# Banking Competition and Convergence across Macro-Regions of MENA

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<u>Abstract</u>: This paper investigates bank competition levels in the Middle East and North Africa (MENA) countries and evaluates to what extent they have converged over the last decade. Following the World Bank classification, we distinguish across three homogenous macro-regions of MENA based on oil exports allowances: the Gulf Cooperation Council (GCC), Developing Oil Exporters (DOE) and Resource-Poor countries (RP). Our findings suggest that although banking competition has increased across the three macro-regions, the trend in competition differs on average across groups. Using alternative tests, we find evidence of a significant process of convergence in banking competition both in the three macro-regions as well as in MENA as a whole over the period under investigation. Our results also point to a significant positive effect of bank competition on GDP growth and on the level of financial deepening.

Keywords: Convergence; Bank Competition; MENA Region.

*JEL classification:* G21; D4; L16; F15; O47; R11.

# 1. Introduction

The process of integration is high on the agenda of many regions in the world, and the Middle East and North Africa (MENA) is no exception.<sup>1</sup> Both bilateral and multilateral agreements have been implemented in recent years showing integration progress in the region and enhancing economic and industrial cooperation (see Appendix A for more details).<sup>2,3</sup> Intensified competition is one expected outcome from integration that should translate into economic gains in all industries through lower prices, better quality, greater innovation and internationalisation. In banking the benefits are expected to be greater than in any other sector. This is because price reductions mean lower loan rates which in turn might lead to greater investments and potentially higher growth (Weill, 2013).

The banking industry dominates MENA's financial systems, with commercial banks leading the sector (according to Bankscope database, there are currently 259 commercial banks out of 517 institutions in MENA). The development of financial markets in MENA has accelerated over the last few years, although at a different pace across countries. Up until the 1980s, the region's financial systems were heavily regulated and typically dominated by a few large and state-owned institutions. More recently, several countries have experienced banking sector deregulation, privatisation and foreign banks' entry. Among the key aims of these forces of change are to improve efficiency, governance and competitive conditions in the banking sector.

However, because MENA is an economically diverse region that enjoys an abundance of human and natural resources (see El-Erian et al., 1996; World Bank, 2008; Diop et al., 2012), an important hindering factor in the process of integration in the region is the combination of both resource-rich and resource-poor countries. MENA is the world's leading oil producer making it

<sup>&</sup>lt;sup>1</sup> According to the World Bank, the MENA region includes 21 countries however, due to geographical ambiguity; other <sup>2</sup> Although the preferential integration of MENA countries with the EU, US and other key partners is equally important, this paper focuses on the intra-MENA integration only.

<sup>&</sup>lt;sup>3</sup> Despite this intra-regional interaction, integration in MENA usually manifests in labor flows with limited trade in goods and services. It is worth noting that these large intra-regional labor movements have been the main vehicle of the region's economic integration, generating significant financial flows in the form of worker's remittances and transmitting economic impulses across countries (Guétat and Serranito, 2007).

highly dependent on revenues from oil exports, and this status seems likely to intensify given the extent of the region's known oil reserves (almost 53% of the world's total at the end of 2012 according to BP, 2013). The economic performance in MENA has mainly reflected the fluctuations in oil prices since the 1970s. Oil revenues have increased liquidity which has fed a rapid increase in banking deposits and a growing demand for credits in some MENA countries, especially oil producers. Yet, oil producing countries are directly affected by the changes in oil prices in the form of changes in export earnings, while the effect on non-oil producers manifests through transmission mechanisms from the oil producers including labour remittances and aid (World Bank, 2006). Some studies argue that the resource-poor countries benefit from regional economic agreements significantly more than resource-rich countries making these latter reluctant to integrate (see Venables, 2011 and Fouquin et al., 2006). On the other hand, the pursuit of hegemonic power could be one reason why resource-rich countries might be interested to integrate with the poorer ones.

The main contribution of this paper is to use non-structural measures of competition to investigate market conditions of the banking sector across macro-regions of MENA and to examine if and to what extent banks' competition levels have converged over time. We follow the World Bank's classification (see Diop et al., 2012) to create three homogenous groups based on oil exports allowances: (1) six Gulf Cooperation Council (GCC) countries, namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates; (2) four selected Developing Oil Exporters (DOE): Algeria, Libya, Morocco, and Syria; and (3) four selected Resource-Poor countries (RP): Egypt, Jordan, Lebanon, and Yemen.

In terms of methodology, we employ two non-structural measures of competition, the Lerner Index of Monopoly Power (Lerner, 1934) and the Panzar and Rosse (1987)'s *H*-statistic, for 14 MENA banking sectors grouped as defined above over the period 2004-2011. Our choice of integration measures are the classical  $\beta$  and  $\sigma$ -convergence (Barro and Sala-i-Martin, 1991). Additionally, a novel panel unit root test by De Blander and Dhaene (2012) is applied to examine the convergence hypothesis. Finally, we relate our competition measures to two macro variables; the growth in GDP and level of credit to the private sector to examine whether greater convergence in bank competition tends to give MENA countries an advantage in terms of economic growth and financial deepening. In this latter step we also control for both growth persistence and cross-country differences across MENA with regard to regulatory and institutional environment.

Our findings suggest that over the period under study the non-structural measures of banklevel competition have increased on average in virtually all countries' banking sectors. As expected, the trend in competition differs across macro-regions and we find that DOE countries attain the largest increase in competition levels. We also find evidence of significant convergence in banking competition in MENA as a whole and in the three macro-regions. This suggests that although there is no simultaneous enhancement in competition levels in all MENA countries, due e.g. to differences in the level of banking sectors' development across countries, some evidence of integration can be identified through the convergence process towards the same level of competition. Our results further suggest that the banking sector's competition appears to have a significant positive effect on GDP growth and the level of financial deepening in MENA and its macro-regions.

The rest of the paper is structured as follows: Section 2 provides a review of the relevant literature. Section 3 presents the methods used for the empirical analysis and the data sources. Section 4 discusses the empirical findings. The final section concludes.

### 2. Selected literature review

The convergence literature in MENA is limited and currently dominated by income convergence studies which comprise two distinct strands: the first concentrates on analysing income convergence among MENA countries themselves (e.g. Guétat and Serranito, 2007; Erlat, 2007;

Pesaran, 2007; Tunali and Yilanci, 2010; and Andreano et al. 2013); while the second focuses on how MENA countries converge to another income reference threshold.<sup>4</sup>

No studies, to the best of our knowledge, have examined the convergence of market conditions in MENA's banking sector and whether the development of these conditions could affect macro factors such as GDP growth and the level of financial deepening. This section is divided into two parts. The first focuses on the recent convergence studies that have been carried out specifically on the banking industry. The second part focuses on studies on banking market competition in MENA.

# 2.1 Convergence in the banking industry

A number of studies have examined convergence for different banking sectors including the US (Fung, 2006); Europe (Fernandez de Guevara et al., 2007; Mamatzakis et al., 2008; Evans et al., 2008; Weill, 2009, 2013; Casu and Girardone, 2010; Andrieş and Căpraru, 2012); and China (Matthews and Zhang, 2010). These studies focus on different types of convergence, including interest rates, bank efficiency and productivity.

Only two recent studies have focused on the evolution and convergence of competition in the European banking sector. Andrieş and Căpraru (2012) use the *H*-statistic and the Lerner index of market power and the measures of  $\beta$  and  $\sigma$ -convergence to investigate competition in the banking systems of EU-27 as a whole, but also for both old and new EU member states over the period 2001 - 2009.<sup>5</sup> Their results show a significant increase in competition in the new EU members between 2001 and 2006, while a notable decrease was found in the old EU members between 2005 and 2007. A decrease in banking competition is noted for the whole EU-27 compared to the 2001; the authors suggest that the adoption of the Euro and the continuous European integration might be key factors

<sup>&</sup>lt;sup>4</sup> Typically reference countries are southern European countries, including France (e.g. Guétat and Serranito, 2008; Serratino, 2010; Péridy and Bagoulla, 2012; Serranito, 2013). Recent studies do not seem to find a univocal empirical answer as to whether the income of MENA countries is converging or not.

<sup>&</sup>lt;sup>5</sup> For methodological details, see section 3.

for this decline. Andrieş and Căpraru (2012) additionally provide evidence of convergence in bank competition among the EU member states.

More recently, Weill (2013) examines the evolution and convergence of banking competition in all EU countries over the period 2002-2008 using the *H*-statistic and the Lerner index of market power and the measures of  $\beta$  and  $\sigma$ -convergence. The author provides evidence of a general improvement as well as convergence in banking competition. These findings are also observed with standard competition measures (Herfindahl-Hirschman index and profitability indicators) supporting the view that banking integration has taken place in the European Union.

