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The Effects of Bank Regulation on Financial Development in the MENA Countries: The Supporting Role of Supervision

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Abstract

This study investigates the impact of bank regulation on financial development in MENA countries for the period 1995-2014. Restrictions on activity, foreign banks, and capital were used as proxies for bank regulation. Also, bank supervisory power, independence, private monitoring, and moral hazard were used as proxies for bank supervision. Liquid liabilities, private credit, and z-score were proxies for financial development. They consecutively represent the financial sector's size, activity, and stability. A positive and significant impact of bank regulation was observed on all measures of financial development. The most important contribution of the present study is that it gives evidence of an important supporting role of supervision on bank regulation to realize its desired impact on financial development. This final result is vital for the MENA countries since data analysis shows that financial sector reform concentrates more on regulation than supervision. Policymakers in the MENA countries need to focus more on bank supervision in their financial sector reform to realize the expected impact of bank regulation on financial development.

Keywords: Bank Regulation and Supervision, Financial Development, Financial Stability, Banking Reform, MENA Countries.

JEL Classification: B26, F65, G18.

1. Introduction

The global financial and economic crisis highlighted gaps and weaknesses in the current international financial architecture as well

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as national regulatory and supervisory systems. Recent financial crisis has renewed interest in identifying those financial reforms in bank regulation and supervision that promote financial sector development (size, activity, and stability). Policymakers can certainly make better decisions about financial sector reforms when they can recognize the likely effect of those decisions on financial sector development.

Banks play a vital role in the economy, as they influence economic growth, poverty, entrepreneurship, labor market conditions and the economic opportunities available to people (Al Samman and Azmeh, 2016; Azmeh et al., 2017; Demerguç-Kunt and Levine, 2010). Thus, examining the real effect of regulations and supervision on the financial sector is a very crucial subject of research. Previous empirical studies on the impact of regulations and supervision on financial development, provided mixed results and led to inconclusive implications (Barth et al., 2010; Laeven and Levine, 2009; Pasiouras et al., 2009; Klomp and De Haan, 2014; Chortareas et al., 2012; Lee and Hsieh, 2013, Azmeh, 2009, 2018a).

Differently from precedent studies, the present study concentrates on investigating the importance of bank supervision in the financial sector reform. In several countries (especially developing countries), policymakers pay more attention, in reforming financial sector, on bank regulation than on bank supervision. The present study attempts to examine the role of bank supervision in achieving the expected and desired impact of bank regulation on all measures of financial development (size, activity, stability).To this end, the present paper examines database compiled mainly from the World Bank, from fifteen Middle Eastern and North African (MENA) countries over the period 1995-2014.

The rest of the paper is organized as follows; Section two presents the review of the literature. Section three presents the data and methodology; section four discusses the main results. In section five, the conclusion.

2. The Literature Review

The regulatory and supervisory reform initiatives in most MENA countries began recently with the sponsorship of international organizations such as the World Bank and the International Monetary

Fund. Furthermore, the Basel Committee has provided a structural framework for these initiatives, with the intention of improving the efficiency of banks and reduces their risk-taking behavior. The MENA region is principally bank based, with limited development of equities and corporate bonds (OECD, 2009). For corporations in the MENA region, the level of long term debt as a percentage of total debt is extremely low, reportedly to be just 3.41% (Awartani et al., 2016).

The literature regarding the relationship between bank regulation and supervision and financial development is largely inconclusive. Two opposing views can explain these inconsistencies. First, the public interest view suggests that powerful regulation and supervision eliminate market failures and lead to a greater bank efficiency. Conversely, the private interest view suggests that they increase corruption and impedes banking efficiency (Barth et al., 2013).

There is mixed evidence on the impact of regulatory and supervisory policies on bank financial development. Capital regulation influences the performance of banks as it determines the minimum amount of capital that owners must have at risk. In fact, capital requirements spur bank`s owners to closely monitor banks, since they have a larger investment at stake. This argument is confirmed by several studies, which demonstrated that stringent capital requirements are associated with better bank performance and efficiency, less non-performing loans, and less capital and asset risk (Naceur and Kandil, 2009; Klomp and De Haan, 2014; Bitar et al., 2016). Furthermore, several studies showed evidence that the relationship between capital requirements and bank efficiency may differ, depending on the level of development of countries. It is positive for developed countries, while it is negative for less developed countries. In addition, in terms of bank efficiency, capital requirements are positively related to cost efficiency but negatively related to profit efficiency (Pasiouras et al., 2009).

Activity restrictions also may have important effects on financial development. Such restrictions may limit the ability of banks to take advantage of economies of scope and scale, and providing different types of banking services to their customers (Barth et al., 2000; Laeven and Levine, 2007). This argument implies a negative effect on bank efficiency, and is confirmed by several studies (Barth et al.,

2010; Haque and Brown, 2017; and Pasiouras et al., 2009). Furthermore, Klomp and De Haan (2014) found that activities restrictions reduce bank riskiness, but only when there is a high level of institutional quality. Sassi (2013) gives evidence that financial institutions that seem to be more open and more democratic are associated with small inefficiencies, whereas strong regulatory policy and more restrictions on banking activities decreased the level of efficiency of banks.

