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**NEW EVIDENCE ON ISLAMIC AND
CONVENTIONAL BANK EFFICIENCY: A
META-REGRESSION ANALYSIS**

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AIMS OF THE STUDY

- 1- To check whether Islamic Banks (IB) are more or less efficient than Conventional Banks (CB) based on ***meta analysis*** (*a regression of regression estimates*)
- 2- We employ rigorous statistical techniques to summarize and explain the discrepancy in the research results and conclusions
- 3- To check whether there is any commitment for ruling some researchers perceptions on the topic, the **“potential publication selection bias”**?

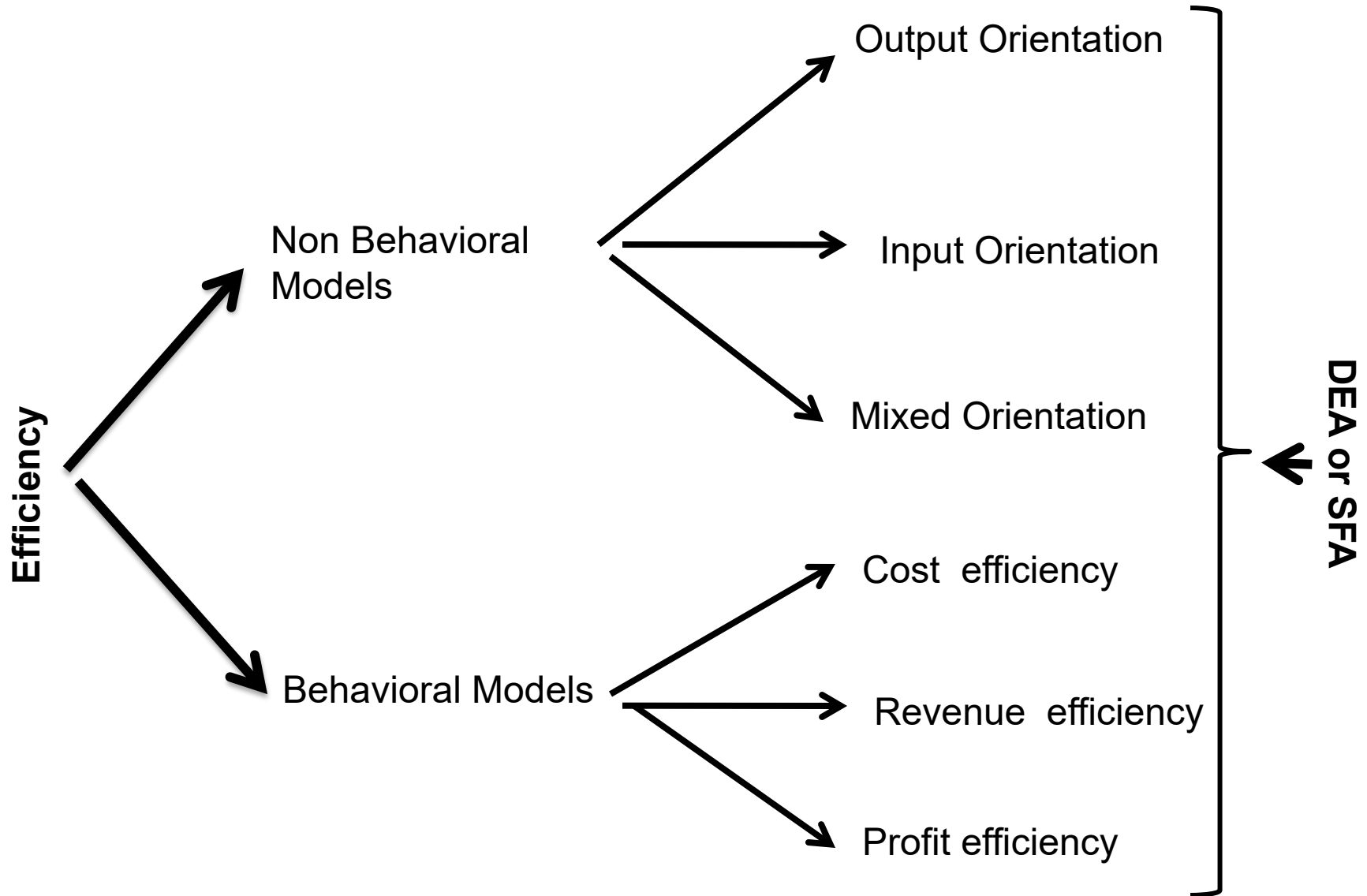
Meta analysis and its use in Banking

- Is restricted to US banks and for a former period 1977-1997, Irsova and Havranek (2010), 32 studies
- Aiello and Bonnano (2016), (2018), 120 papers published over the period 2000-2014
- All these studies focus on the explanation of the heterogeneity of the results linked to (methodology, definition of the inputs/outputs, sample side and data structure...)
- The impact of ownership structure **is not studied**

Efficiency measurement in banking

- Non Behavioral Frontier Models
 - X-efficiency → (Technical efficiency)
- Behavioral Frontier Models
 - Cost minimization, → (Cost efficiency)
 - Revenue maximization → (Revenue efficiency)
 - Profit maximization → (Profit efficiency)

Efficiency measurement in banking, Cont'd



Data collection

