Articles

Financial Development and Economic Growth: Evidence from North African Countries

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Summary:

This paper examines the causal relationship between financial development and economic growth in a panel of three countries of North Africa (Tunisia, Morocco, and Egypt) over the 1980-2012 period. By using system Generalized Method of Moment (GMM) estimator for linear dynamic panel data models, we find a strong positive link between financial development and economic growth when alternative measures of financial development were used. We also found that economic freedom is beneficial to growth, while democracy may have a small negative effect. These findings suggest the need to promote the financial reforms that have been launched since the mid 1980s and to improve the efficiency of these countries' financial systems to stimulate saving/ investment and, consequently, long-term economic growth.

Key words: financial development, economic growth, dynamic panel data analysis

JEL Classification: F13, F43, C23

1. Introduction

The link between financial development and economic growth has received a great deal of attention in recent decades. Indeed, it has been suggested that countries that are relatively more financially developed are better suited to avoid or withstand currency crises (Federici and Carioli 2009). Therefore, enhancing the financial development of countries with developing economies may have important positive consequences for the many organizations and individuals within such countries that are affected by economic downturns.

Since the mid 1980s, many North African countries tried to implement reforms in their financial systems in order to speed up their growth rates. According to Abu-Bader and Abu-Qarn (2008), these reforms were part of an overall strategy aimed at establishing a more market-based and private sector-led economy.

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Even though some of these reforms have been in effect for quite some time now, little work has been done to evaluate their effectiveness with regard to enhancing economic growth. This paper contributes towards closing this gap in the empirical literature.

In view of the growing economic importance of financial development and in the literature, this study estimates a dynamic panel model using the Arellano and Bover (1995) system GMM estimator and shows the effect of financial development on the economic growth of 3 North African countries over the 1980-2012 period. Our analysis, which is based on endogenous growth theory, reveals that the development of the financial sector has a positive impact on economic growth in the region. Thus, this paper contributes to the empirical literature on financial development and economic growth in two ways. First, the paper uses panel regression which is novel to the literature of North Africa. Secondly, due to the presence of the variety of development measure, three indicators are used to capture the role played by financial development to the economic growth process in the region of North Africa.

The organization of this paper is as follows: the theoretical framework which provides potential channels for the financial system to economic growth will be explained in section 2. Section 3 presents the review of the empirical literature on the finance and growth nexus. Section 4 contains an overview of the financial system and economy of North Africa. Section 5 describes the data and empirical methodology. Section 6 reports the empirical results. The final section draws conclusions based on the results.

2. Literature review

The recent empirical literature shows that the development of financial market is relevant (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 to economic growth for few reasons.

First, a better-developed financial system provides a fertile ground for the 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 boosts investment and growth.

Second, the financial sector influences the amount of credit rationing in financial markets and constrains 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 but also export markets (Alfaro et al. 2004).

Third, the financial sector may also determine the extent to which foreign firms will be able to borrow in order to extend

their innovative activities in the host country, which would lead 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). As Demetriades and Andrianova (2004) explain, the existence of a developed financial system is a precondition for the country to materialize new innovations and exploit its resources efficiently. In this way, finance is seen as a facilitator of economic growth, rather than as a deep determinant of GDP growth.

Finally, the efficiency of financial market matters to economic growth[1]. 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 better-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. Empirical literature review

The literature on the finance-economic growth nexus is voluminous. So far, there is no consensus on the relationship between financial development and economic growth in terms of the role and importance of finance on growth and the direction of causality

King and Levine (1993a) examined the relationship between economic growth and financial development indicators (liquid liabilities over GDP, bank credit over bank credit plus central bank domestic assets and credit to private sector divided by GDP) using cross-sectional data for 77 countries over the 1960-1989 period. They showed that a country's level of financial development can predict its level of economic growth.

Levine (1998) explored the effect of the banking sector development, proxied by credit allocated by deposit-taking banks to the private sector divided by GDP, on economic growth, capital accumulation and productivity growth. His empirical analysis was based on 42 developed and less developed countries during the 1976-1993 period. By using a panel GMM estimator, he found a strong positive relationship between the exogenous component of banking development with economic growth.

Levine and Zervos (1998) stated the impact of the stock market and the banking sector development on economic growth for a cross-section of 42 countries over the period 1976-1993. They showed that stock market liquidity and bank development can predict economic growth, capital accumulation and productivity growth. Levine et al. (2000) also evaluated the role of financial development in a pooled cross-section setup using averaged data spanning the period 1960-1995. Using a GMM estimator, the authors showed that

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

financial intermediary variables, namely, liquid liabilities and private credit, have a statistically significant and positive effect on economic growth on a panel of 71 countries. Similarly, Cole et al. (2008) examined the relationship between banking sector stock returns and economic growth for 18 developed and 18 emerging markets over the period 1973-2001. By using dynamic panel techniques, they found a positive and significant relationship between bank stock returns and GDP growth.