### 2.2 Competition studies in MENA banking sector

Most empirical studies on banking market conditions have focused on the US and Europe. However, the interest on MENA banks has increased in recent years as the market evolved as one of the largest in the emerging world and banking data have become more widely available. Several recent studies (e.g., Murjan and Ruza, 2002; Al-Muharrami et al., 2006; Turk-Ariss, 2009; Abuzayed et al. 2012) have examined market structure and bank competition levels in various MENA countries using the non-structural *H*-statistic. They all provide evidence that MENA's banking sector operates under monopolistic competition. Interestingly, Murjan and Ruza (2002) find evidence that Gulf Cooperation Council (GCC) markets tend to be less competitive than non-oil producing countries. The authors suggest that this finding could be a result of the increased focus on structural reform programs and the deregulation process which started earlier in the non-Gulf countries and has helped to promote a higher degree of competition. Anzoátegui et al. (2010), Turk-Ariss (2010) and Weill (2011) use the *H*-statistic as well as the Lerner Index of Monopoly Power to examine the level of bank competition in the MENA region. The former study finds that competition levels in MENA are lower relative to other developing regions; it also suggests that competitive conditions have not improved in recent years, and this is primarily due to the bad quality of credit information, strict regulations and practices governing bank entry, and low market contestability. Turk-Ariss (2010) and Weill (2011) perform cross-country analyses that include selected MENA countries; their results also confirm the monopolistic competition structure.<sup>6</sup>

No studies, to our knowledge, have investigated the relationship between competition in the financial sector and the overall economic growth in MENA; however this has been examined in the context of large cross-country analyses that include some MENA countries. In a study including 41 countries (five of which are in MENA) over the period 1980-1990, Cetorelli and Gambera (2001) suggest that banking sector concentration has a depressing effect on overall economic growth, though it promotes the growth of industries that depend heavily on external finance. Claessens and Laeven (2003) use a sample of 29 countries (five of which are in MENA) over the period 1980-1997 and find that greater competition reduces industrial growth in general and this effect depends on the size and state of development of a country's financial system. Using the same data and methodology of Cetorelli and Gambera (2001), Deiida and Fatouh (2005) find that banking concentration is only negatively associated with growth in low-income countries, while there is no significant relationship between the two variables in high-income countries.<sup>7</sup> Finally, Claessens and Laeven (2005) use the Panzar-Rosse *H*-statistic to measure competition for a sample of 41 countries (5 of which are in MENA) over the period 1980-1990. They find that greater competition in the banking systems allows financially dependent industries to grow faster.

### 3. Methodology and Data

## **3.1 Competition measures**

The empirical literature on competitive behavior in the banking sector can be divided into two main streams. The first relies on market structure to infer competitiveness in the context of the Structure-Conduct-Performance (SCP) (see e.g. Berger, 1995). The second views market structure as

<sup>&</sup>lt;sup>6</sup> These two studies mainly focus on Islamic banks as compared to conventional peers.

<sup>&</sup>lt;sup>7</sup> Rajan and Zingales (1998) model which relates the growth in real value added of a sector in a particular country to a number of country and industry-specific variables.

an inaccurate indicator of the degree of competitive behaviour and relies on non-structural measures such as the *H*-statistic (Panzar and Rosse, 1987) and the Lerner index of monopoly power (Lerner, 1934).<sup>8</sup> For the purpose of this study, we use the non-structural *H*-statistic and Lerner index to measure banking competition in MENA. These two indicators have the major advantage of measuring the banking behaviour directly rather than inferring the degree of competition from indirect proxies such as market shares and concentration ratios.

### 3.1.1 The Panzar-Rosse H-statistic

The Panzar and Rosse *H*-statistic is calculated from reduced form revenue equations and measures the sum of elasticities of total revenue of the firm with respect to the firm's input prices. In the empirical analysis, the following reduced form revenue equation is estimated:

$$\ln(TR_{it}) = \alpha + \beta_1 \ln(P_{L,it}) + \beta_2 \ln(P_{D,it}) + \beta_3 \ln(P_{C,it}) + \gamma_1 \ln(EQAST_{it}) + \gamma_2 \ln(SIZE_{it}) + \gamma_3 \ln(LOANAST_{it}) + \varepsilon_{it}$$
(1)

t = 1...T, where *T* is the number of periods observed, and i=1...I, where *I* is the total number of banks.  $TR_{it}$  are total revenues;  $P_{L,it}$ ,  $P_{D,it}$ , and  $P_{C,it}$  are the cost of labour, cost of deposits, and cost of fixed capital, respectively.  $EQAST_{it}$  is the ratio of total equity to total assets that reflect the bank's capitalisation level;  $SIZE_{it}$  are total assets which captures bank size; and finally  $LOANAST_{it}$  is the total loans to total assets ratio that represents the level of specialisation in traditional activities. All variables are in logarithmic form, and the subscripts *i* and *t* refer to bank *i* operating at time *t*.

The *H*-statistics is calculated as the sum of the input prices coefficients  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  as follows:  $H = \sum_{j=1}^{J} \beta_i$  (2)

where j=1...J, and J is the number of inputs included.

<sup>&</sup>lt;sup>8</sup> For more recent applications to the banking sector see e.g. Molyneux et al. (1994); Bikker and Groenveld (1998); Casu and Girardone (2006); and Schaeck et al. (2009).

*H* is equal to 1 in perfect competition, between 0 and 1 in monopolistic competition, and less than 0 in monopoly.<sup>9</sup>

# 3.1.2 The Lerner index

The index is defined as the difference between price (p) and marginal cost (mc) as a fraction of price (see e.g. Maudos and Fernandez de Guevara, 2007 and Delis and Tsionas, 2009). The index is usually taken as an indicator of market power because the larger the index, the larger the difference between price and marginal cost, hence, the larger the distance between the price and the competitive price. The computation of the Lerner index requires the estimation of a translog cost function with bank fixed effects and time dummies as follows:

$$lnCost_{it} = \beta_{0} + \beta_{1}lnQ_{it} + \frac{\beta_{2}}{2}lnQ_{it}^{2} + \sum_{k=1}^{3}\gamma_{kt} lnP_{k,it} + \sum_{k=1}^{3}\varphi_{k} lnQ_{it}lnP_{k,it} + \sum_{k=1}^{3}\sum_{j=1}^{3}\delta_{kj} lnP_{k,it}lnP_{j,it} + \varepsilon_{it}$$
(3)

where  $Cost_{it}$  stands for total costs,  $Q_{it}$  represents a proxy for bank output or total assets for bank *i* at time *t*, and  $P_{k,it}$  are the three input prices defined in the previous section. The marginal cost is derived by differentiating equation (3) with respect to *Q* as follows:

$$MC_{TA,it} = \frac{Cost_{it}}{Q_{it}} \left[\beta_1 + \beta_2 lnQ_{it} + \sum_{k=1}^3 \varphi_k lnP_{k,it}\right]$$
(4)

Then the Lerner index is then computed as: 
$$Lerner_{it} = \frac{P_{TA,it} - MC_{TA,it}}{P_{TA,it}}$$
 (5)

<sup>&</sup>lt;sup>9</sup> Most importantly in the Panzar-Rosse approach, banks should be observed from a long-run equilibrium perspective. This is justified by the fact that competitive markets will equalize the risk-adjusted return on average assets (ROAA) across banks in equilibrium, so that the ROAA should not be statistically correlated with input prices. The equilibrium test is performed by replacing the total revenue with ROAA in equation (1) and calculating the equilibrium statistic as the sum of the input price elasticities, and the hypothesis that its value is 0 is tested where, if rejected, the market is not in equilibrium.

where  $P_{TA,it}$  is the price of total assets represented by the ratio of total revenues to total assets for bank *i* at time *t* (using total assets as a proxy for bank production), and  $MC_{TA,it}$  is the marginal cost of total assets for bank *i* at time *t*. The Lerner index ranges between 0 and 1, with higher numbers implying greater market power. For a perfectly competitive firm (where P=MC), LERNER = 0; i.e. the firm has no market power.

#### **3.2 Modelling convergence**

#### 3.2.1 $\beta$ and $\sigma$ -convergence

In order to analyse the convergence of banking competition levels across the MENA region over the last decade, we adopt the concepts of  $\beta$ -convergence and  $\sigma$ -convergence proposed by Barro and Sala-i-Martin (1991), which are developed in a cross-section context, as benchmark tests of competition convergence. Unlike  $\beta$ -convergence,  $\sigma$ -convergence does not focus on detecting possible catching-up processes, but conversely emphasizes the variable distribution by measuring standard deviations. The two concepts are complementary, but not excludable: the former is a necessary but not sufficient condition for the latter to occur.

In the case of  $\beta$ -convergence (also referred to as absolute convergence or catch-up effect), we initially estimate a univariate model to determine if there is absolute competition convergence over the period of our study as follows:

$$lnCOMP_{i,t} - lnCOMP_{i,t-1} = \sigma + \beta lnCOMP_{i,t-1} + \sum Country_i + \varepsilon_{i,t}$$
(6)

where  $COMP_{i,t}$  is the mean level of banking competition (proxied by the Lerner index and *H*-statistic) of country *i* in year *t*, and  $COMP_{i,t-1}$  is the mean level of banking competition of country *i* in year *t*-1.*i* = 1, ..., 14 and *t* = 1, ..., 8. *Country<sub>i</sub>* are dummies to control for the country effects,  $\varepsilon_{i,t}$  are the error terms, and  $\sigma$  and  $\beta$  are the parameters to be estimated. There is  $\beta$ -convergence if the

parameter  $\beta$  is negative; the higher the coefficient in relative terms the greater the tendency for convergence.

