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Efficiency and productivity change in Islamic and conventional banks:

Evidence from the Gulf Cooperation Council (GCC) countries

Jill Johnes • Marwan Izzeldin • Vasileios Pappas



Overview

1. Introduction
2. GCC: Background
3. Methodology
4. Literature review
5. Sample data and models
6. Results
7. Conclusion



Why are we interested in the efficiency of Islamic banking (IB) relative to conventional banking (CB)?

- IB sector has fared better than CB one during global banking crisis
- Huge growth in IB sector worldwide
- Efficiency in the financial sector and economic growth are closely related; IB has a dominant share of the banking sector in some developing countries

Why are we interested in the GCC?

- Economic stability in this region is important to the west as it has more than 80% of world oil reserves

Aim of the paper:

- To evaluate and compare the performance of IBs and CBs using 2 methodological approaches
- To identify and compare the sources of inefficiency
- To investigate sources of inefficiency and productivity change over time



GCC: Background

- Demand for Islamic financial products grew in the GCC following the 1970s oil boom
- Dubai Islamic Bank founded in 1975
- Since then there has been an increasing array of Islamic financial products to match those offered by CBs
- 2012: IBs in the GCC have around 34% of global Islamic assets
- Saudi Arabia, UAE and Kuwait are three of the big-4 countries in Islamic finance (Ernst and Young, 2013)
- Effect of the financial crisis on the GCC has been less than in other parts of the world



Banking performance is evaluated here using:

- Financial ratio analysis (FRA) to indicate performance
- Data envelopment analysis (DEA) to indicate technical efficiency (TE)



FRA

PERFORMANCE RATIOS

COST PERFORMANCE RATIOS

Cost to income (CTI)	Calculated as $[\text{Overheads}/(\text{Net Interest Margin} + \text{Other Income})]*100$ where Overheads are mostly salaries
Non-interest expenses to average assets (NIE)	Calculated as $[(\text{Overheads} + \text{Loan Loss Provisions})/\text{Average Total Assets}]*100$

REVENUE PERFORMANCE RATIOS

Net interest margin (NIM)	Calculated as $[\text{Net Interest Margin}/\text{Average Total Earning Assets}]*100$
Other operating income to average assets (OOI)	Calculated as $[\text{Other Operating Income}/\text{Average Total Assets}]*100$

PROFIT PERFORMANCE RATIOS

Return on average assets (ROA)	Calculated as $[\text{Net Income}/\text{Average Total Assets}]*100$
Return on average equity (ROE)	Calculated as $[\text{Net Income}/\text{Average Equity}]*100$

FRA

- **Cost performance ratios**

Cost to income ratio; Non-interest expenses to average assets

- **Profit performance ratios**

Net interest margin; Other operating income to average assets

- **Revenue performance ratios**

Return on average assets; Return on average equity

BUT

- One ratio cannot capture performance over breadth of activities
- Assumes eg. cost minimisation, profit maximisation or revenue maximisation

DEA

- Allows each bank to have its own objectives as it will only be compared with peers using a similar mix of inputs and outputs
- Flexible and easy to incorporate multiple inputs and outputs

BUT

- Does not allow for stochastic errors
- Results can be influenced by outliers



Meta-frontier DEA (MF-DEA) (Charnes *et al* 1981)

- Gross efficiency: measured against the meta-frontier; incorporates technical competence (managerial and scale) and efficiency arising from *modus operandi*
- Net efficiency: measured against the group frontier; isolates the technical component (managerial and scale)
- Type efficiency (TGR): is the component of efficiency arising from *modus operandi*

