
Financial Development, Trade Openness and Economic Growth in North African Countries

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This contribution investigates the causal interactions between financial development, trade openness and economic growth in a panel of 3 countries of North Africa (Tunisia, Morocco, and Egypt) over the period 1980-2012. Using system Generalized Method of Moment (GMM) panel data analysis, we find strong evidence of a positive link between trade openness and economic growth. We also find evidence that trade openness appear 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 advantage of trade liberalization.

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

JEL Classifications: F13, O16, F43, C23

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1. Introduction

Among the macroeconomic variables that the empirical economic growth literature has identified as being highly correlated with growth performance 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 technological and economic benefits of technology transfer. This can cause some countries to diverge from the growth rate of the world production frontier (Aghion et al., 2005). Developing countries with an under-developed 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 a well-developed financial system tend to experience a faster growth in both per-capita GDP and financial development, and are more likely to catch up to their middle-and high-income counterparts (e.g. Demirgüç-Kunt and Levine, 2009; Baltagi et al., 2009).

Moreover, the endogenous growth theory as articulated by Romer (1990) and Grossman and Helpman (1991) and others also underlines 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 Levine, 2005). In addition, Blackburn and Hung (1998) consider the impact on economic growth of both financial development and trade openness. Using endogenous growth theory, their model predicts that economic growth rates under

financial development tend to be higher than those under direct lending or borrowing and shows that both financial development and trade liberalization jointly facilitate the rate of 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) argues 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 financial development and trade openness have a role in the growth process in North Africa in the presence of the limited and inconclusive results of previous studies.

In view of the growing economic importance of financial development and trade openness in the literature, this study estimates a dynamic panel model using the Arellano and Bover (1995) system GMM estimator and shows the effect of trade openness on the economic growth of 3 North African countries (Tunisia, Morocco and Egypt) over the period 1980-2012. The paper also assesses the role of financial development in determining the relative effectiveness of trade openness to the region. The results suggest that trade openness have a positive and significant effect on economic growth in the region, and that the impact is more pronounced when financial development is included in the model. Thus, the findings reported in this study represent a significant contribution to the extant literature, particularly because they have been generated utilizing estimation techniques that address the inherent endogeneity of the included variables.

The organization of the paper is as follows. In Section 2 we present a short review of the related academic literature, followed in Section 3 by an overview of the financial system and economy of North Africa. Section 4 describes the data and empirical methodology. The empirical results are presented in Section 5. The final section draws conclusions based on the results.

2. Finance, trade openness and economic growth: An overview

2.1. Financial development and economic growth

The theoretical relationship between financial development and economic growth can be traced back to early last century and has been increasing since the 1980s (see, for example, Hermes and Lensink 2003; Alfaro et al. 2004, 2010; Azman-Saini et al. 2010; among others). The conventional wisdom suggests that financial development is an essential determinant as well as a major contributor of economic growth for few reasons.

First, a well-developed financial system plays a fundamental role in ensuring the efficient allocation of resources, better monitoring, fewer information asymmetries, and economic growth (Shen and Lee, 2006). Financial system may contribute to GDP growth via two channels. On the one hand, it mobilizes savings; this increases the volume of resources available to finance investment. On the other hand, it screens and monitors investment projects (*i.e.* lowering information acquisition costs); this contributes to increasing the efficiency of the projects carried out (Greenwood and Jovanovic 1990). This argument was put forward by Levine (1990) who posits that the financial development is as a vital determinant of economic growth, which increases savings and facilitates capital accumulation and thereby leads to greater investment and growth.

Second, financial system influences the amount of credit rationing in financial markets and constrain potential entrepreneurs, which in turn determine economic growth. This is especially true when the arrival of

an entirely new technology brings with it the potential to tap not just domestic markets but export markets (Alfaro et al. 2004).