To estimate cross-sectional dispersion or  $\sigma$ -convergence, that is to estimate how quickly each country's competition levels are converging to the group average, we adopt the following model specification:

$$\Delta W_{i,t} = \alpha + \sigma W_{i,t-1} + \sum Country_i + \varepsilon_{i,t}$$
<sup>(7)</sup>

where  $\Delta W_{i,t} = W_{i,t} - W_{i,t-1}$ ;  $W_{i,t} = lnCOMP_{i,t} - ln(\overline{COMP_t})$ ;  $W_{i,t-1} = lnCOMP_{i,t-1} - ln(\overline{COMP_t-1})$ ;  $lnCOMP_{i,t}$  and  $lnCOMP_{i,t-1}$  are the logarithms of the mean levels of banking competition in country *i* at times *t* and *t-1* respectively,  $\overline{COMP_t}$  and  $\overline{COMP_{t-1}}$  are the means of  $COMP_{i,t}$  and  $COMP_{i,t-1}$  respectively. *Country<sub>i</sub>* represent country dummies,  $\varepsilon_{i,t}$  is the error term, and  $\alpha$  and  $\sigma$  are the parameters to be estimated.  $\sigma < 0$  represents the rate of convergence of  $COMP_{i,t}$  towards  $\overline{COMP_t}$ ; the larger is  $\sigma$  in absolute value, the faster the rate of convergence. The models in equations (6) and (7) are estimated using the pooled OLS regression.

# 3.2.2 Unit root test for panel data with AR (1) and small T

Although  $\beta$  and  $\sigma$ -convergence are the most generally applied tests for convergence, they suffer from some limitations that were highlighted in several studies (e.g. Quah, 1993, 1996; Bernard and Durlauf, 1996; and Evans, 1996). To address the criticisms of the cross-section regressions, two main approaches were developed. On one hand, there is the approach that extends the cross-section regressions to take panel data estimations into account (e.g. Islam, 1995). On the other, the literature took advantage of advances in the panel unit root literature to look at the convergence hypothesis using a time series definition of convergence.<sup>10</sup> Many of these tests, particularly Levin et al. (2002)

<sup>&</sup>lt;sup>10</sup> See e.g. Quah, 1994; Bernard and Durlauf, 1995; Evans and Karras, 1996; Evans, 1998; Levin et al., 2002; and Im et al., 2003.

and Im et al. (2003), allow for a considerable degree of cross-sectional heterogeneity. However, one shortcoming of the unit root tests used to date in convergence studies is that they all adapt to samples characterised by large cross-section and a relatively long time span. For example, in this study of macro-regions in MENA we have a sample of 236 banks and 8 available years. The econometric literature has evolved and today there are reliable tests that can adapt well to samples characterised by small T (e.g. De Blander and Dhaene, 2012).

We therefore apply the more recently developed panel unit root test of De Blander and Dhaene (2012) to test the banking competition convergence across macro-regions of MENA. This test is particularly appropriate to use when the number of available time-series observations is small. The model is a fixed-effect panel version of the augmented Dickey–Fuller (ADF) regression of order 1 requiring a balanced panel of observations, and is of the following form:

$$y_{m,n,t} = \alpha_{m,n} + \varphi y_{m,n,t-1} + \rho \Delta y_{m,n,t-1} + \varepsilon_{m,n,t}, \tag{8}$$

where  $y_{m,n,t} = COMP_{m,n,t} - COMP_{m,0,t}$  is the difference of the logarithm of competition measure at time *t*, for bank *m*, between country *n* and the base country.  $\alpha_{m,n}$  measure the price differences that remain constant over time.  $\varphi$  and  $\rho$  are the autoregressive parameters.  $\rho \Delta y_{m,n,t-1}$  accounts for an AR(1) serial correlation in the errors. The error terms,  $\varepsilon_{m,n,t}$ , are assumed to be *i.i.d* (0,  $\sigma_{\varepsilon}^2$ ) across *m*, *n*, and *t*.

Therefore, we test the null hypothesis of a unit root,  $H_0: \varphi = 1$ , (9)

against the alternative, 
$$H_1: \varphi < 1.$$
 (10)

The model can be adjusted to mitigate the impact of cross-sectional dependence by cross-sectionally demeaning the data, i.e. subtracting the cross-sectional averages from the series. Given the size of the panel, both  $\varphi$  and  $\rho$  may be subject to the Nickell (1981) bias.<sup>11</sup> Therefore, De Blander and Dhaene

<sup>&</sup>lt;sup>11</sup> A problem arises in the fixed-effects panel models particularly in the small T, large N setting. It mainly happens due to the correlation between the regressors and errors that results from the demeaning process.

(2012) derive bias-corrected estimators,  $(\tilde{\varphi}, \tilde{\rho})'$ , which are obtained as a function of the biased estimators,  $(\hat{\varphi}, \hat{\rho})'$ . This bias correction yields an asymptotically normal *t*-type test statistic under the null hypothesis of a unit root.

In accordance with the Bank Regulation and Supervision Survey carried out by Barth et al. (2013) and with the Economic Freedom Index of the Heritage Foundation (2013), we choose Bahrain as the base country in our sample on the ground that it has less financial restrictions more economic freedom compared to other MENA countries in our sample.<sup>12</sup> Since we do not have data by bank for the H-statistic, the Lerner index is the competition measure used to carry out the unit root test.

## 3.3 Convergence in bank competition, economic growth and financial deepening

In order to examine whether greater convergence in bank competition tends to give MENA countries an advantage in terms of economic growth and financial deepening, we perform a standard linear regression controlling for the regulatory and institutional environment as follows:

$$Growth_{j,t} = \alpha + \beta_1 Country_j + \beta_2 COMP_{j,t} + \beta_3 Ggrowth_{j,t-1} + \beta_4 R_{j,t} + \beta_5 EF_{j,t} + \nu_{j,t}$$
(11)

where each country and year are indicated by indices *j* and *t* respectively. Growth is proxied by the annual rate of GDP growth and the growth of banking credit to the private sector.<sup>13</sup> We use country dummies to control for country differences. COMP<sub>i,t</sub> are the mean level of banking competition; proxied by the Lerner index and the *H*-statistic, in country *j* at time *t*.  $R_{j,t}$  are regulatory variables to control for governmental restrictions on banking and financial areas in MENA; these include entry and activity restrictions.  $EF_{i,t}$  refers to the index of economic freedom to control for the quality of national institutional developments in MENA countries. To deal with the problem of multicollinearity among these control variables we test them in separate models. We first estimate

 <sup>&</sup>lt;sup>12</sup> Available on: <u>http://www.heritage.org/index/.</u>
 <sup>13</sup> High rates of credit expansion might finance an asset price bubble that may cause a crisis when it bursts.

equation (11) using standard OLS without controlling for previous growth performance. Then, we account for growth persistence by including a one-year lag of the dependent growth variable,  $Growth_{j,t-1}$ , as a regressor. We expect the bias on the competition variable to decrease when controlling for growth persistence.

# 3.4 Data

Data are collected from the Bankscope database. We use consolidated accounting data for a sample of banks from 14 MENA countries over the period 2004-2011. Our sample comprises a total of 236 banks in MENA. For the purpose of this study, three macro-regions are shaped based on the export of oil allowances as explained in section 1.

Table 1 reports the number of banks per country and macro-region and displays summary statistics for the bank-level variables adopted in the estimations. The GCC countries have the highest number of banks and value of total assets when compared to the DOE and RP countries. At the country level, Lebanon dominates the sample in terms of number of banks, followed by Bahrain, the United Arab Emirates and Egypt. Saudi Arabia has the largest average total assets over the period under study, followed by Morocco and the United Arab Emirates.

<< Insert table 1 about here >>

Data of real GDP and credit growth have been retrieved from the World Development Indicators (WDI) database provided by the World Bank. The real GDP growth is the annual percentage growth rate of GDP at market prices based on constant local currency. Credit growth is the ratio of the growth rate of domestic credit to the private sector to GDP.

Entry and activity restrictions are drawn from a recent database by Barth et al. (2013) which builds on four surveys sponsored by the World Bank to collect information on bank regulations and supervisory practices. Entry restrictions express the fraction of entry applications denied for both domestic and foreign banks in the past five years, while activity restrictions include constraints on securities, insurance, and real estate activities plus restrictions on the ability of banks to own and control non-financial firms. Finally, the economic freedom variable is obtained from an index that is published by the Heritage Foundation. The index comprises 10 single freedoms and is an indicator of the quality of national institutional developments of the economy in the target countries.

## 4. Empirical findings

# 4.1 Trends in alternative measures of competition

We first analyse the evolution of bank competition measured by the Panzar-Rosse *H*-statistic and Lerner index for Monopoly power for the whole MENA and the three macro-regions over the period 2004-2011. The results are displayed in Figure  $1.^{14'15}$ 

<< Insert figure 1 about here >>

The evolution of the *H*-statistic shows an increase for the whole MENA and all macroregions over the period of our study; the highest increase is for DOE countries, followed by RP and finally the GCC. In dynamic terms, this increase (if the *H*-statistic is interpreted as a continuous measure) points to greater levels of competition over time. Broadly speaking, monopolistic competition best describes the banking sectors across all macro-regions of MENA, with evidence that GCC markets tend to be less competitive than both the non-oil producing countries and developing oil exporters. This finding is in line with the vast majority of studies on the competitive conditions in MENA (see e.g. Murjan and Ruza, 2002; and Turk-Ariss, 2009).