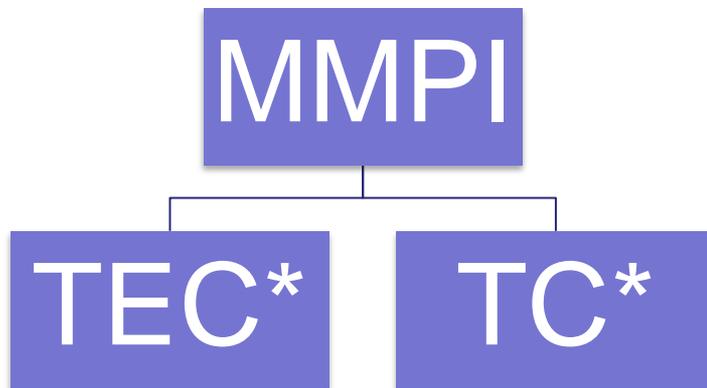
Malmquist productivity

- Malmquist productivity analysis can identify improvements in productivity between periods t and $t+1$
- A decomposition of the Malmquist index can give insight to whether productivity changes are due to
 - Technical efficiency changes (i.e., Banks using existing resources more efficiently thus getting closer to the production frontier)
 - Technological progress (i.e., shifts in the production frontier)

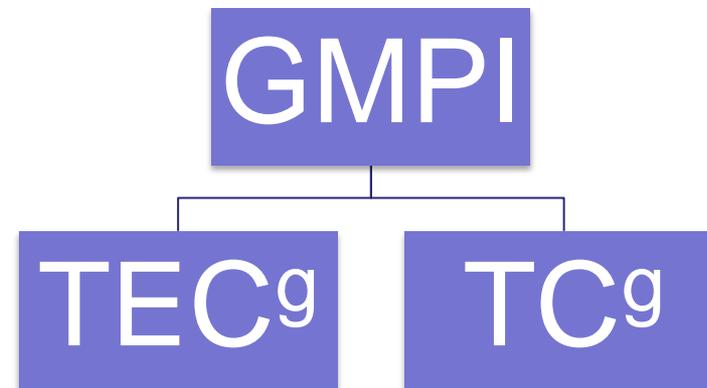
Meta-frontier Malmquist

- Provides further insights for data comprising groups
- Technical efficiency changes and Technological progress are allowed to differ between groups

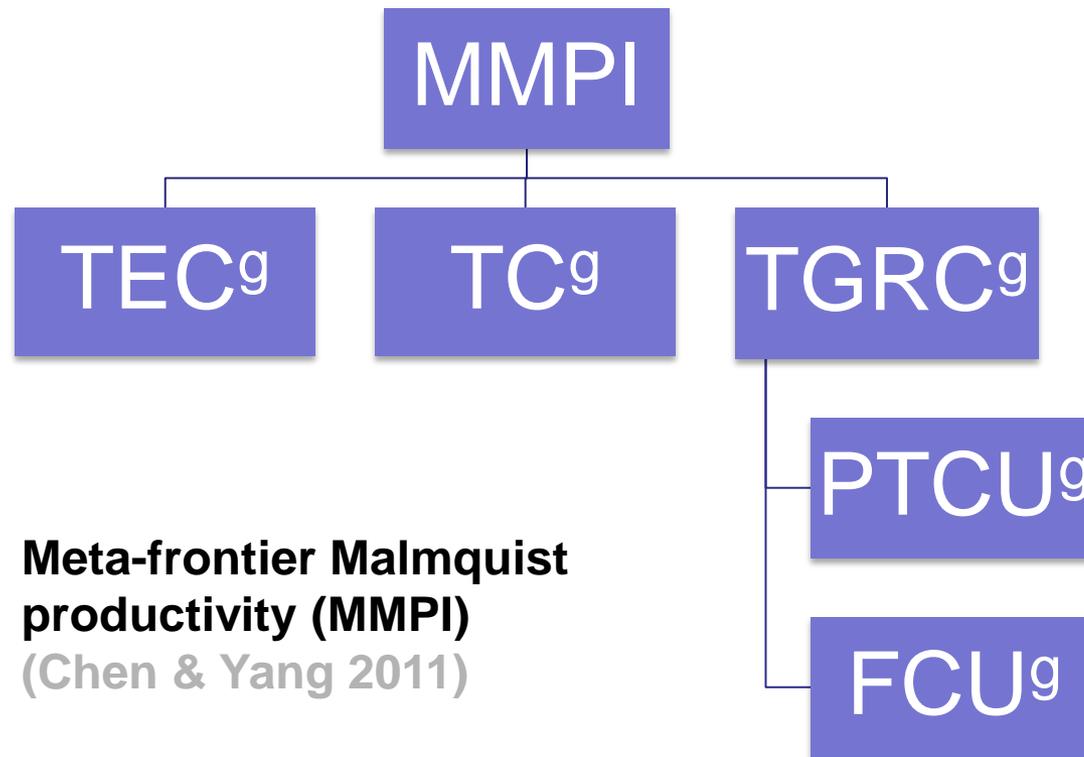
Meta-frontier Malmquist productivity (MMPI)