The Basel committee stresses the importance of supervisory independence and quality in promoting stable and well performing banking system. However, there is no consensus on the benefits of stronger supervision on financial development. Some studies argue that supervisors need important resources and power to prevent banks from taking excessive risks (Beck et al., 2006). Other studies argue that independent and better supervision fosters bank stability and efficiency (Barth et al., 2013). These two views were tested by several empirical studies. Advocates of better supervision concentrate on the important role of independence and experience of supervisors on financial development. By contrast, opponents argue that giving more power and independence to supervisors increases corruption. Supervisors are mainly interested in increasing their wealth (Djankov et al., 2002; Demirguc-Kunt and Detragiache, 2011; Azmeh, 2018b). Chortareas et al. (2012) found that strengthening official supervisory powers can improve the efficiency of banks` operations. Pasiouras et al. (2009) concluded that banking regulations that enhance supervisory power, have positive effect on both cost and profit efficiency of banks. Moreover, Haque and Brown (2017) showed that supervisory power exerts a positive influence but only on cost efficiency. Barth et al. (2013) suggested that it is effective in improving bank efficiency, just in countries with more independent regulators/supervisors.

Based on precedent literature, the present study aims at empirically testing the importance of bank supervision in financial development (size, activity, and stability). To the author`s knowledge, this is the first study to examine the supporting role of bank supervision in achieving the desired impact of regulations on financial development. In fact, the main question that this study aims to answer is: does bank

supervision play a supporting role for regulations to achieve their desired impact on financial development? The author has reasons to believe that regulations will not alone achieve the expected and desired impact of financial sector without better and effective supervision.

3. Materials and Methods

The study covers fifteen MENA countries for the period between 1995 and 2014. Countries covered by this study are: Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Yemen, and United Arab Kingdom.

World Bank governance indicators were used to capture each country's institutional and governance quality. Only one indicator from each governance area was chosen. The indicators are: voice and accountability, government effectiveness and rule of law. It seems that they are the most relevant indicators for banking regulation. The aggregate Z-score was used to measure banking stability. Data on banking regulation and supervision was taken from (Barth et al., 2013). Three variables were chosen to measure banking regulation and four to measure banking supervision. Measures for banking regulations are overall restrictions on banking activities, limitations on foreign bank entry/ownership, and Capital regulatory index. Moreover, measures for banking supervision are: official supervisory power, overall independence of supervisory authority, private monitoring index, and moral hazard.

Furthermore, to construct time series from the four surveys data provided by the World Bank, we followed (Houston et al., 2012) and assigned the data from the survey of 1998 to the period 1995-1999, the values from the 2002 survey to the period 2000-2004, the values from the 2006 survey to the period 2005-2009 and the values for the period 2010-2014 are taken from the survey published in 2011. All other financial and macroeconomic variables are compiled from the World Bank database (Inflation, Foreign banks, GDP per capita, Liquid Liabilities, Private credit, Bank concentration). Description of Statistics is presented in Table1.

The present study attempts to calculate the level of adjustment in regulation and supervision to explore if financial sector reform is more

concentrated on regulation or on supervision. It calculates the differences between the values of survey 2002 and 1998, 2008 and 2002, and 2011 and 2008 (three observations for each country). It repeats this for the seven measures of regulation and supervision (see table 2). To capture the level of adjustment (financial sector reform), the present study calculates the average for the three regulation`s variables and for the four supervision`s variables (without taking into consideration the sign of the difference, positive or negative). The main concern is the degree of adjustment (reform), not the direction. The value of the average for the three regulation`s variables is 1,145, which is bigger than the average for the four supervision`s variables (0.977). Furthermore, by calculating the number of observations with the value(0), the results show that only 39 zeros (no adjustment) over 89 observations from the three regulation`s variables, while there are 53 zeros over 108 from the four supervision`s variables. These final results give evidence that financial sector reform in the MENA countries is more concentrated on regulation than supervision.