- Published studies which compare IB and CB efficiency, until september 2019, based on surveying papers, Abedifar et al. (2015), Hassan and Aliyu (2018) and Narayan and Phan (2019) & additional sources, Sciencedirect, Econlit and Springer
- Those who report estimates of efficiency for the two bank types
- Only 35 studies report efficiency scores by ownership
- Estimates are based on the estimation of a **common frontier**
- The total number of observations used in our meta regression is equal to 484, among them 357 are coming from papers published in indexed journals.

Methodology and Model specification

- Efficiency determinants are divided into 4 groups
- Group 1, (Efficiency Measure Methodology, Parametric, Profit, Cost,..)
- Group 2, (Bank's characteristics, Inputs/outputs definition, off balance sheet, Risk control)
- Group 3, (Sample construction, Size, panel, Deflated data,..)
- Group 4, (Regional dimension, MENA, GCC, MENA & ASIA, One country ,..)

Methodology and Model specification, Cont'd

- Bayesian Model Averaging is used to deal with the model selection uncertainty
- Robustness checks (Estimation method, i.e. Fixed Effect) and (to the sensitivity to one important primary study, 11.6% of the sample)
- The meta regression equation selected by BMA is:

$$Eff_{ij} = f(\text{Islamic}_{ij}, \text{Parametric}_{ij}, \text{Cost}_{ij}, \text{Profit}_{ij}, \text{Meta}_{ij}, \text{Intermediation}_{ij}, \text{Off - balance sheet}_{ij}, \text{Risk_control}_{ij}, \text{Panel}_{ij}, \text{Size}_{ij}, \text{Deflated}_{ij}, \text{Iran}_{ij}, \text{SIR}_{ij}, \text{GCC}_{ij}, \text{MENA}_{ij}, \text{MENA \& ASIA}_{ij}, \text{GCC \& ASIA}_{ij}) + \varepsilon_{ij}, \quad (1)$$