Third, financial system may also determine to what extent foreign firms will be able to borrow in order to extend their innovative activities in the host country, which would further increase the scope for technological spillovers to domestic firms. Hence, the diffusion process may be more efficient once financial markets in the host country are well-developed, since this allows the subsidiary of a multinational corporation to elaborate on the investment once it has entered the host country (Hermes and Lensink 2003). According to Demetriades and Andrianova (2004), a well-developed financial system is a precondition for the economy to materialize new innovations and exploit its resources efficiently. In this way, finance is seen as a facilitator for economic growth, rather than as a deep determinant for GDP growth.

Finally, an efficient financial sector is a vital component of economic growth.³ In fact, some researchers have indicated that countries with efficient financial systems are less susceptible to the risk that a financial crisis will erupt in the wake of real economic disturbances and more resilient in the face of crises that do occur (Bordo and Meissner 2006; Beck et al. 2000). Indeed, countries with well-developed financial systems, i.e. financial markets and institutions that more effectively channel society's savings to its most productive use, experience faster economic growth (Bekaert et al. 2003; Ranciere et al. 2006). As mentioned by Blejer (2006), countries with efficient financial systems are less prone to banking and currency crises, and these countries also suffer much less when a crisis does occur.

³ The financial system's efficiency can be gauged by the efficiency with which it transforms resources into capital. In other words, the financial sector functions efficiently if it intermediates at a minimum price and reduces the comprehensive cost of capital to its optimal level (Blejer, 2006).

2.2. Trade openness and financial development

Research that looks into the link between trade openness and financial development is now emerging (see Baltagi et al., 2009; Kim et al., 2010a, 2010b, 2012; Menyah, 2014). 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) argue 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) find 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) shows 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) find that financial sectors significantly determine industrial specialization across Organization for Economic Co-operation and Development (OECD) countries. More recently, Law and Demetriades (2006) find 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) find that opening up either the trade or the capital accounts - but not necessarily both - could induce financial development.

Kim et al. (2010a) show that the trade-finance link varies with the levels of economic growth. While a positive long-run effect of trade coexists with a negative short-run effect in relatively lower-income countries, trade openness tends to have negative long-run and insignificant short-run effects on financial development in high-income countries. Using the pooled mean group estimator of Pesaran et al. (1999) to a panel of 87 countries over the period 1960-2005, Kim et al. (2010b) found long-run complementarity between financial development and trade openness with short-run substitutionarity between the two policy variables for non-OECD. 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 over the period 1960-2004.

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 for the period 1966-2005, Wolde-Rufael (2009) finds 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. Gries et al. (2009) finds that financial development and trade openness do not appear to have been crucial preconditions of economic growth in 16 Sub-Saharan African countries. Menyah et al. (2014) also showed that the hypotheses of finance-led growth and trade-led growth seem to be

rejected for the overwhelming number of the 21 Sub-Saharan African countries studied over the period 1965-2008.

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) argue. 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) has considered trade openness as a possible factor to affect the finance-growth relationship for 84 countries over the period 1965-2004. He finds that trade openness strengthens the finance-growth link in low-income economies, but its effect is minimal in high-income economies. He argues 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 Walle (2014). Using annual data for 73 countries over the period 1975-2011, they find 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. According to Herwartz and Walle (2014), 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. 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 1980-2012.

3. Overview of Financial System and Economy of North Africa

North African countries' recent economic performance shows a much improved record compared to the 1980s, when 'slow growth' posed a threat 'to social development' in the Arab world as a whole. For instance, in 1985-1994 GDP per capita in the median Arab country grew by a meager 1.1 percent per annum (Elbadawi, 2005). In contrast, real GDP growth rate for the MENA region as a whole rose after the mid-1990s to reach around 4% per annum and was sustained thereafter (Table 1).

Table 1

Real GDP and real GDP per capita growth rates in North Africa and other regions (1995-2012)

	Real GDP growth (average annual %)				Real GDP per capita growth (average annual %)			
	1995- 2000	2000- 2005	2005- 2009	2002- 2012	1995- 2000	2000- 2005	2005- 2009	2002- 2012
Tunisia	5.5	4.4	4.9	4.1	4.2	3.3	3.7	2.9
Morocco	3.4	4.9	4.9	4.6	2.0	3.9	4.0	3.6
Egypt	5.1	3.6	6.5	5.1	3.5	1.9	4.7	3.4
MENA*	4.0	5.2	4.5	5.2	2.1	3.3	2.4	3.2
South- East Asia *	1.7	5.3	4.7	5.3	0.1	3.9	3.4	4.0
South Asia*	5.1	6.5	6.7	7.1	3.1	4.8	5.3	5.5

Note: *Refers to countries at all income levels.