Table 1: Descriptive Statistics

Variable	Mean	Minimum	Maximum	Std. Dev.
ACT_RESTRICT	7.71739	3.00000	10.0000	1.52724
LIMIT_FOREIGN	3.61792	1.00000	4.00000	0.870848
CAP_REG	6.91628	3.00000	10.0000	1.81285
SUP_POWER	11.9340	5.00000	15.0000	2.27684
SUP_IND_OVERALL	1.61538	0.000000	3.00000	0.837749
PRIVATE MONITORING	3.84941	2.00000	8.00000	0.858431
MORAL HAZARD	1.27083	0.000000	3.00000	1.05499
BANK CONCENTRATION	73.6074	39.3265	100.000	18.2486
FOREIGN BANKS	22.2368	0.000000	71.0000	20.8359
GDP PER CAPITA	12142.	481.780	62168.8	15468.4
LIQUID LIABILITIES	68.0935	8.22397	252.719	44.9885
PRIVATE CREDIT	39.3638	1.67978	96.1080	23.7610
INFLATION	6.32128	-4.86328	132.824	11.5715
RULE OF LAW	-0.0956380	-1.63346	1.04361	0.678734
BANK Z SCORE	19.5022	0.0864938	47.5146	9.22881
GOV_EFFECT	-0.118997	-1.55692	1.47720	0.642485

VOICE&ACCOUNT	-0.964231	-1.88332	0.157888	0.452605

Table 2: Degree of Adjustment in the Level of Regulation and Supervision (Measured by the Differences in the Value of the Four Questionnaires 1998, 2002, 2006 and 2011)

Name	act_restrict	Limit_foreign_bank	cap_reg	Sup_Pow	Sup_Ind	PrivateMonit	MoralHaz
Algeria		0		0			-1
Algeria	1	0	4.6	-3		-2	1
Algeria							
Bahrain	0	0	3	0.5		0	0
Bahrain	0	0	1	-2	1	0	0
Bahrain	-2	0	1	-1.5	1	0	0
Egypt	-3	0	0	3	0	0	
Egypt	0	0	0	-1	-1	-1	
Egypt	1	0	5	-3	0	0	
Jordan	-2	0	0	6	0	0	
Jordan	2	0	-1	-4.3	-2	-1	-2
Jordan	2	-1	2	4.3	1	1	1
Kuwait	-2	0	1	-1	0	0	
Kuwait	3	0	1	0	0	0	
Kuwait	-4	-2	1	1	1	0	
Lebanon	-1	0	1	-2	0	0	1
Lebanon	1	-1	0	0	0	0	0
Lebanon	-2	1	0	-3		0	-1
Morocco	-3	0	-1	1.4	0	0	2
Morocco	2	0	-2	-0.4	0	-1	0
Morocco	-1	0	4	-6.6	0	0	-1
Oman	-1		0	1.5		0	0
Oman	-1	0	0	-2.5	-1	-2	0
Oman	0	-3	2	1		1	0
Qatar	-5		4		0	0	
Qatar					0	0	
Qatar	5		5	-5	0	0	
Saudi Arabia	0	0	0	0	-1	0	
Saudi Arabia	1	0	1	-1	1	0	
Saudi Arabia							
Sudan							

Name	act_restrict	Limit_foreign_bank	cap_reg	Sup_Pow	Sup_Ind	PrivateMonit	MoralHaz
Sudan					-2		
Sudan							
Syrian Arab Republic	0	0				0	
Syrian Arab Republic	0.5	-0.3		1.3		0	
Syrian Arab Republic	1	1		-8		0	
Tunisia		0		-1		-0.6	
Tunisia		0			1	0.6	
Tunisia	1	0	-2	-4	0	0.3	
Yemen							
Yemen							
Yemen							
United Arab Emirates		0				0	
United Arab Emirates		0				0	
United Arab Emirates	4	-1	1	-5	-2	0	

The Model

Cross-sectional OLS regressions

We use Cross sectional (OLS) method to estimate the following equation:

$$\mathbf{Y_i = \alpha + \beta F_i + \gamma X_i + \mu_i,}$$

where:

Y_i: is the variable that represents financial development (size, activity, efficiency, and stability),

F_i: is the matrix of variables that represents the level banking regulation and supervision,

X_i: is the matrix of control variables and μi is the error term.

α: is the constant,

β: is the vector of coefficients of the degree of banking regulation and supervision and,

γ : is the vector of coefficients on the control variables

Hence the model takes the following form:

Llyi = α + β Banking Regulation & Supervision i + γ Institutional i + δ Foreign banks i + δ log (Inf) i + ε log (GDP) i + η concentration i + μ i

(1)

$$Privi = \alpha + \beta \text{ Banking Regulation \& Supervision } i + \gamma \text{ Institutional } i + \delta \text{ Foreign banks } i + \delta \log(Inf)\, i + \varepsilon \log(GDP)\, i + \eta \text{ concentration } i + \mu\, i$$

(2)

$$\text{Z-Score } i = \alpha + \beta \text{ Banking Regulation \& Supervision } i + \gamma \text{ Institutional } i + \delta \text{ Foreign banks } i + \delta \log(Inf)\, i + \varepsilon \log(GDP)\, i + \eta \text{ concentration } i + \mu\, i$$

(3)

In each model, and for each financial development variable, to capture the mutual effect of banking regulation and supervision, we apply the model three times. First, we only integrate banking regulation variables to examine the impact of regulation on financial development without taking into consideration the level of supervision. Secondly, we only integrate banking supervision to examine the impact of supervision on financial development without taking into consideration the impact of regulation. Thirdly, we integrate all measures of banking regulation and supervision to examine their mutual effects on financial development. Results are presented in tables 3 and 4.