The relatively more recent studies have also documented evidence that the financial development plays a strong role in promoting economic growth. In a panel data study of 31 Chinese provinces for the period 1986-2002, Hasan et al. (2009) used the GMM estimator and found that the development of financial sector institutions and markets promoted provincial GDP growth rates. Similar findings were found by Zhang et al. (2012) for a data set consisting of 286 Chinese cities for the period 2001-2006. In addition, Bittencourt (2012) investigated the role of financial development in promoting economic growth in a panel of four Latin American countries between 1980 and 2007. The results, based on panel time-series analysis, suggest that, once he take into account the role of macroeconomic performance, financial development indeed played a significant role in generating economic activity, innovation and consequently economic growth in the region.

Recently, Hsueh et al. (2013) investigated the causality between financial development and economic growth among ten Asian countries surveyed during period 1980 to 2007. The empirical results indicated that the direction of causality between finance and growth is sensitive to the financial development indicators. Moreover, they

confirmed the existence of supply-leading hypothesis, as many financial development indicators drive economic growth in some of the ten Asian countries surveyed, especially in China. In the same trend, Narayan and Narayan (2013) affirmed that here is evidence of financial sector-led growth; bank credit has a negative effect on economic growth for a panel of 65 developing countries over the period 1995-2011. At the regional level, for the Middle Eastern countries evidence suggests that neither the financial sector nor the banking sector contributes to growth. Except for Asia, the role of financial development on economic growth is relatively weak.

Recent empirical studies have used endogenous growth models to investigate the impact of financial development on economic growth in developing countries.

Boulila and Trabelsi (2004) explored the relationship between finance and growth for sixteen Middle East and North African (MENA) countries for the period 1960-2002. The results obtained with cointegration techniques and Granger causality tests support the hypothesis that causality is running from the real to the financial sector. Moreover, there is a little evidence in support of the view that finance is a leading sector in prompting long-term growth in the MENA region.

Al-Avad and Harb (2005), for ten MENA countries over the 1969-2000 period and by applying the panel cointegration approach, concluded that the long-run financial development and economic growth may be related to some level. However, in the short run, the evidence of causality is very weak. Ben Naceur and Ghazouani (2007) analyzed the simultaneous impact of banks and financial sector development on

economic growth on a sample of 11 Arab countries over the period 1979-2003. They found evidence of a positive effect of stock markets development but a meaningful negative effect of bank development on growth on a sample of 10 MENA countries. Similarly, Ben Naceur et al. (2008) study showed that stock market liberalization has no impact on private investment and real growth whether in the short or long run in the MENA region during 1979-2005.

Abu-Bader and Abu-Qarn (2008) explored the causal relationship between financial development and economic growth for six MENA countries (Algeria, Egypt, Israel, Morocco, Syria, and Tunisia) over the period 1960-2001 using a vector autoregressive framework. The authors employed four different indicators of financial development (ratio of money stock to nominal GDP, ratio of M2 minus currency to GDP, ratio of bank credit to the private sector to GDP and the ratio of credit issued to nonfinancial private firms to total domestic credit). They affirmed that where evidence of causality from financial development to economic growth was identified, this causality ran through enhancing investment efficiency rather than through enhancing capital accumulation.

Baliamoune-Lutz (2008) investigated the short-term dynamics and the long-term relationship between income and financial development in three North African countries (Algeria, Egypt and Morocco) for the period 1960-2001 by using the co-integration and the VECM models and four indicators of financial development. The results indicated long-run relationship between income and each of the financial development indicators except credit to the private sector in Algeria. On the other

hand, the Granger-causality test results showed that the evidence on the direction of causality is mixed.

Kar et al. (2011) borrowed the method from Kónya (2006) to examine the causality between financial development and economic growth for fifteen MENA countries for the 1960-2002 period. Empirical results showed that the direction of causality between finance and growth is sensitive to the measurement of financial development. They confirmed the existence of demand-following and supply-leading hypotheses. Therefore the direction of causality seems to be specific for the country and the financial development indicator. This implies that financial sector and real sector are interrelated to each other in most cases.