Source: UNCTAD.

North Africa's average real GDP growth was even higher. In the last decade (2002-2012), Tunisia, Morocco and Egypt all experienced annual growth rates of between 4.1% and 5.1%. In comparative terms,

too, North African growth rates in this period compared favorably with most other regions. For instance, they were just beneath that for the MENA region as a whole (5.2%) and the South-East Asia region (5.3%). However, they fell well short of South Asia (7.1%).

This picture is somewhat moderated if we take into account the high population growth rates in the Arab world. Tunisia, Morocco and Egypt realized superior per capita real growth rates of 2.9% - 3.6% in the same period. In comparative terms, the overall performance of North Africa is at least comparable to, if not above, other regions' (for instance, compared to MENA region's 3.2% per capita growth rate) and is again outpaced by South Asia's 5.5% per capita annual growth rates.

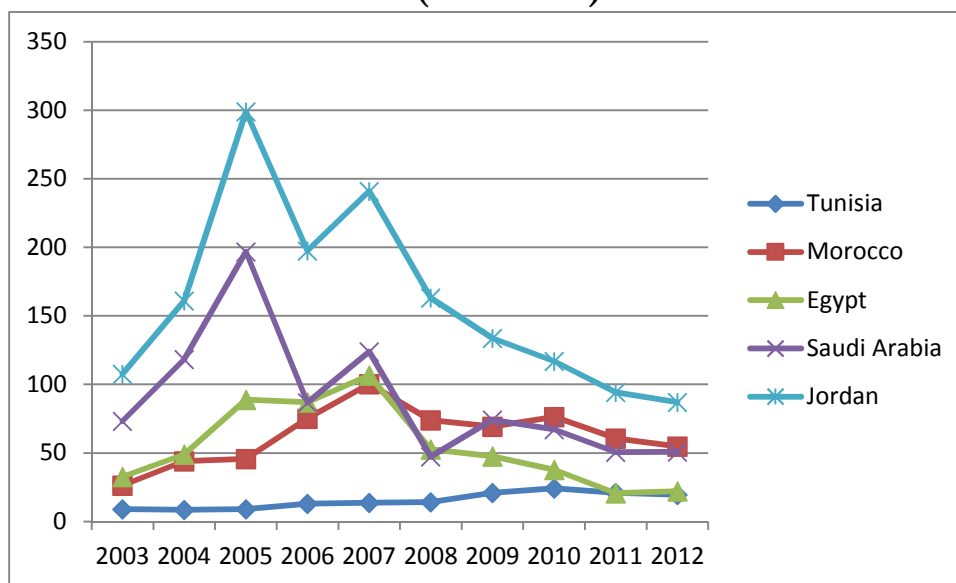
Interestingly, and as mentioned before, this generally better record of economic performance over the period 2005-2009 applies also for those countries that have been affected by political upheavals since 2010. For instance, Tunisia realized real growth rate of about 4.9% before these upheavals. However, Egypt has achieved a higher real GDP growth rate at the same period of about 6.5% on average.

The countries of North Africa, over the last two decades, have experienced a wave of liberalization in the financial system with an expectation on restriction government on the banking system. The reform of the financial sector is crucial to transforming the country's economic growth model. Hence, a careful investigation of the results from these experiences provides additional evidence of whether the financial sector actually causes to economic growth.

In this context, the role of stock market development in North Africa is compared with that of the Jordan Stock Exchange, the most active in the Mediterranean region and the Saudi Arabian Stock Exchange, the largest in the Arab World in relation to the economy it serves.