<sup>&</sup>lt;sup>14</sup> The results (not reported) of equation (1) with ROAA as a dependent variable suggest long-run equilibrium (see footnote 9).

<sup>&</sup>lt;sup>15</sup> To recall, higher (lower) levels of *H*-statistic are associated with higher (lower) competition; vice versa, higher levels of Lerner imply greater marker power (i.e. lower levels of competition).

On the other hand, the trend of the Lerner indices indicates a decrease for the whole MENA and all macro-regions; the highest decrease is for DOE countries, followed by RP and finally the GCC. These results confirm the *H*-statistic findings implying that all macro-regions of MENA have witnessed enhancement in banking competition during the period of this study with DOE countries benefiting from the highest increase in competition levels compared to the other two groups.<sup>16</sup>

#### 4.2 Convergence of banking competition levels in MENA

We test for  $\beta$  and  $\sigma$ -convergence using the two estimated competition measures separately for the full sample of MENA countries as well as the three macro-regions over 2004-2011. To take account of both the intertemporal pattern of convergence and the cross sectional varieties of MENA countries, we use the specifications of convergence tests for panel data. The  $\beta$ -convergence results for both the *H*-statistic and the Lerner index are reported in Table 2. In panel A (when using the *H*statistic as a competition measure), the table shows that all  $\beta$ s are significantly negative suggesting that there is evidence of  $\beta$ -convergence in banking competition levels in the three macro-regions as well as in the pooled MENA during the period of our study.

# << Insert table 2 about here >>

This finding is also robust to the use of the Lerner index as a measure of market power in panel B implying that the most competitive banking sectors in 2004 have experienced lower improvements in competition than the least competitive ones, thereby providing preliminary evidence of competition catch-up among MENA countries and macro-regions.

Results of  $\sigma$ -convergence are illustrated in Table 3 for both the *H*-statistic (panel A) and Lerner index (panel B). These results confirm the convergence hypothesis in MENA as a whole and

<sup>&</sup>lt;sup>16</sup> Results of the *H*-statistic and Lerner indices by country are listed Appendix B.

in all macro-regions ( $\sigma$  coefficients are predominantly negative and statistically significant). This implies that the dispersion of the mean competition measures between MENA countries and macro-regions was reduced during the period under investigation, suggesting an increase in the speed of convergence.

<< Insert table 3 about here >>

We further apply a newly developed unit root test to shed more light on the convergence of bank competition levels across MENA. Because there are no data by bank for the *H*-statistic, we use the Lerner index to carry out the unit root test. We therefore test the null hypothesis of a unit root,  $H_0: \varphi = 1$ , for the whole MENA and the three macro-regions. Table 4 reports the fixed effects OLS and the bias-corrected OLS estimates of  $\varphi$  and  $\rho$ . The null hypothesis of no convergence is rejected for the whole MENA and for all macro-regions.

<< Insert table 4 about here >>

The rejected null for the pooled sample (MENA) at the 1% level indicates support for convergence in the region suggesting that some harmonisation is occurring among MENA countries despite of the economic and financial differences at the country level. In fact, MENA countries are facing similar policy challenges such as privatization and deregulation, reforming public finances, strengthening human resources, increasing domestic and foreign investments, and liberalizing external trade and payments (Guétat and Serranito, 2007). Moreover, evidence provides support to the convergence hypothesis in the three macro-regions in our sample suggesting that countries in each macro-region share similar characteristics that might have influenced convergence.

We also investigate the relationship between improved banking competition and economic performance in MENA and its macro-regions while controlling for growth persistence and cross-country regulatory and institutional differences. Two different proxies of growth are used; the real GDP growth and the credit growth. Results for the pooled MENA and its macro-regions are shown in Tables 5 and 6 using the *H*-statistic and Lerner index respectively. We use standard OLS without and with controlling for growth persistence. We also control for activity and entry restrictions as well as for economic freedom. Due to the relatively high correlation between activity and entry restrictions, they are tested in separate models.

# << Insert table 5 about here >>

According to panel A in Tables 5 and 6, MENA banking sector's competition has a significant positive effect on economic growth, and this effect persists with and without controlling for time trends and is robust to alternative measures of growth. However, the estimated coefficients are two to five times larger when not controlling for growth persistence implying that OLS without lagged dependent variables tends to overestimate the relationship between variables.

By means of panel B, some evidence of a positive link between banking competition and economic growth is found in the GCC countries where the *H*-statistic is positively related to the GDP growth rate. However, no significant relationship between Lerner indices and economic growth is found. In fact, the structure of the GCC economies and exports is changing towards more diversification. For example, while the banking sector is by far the single most important sector in Bahrain, the weight of manufacturing sector has been growing in Saudi Arabia, as has the entrepôt trade in the UAE. Similarly, Qatar and Oman have been concentrating more on developing their natural gas resources and tourism.

When compared to the GCC, panels C and D show a little more evidence that banking sector competition in both DOE and RP countries, however calculated, has a positive link with the overall economic growth as proxied by the GDP growth and credit growth in the case of RP and the latter only in the case of DOE. This could imply more dependence on the banking sector in these economies.

In most cases, the lagged growth variables have a significant positive impact on current growth; this effect is consistent across different models and specifications in Tables 5 and 6. Entry and activity restrictions enter the majority of our models significantly negative. This implies that fewer restrictions in the banking sector would benefit the economic growth in MENA and its macro-regions. The main implication from this finding is that governments should encourage banking competition by reducing unnecessary constraints on banks' activities and entry requirements. Similarly, allowing greater freedom in banking and economy seems to have desirable outcome in MENA and its macro-regions.

# 5. Conclusion

Using consolidated accounting data for 236 banks across 14 countries in the Middle East and North Africa (MENA) region, this paper empirically examines the evolution and convergence of banking competition across three different macro-regions of MENA that are classified according to oil export allowances over the period 2004-2011.

Our evidence suggests that banking competition levels, measured by the *H*-statistic and the Lerner index, have increased for all macro-regions during the period of our study. The evolution in banking competition differs on average between the three different macro-regions in our sample; DOE countries witnessed the highest increase in competition levels, followed by the RP countries

and finally the GCC. We also observe a general trend of enhanced banking competition in pooled MENA over the period, even though the situation might be different across countries.

Applying a battery of tests, we find evidence that convergence in banking competition has taken place in MENA as a whole and in the three macro-regions during 2004-2011. These results are observed for both competition measures and for all concepts of convergence.

Finally, we test the effect of increased competition on the overall economic growth across macro-regions of MENA. Our evidence suggests that banking sector's competition has a significant positive effect on economic growth across all macro-regions and in MENA as a whole.

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# Appendix A

# **Intra-MENA Agreements**

Agreement	Type of Agreement	Member Countries	Date
Pan Arab Free Trade Area (PAFTA)	Free trade agreement that aims at enhancing trade and economic activities among the Arab States and the establishment of a regional Free Trade Area.	Bahrain; Egypt; Iraq; Jordan; Kuwait; Lebanon; Libya; Morocco; Oman; Qatar; Saudi Arabia; Sudan; Syria; Tunisia; United Arab Emirates; Yemen.	01-01-1998
Gulf Cooperation Council (GCC)	Political and economic union of Arab states bordering the Persian Gulf.	Bahrain; Kuwait; Oman; Qatar; Saudi Arabia; United Arab Emirates.	01-01-2003
AGADIR	An agreement between the Arabic Mediterranean Nations for establishing a Free Trade Zone.	Egypt; Jordan; Morocco; Tunisia.	01-01-2004
Arab Maghreb Union (AMU)	A trade agreement aiming for an economic and future political unity among Arab countries of the Maghreb in North Africa.	Algeria; Libya; Morocco; Tunisia; Mauritania.	02-01-2012

Notes: This table displays the agreements that show integration progress in MENA region during the last two decades.