Group Malmquist productivity (GMPI)



Methodology



- $TGRC^g = \frac{MMPI}{GMPI}$ is the technology gap ratio change and comprises 2 components:
- $FCU^g = \frac{TC^*}{TC^g}$ is the frontier catch-up and refers to the band lying between the group and meta-frontiers. It captures the speed of change of the meta-frontier relative to the group frontier
- $PTCU^g = \frac{TGR_{t+1}^g}{TGR_t^g}$ is the pure type catch-up between periods t and $t+1$

Evidence using FRA

- IBs perform better than CBs in terms of profitability (Olson & Zoubi 2008; 2011; Parashar & Venkatesh 2010; Hasam and Dridi 2011)
- IBs perform better than CBs in terms of resource use, cost effectiveness, asset quality capital adequacy and liquidity ratios (Hassan & Bashir 2005)



Evidence using frontier estimation

Evidence is mixed!

- There is no significant difference between IBs and CBs (Abdul-Majid et al 2005b; Bader 2008; El-Gamal and Inanoglu 2005; Hassan et al 2009; Mokhtar et al 2006)
- IBs are significantly less efficient than CBs (Mokhtar et al 2007; 2008; Srairi 2010; Kamarudin et al 2014; Mobarek & Kalonov 2014)
- IBs are significantly more efficient than CBs (Al-Jarrah & Molyneux 2006; Al-Muharrami 2008; Olson & Zoubi

Evidence using meta-frontier approaches

SFA cost function (Abdul-Majid *et al* 2008; 2010; 2011a; 2011b)

- **Malaysia:** Gross efficiency is significantly higher for CBs than IBs
- Net efficiency is only slightly different between types of banks
- **10 countries:** No significant difference in net efficiency.

DEA output distance function (Johnes *et al* 2014)

- **19 countries:** No significant difference in gross efficiency
- Net efficiency is significantly higher in Islamic compared to conventional banks
- Type efficiency is significantly lower in Islamic compared to conventional banks

Malmquist productivity

- **Malaysia:** Increase in productivity 1996 to 2002; technology has increased; no difference between bank types (Abdul-Majid *et al* 2008)
- **GCC:** Increase in productivity 2000 to 2004; technology has regressed (Ramanathan 2007)
- **GCC: Fall in productivity** 1999 to 2004; technology has regressed (Ariss *et al* 2007)



Sample data and models

- 2006 to 2012
- Complete data on all variables required for FRA and DEA (balanced sample)
- 19 IBs, 43 CBs, 434 bank-year observations
- 6 GCC countries: Bahrain; Kuwait; Oman; Qatar; Saudi Arabia; UAE



DEA model

- Intermediation approach

Outputs

- Total loans
- Other earning assets

Inputs

- Deposits and short-term funding
- Fixed assets
- General and administrative expenses
- Equity



Sample data and models

Inputs and outputs for CB/IB (US \$ mil in 2005 prices)



Cost performance

- IBs have lower cost performance (Shariah compliance, complexity of contracts, legal costs, economies of scale)