The market capitalization of listed companies (as a percentage of GDP) in North Africa is shown in Figure 1 which provides time series data for the period 2003-2012.

Figure 1
Comparative market capitalization on North African exchanges
(% of GDP)



Source: World Development Indicators.

The Egyptian and Moroccan market capitalization are the largest in North Africa as Figure 1 shows, the Casablanca market dating from 1929, not as long a history as the Cairo and Alexandria exchanges, but nevertheless a lengthy period. The recent financial crisis has however, led to a drop in market capitalization in North Africa in 2008. The market capitalization of Morocco and Egypt has dropped by about 26% and 50%, respectively. Subsequently the Casablanca market largely recovered, but for Egypt the decline was greater and the subsequent recovery weaker in the period leading up to the revolution

which brought an even greater fall. The smaller Tunisian market was only marginally affected by the global financial crisis and enjoyed six years of growth prior to its revolution.

The market capitalization of North Africa is very small compared to the two largest markets in the Middle East, those of Jordan and Saudi Arabia. The Egyptian Stock Exchange is one of the oldest stock exchanges in the Arab world, but the nationalization of most of the listed companies under Nasser's rule resulted in its demise. Meanwhile the rise of Saudi Arabia as the world's largest producer and exporter of petroleum and other liquids, with much more support for the private sector development, encouraged stock market development, which contribute most to diversification of the Kingdom's economy.

The number of listed companies provides a measure of the breadth of a stock market, the higher the number the greater the breadth. Investors can lower the risk of their portfolio through diversification, which is especially important for institutional investors such as pension funds and insurance companies. According to Wilson (2012), the number of listed companies is also affected by the rigor of the condition of registration, as very demanding requirements may result in private companies being unwilling to enter the market, or those already listed to leave the market. This is what happened in Egypt as table 2 shows, as there was little secondary trading in the shares of many of the almost 800 companies listed in 2004. This resulted in the value of a listing being reduced, as the market could not be tapped for new capital. Once financial reporting requirements were increased, many companies decided to delist rather than incurring further costs for little possibility of benefits. This happened particularly with the companies privatized after 1990 in Egypt as the artificially low prices of the initial public offerings (IPOs) resulted in favorable price earnings ratios and high returns. In this context, Omran (2005) researched 53 IPOs listed in Egypt between 1994 and 1998. He found

the average raw return on these IPOs to be 8%. This is lower than the raw returns found in Mauritius and Nigeria.

Table 2

Number of listed companies on North African exchanges in comparative perspective (2003-2012)

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Tunisia	46	44	46	48	50	49	52	56	57	59
Morocco	53	52	56	65	74	77	78	73	75	76
Egypt	967	792	744	603	435	373	305	213	231	234
Jordan	161	192	201	227	245	262	272	277	247	243
Saudi Arabia	70	73	77	86	111	127	135	146	150	158

Source: World Development Indicators.

In the case of Tunisia the market was also excessively dominated, with over 53 per cent of market capitalization accounted for by banks, insurance, leasing companies and investment companies. On the other hand, the consumer goods sector was in second place with an 11.9 per cent of capitalization, followed by the industrial sector with a 9.2 per cent⁴.

The market was better balanced in Morocco, as although the banks accounted for almost one third of market capitalization the other two thirds was diversified with telecommunications accounting for 21 per cent of market capitalization, building and materials sectors 10.4 per cent and industry 5.5 per cent, admittedly a disappointingly low number⁵.

Egypt's market is less dominated by banks accounting for 14 per cent of market capitalization. On the other hand, the construction and materials was in first place with a 22 per cent of capitalization, followed by the telecommunications companies with a 16 per cent⁶.

⁴ Tunis Stock Exchange, Annual Report, 2012, p. 23.

⁵ Casablanca Stock Exchange, Annual Report, 2012, p. 35.

⁶ Egyptian Stock Exchange, Annual Report, 2012, p. 33.