# Appendix **B**

# The Evolution of Bank Competition Levels across MENA Countries during 2004 - 2011: *H*-statistic and Lerner Indices

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Country	2004	2005	2006	2007	2008	2009	2010	2011	Evolution	
Panel A: the H-statistic										
Algeria	0.512	0.508	0.451	0.544	0.785	0.367	0.413	0.957	0.445	
Bahrain	0.452	0.436	0.425	0.368	0.498	0.404	0.448	0.460	0.008	
Egypt	0.625	0.674	0.584	0.517	0.508	0.646	0.578	0.568	-0.057	
Jordan	0.480	0.404	0.456	0.659	0.516	0.485	0.228	0.497	0.017	
Kuwait	0.299	0.447	0.332	0.346	0.47	0.325	0.201	0.327	0.028	
Lebanon	0.702	0.685	0.608	0.644	0.86	0.657	0.65	0.812	1.514	
Libya	0.288	0.271	0.425	0.282	0.332	0.269	0.223	0.215	-0.073	
Morocco	0.503	0.611	0.573	0.48	0.584	0.518	0.564	0.619	0.116	
Oman	0.678	0.65	0.554	0.614	0.677	0.649	0.678	0.777	0.099	
Qatar	0.496	0.635	0.609	0.273	0.306	0.353	0.455	0.385	0.087	
Saudi	0.605	0.888	0.955	0.733	0.373	0.437	0.486	0.751	0.116	
Syria	0.463	0.589	0.48	0.544	0.336	0.465	0.402	0.431	-0.032	
UAE	0.723	0.794	0.658	0.945	0.816	0.777	0.617	0.728	0.05	
Yemen	0.284	0.215	0.231	0.356	0.227	0.366	0.374	0.22	-0.064	
			Ĺ	Panel B: the L	erner indices					
	0.473	0.609	0.470	0.458	0.555	0.470	0.376	0.360	-0.113	
Bahrain	0.375	0.423	0.360	0.390	0.481	0.432	0.199	0.349	-0.026	
Egypt	0.193	0.208	0.277	0.114	0.148	0.224	0.158	0.219	0.026	
Jordan	0.309	0.345	0.459	0.303	0.392	0.190	0.251	0.173	-0.136	
Kuwait	0.412	0.321	0.337	0.414	0.483	0.334	0.483	0.469	0.057	
Lebanon	0.144	0.181	0.130	0.104	0.189	0.184	0.192	0.185	0.041	
Libya	0.349	0.483	0.489	0.276	0.474	0.265	0.260	0.195	-0.154	
Morocco	0.288	0.322	0.339	0.225	0.234	0.238	0.191	0.172	-0.116	
Oman	0.399	0.399	0.357	0.238	0.301	0.338	0.327	0.297	-0.102	
Qatar	0.501	0.527	0.521	0.426	0.562	0.576	0.496	0.467	-0.034	
Saudi	0.470	0.529	0.405	0.373	0.629	0.520	0.364	0.408	-0.062	
Syria	0.403	0.396	0.312	0.389	0.424	0.454	0.487	0.361	-0.042	
UAE	0.438	0.310	0.328	0.382	0.514	0.473	0.581	0.437	-0.001	
Yemen	0.353	0.463	0.408	0.394	0.322	0.323	0.281	0.281	-0.072	

Notes: Panel A of this table displays the results of the *H*-statistic provided by the Panzar-Rosse model for each year and country. Panel B shows the means of Lerner indices for each year and country; all indices are in percentage. Evolution is the difference between the values of the *H*-statistic and Lerner indices in 2011 and their values in 2004.





The Evolution of Bank Competition Levels across Macro-Regions of MENA over the

Notes: MENA= Middle East and North Africa; DOE= Developing Oil Exporters, GCC= Gulf Cooperation Council, RP= Resource Poor countries.

Country	Number of banks	Total assets	Total Loans	Total revenues	Total costs	Price of Labor	Price of Deposits	Price of Fixed Capital
Algeria	16	4391.68	1492.16	273.82	75.86	0. 547	1. 788	0. 966
Bahrain	28	4563.62	2437.09	226.52	128.49	0.902	2.413	0. 749
Egypt	24	6047.71	2084.84	329.14	305.61	0. 762	4. 433	1.280
Jordan	14	7132.76	3224.17	462.15	263.18	0. 969	3. 539	0. 966
Kuwait	15	10881.46	6142.78	726.63	401.84	0. 983	6. 649	0.850
Lebanon	40	3165.51	825.48	122.75	119.85	0. 998	9. 403	1. 121
Libya	8	2566.03	363.406	151.27	84.93	0.809	2.929	1.015
Morocco	11	12667.13	7826.61	757.36	458.43	2. 539	1.691	2. 163
Oman	6	4640.03	3123.90	365.16	254.38	0. 931	5.795	1.965
Qatar	10	11210.06	6654	726.97	290.29	0. 955	1.832	1.360
Saudi	13	25438.56	14630.75	2138.31	118.40	2.455	13.814	3.164
Syria	14	1098.69	456.227	135.4	106.04	1.094	2.8405	1.685
UAE	28	12357.10	8109.93	748.66	473.37	0. 736	3.4640	0. 557
Yemen	9	400.10	84.300	45.22	34.90	1.009	4. 144	2.249
DOE	47	3015.55	721.86	128.62	115.98	0.843	2.747	1.434
GCC	100	11218.94	7279.91	754.63	325.77	1.077	6.619	1.588
RP	89	7368.52	2445.65	310.78	254.66	0.942	4.775	1.093
Average (MENA)	236	7539.026	3994.298	494.317	224.234	0.954	3.533	1.820

Summary Statistics per Country and Macro-region for the Bank-level Variables Adopted in the Estimations during 2004 - 2011

Notes: Figures in US\$ millions. Numbers are obtained by own calculation based on data retrieved from Bankscope. MENA= Middle East and North Africa; DOE= Developing Oil Exporters, GCC= Gulf Cooperation Council, RP= Resource Poor countries.

Table	2
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Countries	DOE	GCC	RP	MENA
	I	Panel A: H-statistic		
Intercept	-0.344**	-0.457**	-0.312***	-0.398***
1	(5.62)	(5.13)	(5.27)	(5.02)
Ln(H - statistic)	-0.870**	-0.720*	-0.787**	-0.754***
(	(6.91)	(6.20)	(5.13)	(5.11)
Adjusted R <sup>2</sup>	0.623	0.534	0.587	0.502
Ν	47	100	89	236
		Pane B: Lerner indices		
Intercent	-1.654**	-1.031*	-1.342**	-1.222***
	(5.62)	(6.72)	(4.76)	(5.22)
Ln(Lerner index)	-0.661**	-0.514*	-0.486**	-0.596***
	(6.91)	(6.09)	(5.77)	(5.58)
Adjusted R <sup>2</sup>	0.227	0.202	0. 223	0.274
Ν	47	100	89	236

β-convergence Test for Banking Competition across Macro-Regions of MENA

Notes: The table displays the results of the  $\beta$ -convergence test. In panel A, the variable Ln (H - statistic) is: H - statistic<sub>*i*,*t*</sub> - H - statistic<sub>*i*,*t*-1</sub>, where H - statistic<sub>*i*,*t*-1</sub>, where H - statistic<sub>*i*,*t*-1</sub> and H - statistic<sub>*i*,*t*-1</sub> are the H-statistic estimates of country *i* in year *t* and *t*-1 respectively. In panel B, the variable Ln (Lerner index) is: Lerner index<sub>*i*,*t*-1</sub> are the mean Lerner index of country *i* in year *t* and *t*-1 respectively. In panel B, the variable Ln (Lerner index) is: Lerner index<sub>*i*,*t*-1</sub> are the mean Lerner index of country *i* in year *t* and *t*-1 respectively. *t*-values are in parentheses. \*, \*\*, \*\*\* denote the statistical significance at the 10%, 5%, and 1% levels respectively. Country dummies are not reported.

Countries	DOE	GCC	RP	MENA
		Panel A: H-statistic		
Intercept	0.117**	0.105**	0.123***	-0.104***
-	(1.89)	(1.62)	(1.84)	(1.33)
Ln(W)	-1.001**	-0.998**	-1.110***	-0.973***
	(19.41)	(15.33)	(16.77)	(15.22)
Adjusted $R^2$	0.731	0.687	0.702	0.655
Ν	47	100	89	236
		Pane B: Lerner indices		
Intercept	-0.454**	-0.414**	-0.467**	-0.404***
1	(2.62)	(2.52)	(2.49)	(2.33)
Ln(W)	-0.666**	-0.612**	-0.633**	-0.673***
	(6.91)	(5.99)	(4.98)	(5.22)
Adjusted $R^2$	0.277	0.253	0.278	0.255
N	17	100	80	226

# $\sigma$ -convergence Test for Banking Competition across Macro-Regions of MENA

Notes: The table displays the results of  $\sigma$ -convergence test. In panel A, the variable Ln(W) is:  $\Delta W_{i,t}$  where  $\Delta W_{i,t} = W_{i,t} - W_{i,t-1}, W_{i,t} = ln H - statistic_{i,t} - MH - statistic_t, ln H - statistic_{i,t}$  is the logarithm of the *H*-statistic of country *i* in year *t*, and  $MH - statistic_t$  is the mean of  $ln H - statistic_{i,t}$  for each period. In panel B, the variable Ln(W) is:  $\Delta W_{i,t}$  where  $\Delta W_{i,t} = W_{i,t-1}, W_{i,t} = ln Lerner index_{i,t} - MLerner index_t$ , ln Lerner index<sub>i,t</sub> is the logarithm of the Lerner index of country *i* in year *t*, and *MLerner index\_t*, is the mean of ln *H* - statistical significance at the 10%, 5%, and 1% levels respectively. Country dummies are not reported.

Countries	Ν	Coefficient	OLS	<b>Bias-corrected OLS</b>
MENA	236	arphi ho	0.403*** -0.004	0.823*** -0.088
DOE	47	arphi ho	0.522** -0.083	0.940* -1.37
GCC	100	arphi ho	0.250* -0.053	0.652* -0.152
RP	89	arphi ho	0.620** -0.095	1.020** -0.141

Unit Root Test for Banking Competition Convergence across Macro-Regions of MENA

Notes: The table displays the results of the De Blander and Dhaene (2012) test. The test is carried out using the Lerner index as a measure of market power. \*, \*\*, \*\*\* indicate that the null hypothesis of a unit root is rejected at 10%, 5% and 1% levels respectively.