Ben Salem and Trabelsi (2012) explored the importance of financial development as a determinant of economic growth for selected MENA countries (Algeria, Egypt, Israel, Morocco, Saudi Arabia and Syria) using the Pedroni's panel cointegration approach during the period 1970-2006. The empirical analysis revealed the existence of a long-run relationship between financial development and economic growth. In contrast, there is weak support to the hypothesis that finance is a leading sector in the countries of the region. They related these findings to macroeconomic imbalances and institutional weakness in the region.

Studying some North African countries, Abdelhafidh (2013) investigated the direction of causality between finance and growth over the period 1970-2008. In this study, he distinguished between domestic savings and foreign capital inflows. He also disaggregated foreign capital inflow into FDI, portfolio investment, grants and loans.

He stated that economic growth Granger causes domestic savings for all countries studied. But in Egypt, FDI, long and short-term loans, bilateral, multilateral and bank loans all Granger-causes grants growth with a reverse causality running from growth to foreign inflows. In Morocco and Tunisia, the foreign capital-led growth hypothesis is confirmed only for grants, and it is growth that Granger-causes loans.

Recently, Barajas et al. (2013) validated the effect of financial development on economic growth for a panel of 150 countries from 1975 to 2005. They found that the beneficial impact of financial development on economic growth in fact shows measurable heterogeneity; it is generally smaller in oil exporting countries; in regions such as the MENA; and in lower-income countries. They confirmed that these differences may be explained by regulatory/supervisory characteristics and related to differences in the ability to provide widespread access to financial services.

The following conclusions can be drawn on the basis of this brief literature review: (1) financial development contributes to economic growth when the economy reaches a critical threshold; (2) the link between finance and growth is positive and highly significant only at relatively high levels of economic growth; (3) for developing countries, the relationship is weak and occasionally even negative; (4) there is no clear consensus regarding the direction of causality between financial development and economic growth and the empirical findings are country specific.

4. 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).

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

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: United Nations Conference on Trade and Development.

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 better than 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 was mentioned before, this generally better record of economic performance over the 2005-2009 period applies also to the countries

that have been affected by political turmoil since 2010. For instance, Tunisia realized real growth rate of about 4.9% before these upheavals. However, Egypt achieved a higher real GDP growth rate during 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 government restriction 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
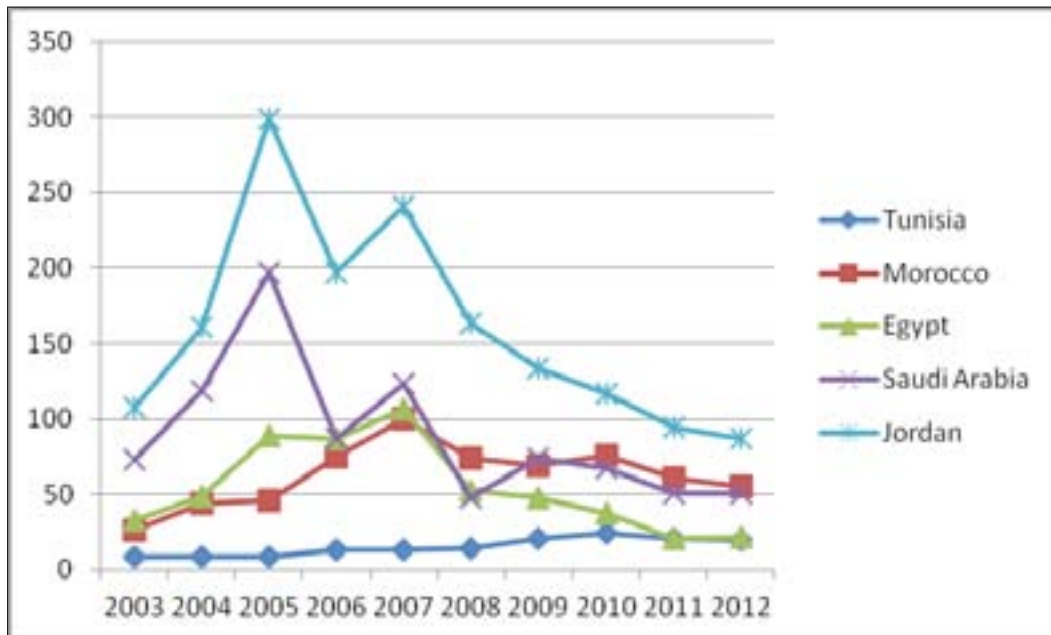

Fig. 1. Comparative market capitalization on North African exchanges (% of GDP)
Source: World Development Indicators.

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.