4. Data and Empirical Methodology

4.1. Data

This section describes the data used in the empirical analysis, specifically the measures of financial market development, trade openness, economic growth, and a number of controlling variables used in growth regressions. Our sample consists of 3 countries of the North Africa (Tunisia, Morocco and Egypt) with annual data for the period 1980-2012. Our data is mainly taken from the World Development Indicators (2014) published by the World Bank.

In this study we use two indicators to measure financial development. The first indicator is liquid liabilities of the financial system (Liquid): equal currency plus demand and interest-bearing liabilities of banks and non financial intermediaries divided by GDP. It is the broadest measure of financial intermediation and includes three types of financial institutions: the central bank, deposit money banks, and other financial institutions. Hence, Liquid provides a measure for the overall size of the financial sector without distinguishing between different financial institutions.

This commonly used measure of financial sector development has shortcomings. It may not accurately represent the effectiveness of the financial system in ameliorating information asymmetries and easing transaction costs as well as the measure takes into account deposits by one financial intermediary in another, which may involve double counting problem (Levine et al. 2000). The use of this indicator is based on the McKinnon - Shaw hypothesis, which implies that a monetized economy reflects a highly developed capital market; hence a high degree of monetization, therefore, should be positively related to economic growth. Under this assumption, many researchers use this measure as financial depth (McKinnon 1973; King and Levine

1993a; Schich and Pelgrin 2002). Thus, we include it as one measure of financial intermediary development.

The second measure is the credit provided by the banking sector to GDP (Credit), which measures how much intermediation is performed by the banking system, including credit to the public and private sectors. Calderon and Liu (2003) suggest that this indicator has an advantage as it takes into account the credit 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, it excludes credits issued by the central bank. They argue that the measure is even better than indicators used by previous studies such as King and Levine (1993a, b)⁷ and Levine (1999).⁸ Indeed, De Gregorio and Guidotti (1995) claim that Credit 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) contend that a higher ratio of credit to GDP indicates more financial services and hence, greater financial intermediary development. The financial sector is mainly dominated by the banking sector in the North African countries and therefore this indicator is expected to adequately capture the development of the financial sector.

The dependent variable is the real GDP per capita growth. In addition, the real GDP per capita used here is in US dollars (2005 prices). Trade openness is measured as the percentage of imports plus exports in GDP (Trade). Our set of controls includes: Inflation,

⁷ 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.

⁸ 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.

measured as the annual percentage change in the consumption price index (Inf), is used as a proxy for macroeconomic stability. Investment ratio, defined as the ratio of gross fixed capital formation to GDP (Inv). Government size is approximated in terms of government consumption expenditure as a percentage of GDP (Govcon). Lagged GDP per capita was included to control for economic convergence in our regressions. Several studies point out that per capita income could serve as a good proxy for the general development and sophistication of institutions (La Porta et al., 1998; Beck et al., 2003). All control variables, except inflation, are specified in natural logs.

4.2. Empirical Methodology

Here we explain the estimation strategy used in this paper. As a starting point we formulate the standard growth model in a manner consistent with Herwartz and Walle (2014). We estimate the impact of trade openness on economic growth by system GMM. For illustrative purposes, we do not include in our first regression any variable for financial development. We estimate the following equation:

$$GDP_{i,t} = \alpha_0 + \alpha_1 GDP_{i,t-1} + \alpha_2 Trade_{i,t} + \beta' X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \quad (1)$$

where $GDP_{i,t-1}$ denotes the (logarithm of) initial level of GDP per capita, Trade measures trade openness and $X_{i,t}$ is a vector of economic determinants of economic growth including: the ratio of gross investment to GDP; inflation rate and the ratio of government consumption to GDP, μ_t is a time specific effect, η_i is an unobserved country-specific fixed effect and $\varepsilon_{i,t}$ is the error term.⁹ We are

⁹ Note that Eq. (1) can be alternatively written with the growth rate as dependent variable as: $Growth_{i,t} = GDP_{i,t} - GDP_{i,t-1} = \alpha_0 + (\alpha_1 - 1)GDP_{i,t-1} + \alpha_2 Trade_{i,t} + \beta' X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t}$, where $(\alpha_1 - 1)$ is the convergence coefficient.

interested in testing whether the marginal impact of trade openness on growth, α_2 , is statistically significant.