Dependent Variable	H-statistics	GDP Growth Rate(-2)	Credit Growth(-2)	Activity Restrictions	Entry Restrictions	Economic Freedom
		Panel A:	MENA			
GDP Growth Rate	0.065**			-1.012*		1.071**
	0.054*				- 0.119*	1.086**
	0.013*	0.261***		-0.337*		0.358*
	0.018*	0.370***			-0.039**	0.366*
Credit Growth	0.081**			-1.221*		1.081**
	0.035**				- 1.120*	1.022*
	0.014*		0.312**	-0.461*		0.361**
	0.012*		0.421**		-0.276*	0.341**
GDP Growth Rate	0.560	Panel B.	: GCC	-4.84***		-0.33
	1.031**				-5.74***	0.46**
	0.438	0.48***		-2.07		0.23
	0.639*	0.52***			-2.84	0.28
Credit Growth	1.637			-2.15		1.74***
	1.583*				1.46	1.72***
	0.81		0.85***	-1.46		0.25
	0.53*		0.86***		-1.24	0.22
	0.000	Panel C.	: DOE	0.0501		0.454
GDP Growth Rate	0.293			-0.870*		0.47*
	0.195				-0.09	0.54*
	0.2.51	0.85**		-0.151***		0.59**
	0.171	0.31			-0.09	0.61**
Credit Growth	0.2.67***			-0.239**		0.47
	0.711**				-3.87***	0.46**
	0.711** 0.21*		0.64***	-0.226**	-3.87***	0.46** 0.81***
	0.711** 0.21* 0.731**		0.64*** 0.05	-0.226**	-3.87*** -3.70***	0.46** 0.81*** 0.48**
GDP Growth Rate	0.711** 0.21* 0.731** 0.721	Panel L	0.64*** 0.05 D: RP	-0.226** -2.09	-3.87*** -3.70***	0.46** 0.81*** 0.48**
GDP Growth Rate	0.711** 0.21* 0.731** 0.721 0.641	Panel L	0.64*** 0.05 <b>D: RP</b>	-0.226** -2.09	-3.87*** -3.70*** -0.55	0.46** 0.81*** 0.48** 0.42** 0.29
GDP Growth Rate	0.711** 0.21* 0.731** 0.721 0.641 0.631	<i>Panel L</i> 0.014	0.64*** 0.05 <b>D: RP</b>	-0.226** -2.09 -1.41	-3.87*** -3.70*** -0.55	0.46** 0.81*** 0.48** 0.42** 0.29 0.37
GDP Growth Rate	0.711** 0.21* 0.731** 0.721 0.641 0.631 0.487	<b>Panel 1</b> 0.014 0.023	0.64*** 0.05 <b>): RP</b>	-0.226** -2.09 -1.41	-3.87*** -3.70*** -0.55 -0.49	0.46** 0.81*** 0.48** 0.42** 0.29 0.37 0.34
GDP Growth Rate Credit Growth	0.711** 0.21* 0.731** 0.721 0.641 0.631 0.487 0.662**	<i>Panel I</i> 0.014 0.023	0.64*** 0.05 <b>D: RP</b>	-0.226** -2.09 -1.41 -6.27***	-3.87*** -3.70*** -0.55 -0.49	0.46** 0.81*** 0.48** 0.29 0.37 0.34 4.49***
GDP Growth Rate Credit Growth	0.711** 0.21* 0.731** 0.721 0.641 0.631 0.487 0.662** 0.591	<i>Panel 1</i> 0.014 0.023	0.64*** 0.05 D: RP	-0.226** -2.09 -1.41 -6.27***	-3.87*** -3.70*** -0.55 -0.49 -3.34*	0.46** 0.81*** 0.48** 0.42** 0.29 0.37 0.34 4.49*** 1.07
GDP Growth Rate Credit Growth	0.711** 0.21* 0.731** 0.721 0.641 0.631 0.487 0.662** 0.591 0.709*	<i>Panel I</i> 0.014 0.023	0.64*** 0.05 <b>D: RP</b> 0.95***	-0.226** -2.09 -1.41 -6.27*** -1.35**	-3.87*** -3.70*** -0.55 -0.49 -3.34*	0.46** 0.81*** 0.48** 0.42** 0.29 0.37 0.34 4.49*** 1.07 0.48

Notes: We perform a standard linear regression to examine whether greater convergence in bank competition (proxied by the *H*-statistic) tends to give MENA countries an advantage in terms of economic growth and financial deepening controlling for growth persistence and regulatory and institutional environment. Empty cells occur when a particular variable is not included in the regression. Activity and entry restrictions are tested in separate models to control for multicollinearity. \*, \*\*, \*\*\* denote significance levels 10%, 5% and 1% respectively. Constant terms and country dummies are not reported.

