, and business (Area 5). According to the survey of De Haan et al., (2006), which focused on the empirical studies that used this economic freedom indicator of the Fraser Institute, greater economic freedom stimulates economic growth. Thus, a positive coefficient is expected. The data are obtained from Miller and Kim (2017).

3.2. Empirical methodology

The purpose of our empirical analysis is to examine if financial development plays an important role in influencing the effects of trade openness on economic growth in North Africa. To this end, we employ a specification that is broadly similar to others (e.g., Gries et al., 2009; Herwartz and Walle, 2014). We consider the following model:

\[ y_{t,i} = \alpha y_{t-1,i} + \beta_1 \text{TRADE}_{t,i} + \beta_2 \text{FD}_{t,i} + \beta_3 X_{t,i} + \mu_i + \eta_i + \epsilon_{t,i} \]  \hspace{1cm} (1)

Eq. (1) can also be alternatively written with the growth rate as a dependent variable as:

\[ \text{Growth}_{t,i} = y_{t,i} - y_{t-1,i} = (\alpha - 1) y_{t-1,i} + \beta_1 \text{TRADE}_{t,i} + \beta_2 \text{FD}_{t,i} + \beta_3 X_{t,i} + \mu_i + \eta_i + \epsilon_{t,i} \]  \hspace{1cm} (2)

The subscript “t” represents one of these 5-year periods, whereas “i” represents the country, \( y \) is the logarithm of the real GDP per capita, TRADE is trade openness, FD is the financial development variable and \( X \) is the matrix of control variables described in the previous section, \( \mu_i \) is a time specific effect, \( \eta_i \) is an unobserved country-specific fixed effect and \( \epsilon_{t,i} \) is the error term. Eq. (2) forms the basis for our estimation. \( (\alpha - 1) \) is the convergence coefficient.

While TRADE has the potential to affect economic activity through a host of channels, in a second set of regressions, we examine one specific link between TRADE and economic growth, specifically the one working through FD. The hypothesis we would like to test is whether the level of FD in the host country affects TRADE on economic growth. To this end, we add an interaction term constructed as the product of TRADE and the FD (i.e., TRADE*FD) to Eq. (2) as an additional explanatory variable, apart from the standard variables used in the economic growth equation. To ensure that the interaction term does not proxy for TRADE or the level of FD, both of the latter variables were included in the regression independently. If the coefficient on the

\[^7\text{There is an extensive literature on the effects of institutions on economic growth. See, among others, Acemoglu et al., (2001), Glaeser et al., (2004) and De Haan (2007).}\]
interaction term is positive and significant, it implies that the marginal effect of TRADE on economic growth depends on the level of FD.

The regression to be estimated is the following:

\[ \text{Growth}_{it} = (\beta_0 - 1)y_{it-1} + \beta_1 \text{TRADE}_{it} + \beta_2 \text{FD}_{it} + \beta_3 (\text{TRADE}_{it} \cdot \text{FD}_{it}) + \beta_4 X_{it} + \mu_i + \eta_t + \varepsilon_{it} \]

This paper applies the GMM panel estimator developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). There are two main reasons for choosing this estimator. The first is to control for country specific effects, which cannot be done with country-specific dummies due to the dynamic structure of the regression equation. Second, is to control for a simultaneity problem caused by the possibility that some of the explanatory variables may be endogenous with growth or other dependent variables.

Following Arellano and Bond (1991), Eq. (1) can be transformed into a first-difference equation to eliminate country-specific effects as follows:

\[ y_{it} - y_{it-1} = \alpha(y_{it-1} - y_{it-2}) + \beta_1 (\text{TRADE}_{it} - \text{TRADE}_{it-1}) + \beta_2 (\text{FD}_{it} - \text{FD}_{it-1}) + \beta_3 (X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \]

To address the possible simultaneity bias of the explanatory variables and the correlation between \((y_{it-1} - y_{it-2})\) and \((\varepsilon_{it} - \varepsilon_{it-1})\), Arellano and Bond (1991) proposed that the lagged levels of the regressors are used as instruments. It is valid under the assumptions that the error term is not serially correlated and the lag of the explanatory variables are weakly exogenous. This strategy is known as Difference GMM estimation and the moment conditions can be listed as follows:

\[ E[y_{it-1} (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \text{ for } s \geq 2; \ t = 3, \ldots, T \]

\[ E[\text{TRADE}_{it-1} (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \text{ for } s \geq 2; \ t = 3, \ldots, T \]

\[ E[\text{FD}_{it-1} (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \text{ for } s \geq 2; \ t = 3, \ldots, T \]

\[ E[X_{it-1} (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \text{ for } s \geq 2; \ t = 3, \ldots, T \]