While trade openness have the potential to affect economic activity through a host of channels, in a second set of regressions we examine one specific link between trade openness and economic growth, specifically the one working through financial markets. The hypothesis we would like to test is whether the level of financial development in the recipient country affects the impact of trade openness on economic growth. To this end, we interact the trade openness variable with an indicator of financial development and test for the significance of the interacted coefficient.¹⁰

A negative interaction provides evidence of substitutability between trade openness and financial development. In other words, a positive coefficient would indicate that trade openness are more effective in boosting economic growth in countries with shallower financial systems. On the other hand, a positive interaction would imply that the growth effects of trade openness are enhanced in deeper financial systems, supporting complementarity between trade openness and financial development.

The regression to be estimated is the following:

$$GDP_{i,t} = \alpha_0 + \alpha_1 GDP_{i,t-1} + \alpha_2 Trade_{i,t} + \alpha_3 FinDev_{i,t} + \alpha_4 (Trade_{i,t} \cdot FinDev_{i,t}) + \beta X_{i,t} + \mu_i + \eta_t + \varepsilon_{i,t} \quad (2)$$

where *FinDev* is a set of financial development indicators, and *Trade.FinDev* is an interaction variable. As shown in Eq. (1) trade openness are critical to economic growth performance. Here we hypothesize that higher level of trade openness will affect on economic growth. This follows the work of Chang and Mendy (2012) and Shahbaz (2013). Further motivation is found in Kim et al. (2011)

¹⁰ In order to ensure that the interaction term does not proxy for trade openness or the level of development of financial markets, these variables are also included in the regression separately.

and Menhay et al. (2014) where it is shown that trade openness may directly promote financial development which will in turn positively impact the level of economic growth.

In Eq. (2) the interaction term (Trade.FinDev) is incorporated. This variable serves to show the role of trade openness on economic growth using the financial sector transmission mechanism. The inclusion of the interaction term in this equation is based on the debate in the literature on whether these two variables are complements or substitutes (see, for example, Das and Rishi, 2010; Kim et al. 2010b).

Our estimation technique addresses issues of endogeneity and unobserved country characteristics. Therefore, to account for endogeneity and country-specific unobserved characteristics, we use the system GMM dynamic panel estimation method. The option to use system GMM is based on the argument that the existence of weak instruments implies asymptotically that the variance of the coefficient increases and in small samples the coefficients can be biased. To reduce the potential bias and inaccuracy associated with the use of Difference GMM (Arellano and Bond, 1991), Arellano and Bover (1995) and Blundell and Bond (1998) develop a system of regressions in differences and levels. The instruments for the regression in differences are the lagged levels of the explanatory variables and the instruments for the regression in levels are the lagged differences of explanatory variables. These are considered as appropriate instruments under the assumption that although there may be correlation between the levels of explanatory variables and the country specific effect, there is no correlation between those variables in differences and the country specific effect.

The consistency of the system GMM estimator is assessed by two specification tests. The Sargan test of over identifying restrictions tests the overall validity of the instruments. Failure to reject the null hypothesis gives support to the model. The second test examines the

null hypothesis that the error term is not serially correlated. Again, failure to reject the null hypothesis gives support to the model.

5. Empirical results

To investigate the interaction between financial development, trade openness and economic growth we present a range of results. We follow the approach of first estimating the growth model following the standard variables as shown in Table 3 then financial development indicators is included.

Further evidence of the importance of trade openness to economic growth are shown in Table 3, where the financial development indicators are introduced into the model, and it is found that the estimated coefficients are largely positive and significant at the conventional levels of testing. The results suggest that trade openness is positive and statistically significant in all columns, suggesting that trade openness contribute significantly to economic growth in North African countries. The result corroborates the work of Yanikkaya (2003); Chang et al. (2009) and Chang and Mendy (2012). However, the impact is more pronounced when the financial development variable is included. Column (1), for example, suggests that a 1% increase in trade openness leads to a 0.032% increase in the growth rate. A 1% increase in trade openness leads to a 0.041% increase in economic growth in column (3).