Table 3: Mutual Effect of Regulation and Supervision on the Size and Activity of the Financial Sector (Cross-Sectional OLS Model)

	Liquid Liabilities	Liquid Liabilities	Liquid Liabilities	Private Credit	Private Credit	Private Credit
MODEL		**1**			**2**	
REGRESSIONS	**1**	**2**	**3**	**1**	**2**	**3**
CONSNT	158.864 (48.6276)***	280.561 (80.0891)***	969.958 (79.662) ***	91.2449 (23.255)	221.167 (36.5106)***	512.434 (50.3294) ***
ACT_RESTRICT	1.05889 (2.11613)		−12.382 (2.42026) ***	0.524189 (1.01199)		−5.54906 (1.52909) ***
LIMIT_FOREIGN	−1.21215 (4.85589)		−133.888 (12.4061) ***	−0.00865594 (2.32221)		−53.8063 (7.83802) ***
CAP_REG	−0.460863 (1.78903)		−17.0957 (3.67898) ***	2.38754 (0.855562)		−9.828 (2.32433) ***
SUP_POWER		1.83353 (3.4351)	−13.4399 (2.84811) ***		0.236017 (1.56598)	22126.96056 (1.7994) ***
SUP_IND_OVERALL		34.3593 (10.0403)***	7.8954 (5.9321)		16.4753 (1.56598)***	8.79025 (3.74782) **
PRIVATE MONITORING		−24.8984 (13.0136)*	4.55299 (8.55393)		−15.0299 (5.93259)**	0.230092 (5.40426)

	Liquid Liabilities	Liquid Liabilities	Liquid Liabilities	Private Credit	Private Credit	Private Credit
MODEL		**1**			**2**	
REGRESSIONS	**1**	**2**	**3**	**1**	**2**	**3**
MORAL HAZARD		−25.188	7.79964		−10.3035	0.670203
		(9.20977)***	(5.94621)		(4.1985)**	(3.75674)
BANK CONCENTRATION	−0.182845	−0.587775	1.24688	−0.118837	−0.296556	0.429192
	(0.176995)	(0.570769)	(0.332757) ***	(0.0846437)	(0.260199)	(0.210232) **
FOREIGN BANKS	0.385707	0.928736	−0.208143	0.103336	0.491558	0.0119628
	(0.176995)***	(0.314413)***	(0.218052)	(0.0714374)	(0.143333)**	(0.137762)
INFLATION	−0.279638	0.14201	0.559502	−0.37167	−0.368304	−0.101719
	(0.949636)	(1.65395)	(0.841307)	(0.45414)	(0.753995)	(0.531527)
RULE OF LAW	7.54922	−53.4746	−42.9013	15.2192	−16.9106	−4.99192
	(0.949636)	(36.1731)	(19.7128) **	(5.97157)	(16.4904)	(12.4543)
GOV_EFFECT	−8.90119	40.1466	48.9588	14.4445	49.2122	38.7935
	(14.0693)	(42.7664)	(25.536) *	(5.97157)	(19.4962)**	(16.1333) **
VOICE&ACCOUNT	44.121	89.6723	68.5633	14.5926	22.2815	8.72543
	(14.0693)***	(42.7664)***	(15.8232) ***	(4.13132)	(12.327)*	(9.9969)
LOG GDP PER CAPITA	−5.38227	−7.21789	−7.1118	−5.3408	−12.4321	−11.4511
	(14.0693)	(42.7664)	(4.30494)	(1.71237)	(3.62435)***	(2.71981) ***
OBSERVATIONS	125	55	55	125	55	55
ADJ R-SQUARED	0.254001	0.586480	0.894786	0.505856	0.741960	0.873901

Note: Standard errors are in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%.

Table 4: Mutual Effect of Regulation and Supervision on the Stability of the Financial Sector (Cross-Sectional OLS Model)

	Bank Z score	Bank Z score	Bank Z score
MODEL		**3**	
REGRESSIONS	**1**	**2**	**3**
CONSNT	43.1176	134.41	192.131
	(12.0654)***	(13.652)	(18.9106) ***
ACT_RESTRICT	1.38804		2.44089
	(0.518899)***		(0.598436) ***
LIMIT_FOREIGN	-1.23351		−12.5379
	(1.21421)		(3.06593) ***
CAP_REG	-0.626281		−2.26133
	(0.445354)		(0.886388) **
SUP_POWER		-1.34845	−4.12796
		(0.640484)	(0.695917) ***
SUP_IND_OVERALL		-0.66767	−3.39394
		(1.74625)	(1.35548) **
PRIVATE MONITORING		-1.00517	4.88883
		(2.42406)	(2.10618) **
MORAL HAZARD		-1.04018	5.31426
		(1.61893)	(1.41604) ***