If the variables are persistent, however, their past values convey little information about their future changes, making their lagged value a weak instrument for their differenced series (Acemoglu and Robinson, 2008). This may be the case for the institution variables which may lead to a biased estimation of parameters in small samples and asymptotically larger variance. Arellano and Bover (1995) suggested a combination of
the differenced Eq. (4) and level Eq. (1). Blundell and Bond (1998) showed that this estimator is able to increase the efficiency via its reduction in biases, and imprecision characterized the Difference GMM estimator, especially the above mentioned weak instrument problem. Arellano and Bover (1995) and Blundell and Bond (1998) proposed a System GMM estimator as follows. In addition to the moment conditions of Eqs. (5)-(8), the authors proposed that the System GMM uses the following moment conditions:

\[
E[(y_{t-s} - y_{t-s-1})(\eta_i + \varepsilon_{it})] = 0 \text{ for } s=1
\]

\[
E[(\text{TRADE}_{t-s} - \text{TRADE}_{t-s-1})(\eta_i + \varepsilon_{it})] = 0 \text{ for } s=1
\]

\[
E[(\text{FD}_{t-s} - \text{FD}_{t-s-1})(\eta_i + \varepsilon_{it})] = 0 \text{ for } s=1
\]

\[
E[(X_{t-s} - X_{t-s-1})(\eta_i + \varepsilon_{it})] = 0 \text{ for } s=1
\]

The consistency of the System GMM estimator depends on the validity of the assumption that the error term does not exhibit serial correlation and on the validity of the instruments. By construction, the test for the null hypothesis of no first-order serial correlation should be rejected under the assumption that the error is not serially correlated; but the test for the null hypothesis of no second-order serial correlation, should not be rejected. We use two diagnostics tests proposed by Arellano and Bover (1995) and Blundell and Bond (1998), the Sargan test of over-identifying restrictions, and whether the differenced residuals are second-order serially correlated. If the null hypothesis of both tests cannot be rejected, this would indicate that the model is adequately specified and the instruments are valid. The results from this estimation procedure are reported in table 1.

4. Empirical results

The empirical results are presented in Table 1. Column (1) reports a preliminary analysis on the effects of TRADE and FD on economic growth. Column (2) presents the coefficient estimates obtained from the baseline specification, which used an interaction term constructed as a product of TRADE and FD.
Table 1: The growth effect of trade openness and financial development

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial GDP per capita</td>
<td>-0.07156***</td>
<td>-0.0711***</td>
</tr>
<tr>
<td></td>
<td>(-3.939)</td>
<td>(-3.896)</td>
</tr>
<tr>
<td>Trade openness</td>
<td>0.0276**</td>
<td>0.0365**</td>
</tr>
<tr>
<td></td>
<td>(1.98)</td>
<td>(2.21)</td>
</tr>
<tr>
<td>Financial Development</td>
<td>0.028*</td>
<td>0.0284*</td>
</tr>
<tr>
<td></td>
<td>(1.7)</td>
<td>(1.75)</td>
</tr>
<tr>
<td>Trade openness*Financial Development</td>
<td>-</td>
<td>0.0044*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.73)</td>
</tr>
<tr>
<td>Investment (% GDP)</td>
<td>0.031*</td>
<td>0.034**</td>
</tr>
<tr>
<td></td>
<td>(1.921)</td>
<td>(2.11)</td>
</tr>
<tr>
<td>Foreign Direct Investment (% GDP)</td>
<td>0.0063***</td>
<td>0.0068***</td>
</tr>
<tr>
<td></td>
<td>(2.6)</td>
<td>(2.68)</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.01***</td>
<td>-0.0107***</td>
</tr>
<tr>
<td></td>
<td>(-2.735)</td>
<td>(-2.808)</td>
</tr>
<tr>
<td>Government Spending</td>
<td>-0.0024</td>
<td>-0.0142</td>
</tr>
<tr>
<td></td>
<td>(-0.119)</td>
<td>(-0.543)</td>
</tr>
<tr>
<td>Index of Economic Freedom</td>
<td>0.0018*</td>
<td>0.0019*</td>
</tr>
<tr>
<td></td>
<td>(1.911)</td>
<td>(2.01)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.1952</td>
<td>0.0775</td>
</tr>
<tr>
<td></td>
<td>(0.866)</td>
<td>(0.168)</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.45</td>
<td>0.52</td>
</tr>
<tr>
<td>AR(2) test (p-value)</td>
<td>0.623</td>
<td>0.551</td>
</tr>
<tr>
<td>Sargan test (p-value)</td>
<td>0.706</td>
<td>0.591</td>
</tr>
</tbody>
</table>