The role of financial development is shown in Table 3. Results demonstrate a statistically and economically significant positive long run impact of financial development on economic growth. This positive impact is in line with much of the empirical finance and economic literature (see Levine, 2005, for a broad survey). In addition, we explore whether the financial development of the recipient country influences the specific uses given to trade openness and their effect on economic growth. To this end, we estimate Eq. (2), which allows the impact of trade openness on economic growth to vary across levels of

financial development in the recipient country. The sign of the interacted coefficient provides information regarding the nature of trade openness. More specifically, a positive interaction term reveals that they are complementary and that a well functioning financial system enhances the impact of trade openness. On the other hand, a negative sign indicates that trade openness and financial development are used as substitutes to promote economic growth. Table 3 (columns 2 and 3) present system GMM estimates using domestic credit as ratio of GDP and M2 as a ratio of GDP as a measure of financial development. All two financial development indicators are positive and statistically significant at the 5% significance levels.

Table 3
Financial development, trade openness and economic growth

	(1)	(2)	(3)
GDP _{t-1}	-0.059***	-0.042***	-0.049***
Govcon	-0.019*	-0.014*	-0.011*
Inf	-0.002**	-0.001*	-0.001*
Inv	0.015*	0.022*	0.016*
Trade	0.032***	0.042***	0.041**
Credit	-	0.028**	-
Trade*Credit	-	0.007*	-
Liquid	-	-	0.015**
Trade*Liquid	-	-	0.003*
Constant	0.57*	0.69*	0.56*
R-squared	0.62	0.57	0.56
AR(1) test	0.00	0.00	0.00
AR(2) test	0.83	0.79	0.81
P-value Sargan test	0.81	0.77	0.80

Dependent variable is real GDP per capita growth. *, **, and *** indicate statistical significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 3 presents the results where the interaction variable is added to the regressions. As shown in columns 2 and 3, the coefficients on Trade*Credit and Trade*Liquid are positive and statistically significant, confirming the results that trade openness contribute to an increase in economic growth through its interaction with financial sector development. This finding supports the complementarity hypothesis and corroborates the findings by Herwartz and Walle (2014); Bojanic (2012) and Jenkis and Katircioglu (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.

We introduce the level of initial GDP per capita (the natural logarithm) as independent variable according to the conditional convergence hypothesis. The initial GDP per capita coefficient is negative, meaning that the conditional convergence hypothesis is evidenced: holding constant other growth determinants, countries with lower GDP per capita tend to grow faster. The initial position of the economy is thus a significant determinant of economic growth, as recognized by the neoclassical theory. The initial income has a negative effect on economic growth coherent to the theoretical study and statistically significant at a 1% level. The result corroborates the work of Barro and Sala-i-Martin (1997); Easterly and Levine (1997) and Sachs and Warner (1997). With regards to the effect of the other variables in the regression, they are all consistent with standard growth regression results. The ratio of gross investment to GDP *has* a significantly *positive effect* on economic growth in most of the regressions. Inflation has negative and statistically significant coefficient, indicating that the high and volatile inflation would affect growth negatively. Government spending has the expected negative coefficient, indicating that an excessively large government is expected

to crowd out resources from the private sector and be harmful to economic growth. Barro and Sala-I-Martin (1995) attributed the negative impact of government consumption on economic growth to unproductive public sector or some aspects of bad government such as corruption, which is likely to be captured by the variable. The p values for the Sargan test for over-identifying restrictions where the null hypothesis is that the instruments are uncorrelated with the residuals, and the Arellano-Bond (1991) test for second order serial correlation in the first-differenced residuals, confirm that the moment conditions cannot be rejected.

6. 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 financial development, trade openness and economic growth in a panel of 3 countries of North Africa over the period 1980-2012, both trade openness and financial development indicators generally show 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 different measures of financial market development. The result is that trade openness is interacted with the financial development indicators; the interaction terms are 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.

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