The Egyptian and Moroccan market capitalization are the largest in North Africa as Figure 1 shows, the Casablanca market dating back to 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

Table 2: Number of listed companies on North African exchanges in comparative perspective

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

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.

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 cent[3].

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 number[4].

The Egyptian Stock Exchange referred to as the Cairo and Alexandria Stock Exchange is one of the oldest stock exchanges in the world. 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 cent[5].

5. Data and Empirical Methodology

5.1. Data

This section describes the data used in the empirical analysis, specifically the measures of financial market development, 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 three 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. A higher liquidity ratio means higher intensity in the banking system. The assumption here is that the size of the financial sector is positively associated with financial services (King and Levine, 1993b). It is assumed, however, that this 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

[3] Tunis Stock Exchange, Annual Report, 2012, p. 23.
[4] Casablanca Stock Exchange, Annual Report, 2012, p. 35.
[5] Egyptian Stock Exchange, Annual Report, 2012, p. 33.

another, which may involve double counting problem (Levine et al. 2000).

Because of this shortcoming, we also used domestic credit provided by the banking sector to GDP (DCBS), 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)[6] and Levine (1999).[7] 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.

The third indicator of financial development is the ratio of domestic credit to the private sector as a percentage of GDP (DCPS). A high ratio of domestic credit to GDP indicates not only a higher level of domestic investment, but also higher development of the financial system. Financial systems that allocate more credit to the private sector are more likely to be engaged in researching borrower firms, exerting corporate control, providing risk management control, facilitating transactions, and mobilizing savings (Levine, 2005), which requires a higher degree of financial development. Thus, a positive coefficient is expected for all financial development indicators.

The dependent variable is the real GDP per capita growth. Our baseline model includes the explanatory variables common to most growth regressions found in the literature (all control variables, except inflation, are specified in natural logs):

- Initial 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).
- Investment ratio, defined as the ratio of gross fixed capital formation to GDP (Inv). A positive coefficient is expected, as greater investment shares have been shown to be positively related with economic growth (Mankiw et al. 1992).
- Inflation, measured as the annual percentage change in the consumption price index (Inf), is used as a proxy for macroeconomic stability. A negative coefficient is expected, as high inflation has been found to negatively affect growth. See, among others, Edison et al. (2002) and Elder (2004).
- Government size is approximated in terms of government consumption expenditure as a percentage of GDP (Govcon). An excessively large government is expected to crowd out

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[6] 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.

[7] 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.

resources from the private sector and be harmful to economic growth. Thus, a negative coefficient is expected.

- Trade openness is measured as the percentage of imports plus exports in GDP (Trade). Assuming that openness to international trade is beneficial to economic growth, a positive coefficient is expected.

The extended model will also include the following institutional variables[8]:

- Index of Economic Freedom (Ecofr). 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 focuses on the empirical studies that use this economic freedom indicator of the Fraser Institute, greater economic freedom stimulates economic growth. Thus, a positive coefficient is expected. This variable is taken from (Gwartney et al. 2014).

- Polity Scale (Polity): from strongly autocratic (-10) to strongly democratic (10). This variable is our proxy for democracy. According to Tavares and Wacziarg (2001), and Aisen and Veiga (2008, 2013) a negative coefficient is expected[9]. This variable is taken from the Polity IV Database (Marshall and Jaggers, 2014).

5.2. 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 Saci et al. (2009). We estimate the impact of financial development on economic growth for the North African region. We estimate the following equation:

$$GDP_{i,t} = \alpha_0 + \alpha_1 GDP_{i,t-1} + \alpha_2 FinDev_{i,t} +$$
$$+ \beta' X_{i,t} + \lambda' W_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t} \qquad (1)$$

where $GDP_{i,t-1}$ denotes the (logarithm of) level of GDP per capita of country i at the end of period t, FinDev measures the proxy of financial development, $X_{i,t}$ is a vector of economic determinants of economic growth including: the ratio of gross investment to GDP; inflation rate; trade openness; and the ratio of government consumption to GDP, and $W_{i,t}$ is a vector of institutional determinants of economic growth; μ_t is a time specific effect, η_i is an unobserved country-specific fixed effect and $\varepsilon_{i,t}$ is the error term.[10] We are interested in testing whether the marginal impact of financial development on growth, α_2, is statistically significant.

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

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[8] There is an extensive literature on the effects of institutions on economic growth. See, among others, Acemoglu et al. (2001), Acemoglu et al. (2003), and Glaeser et al. (2004).The Polity Scale is used in Aisen and Veiga (2008). It was found to be negatively related to governments' reliance on seigniorage revenues.