$i = 1, 2, \dots, N_j$ observations, $j = 1, \dots, 35$ studies

Table 1: Characteristics of the primary studies

Study	Author(s)	Year	Studied Period	Number of collected estimates	Efficiency Measure	Region or Country(ies)	# obs (IB/CB)	Average efficiency	
								IB	CB
1	AlJarrah & Molyneux	2006	1992-2000	9	SFA(C)	BH, EG, JO, SA(#3)	(11/30)	0.982	0.944
2	Ariss	2007	1998-2003	6	SFA(C)	GCC(#3)	(7/66)	0.883	0.755
3	Al-Muharrami	2008	1993-2002	10	DEA(I)	GCC(#6)	(7/45)	0.888	0.881
4	Bader	2008	1992-2005	28	DEA(C,P,R)	Africa, Mena, Asia(#21)	(43/37)	0.857	0.887
5	Hassan et al.	2009	1990-2005	2	DEA(C,P)	Mena(#11)	(22/18)	0.879	0.867
6	Johmes et al. (a)	2009	2004-2007	4	DEA(O)	GCC(#6)	(19/50)	0.872	0.911
7	Abdul-Majid et al.(a)	2010	1996-2002	7	Dist.(SFA)	GCC&Asia(#10)	(23/88)	0.706	0.859
8	Srairi	2010	1999-2007	2	SFA(C, P)	GCC (#6)	(23/48)	0.567	0.681
9	Abdul-Majid et al.(b)	2011	1996-2002	1	SFA(C)	MY(#1)	(6/19)	0.669	0.826
10	Assaf et al.	2011	1999-2007	9	DEA(O)	SA(#1)	(6/3)	0.874	0.939
11	Olson & Zoubi	2011	2000-2008	4	SFA(C, P)	Mena (#10)	(17/66)	0.644	0.684
12	Rozzani&Abdulrahman	2013	2008-2011	4	SFA(P)	MY(#1)	(16/19)	0.439	0.460
13	Johnes et al. (b)	2014	2004-2009	6	DEA(O)	GCC&Asia(#18)	(45/207)	0.789	0.800
14	Kamarudin et al.(a)	2014	2007-2011	3	DEA(C,P,R)	GCC((#6)	(27/47)	0.478	0.718
15	Mobarek and Kalonov	2014	2004-2009	12	DEA(I),SFA(I)	GCC&Asia(#18)	(101/307)	0.613	0.666
16	Shaban et al.	2014	2002-2010	2	SFA(C, P)	IN(#1)	(7/107)	0.875	0.870
17	Yilmaz and Günes	2015	2007-2013	7	DEA(I)	TR(#1)	(4/28)	0.845	0.816
18	Kamarudin et al.(b)	2015	2007-2011	3	DEA(C,P,R)	GCC((#6)	(27/47)	0.476	0.691
19	Saeed & Izzeldin	2016	2002-2010	2	SFA(C, P)	GCC&Asia(#8)	(23/83)	0.840	0.817
20	Azad et al.	2017	2009-2013	1	DEA(O)	MY(#1)	(16/27)	0.958	0.943
21	Abdul-Majid et al.(c)	2017	1996-2010	1	SFA(C)	MY(#1)	(14/36)	0.832	0.888
22	Al-Jarrah et al.	2017	2007-2013	7	SFA(C)	Mena(#19)	(222/954)	0.774	0.776
23	Alqahtani et al.	2017	1999-2012	2	DEA(C,P)	GCC(#6)	(30/50)	0.639	0.688
24	Batir et al.	2017	2005-2013	2	DEA(I,C)	TR(#1)	(4/29)	0.857	0.643
25	Miah & Uddin	2017	2005-2014	1	SFA(C)	GCC(#5)	(20/28)	0.650	0.851
26	Doumpos et al.	2017	2000-2011	3	SFA(C, P)	Mena&Asia(#22)	(101/347)	0.790	0.785
27	Asmild et al.	2018	2001-2015	20	DEA(I) ⁹	BA(#1)	(7/23)	0.801	0.775
28	Bitar et al.	2018	1999-2013	2	DEA(I)	Mena & Asia(#33)	(116/540)	0.597	0.558
29	Abid & Goaid	2019	2001-2015	15	SFA(C)	GCC(#6)	(17/47)	0.667	0.594
30	Alexakis et al.	2019	2006-2012	7	DEA(O)	GCC(#6)	(19/43)	0.753	0.765
31	Chaffai & Hassan	2019	2002-2014	13	SFA(C)	Mena(#15)	(106/245)	0.861	0.912
32	Chaffai	2019	2002-2014	5	SFA(C,P,M)	Mena(#16)	(94/231)	0.807	0.828
33	Hafez & Halim	2019	2003-2017	7	DEA(I)	EG(#1)	(5/25)	0.954	0.856
34	González et al.	2019	2005-2012	1	SFA(C)	Mena(#19)	(40/161)	0.730	0.780
35	Safiullah & Shamsuddin	2019	2003-2014	8	SFA(C,P)	Africa, Mena, Asia(#21)	(94/94)	0.775	0.819

MY Malaysia, SA Saudi Arabia, IN Indonesia, TR Turkey, BA Bangladesh, EG Egypt.