DP Growth Rate         -0.832**         -0.060**         0.801*           -0.940**         -0.109**         -0.109**         1.382**           -0.91*         0.301***         -0.078         0.36**           -0.421*         0.072***         -0.078         0.36**           -0.92***         -1.002         0.876***           -0.92***         -1.02         0.876***           -0.92***         -1.429*         1.091**           -0.164*         0.399***         -0.261*         0.43**           -0.164*         0.399***         -0.261*         0.43**           -0.164*         0.399***         -0.261*         0.43**           -0.164*         0.599***         -0.261*         0.43**           -0.158         0.611***         -1.42*         0.261           -1.16         0.50***         -2.12***         0.22           -1.16         0.50***         -2.13**         0.22           -1.12         0.50***         -1.13*         0.22           -1.12         0.50***         -1.142*         0.22           -1.12         0.50***         -1.15*         0.22           -1.12         0.23*         -1.15*         0.22	Dependent Variable	Lerner	GDP Growth Rate(-2)	Credit Growth(-2)	Activity Restrictions	Entry Restrictions	Economic Freedom
CDP Growth Rate-0.832**-1.062**0.801*0.904**-0.169**1.382**0.9391**0.361***-0.0169**1.382**0.9421**0.361***-0.0730.365***0.922**-1.4020.576**0.385**-0.164*0.399***-0.261**0.438**-0.164*0.399***-0.261**0.438**-0.163*0.611***-0.346**0.438**-0.164*0.399***-0.261**0.438**-0.164*0.399***-0.261**0.438**-0.164*0.399***-0.261***0.438**0.18**0.611***-0.346**0.22-1.280.50***-2.190.14-1.280.50***-2.190.14-1.280.50***-1.850.21-1.292-1.850.060.32-1.992-1.850.060.32-1.992-1.850.060.32-1.9930.85***0.95**0.97-1.9940.350.320.95*-1.0050.32***0.65**0.95**-1.0160.85**0.95**0.31***-1.020.38**-0.020.95*-1.04-0.22***0.030.42**-1.050.03-2.030.42**-1.060.32***0.05**0.94**-1.07**-1.26**0.92***0.95**-1.080.61***-0.920.95**-1.09**0.039-2.030.95**-1.015			Panel A:	MENA			
-0.940**-0.169*1.32*-0.391*0.361***-0.397*2.291*-0.421*0.672***-0.397*0.365*-0.812**-1.0020.876**-0.922**-1.420*0.381*-0.164*0.399***-0.261*0.381*-0.164*0.399***-0.261*0.381*-0.164*0.399***-0.261*0.361*-0.128-1.360.51***0.31*-0.128-1.320.50***-0.21*-1.280.50***-2.190.14-1.280.50***-2.190.14-1.290.56***-1.18*0.218***-1.4290.56***-1.18*0.218***-1.4290.56***-0.76*0.32*-1.4290.56***-0.120.43**-1.990.85***-0.67*0.32*-1.990.85***-0.120.49*-1.990.85***-0.120.49*-1.990.85***-0.120.49*-1.000.32**-0.120.51**-1.010.32**-0.120.51**-1.02*0.03-1.28**0.42*-0.51*-0.92-0.990.31***-0.52*0.003-3.19***0.42*-0.52*0.03-3.19***0.42*-0.52*0.03-3.19***0.42*-0.540.039-4.380.61*-0.55*0.039-4.380.61*-0.56*0.039-4.380.61*-0.5	GDP Growth Rate	-0.832**			-1.062**		0.801*
-0.391*       -0.391**       -0.397*       2.291*         -0.421*       0.672***       -0.078       0.36**         -0.92**       -1.002       0.97***       -1.40*       1.091**         -0.92***       -0.261**       -1.40*       1.091**       -1.43**       0.36**         -0.92***       -0.161**       0.36**       0.36*       0.36*       0.36*         -0.164*       0.39***       0.261***       0.36*       0.36*       0.36*         -0.164*       0.39***       0.611***       0.36**       0.36*       0.36*         -0.164       0.50***       -2.19       0.44       0.45*       0.21****         -1.28       0.50***       -2.19       0.16*       0.21****         -1.62       0.56***       -1.17*       0.15*         -1.28       0.50***       -0.06*       0.23***         -0.879       0.85***       0.36*       0.23***         -0.992       -1.10*       0.99*       0.99*         -0.06*       -0.22***       0.02*       0.5**         -0.076*       -0.32*       0.02***       0.42*         -0.53       0.03*       -0.09*       0.5**         -0.54*		-0.940**				- 0.169*	1.382*
0.421*0.672***0.0780.365*Credit Growth0.812**-1.0020.876**-0.922**-1.420*0.911**0.438*-0.164*0.399***-0.261*0.438*-0.164*0.399***-0.261*0.438*-0.164*0.611***-0.346*0.438*-0.1790.611***-5.12***0.223.71-4.32*0.26-1.280.50***-2.190.14-1.290.56***-1.350.218***-1.290.56***-1.850.218***-1.620.56***-1.850.218***-0.51*0.56***-0.680.32-0.8790.85***-0.660.32-1.0660.85***0.060.32-0.0700.88**-0.501***0.51**-0.0700.88**-0.51***0.51**-0.503-0.32-0.090.55*Credit Growth-0.276**-0.282**0.7**-0.66*-0.32*-0.020.44*-0.51*-0.50*-0.282**0.7**-0.52*0.03-1.23*0.42*-0.55*0.63***-0.22**0.5*-0.56*0.03*-0.320.42*-0.51*-0.51**-0.5*0.5*-0.51*-0.51**-0.5*0.5*-0.51*-0.55*-0.5*0.5*-0.55*0.03-2.33*0.65-0.51*-0.920.15*-0.5*-0.51*0.03-2.03 <th></th> <th>-0.391*</th> <th>0.361***</th> <th></th> <th>-0.397*</th> <th></th> <th>2.291*</th>		-0.391*	0.361***		-0.397*		2.291*
Credit Growth $-0.812^{**}$ $-1.00$ $0.876^{**}$ $-0.922^{**}$ $-1.420^{*}$ $0.91^{**}$ $-0.164^{**}$ $0.399^{***}$ $0.261^{**}$ $0.336^{**}$ $-0.164^{**}$ $0.611^{***}$ $-0.346^{**}$ $0.438^{**}$ $-0.18^{**}$ $0.611^{***}$ $-0.346^{**}$ $0.336^{**}$ $-0.16^{**}$ $-0.346^{**}$ $0.22^{**}$ $0.346^{**}$ $-0.17^{**}$ $-0.346^{**}$ $0.22^{**}$ $0.22^{**}$ $3.71$ $-1.28^{**}$ $0.22^{**}$ $0.22^{**}$ $-1.28^{**}$ $0.50^{***}$ $-2.19^{**}$ $0.21^{***}$ $-0.27^{**}$ $0.51^{***}$ $0.21^{***}$ $0.21^{***}$ $-0.87^{**}$ $0.85^{***}$ $0.86^{***}$ $0.23^{**}$ $-0.87^{**}$ $0.85^{***}$ $0.86^{**}$ $0.23^{**}$ $-0.07^{**}$ $0.88^{***}$ $0.68^{**}$ $0.21^{**}$ $-0.070^{**}$ $0.88^{***}$ $0.69^{**}$ $0.12^{**}$ $0.7^{**}$ $-0.50^{**}$ $-0.22^{**}$ $0.07^{**}$ $0.22^{***}$ $0.21^{**}$ $-0.51^{**}$ $-0.21^{$		-0.421*	0.672***			-0.078	0.365*
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Credit Growth	-0.812**			-1.002		0.876**
$ \begin{array}{ccccccc}$		-0.922**				- 1.420*	1.091**
-0.133*       0.611***       -0.346*       0.361         CDP Growth Rate       -1.36       -5.12***       0.22         3.71       -4.32*       0.26         1.28       0.50***       -2.19       0.14         1.62       0.56**       -2.19       0.15         Credit Growth       0.287       -1.85       0.218**         -3.992       -0.768       0.211**         -0.879       0.85***       -0.86       0.32         -0.879       0.85***       -0.86       0.32         -0.879       0.85***       0.06       0.32         -0.879       0.85***       0.06       0.32         -0.070       0.88**       -0.895*       0.09       0.51*         -0.770       0.88**       -0.501***       0.12       0.49*         -0.503       -0.32       -0.09       0.55*       0.42*         -0.66*       -2.28**       0.42*       0.42*         -0.52*       0.003       -3.19***       0.42*         -0.52*       0.03       -3.30       0.53         -0.52*       0.03       -2.03       0.66*         -0.52*       0.03       -2.03       0.61*		-0.164*		0.399***	-0.261*		0.438*
Panel B: GCC         -5.12***         0.22           3.71         -4.32*         0.26           -1.28         0.50***         -2.19         0.14           -1.62         0.56***         -2.19         0.14           -1.62         0.56***         -1.79         0.15           Credit Growth         -0.287         -1.85         0.21***           -3.992         -0.768         0.23           -0.85***         -0.06         0.32           -1.066         0.85***         0.06         0.32           -0.070         0.85***         -0.06         0.32           -0.070         0.85***         -0.06         0.32           -0.070         0.85***         -0.012         0.49*           -0.508         -0.12         0.49*           -0.503         -0.32         -0.09         0.55*           Credit Growth         -0.26*         -0.12         0.49*           -0.52*         0.03         -3.19***         0.42*           -0.85         0.63***         -0.232***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.03         -3.19***         0.42*		-0.183*		0.611***		-0.346*	0.361
GDP Growth Rate         -1.56         -5.12***         0.22           3.71         -4.32*         0.26           -1.28         0.50***         -2.19         0.14           -1.62         0.56***         -2.19         0.15           Credit Growth         -0.287         -1.85         0.218***           -0.879         0.85***         -0.068         0.32           -0.879         0.85***         -0.86         0.32           -0.66         0.85***         -0.895*         0.39           -0.508         -0.12         0.49*           -0.508         -0.12         0.49*           -0.503         -0.32         -0.09         0.55*           Credit Growth         -0.276**         -0.32         0.09         0.55*           Credit Growth         -0.276**         -0.32         0.09         0.55*           Credit Growth         -0.276**         -0.32         0.42*         0.42*           -0.66*         -3.20***         0.42*         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.039         -3.19*** </th <th></th> <th>1.24</th> <th>Panel B</th> <th>: GCC</th> <th>c 10444</th> <th></th> <th>0.00</th>		1.24	Panel B	: GCC	c 10444		0.00
-1.28       0.50***       -2.19       0.14         -1.28       0.56***       -2.19       0.14         -1.62       0.56***       -1.79       0.15         Credit Growth       -0.287       -1.85       0.218***         -3.992       -0.768       0.231***         -0.879       0.85***       -0.86       0.32         -1.066       0.85***       0.06       0.32         -0.770       0.88**       -0.86       0.39         -0.508       -0.12       0.49*         -0.770       0.88**       -0.501***       0.51**         -0.503       -0.32       -0.09       0.55*         Credit Growth       -0.276**       -0.282**       0.42*         -0.66*       -3.20***       0.42*       -3.20***         -0.66*       -0.232***       0.42*         -0.85       0.63***       -0.92       0.15         -0.61*       -0.232***       0.42*         -0.52*       0.03       -2.03       0.66         -0.52*       0.03       -2.03       0.66         -0.51*       -0.92       0.15       -3.19***         -0.12       0.33       -2.03       0.66	GDP Growth Rate	-1.36			-5.12***		0.22
-1.28       0.50***       -2.19       0.14         -1.62       0.56***       -1.79       0.15         Credit Growth       -0.287       -1.85       0.218***         -3.992       -0.768       0.32         -0.879       0.85***       -0.86       0.32         -1.066       0.85***       0.06       0.32         GDP Growth Rate       -0.734       -0.895*       0.39         -0.508       -0.12       0.49*         -0.503       -0.32       -0.12       0.49*         -0.503       -0.32       -0.09       0.55*         Credit Growth       -0.276**       -0.282**       0.77**         -0.66*       -0.282**       0.77**       0.42*         -0.50       -0.53       -0.232***       0.42*         -0.52*       0.003       -3.19***       0.42*         -0.52*       0.003       -3.19***       0.53         -0.12       -0.30       0.53       0.53         -0.52*       0.003       -3.19***       0.64*         -0.52*       0.003       -3.19***       0.53         -0.12       0.30       -2.03       0.53         -0.55*       0.03		3.71				-4.32*	0.26