Notes: The dependent variable is the growth rate of real GDP per capita. System GMM estimations for dynamic panel data models. Sample period 1992-2016. AR(2) is a test of second order residual serial correlation. J-test is the Hansen over identification test. t-statistics are in parentheses. *, **, and *** indicate statistical significance at 10 percent, 5 percent and 1 percent levels, respectively.

The results in Column (1) clearly indicate that the estimated coefficient on TRADE is statistically significant at the 5% level, which suggests that TRADE plays a positive role in boosting the economic growth of North African countries. The result corroborates the work of Yanikkaya (2003); Chang et al., (2009) and Chang and Mendy (2012). Meanwhile, the FD coefficient carries a positive sign and is statistically significant at conventional levels, confirming a long-run positive relationship between financial development and economic growth. This positive impact is in line with much of the empirical finance and economic literature (see Levine, 2005, for a broad survey). It should be noted that the coefficients of the core variables considered in the equation
enter the regression equation with the correct sign and are significant at the 10 percent significance level or better. Additionally, the estimated regression passed both specification tests. The null hypothesis of no second-order serial correlation cannot be rejected at the 5% level. The regression is not plagued by simultaneity bias as the orthogonality conditions cannot be rejected at the 5 percent level, as indicated by Hansen’s test. This suggests that the equation is adequately specified and the instruments employed in the analysis are valid.

Next, Column (2) shows the regression results based on interaction specification using an interaction term between TRADE and FD (TRADE*FD). In this specification, we relied on the interaction term to establish the contingency. If the term is positive and significant, this implies that the impact of TRADE on economic growth increases with FD. The first thing to note is that the interaction term turns out to be positively signed and statistically significant at 10% level. This result implies that a better contribution of TRADE to economic growth requires taking into account the interrelationship and the complementarity between FD and TRADE. This finding supports the complementarity hypothesis and corroborates the findings by Herwartz and Walle (2014); Bojanic (2012) and Jenkis and Katicioğlu (2010). However, our findings suggest that public authorities in today’s North African countries should try to maximize the impact of trade openness by identifying policies aiming to promote financial democracy, that is, policies that facilitate the access to bank service and that ensure greater transparency in the financial system. The p-values of second-order serial correlation and Hansen’s over identification tests indicate that the model is adequately specified.

We introduced the level of initial GDP per capita (the natural logarithm) as an independent variable according to the conditional convergence hypothesis. The coefficient of initial GDP per capita shows the expected negative sign and is highly significant, indicating a convergence of per capita income across countries as proposed in the growth theories. This result corroborates the work of Barro and Sala-i-Martin (1997). The effect of the other variables in the regression is consistent with the standard growth regression results. Investment and foreign direct investment have positive and statistically significant coefficients, indicating that greater investment and more foreign direct investment inflows promote economic growth. Regarding macroeconomic stability, inflation and government size have the expected signs, but only the first is statistically significant. Finally, the index of economic freedom coefficient carries a positive sign and is statistically significant at conventional levels, implying that economic growth is stronger when economic freedom is high because it makes investment more productive. This finding is consistent with the survey conducted by De Haan et al., (2006) and Azman-Saini et al., (2010) who concluded that economic freedom is crucial for economic growth.

5. Conclusion

This paper examines the relationship between trade openness and GDP growth in the presence of domestic financial system. Using system GMM panel data model to examine the link between trade openness, financial development and economic growth on a panel of four North African countries, over a 5-year period from 1992 to 2016, both trade
openness and financial development have a significant and positive impact on economic growth.

To examine whether financial development helps a country to benefit more trade openness, the study interacted trade openness with financial development variable. The result is that trade openness is interacted with the financial development indicator; the interaction term is generally positive and significant, shedding light on the role of financial development in benefiting from trade openness.

The results have clear policy implications, namely the effect of trade openness on economic growth is subject to the underlying financial conditions and institutions. A well-developed domestic financial system plays an important role in complementing the impact of trade openness on economic growth; that is, countries with better-developed financial sectors experience a raise in their growth rates.

References


World Bank (2017), World Development Indicators, World Bank, Washington DC.