[9] On the relationship between democracy and growth, see also Acemoglu, et al. (2008).

[10] Note that Eq. (1) can be alternatively written with the growth rate as dependent variable as:
$Growth_{i,t} = GDP_{i,t} - GDP_{i,t-1} = \alpha_0 + (\alpha_1 - 1) GDP_{i,t-1} + \alpha_2 FinDev_{i,t} + \beta' X_{i,t} + \lambda' W_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t}$
where $(a_1 - 1)$ is the convergence coefficient.

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.

The estimation of the growth models by using the difference-GMM estimator for the linear panel data was introduced by Caselli et al. (1996). Then, Levine et al. (2000) used the system-GMM estimator, which is now a common practice in the literature (Beck, 2008; Saci et al. 2011).

6. Empirical results

Table 3 (columns 1, 2, and 3) present system GMM estimates using M2 as a ratio of GDP (LIQUID), domestic credit provided by the banking sector (DCBS) and domestic credit to the private (DCPS) as a measure of financial development. These financial measures, as well as the other control variables, proxy for the steady state level of GDP. All three financial development indicators are positive and statistically significant at the 5% significance levels.

Most of the results are similar to those of column 1. Columns 1 and 2, displays results when LIQUID and DCBS are used as proxies for financial development. LIQUID and DCBS, when significant, have a positive sign in all countries, confirming a long-run positive relationship between finance and growth. Column 3 describes results when DCPS serve as measure for financial development. The results are similar to those presented in columns 1 and 2. DCPS is significant and positively associated with growth rate. Our results are in agreement with several studies such as Beck and Levine (2004), Levine (2005) and Abu-Bader and Abu-Qarn (2008) who found a positive relationship between financial development and GDP per capita.

Initial GDP per capita has a negative coefficient, which is consistent with conditional income convergence across countries. 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. These results are consistent with

Table 3: Financial development and economic growth (1980-2012)

	(1)	(2)	(3)
GDP$_{t-1}$	-0.046***	-0.041***	-0.04***
Govcon	-0.014*	-0.009*	-0.01*
Inf	-0.027*	-0.054*	-0.053*
Trade	0.057**	0.063**	0.062**
Inv	0.032*	0.033*	0.034*
Ecofr	0.018*	0.016*	0.015*
Polity	-8.35e-05	-5.30e-05	-4.65e-05
LIQUID	0.013**	-	-
DCBS	-	0.007**	-
DCPS	-	-	0.006**
Constant	0.04*	0.03*	0.05*
R-squared	0.72	0.75	0.81
AR(1) test	0.00	0.00	0.00
AR(2) test	0.81	0.77	0.8
P-value Sargan test	0.79	0.82	0.83
(No. observations)	99	99	99

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

the previous literature (see, for example, Barro and Sala-i-Martin, 1997; Bekaert et al., 2003). With regards to the effect of the other variables in the regression, they are all consistent with standard growth regression results. Investment ratio has a positive and statistically significant coefficient, indicating that greater investment promotes growth. Trade openness has a positive impact on growth, proving that reducing trade barriers foster growth. The result corroborates the work of Yanikkaya (2003) and Chang et al. (2012). 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 (1997) attributed the negative impact of government 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. These factors have the tendency to hinder economic growth.

The Index of Economic Freedom is included in the model in order to account for favorable economic institutions. It is statistically significant and has a positive sign, as expected. In Table 3, we also account for the impact of democracy by including the Polity Scale in the model. There is weak evidence that democracy has small adverse effects on growth, as the Polity Scale has a negative coefficient, but is not statistically significant. These results are consistent with those of Tavares and Wacziarg (2001), and Aisen and Veiga (2008, 2013). To justify the negative effect

of democracy on growth, Tavares and Wacziarg (2001), argued that democratic institutions are responsive to the demands of the poorer fractions of society by increasing access to education and lowering income inequality, but do so at the expense of physical capital accumulation. 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.

7. Conclusion

This paper re-examines the causal relationship between financial development and economic growth in a panel of 3 countries of North Africa over the period 1980-2012. We use three conventionally accepted proxies for financial development, namely liquid liabilities of the banking system, domestic credit provided by the banking sector and domestic credit to the private sector (all percent of GDP). Using system GMM panel data analysis, we found a strong positive relationship between financial development and economic growth. Our findings can have an important implication of the policy recommendation. Indeed, North African countries should establish a better-developed financial system with a more efficient allocation of credit in order to sustain economic growth.

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