C (Cost), P (Profit), R (Revenue), I (Input oriented distance function), O (Output oriented distance function), M (Mixed oriented distance function)

Table 2: Average efficiency characteristics by bank type

	Islamic banks			Conventional banks			Mean difference	
	Mean	sd	# obs	Mean	# obs	t-test	P-value	
Methodology								
Parametric	0.745	(0.015)	102	0.788	(0.013)	102	-2.185	(0.030) **
Non parametric	0.804	(0.012)	140	0.795	(0.011)	140	0.540	(0.589)
Efficiency model								
Cost	0.782	(0.016)	97	0.799	(0.015)	97	-0.818	(0.353)
Profit	0.693	(0.027)	37	0.741	(0.022)	37	-1.348	(0.182)
Technical efficiency	0.806	(0.012)	108	0.803	(0.010)	108	0.195	(0.845)
Geographical zone								
One country	0.815	(0.016)	76	0.769	(0.017)	76	1.996	(0.048) **
GCC	0.720	(0.022)	66	0.778	(0.015)	66	-2.175	(0.032) **
Mena	0.848	(0.016)	50	0.844	(0.015)	50	0.189	(0.850)
Mena less Iran*	0.902	(0.028)	22	0.862	(0.022)	22	1.144	(0.259)
Mena & Asia & Africa or GCC & Asia	0.798	(0.011)	109	0.829	(0.102)	109	-2.007	(0.046) **
Studies which compare the efficiency distributions								
Mean difference test (Yes)	0.771	(0.010)	133	0.809	(0.008)	133	-2.829	(0.005) ***
Mean difference test (No)	0.789	(0.017)	109	0.771	(0.015)	109	0.774	(0.439)
Average	0.779	(0.009)	242	0.792	(0.008)	242	-1.044	(0.297)

(*) we retain only the studies on MENA region where Iran has been excluded from the sampled countries.

Table 3: Meta regression parameter estimates for mean efficiency

Variables	BMA		OLS	Tobit
	Post-Mean	Pip		
Constant	0.955 (0.041)	1.00	0.935*** (0.045)	0.939*** (0.044)
Islamic	-0.011 (0.011)	1.00	-0.013 (0.010)	-0.012 (0.010)
Param	0.053 (0.024)	1.00	0.036 (0.023)	0.038* (0.023)
Cost	-0.056 (0.015)	1.00	-0.054*** (0.018)	-0.054*** (0.018)
Profit	-0.104 (0.017)	1.00	-0.103*** (0.018)	-0.104*** (0.018)
GCC	0.230 (0.020)	1.00	0.009 (0.022)	0.010 (0.021)
MENA	0.098 (0.024)	1.00	0.089*** (0.023)	0.092*** (0.023)
MENAASIA	0.043 (0.023)	1.00	0.027 (0.023)	0.029 (0.023)
GCCASIA	-0.063 (0.031)	1.00	-0.073* (0.038)	-0.072* (0.038)
Intermediation	0.013 (0.021)	0.36	0.037* (0.020)	0.036* (0.020)
Off-balance sheet	0.068 (0.015)	1.00	0.068*** (0.016)	0.068*** (0.016)
Iran	0.090 (0.019)	1.00	0.085*** (0.017)	0.084*** (0.017)
SJR	0.077 (0.015)	1.00	0.072*** (0.017)	0.072*** (0.017)
Size	0.055 (0.009)	1.00	-0.051*** (0.009)	-0.051*** (0.009)
Meta	0.068 (0.023)	0.97	0.062*** (0.018)	0.063*** (0.018)
Panel	0.000 (0.004)	0.04		
Risk_Control	-0.001 (0.006)	0.06		
Deflated	0.001 (0.007)	0.05		
Meta*Islamic	-0.008 (0.020)	0.17		
Cost*Islamic	-0.000 (0.003)	0.05		
Profit*Islamic	-0.003 (0.013)	0.09		
Observations	484		484	484
R-squared	-		0.370	