Profit performance

- CBs have greater profit performance particularly after the crisis

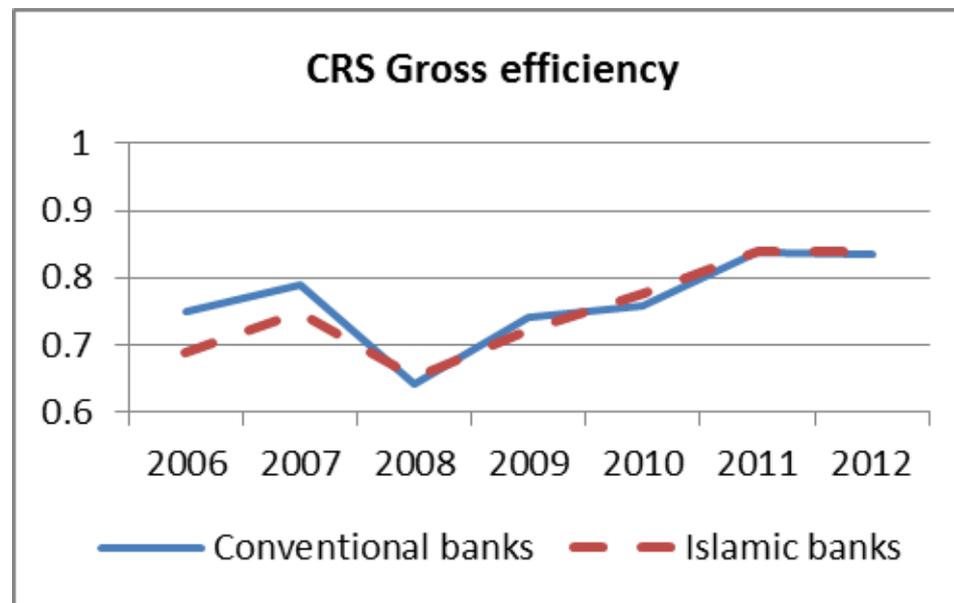
Revenue performance

- Little difference between IBs and CBs



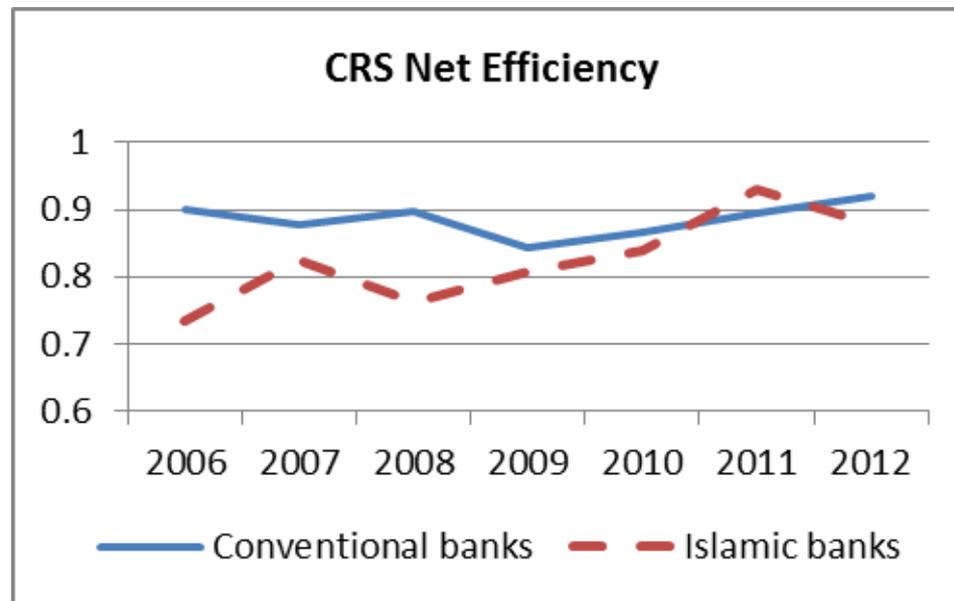
Results: MF-DEA