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		-1.28	0.50***		-2.19		0.14
Credit Growth         -0.287         -1.85         0.218***           -3.992         -0.768         0.231***           -0.879         0.85***         -0.86         0.32           -1.066         0.85***         0.06         0.32           Credit Growth Rate         -0.734         -0.895*         0.06         0.32           -0.070         0.88**         -0.895*         0.06         0.32           -0.508         -0.12         0.49*         0.51**         0.51**           -0.503         -0.32         -0.09         0.55*           Credit Growth         -0.276**         -0.282**         0.77**           -0.66*         -3.20***         0.42*         0.42*           -0.85         0.63***         -0.232***         0.81***           -0.65*         0.63***         -0.232***         0.42*           -0.85         0.63***         -0.232***         0.42*           -0.85         0.63***         -0.230         0.65           -0.142         -3.30         0.53         0.53           -0.15         0.03         -2.03         0.06           -0.15*         0.03         -2.03         0.61*           -0.15*		-1.62	0.56***			-1.79	0.15
-3.992 -0.768 0.231*** -0.879 0.85*** -0.86 0.32 -1.066 0.85*** 0.06 0.32 <b>GDP Growth Rate</b> -0.734 -0.895* 0.39 -0.508 -0.12 0.49* -0.70 0.88** -0.501*** 0.51** -0.503 -0.32 -0.09 0.55* -0.50* -0.282** 0.77** -0.66* -3.20*** 0.42* -0.66* -3.20*** 0.42* -0.85 0.63*** -0.232*** 0.81*** -0.52* 0.003 -3.19*** 0.81*** -0.142 -3.30 0.53 -0.751 0.03 -2.03 0.65 -0.142 -3.30 0.53 -0.751 0.03 -2.03 0.65 -0.142 -3.30 0.53 -0.751 0.03 -2.03 0.65 -0.15* 0.039 -4.38 0.61* -1.23* -1.92 0.53 -5.66 0.96*** -1.33** 0.34 -1.23* -1.92 0.53	Credit Growth	-0.287			-1.85		0.218***
$\begin{array}{c c c c c c c c } & 0.85^{***} & -0.86 & 0.32 \\ \hline & -1.066 & 0.85^{***} & 0.06 & 0.32 \\ \hline & & & & & & & & & & & & & & & & & &$		-3.992				-0.768	0.231***
-1.066       0.85***       0.06       0.32         CDP Growth Rate       -0.734       -0.895*       0.39         -0.508       -0.12       0.49*         -0.770       0.88**       -0.501***       0.51**         -0.503       -0.32       -0.09       0.55*         -0.503       -0.32       -0.09       0.55*         -0.66*       -0.282**       0.077**         -0.85       0.63***       -0.232***       0.81***         -0.66*       -3.20***       0.81***         -0.52*       0.003       -3.19***       0.42*         GDP Growth Rate       -0.735       -0.92       0.15         -0.142       -3.30       0.53       -0.53         -0.195*       0.039       -4.38       0.61*         -0.195*       0.039       -4.38       0.61*         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**		-0.879		0.85***	-0.86		0.32
Panel C: DOE           GDP Growth Rate $-0.734$ $-0.895^*$ $0.39$ $-0.508$ $-0.12$ $0.49^*$ $-0.770$ $0.88^{**}$ $-0.501^{***}$ $0.51^{**}$ $-0.503$ $-0.32$ $-0.09$ $0.55^*$ $-0.503$ $-0.32$ $-0.09$ $0.55^*$ $-0.66^*$ $-0.282^{**}$ $0.77^*$ $-0.66^*$ $-0.232^{***}$ $0.42^*$ $-0.66^*$ $-0.322^{***}$ $0.42^*$ $-0.65^*$ $0.63^{***}$ $-0.232^{***}$ $0.42^*$ $-0.85$ $0.63^{***}$ $-0.232^{***}$ $0.42^*$ $-0.52^*$ $0.003$ $-3.19^{***}$ $0.42^*$ $-0.52^*$ $0.003$ $-3.30^*$ $0.53^*$ $-0.142$ $-3.30$ $0.53^*$ $-0.92^*$ $0.66^*$ $-0.195^*$ $0.039$ $-4.38$ $0.61^*$ $-0.195^*$ $0.039^*$ $-4.38^*$ $0.61^*$ $-1.23^*$ $-1.92^*$ $0.53^*$ $-5.66^*$ $0.9$		-1.066		0.85***		0.06	0.32
Line         Line         Line         Line           -0.508         -0.12         0.49*           -0.70         0.88**         -0.501***         0.51**           -0.503         -0.32         -0.09         0.55*           Credit Growth         -0.276**         -0.282**         0.77**           -0.66*         -3.20***         0.42*           -0.65*         0.63***         -0.232***         0.81***           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.12         0.03         -3.19***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.142         -3.30         0.53         0.65           -0.155*         0.039         -4.38         0.61*           -0.195*         0.039         -4.38         0.61*           -1.23*         -1.92         0.53         0.54           -1.23*         -1.92         0.53         0.54           -2.55*         1.07***         -1.91***         0.34	GDP Growth Rate	-0.734	Panel C	: DOE	-0.895*		0.39
Image: Constant         Image: Con		-0 508				-0.12	0 49*
Credit Growth         -0.503         -0.32         -0.09         0.55*           -0.66*         -0.282**         0.77**         -0.42*         0.77**           -0.66*         -0.232***         0.42*         0.81***           -0.66*         -0.320***         0.81***           -0.66*         -0.232***         0.42*           -0.85         0.63***         -0.232***         0.81***           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.142         -0.15         -0.15         -0.15           -0.151         0.03         -2.03         0.06           -0.195*         0.039         -4.38         0.61*           -0.195*         0.039         -4.38         0.61*           -1.23*         -1.92         0.53           -5.66         0.96***         -1.3**         0.34           -2.55*         1.07***         -1.91***         1.45**		-0.770	0 88**		-0 501***	0.12	0.51**
Credit Growth         -0.276**         -0.282**         0.77**           -0.66*         -3.20***         0.42*           -0.85         0.63***         -0.232***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.003         -3.19***         0.42*           -0.52*         0.003         -3.19***         0.42*           GDP Growth Rate         -0.735         -0.02         0.15           -0.142         -3.30         0.53           -0.751         0.03         -2.03         0.06           -0.195*         0.039         -4.38         0.61*           -0.195*         0.039         -4.38         0.61*           -1.23*         -1.92         0.53         -1.92         0.53           -5.66         0.96***         -1.33**         0.34           -2.55*         1.07***         -1.91***         1.45**		-0.503	-0.32		0.001	-0.09	0.55*
-0.60*       -3.20***       0.42*         -0.85       0.63***       -0.232***       0.81***         -0.52*       0.003       -3.19***       0.42*         GDP Growth Rate       -0.735       -0.92       0.15         -0.142       -3.30       0.53         -0.751       0.03       -2.03       0.06         -0.195*       0.039       -4.38       0.61*         Credit Growth       -1.66       -4.92**       2.96**         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**	Credit Growth	-0 276**	0.52		-0 282**	0.07	0.55
-0.00       -0.20***       0.42         -0.85       0.63***       -0.232***       0.81***         -0.52*       0.003       -3.19***       0.42*         -0.52*       0.003       -3.19***       0.42*         GDP Growth Rate       -0.735       -0.92       0.15         -0.142       -3.30       0.53       -0.53         -0.751       0.03       -2.03       0.06         -0.195*       0.039       -4.38       0.61*         Credit Growth       -1.66       -4.92**       2.96**         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**		0.66*			-0.202	2 20***	0.42*
-0.53       0.03 + 40.232 + 40       0.03 + 40.232 + 40         -0.52*       0.003       -3.19***       0.42*         GDP Growth Rate       -0.735       -0.92       0.15         -0.142       -3.30       0.53         -0.751       0.03       -2.03       0.06         -0.195*       0.039       -4.38       0.61*         Credit Growth       -1.66       -4.92**       2.96**         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**		-0.00		0 62***	0 222***	-5.20	0.42
Panel D: RP       -0.32*       0.42*         GDP Growth Rate       -0.735       -0.92       0.15         -0.142       -3.30       0.53         -0.751       0.03       -2.03       0.06         -0.195*       0.039       -4.38       0.61*         Credit Growth       -1.66       -4.92**       2.96**         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**		-0.85		0.003	-0.232	2 10***	0.01**
GDP Growth Rate         -0.735         -0.92         0.15           -0.142         -3.30         0.53           -0.751         0.03         -2.03         0.06           -0.195*         0.039         -4.38         0.61*           Credit Growth         -1.66         -4.92**         2.96**           -1.23*         -1.92         0.53           -5.66         0.96***         -1.33**         0.34           -2.55*         1.07***         -1.91***         1.45**		-0.32*		0.005		-5.19	0.42
-0.142 -3.30 0.53 -0.751 0.03 -2.03 0.66 -0.195* 0.039 -4.38 0.61* -1.23* -1.92 0.53 -5.66 0.96*** -1.33** 0.34 -2.55* 1.07*** -1.91*** 1.45**	GDP Growth Rate	-0.735	Panel I	): KP	-0.92		0.15
-0.751       0.03       -2.03       0.06         -0.195*       0.039       -4.38       0.61*         Credit Growth       -1.66       -4.92**       2.96**         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**		-0.142				-3.30	0.53
-0.195*       0.039       -4.38       0.61*         Credit Growth       -1.66       -4.92**       2.96**         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**		-0.751	0.03		-2.03		0.06
Credit Growth       -1.66       -4.92**       2.96**         -1.23*       -1.92       0.53         -5.66       0.96***       -1.33**       0.34         -2.55*       1.07***       -1.91***       1.45**		-0.195*	0.039			-4.38	0.61*
-1.23*-1.920.53-5.660.96***-1.33**0.34-2.55*1.07***-1.91***1.45**	Credit Growth	-1.66			-4.92**		2.96**
-5.66 0.96*** -1.33** 0.34 -2.55* 1.07*** -1.91*** 1.45**		-1.23*				-1.92	0.53
-2.55* 1.07*** -1.91*** 1.45**		-5.66		0.96***	-1.33**		0.34
		-2.55*		1.07***		-1.91***	1.45**

Notes: We perform a standard linear regression to examine whether greater convergence in bank competition (proxied by the Lerner index) tends to give MENA countries an advantage in terms of economic growth and financial deepening controlling for growth persistence and regulatory and institutional environment. Empty cells occur when a particular variable is not included in the regression. Activity and entry restrictions are tested in separate models to control for multicollinearity. \*, \*\*, \*\*\* denote significance levels 10%, 5% and 1% respectively. Constant terms and country dummies are not reported.