	Bank Z score	Bank Z score	Bank Z score
MODEL		**3**	
REGRESSIONS	**1**	**2**	**3**
BANK CONCENTRATION	0.102971	-0.223346	−0.0432063
	(0.0441542)**	(0.0975147)	(0.0782763)
FOREIGN BANKS	-0.0328321	0.122135	−0.115894
	(0.0365337)	(0.0585622)	(0.0536382) **
INFLATION	-0.0621037	0.147492	0.15165
	(0.2368)	(0.308377)	(0.208048)
RULE OF LAW	-4.54396	7.01773	7.25539
	(3.1086)	(6.71868)	(4.81662)
GOV_EFFECT	5.6024	-2.01566	10.3616
	(3.50055)	(7.94353)	(6.26122)
VOICE&ACCOUNT	10.0606	6.23523	−3.1267
	(2.15582)***	(4.90698)	(3.72953)
LOG GDP PER CAPITA	-2.61792	-8.22707	−10.4587
	(0.891862)***	(1.42689)	(1.03614) ***
OBSERVATIONS	128	57	57
ADJ R-SQUARED	0.259969	0.762783	0.893582

Note: Standard errors are in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%.

4. Results and Discussion

4.1 Cross Sectional Regressions

4.1.1 Impact of Banking Regulation and Supervision on the Size of the Financial Sector (Liquid Liabilities)

For the first model in table 2, three regressions were estimated. The dependent variable is Liquid Liabilities as a percentage of GDP. In the first regression, only measures on banking regulation are integrated, while measures on banking supervision are excluded from the model. Results from table 2 (model 1), show no impact of banking regulation on the size of the financial sector. All three measures of banking regulations are not statistically significant. In the second regression, only measures on banking supervision are integrated. Measures on banking regulation are excluded from the model. Results show a statistically significant impact of three of the four banking supervision measures. Two out of the four measures have negative sign. This means that banking supervision has negative and significant impact on the size of the financial sector. The only exception is the level of supervisory independence, which has positive and significant impact on the size of financial sector. In the third regression, all

measures on banking regulation and supervision are included in the model to examine the mutual impact of regulation and supervision and financial development (size of the financial sector). Results show a negative and significant impact of all measures of banking regulation on the size of the financial sector. This means that tighter regulation is negatively associated with financial development (size). Only one of the banking supervision measures (supervisory power) shows negative and significant impact on financial development (the size). The results provide evidence of a supporting role of bank supervision in financial development. In fact, banking regulation will have significant impact on the size of the financial sector only after taking supervision into consideration. Adjusted R-Square equals 0.89 in the third regression. This means that 89% of response of the dependent variable variation is explained by control variables. It was only (25%, and 58%, respectively) in the first and second regressions.

4.1.2 Impact of Banking Regulation and Supervision on the Activity of the Financial Sector (Private Credit as a Percentage of GDP)

For the second model in table 2, three regressions were estimated. The dependent variable is Private credit as a percentage of GDP. Similarly to the first model, in the first regression, we only examine the impact of banking regulation on financial development (activity). Measures on banking supervision are excluded from the model. Results from table 2 (model 2), show no impact of banking regulation on the activity of the financial sector. All three measures of banking regulations are not statistically significant. In the second regression, only measures on banking supervision are integrated. Results show a statistically significant impact of three of the four banking supervision measures. Two of them have negative sign. This means that banking supervision has negative and significant impact on the activity of the financial sector. The only exception is the level of supervisory independence, which has positive and significant impact on the activity of the financial sector. In the third regression, all measures on banking regulation and supervision are included in the model to examine the mutual impact of regulation and supervision and financial development (size of the financial sector). Results show a negative and significant impact of all measures of banking regulation on the

size of the financial sector. This means that tighter regulation is negatively associated with financial development (activity). Only one of the banking supervision measures (supervisory power) shows negative and significant impact on financial development (the activity). The results present an evidence of a supporting role of bank supervision in financial development. In effect, banking regulation will have significant impact on the activity of the financial sector only when supervision is taken into consideration. Adjusted R-Square equals 0.87 in the third regression. This means that 87% of response of the dependent variable variation is explained by control variables. It was only (50%, and 74%, respectively) in the first and second regressions.