Gross efficiency: no significant differences



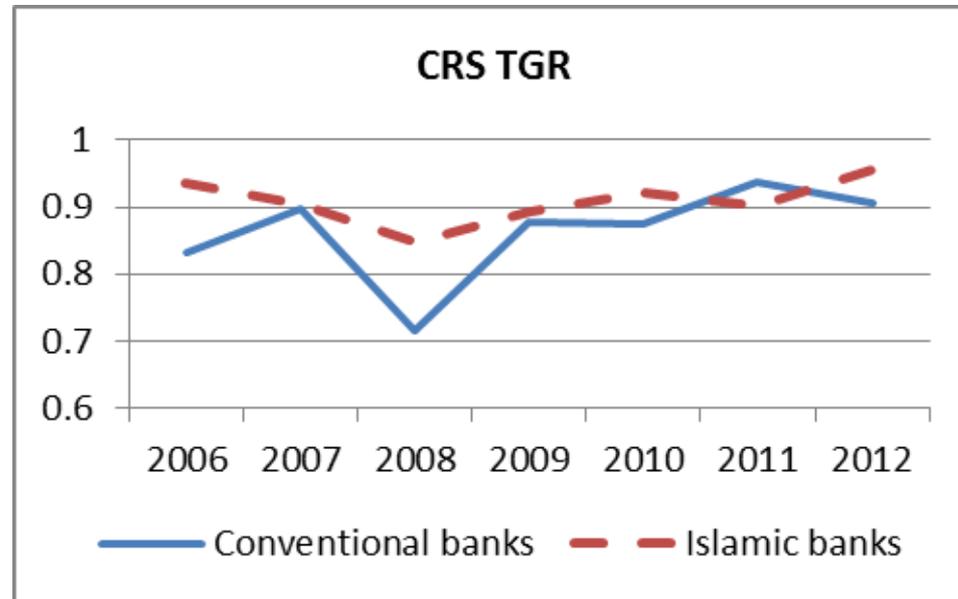
Results: MF-DEA

Net efficiency: about 6 percentage points higher for CBs



Results: MF-DEA

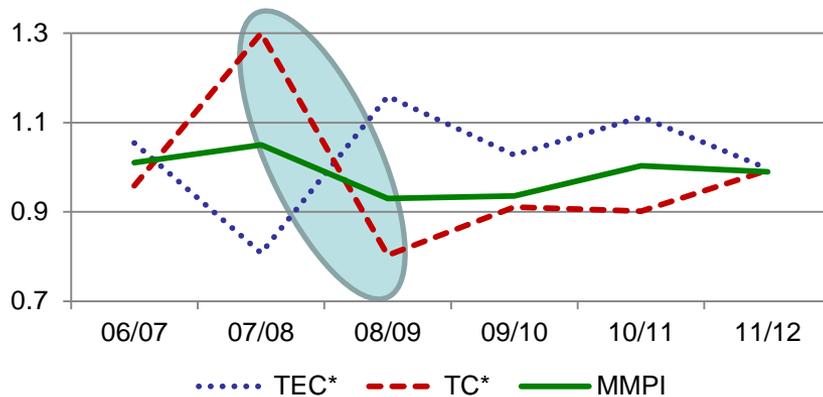
Type efficiency (TGR): about 5 percentage points higher for IBs