Table 4: Meta regression parameter estimates for mean efficiency by subsample

Variables	OLS (1) with t-test	OLS (2) without t-test	Tobit (3) with t-test	Tobit (5) without t-test
Constant	0.594*** (0.098)	1.237*** (0.118)	0.594*** (0.096)	1.242*** (0.116)
Islamic	-0.038*** (0.010)	0.017 (0.015)	-0.038*** (0.009)	0.019 (0.015)
Param	0.033 (0.036)	0.230*** (0.066)	0.033 (0.035)	0.231*** (0.064)
Cost	0.008 (0.023)	-0.208*** (0.040)	0.008 (0.023)	-0.209*** (0.039)
Profit	-0.053** (0.021)	-0.339*** (0.048)	-0.053** (0.021)	-0.340*** (0.046)
GCC	0.064 (0.040)	0.154*** (0.053)	0.064 (0.039)	0.155*** (0.052)
MENA	-0.042 (0.041)	0.156*** (0.031)	-0.042 (0.040)	0.161*** (0.030)
MENAASIA	-0.047 (0.033)		-0.047 (0.032)	
GCCASIA	-0.042 (0.037)	0.105** (0.050)	-0.042 (0.036)	0.107** (0.049)
Intermediation	0.095*** (0.026)	0.004 (0.034)	0.095*** (0.026)	0.004 (0.033)
Off-balance sheet	0.178*** (0.041)	-0.035 (0.036)	0.178*** (0.040)	-0.036 (0.035)
Iran	0.061*** (0.019)	0.228*** (0.062)	0.061*** (0.018)	0.225*** (0.061)
SJR	0.016 (0.027)	0.191*** (0.053)	0.016 (0.026)	0.191*** (0.051)
Size	0.007 (0.014)	-0.122*** (0.035)	0.007 (0.014)	-0.123*** (0.035)
Meta	0.090*** (0.027)	0.036 (0.041)	0.090*** (0.026)	0.036 (0.041)
Observations	266	218	266	218
R-squared	0.521	0.566		

Empirical Findings-Summary

- No significant differences in the efficiency between IB and CB whatever is the metric (Cost, Profit, TE)
- MENA banking system is much more efficient compared to the GCC & ASIA
- High sensitivity of the efficiency measures to the inputs/outputs definition in the empirics
- Off-balance sheet should be included as an output
- IRAN should be included in MENA samples
- Warning from the results of the papers not published in indexed journals?
- Warning from potential bias for studies ***which do not conduct a deep analysis of the efficiency distributions by bank type ?***

Conclusion and Policy Issues (Cont'd.)

- There is no need to separate the sample by bank type in conducting an efficiency analysis for countries with the two banking systems in MENA or the GCC
- MENA region banking system is much more efficient compared to other regions (GCC, ASIA)
- the importance of banking and sample characteristics may affect the efficiency measures in any study aiming to compare banking efficiency of IB and CB in the region
- Comparing the efficiency distributions by using statistical tests is highly recommended in any future study comparing the efficiency of the 2 banking systems, as we have shown a suspicion of potential bias?

Conclusion and Policy Issues (Cont'd.)

- The meta regression analysis find evidence that the banks have more difficulties to increase their profits than to reduce costs or to control their technical efficiency
- Policy makers in the region need to reinforce bank competition, by for example deregulating their markets, or by allowing more entries.
- Policy makers for the issue of dual banking systems efficiency, IB and CB performance, should be warned from the experience of one single country.

Thank You