4.1.3 Impact of Banking Regulation and Supervision on the Stability of the Financial Sector (Z-Score)

For the third model in table 3, as in the first two models, three regressions were estimated. The dependent variable is Z-Score. Higher aggregate Z-score values indicate a more stable banking system. Similarly to the two previous models, in the first regression, we only examine the impact of banking regulation on financial development (stability). Measures on banking supervision are excluded from the model. Results from table 3 (model 3), show no real impact of banking regulation on the stability of the financial sector. Only activity restrictions have positive and significant impact on financial stability. In the second regression, only measures on banking supervision are integrated. Results show no significant impact of all four measures of banking supervision. This means that banking supervision, alone, has no impact on the stability of the financial sector. In the third regression, all measures on banking regulation and supervision are included in the model to examine the mutual impact of regulation and supervision and financial development (stability of the financial sector). Results show significant impact of all measures of banking regulation on the stability of the financial sector. Tighter regulation on activity restrictions is positively associated with financial development (stability), while tighter regulations on entry of foreign banks and on capital are negatively associated with the stability of financial sector. Furthermore, two of the banking

supervision measures (supervisory power and independence) show positive and significant impact on the stability of the financial sector. In addition, private monitoring and moral hazard show negative and significant impact of the stability of the financial sector. The results provide an evidence of a supporting role of bank supervision in financial development. In fact, banking regulation will have significant impact on the stability of the financial sector, only after taking supervision into consideration. Adjusted R-Square equals 0.89 in the third regression. This means that 89% of response of the dependent variable variation is explained by control variables. It was only (25%, and 76%, respectively) in the first and second regressions.

4.2 GMM Panel Regressions

A concern with cross-sectional regressions is that the relationship of interest may by disturbed by omitted country characteristics. Furthermore, the numbers of observations in some of the OLS regressions are rather low. To approximate the samples by a normal distribution, sample size needs to be bigger. Moreover, the right-hand side variables are potentially endogenous, which could further bias the results. To address these issues, we estimate the model using GMM estimator. Results of the GMM model regressions are presented in Tables 5 and 6.

Table 5: Mutual Effect of Regulation and Supervision on the Size and Activity of the Financial Sector (GMM panel estimation)

	Liquid Liabilities					Private Credit				
MODEL	**1**					**2**				
REGRESSIONS	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
ACT_RESTRICT	9.396			9.952	23.711	6.431			5.637	18.016
	(1.986)***			(2.611)***	(9.926)**	(1.117)***			(1.367)***	(9.029)*
LIMIT_FOREIGN		11.501		1.625	86.260		5.575		2.203	55.352
		(5.148)**		(6.658)	(16.825)***		(3.175)*		(3.486)	(15.304)***
CAP_REG			0.942	-2.519	28.434			2.497	1.687	13.726
			(2.472)	(3.073)	(6.457)***			(1.466)*	(1.609)	(5.874)**
SUP_POWER					13.400					5.010
					(5.729)**					(5.211)**
SUP_IND_OVER ALL					5.363					0.669
					(28.896)					(26.285)
PRIVATE MONITORING					-54.663					-22.206
					(21.480)**					(19.539)
MORAL HAZARD					6.898					9.571
					(34.555)					(31.433)
BANK CONCENT	0.486	0.401	0.415	0.555	-0.298	0.200	0.139	0.098	0.170	-0.209
	(0.206)**	(0.199)**	(0.232)*	(0.225)**	(1.046)***	(0.116)*	(0.123)	(0.137)	(0.117)	(0.951)

	Liquid Liabilities					Private Credit				
MODEL	**1**					**2**				
REGRESSIONS	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
FOREIGN BANKS	0.581 (0.156)***	0.630 (0.168)***	0.687 (0.171)***	0.616 (0.183)***	1.276 (0.662)*	0.266 (0.088)***	0.266 (0.103)**	0.318 (0.101)***	0.182 (0.096)*	0.523 (0.602)*
INFLATION	0.238 (1.968)	1.382 (2.037)	2.442 (2.299)	0.510 (2.361)	-3.137 (2.073)	0.888 (1.108)	2.053 (1.256)	1.824 (1.363)	0.249 (1.236)	-1.557 (1.885)
RULE OF LAW	24.285 (16.797)	29.986 (18.046)	17.650 (18.897)	22.941 (20.694)	-18.20 (39.795)	18.396 (9.453)*	14.427 (11.129)	18.332 (11.206)	20.633 (10.835)*	-8.938 (36.199)
GOV_EFFECT	-35.833 (19.913)*	-31.648 (20.133)	-26.220 (21.908)	-36.019 (22.378)	212.758 (97.409)**	-2.479 (11.207)	12.008 (12.416)	-0.261 (12.992)	1.127 (11.717)	165.526 (88.607)*
VOICE& ACCOUNT	43.158 (11.789)***	25.413 (10.930)**	25.069 (13.070)*	47.544 (14.428)***	11.189 (69.027)	27.284 (6.635)***	13.057 (6.741)*	12.961 (7.751)*	22.207 (7.554)***	-34.433 (62.789)
LOG GDP PER CAPITA	-2.252 (2.485)	-1.011 (2.888)	2.402 (2.844)	-1.798 (3.743)	-77.72 (27.043)***	-0.706 (1.399)	1.092 (1.781)	1.528 (1.686)	-1.916 (1.960)	-52.195 (24.599)**
OBSERVATIONS	93	96	93	90	42	93	96	93	90	42
ADJ R-SQUARED	0.167	0.117	0.0091	0.140	0.848	0.332	0.149	0.118	0.405	0.636

Note: Standard errors are in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%.