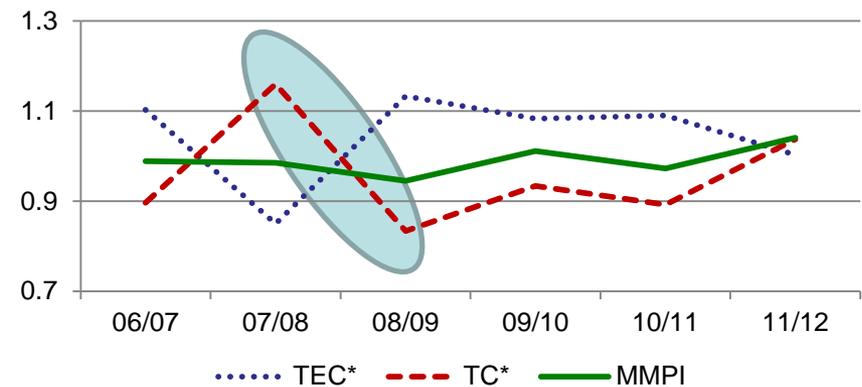
Results: Malmquist productivity

MMPI, TEC,TC

Conventional banks



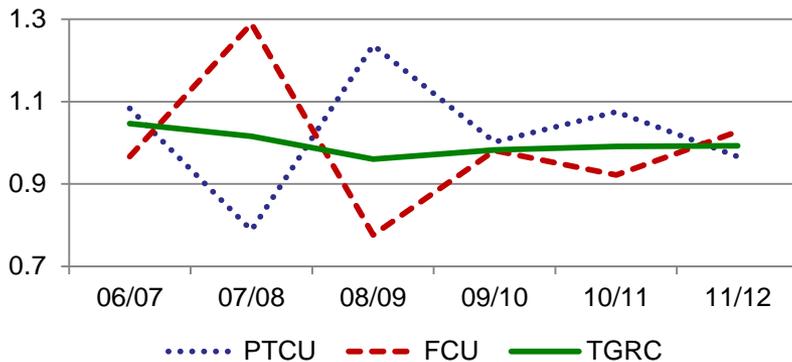
Islamic banks



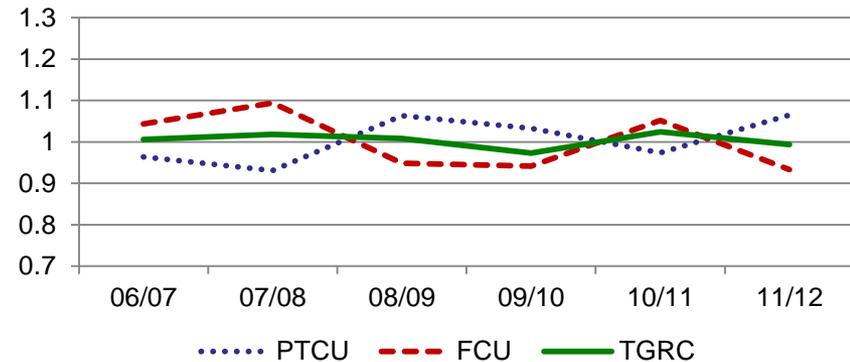
- Productivity changes of around 1% per annum
- More prolonged productivity change for CBs than IBs
- High technology change for CBs before crisis (eg securitisation products). Lower magnitude for IBs.

Results: Malmquist productivity

PTCU, FCU, TGRC Conventional banks



Islamic banks



- CBs experience more volatility than IBs
- IBs are mainly local banks / similar rates of technology diffusion (FCU)
- CBs have strong presence of foreign banks

Conclusions

- We compare performance of IBs and CBs in the GCC region from 2006-2012 using FRA and MF-DEA
- FRA: IBs have lower cost and profit performance than CBs
- No significant difference between bank types in gross efficiency
- Net efficiency is higher in CBs – better managerial and/or scale efficiency
- Type efficiency is higher in IBs – *modus operandi* more efficient
- Financial crisis has impacted efficiency – more pronounced for CBs (type) and IBs (net).

Conclusions

- MPI has fallen by 1% per annum on average
- Positive efficiency change and negative technology change
- The gap between the meta-frontier and the group bank frontier widens around the crisis the banking model becomes more distinctive; after the crisis the gap between frontiers narrows and banking model practices become less distinctive.
- This pattern is more pronounced for CBS than IBs
- Having both CBs and IBs in the GCC offers diversity - potential insulation against both general and specific crises
- Dual banking sector should therefore be encouraged.