Table 5: Mutual Effect of Regulation and Supervision on the Stability of the Financial Sector (GMM Panel Estimation)

	Bank Z score				
MODEL				**1**	
REGRESSIONS	**1**	**2**	**3**	**4**	**5**
ACT_RESTRICT	3.273 (0.51)***			3.942 (0.650)***	12.301 (5.004)**
LIMIT_FOREIGN		3.721 (1.449)**		-0.822 (1.663)	28.419 (7.475)***
CAP_REG			-0.229 (0.697)	-1.899 (0.764)**	7.702 (2.956)**
SUP_POWER					0.681 (2.806)
SUP_IND_OVERALL					-11.411 (12.042)
PRIVATE MONITORING					-2.037 (10.615)
MORAL HAZARD					13.020 (34.55)
BANK CONCENT	0.280 (0.052)***	0.247 (0.056)***	0.268 (0.065)***	0.331 (0.056)***	-0.177 (0.401)
FOREIGN BANKS	-0.031 (0.039)	-0.006 (0.047)	0.013 (0.047)***	0.007 (0.045)	-0.002 (0.320)
INFLATION	-0.394 (0.498)	0.128 (0.568)	0.583 (0.649)	0.104 (0.588)	-0.381 (1.016)
RULE OF LAW	-4.726 (4.270)	-2.918 (5.055)	-8.390 (5.341)	-8.178 (5.159)	-3.742 (19.188)
GOV_EFFECT	2.998 (5.077)	4.071 (5.660)	7.627 (6.201)	4.079 (5.585)	87.303 (46.298)*
VOICE&ACCOUNT	10.601 (3.014)***	5.045 (3.084)	5.248 (3.702)	14.486 (3.599)***	-28.411 (34.688)

	Bank Z score				
MODEL				**1**	
REGRESSIONS	**1**	**2**	**3**	**4**	**5**
LOG GDP PER CAPITA	-1.504 (0.635)**	-0.958 (0.814)	0.441 (0.805)	-0.598 (0.934)	-30.372 (13.534)**
OBSERVATIONS	94	97	94	91	43
ADJ R-SQUARED	0.290	0.080	-0.037	0.292	0.507

Note: Standard errors are in brackets. * Significant at 10%, ** significant at 5%, and *** significant at 1%.

In all specifications of the GMM model estimator, results in tables 5 and 6 contradict with previous results of the OLS model. All three measures of bank regulation have positive and significant impact on the size, activity, and stability of the financial sector. By contrast, results of the GMM model, confirms previous results and give evidence of a supporting role of bank supervision. In fact, integrating measures of bank supervision in the model (in regressions no. 5) has increased the importance and significance of bank regulation coefficients. While, values of coefficients of bank regulation were either negative or not significant in the first four regressions in the 3 models (without controlling for bank supervision), they are positive and significant after controlling for bank supervision in regressions 5. Even when values were positive and significant without controlling for bank supervision, they are considerably higher in terms of importance and significance when controlling for bank supervision.

5. Conclusions

In this study, we developed a model to examine the impact of bank regulation on financial development for a sample of fifteen MENA countries during the period 1995-2014. Results showed a positive and significant impact of all measures of banking regulation on the size, activity, stability of the financial sector. Our results supported the public interest view, which suggest that powerful regulation and supervision are likely to lead greater bank efficiency and financial development. These results confirm the findings of Naceur and Kandil, 2009; Klomp and De Haan, 2014; Bitar et al., 2016. They demonstrate that stringent capital requirements are associated with better bank performance and efficiency. By contrast, they are in

contradiction with other studies, which proclaim that activity restrictions may limit the ability of banks to take advantage of economies of scope and scale, which implies negative effect on bank efficiency and financial development (Barth et al., 2010; Haque and Brown, 2017; and Pasiouras et al., 2009). Furthermore, the present study gives evidence of an important supporting role of bank supervision in financial development. In fact, results show that impact of bank regulation on financial development is considerably more important and significant when controlling for bank supervision.

By calculating the level of adjustment in regulation and supervision from the four surveys (1998, 2002, 2008, 2011), results show that the level of adjustment in regulation is higher than in supervision. Hence, financial sector reform in the MENA countries is more concentrated on bank regulation than on bank supervision. Policy makers in the MENA countries need to focus on bank supervision in their financial sector`s reform plan to achieve the desired and expected impact of regulations on financial development. Bank regulations will not have effective impact on financial development without the supporting role of bank supervision.

References

Al Samman, H., & Azmeh, C. (2016). The Effect of Financial Liberalization through the General Agreement on Trade and Services on Economic Growth in Developing Countries. *International Journal of Economics and Financial Issues*, *6*(3), 855-860.

Awartani, B., Belkhir, M., Boubaker, S., & Maghyereh, A. (2016). Corporate Debt Maturity in the MENA Region: Does Institutional Quality Matter? *International Review of Financial Analysis*, *46*, 309-325.

Azmeh, C. (2018). Foreign Bank Entry and Financial Development: New Evidence on the Cherry Picking and Foreign Bank's Informational Disadvantage Phenomena in the MENA Countries. *Cogent Economics & Finance*, Retrieved from

https://www.tandfonline.com/doi/pdf/10.1080/23322039.2018.1452343.

Azmeh, C. (2009). *The Role of Liberalization of Trade in Services in Economic Development: the case of Financial Services* (Doctoral Dissertation, Université Panthéon-Sorbonne-Paris I, France). Retrieved from https://tel.archives-ouvertes.fr/tel-00408079/document.

Azmeh, S. (2018b). Determinants of Financial Development in Syria, Lebanon and Jordan for the Period 1995-2014. *Tishreen University Journal for Research and Scientific Studies, Economic and Legal Sciences Series, 40*(1), 87-100.

Azmeh, C., Al Samman, H., & Mouselli, S. (2017) The Impact of Financial Liberalization on Economic Growth: The Indirect Link. *International Business Management, 11*(6), 1289-1297.

Barth, J. R., Caprio, G., & Levine, R. (2000). *Banking Systems around the Globe: Do Regulation and Ownership Affect Performance and Stability?* Retrieved from https://www.nber.org/chapters/c10757.pdf.

Barth, J. R., Caprio Jr, G., & Levine, R. (2013). Bank Regulation and Supervision in 180 Countries from 1999 to 2011. *Journal of Financial Economic Policy*, *5*(2), 111-219.

Barth, J. R., Lin, C., Seade, J., & Song, F. M. (2010). Do Bank Regulation, Supervision and Monitoring Enhance or Impede Bank Efficiency? *Social Science Research Network,* Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1579352

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2006). Bank Concentration, Competition, and Crises: First Results. *Journal of Banking & Finance, 30*(5), 1581-1603.

Bitar, M., Saad, W., & Benlemlih, M. (2016). Bank Risk and Performance in the MENA Rregion: The Importance of Capital Requirements. *Economic Systems*, *40*(3), 398-421.

Chortareas, G. E., Girardone, C., & Ventouri, A. (2012). Bank Supervision, Regulation, and Efficiency: Evidence from the European Union. *Journal of Financial Stability*, *8*(4), 292-302.

Demirgüç-Kunt, A., & Detragiache, E. (2011). Basel Core Principles and Bank Soundness: Does Compliance Matter? *Journal of Financial Stability*, *7*(4), 179-190.

Demerguç-Kunt, A., & Levine, R. (2010). Finance and Inequality: Theory and Evidence. *Annual Review of Financial Economics, Annual Reviews*, *1*(1), 287-318.

Haque, F., & Brown, K. (2017). Bank Ownership, Regulation and Efficiency: Perspectives from the Middle East and North Africa (MENA) Region. *International Review of Economics & Finance*, *47*, 273-293.

Houston, J. F., Lin, C., & Ma, Y. (2012). Regulatory Arbitrage and International Bank Flows. *The Journal of Finance*, *67*(5), 1845-1895.

Klomp, J., & De Haan, J. (2014). Bank Regulation, the Quality of Institutions, and Banking Risk in Emerging and Developing Countries: An Empirical Analysis. *Emerging Markets Finance and Trade*, *50*(6), 19-40.

Laeven, L., & Levine, R. (2007). Is There a Diversification Discount in Financial Conglomerates? *Journal of Financial Economics*, *85*(2), 331-367.

Lee, C. C., & Hsieh, M. F. (2013). The Impact of Bank Capital on Profitability and Risk in Asian Banking. *Journal of International Money and Finance*, *32*, 251-281.

Naceur, S. B., & Kandil, M. (2009). The Impact of Capital Requirements on Banks' Cost of Intermediation and Performance: The Case of Egypt. *Journal of Economics and Business*, *61*(1), 70-89.

OECD. (2009). *Policy Brief on Improving Corporate Governance of*

Banks in the Middle East and North Africa. Retrieved from https://www.oecd.org/corporate/ca/corporategovernanceprinciples/44372710.pdf.

Pasiouras, F., Tanna, S., & Zopounidis, C. (2009). The Impact of Banking Regulations on Banks' Cost and Profit Efficiency: Cross-Country Evidence. *International Review of Financial Analysis*, *18*(5), 294-302.

Sassi, H. (2013). The Impact of Bank Regulations and Institutions on Efficiency in Selected MENA Banks. *International Journal of Economics and Finance, 5*(8), 84-100.