

Are more productive banks always better?

Rajeswari Sengupta (IGIDR, Mumbai)
Harsh Vardhan (SPJIMR Mumbai)

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Productivity in banking

- An important source of economic growth is productivity growth.
- Productivity can be studied at the level of the entire economy and also for specific sectors.
- Banking sector in India is the cornerstone of financial intermediation.
 - ▶ Banks contribute more than 90% of the economy's commercial credit.
 - ▶ Banking income accounts for roughly 6% of Indian GDP.
 - ▶ With a total asset size of USD 2.2 trillion, it is also among the largest banking systems in the world.
- We study the productivity growth in Indian banking over the last couple of decades, across different ownership groups.
- Study of bank efficiency can contribute to policy making and improving bank management.

Indian Banking: Pre 1991

- Between 1969 and 1995, government owned banks (public sector banks or PSBs) dominated the banking sector, with over 90% share of the business.
- PSBs grew rapidly, not in pursuit of commercial objectives but in line with the government policy.
- Expanded through large scale recruitment and increased branch network to reach all segments of population.
- Competition was muted and banks had to follow interest rate and pricing regulations.

Indian Banking: 1991-1996

- Deregulation, liberalisation, privatisation reforms ushered in dramatic shift in the banking sector.
- New private banks started operations in 1995-1996.
- They started with superior technology platforms that helped them scale rapidly and efficiently.
- PSBs responded by adopting technology (core banking solution etc), downsizing overstaffed organisations, listing shares publicly etc.

Indian Banking: Mid 1990s-Present

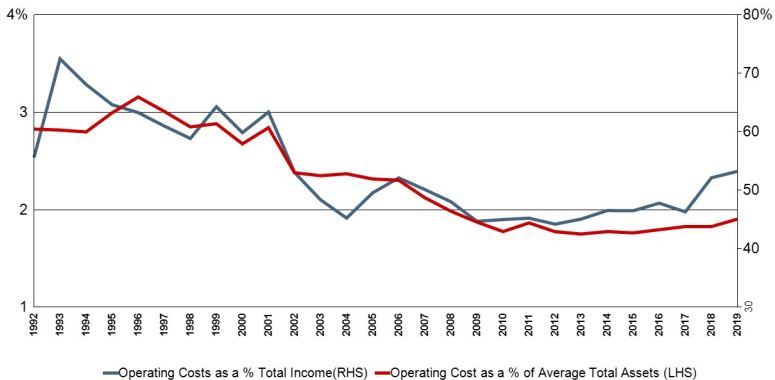
- Competition went up in a more open, and market-oriented environment.
- Several structural changes:
 - ▶ Rapid growth of private and foreign banks,
 - ▶ Expansion of reach of formal banking services,
 - ▶ Reforms to improve income recognition and asset classification,
 - ▶ Use of computers and information technology,
 - ▶ Improved risk management practices,
 - ▶ Emergence of payment banks and small finance banks,
 - ▶ Harmonisation of the regulatory regime with global standards etc.

Indian Banking: Productivity growth

- These changes would affect productivity of the banking sector.
- Adoption of technology by PSBs may have resulted in significant productivity gains.
- One metric for measuring banking productivity is cost of intermediation.
- Costs of operations of banking system (costs of manpower, establishment, IT etc).
- Cost of intermediation must come down for the system to enjoy productivity gains.

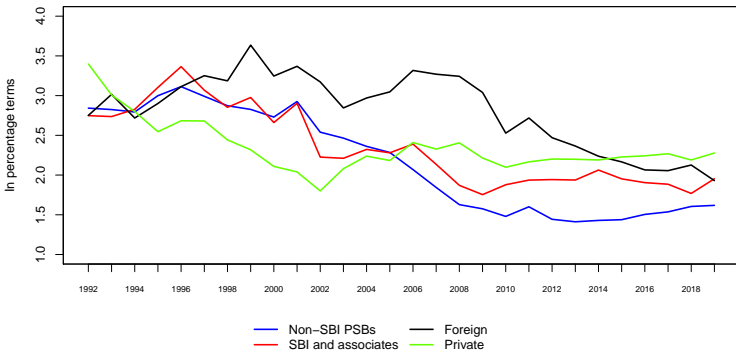
Cost of intermediation of the Indian banking system, 1991-2019

Ratio of operating costs to assets and income



Cost of intermediation for various groups of banks, 1991-2019

Ratio of operating costs to assets and income



Research questions

- ① What has been the pattern of evolution of productivity growth in the Indian banking sector, during 2002-2018?
Productivity grew steadily till 2010 and slowed down thereafter, declining in the most recent years. Overall, productivity has been stagnant.
- ② What has the been the distribution of efficiency gains across various ownership groups of banks?
PSBs experienced steep gains during 2002-2010 which got reversed from 2015 onwards. Private banks witnessed moderate gains during 2002-2010 but productivity stagnation from 2011.
- ③ What have been the main sources of productivity growth?
Frontier shift or technology change has been the main source for PSBs whereas efficiency change or catching up to the frontier has been important for private banks.

Literature

Other countries Berger & Humphrey (1997), Kumbhakar et al. (2001), Canhoto & Dermine (2003), Das & Shanmugam (2004), Sensarma (2006), Casu et al. (2010).

India Bhattacharyya et al. (1997), Sathye (2003), Das et al. (2005), Das & Ghosh (2006), Kumar & Gulati (2009).

Summary: Most studies have explored the effect of deregulation and liberalisation reforms on productivity growth in the banking sector.

Contribution

- Since 2000s many changes have taken place which would impact banking productivity.
- A study spanning a long time period is able to capture these nuances.
- Our methodology allows us to capture efficiency gains *over time* without any specific assumption about the production function.

Data envelopment analysis

- Use a linear, input-output programming method called the Data Envelopment Analysis (DEA).
- Define a non-parametric, efficient production frontier which serves as a benchmark for the measure of efficiency.
- The benchmark is a linear combination of banks included in the sample.
- The efficiency scores range from 0 to 1.
- Input-oriented approach to efficiency measurement.

Malmquist Index

- DEA cannot be applied to compare banks observed in different periods of time.
- To analyse productivity growth over time, we use the Malmquist Index (MI)-calculates absolute improvement over time in efficiency.
- Look into sources of productivity gains by separating the efficiency change into a frontier or technology shift component and an efficiency gain or catching up component.

Intermediation vs. Value added approaches

- DEA and MI use inputs and outputs to calculate efficiency scores.
- **Intermediation approach**
 - ▶ Inputs: Employee expenses, operating expenses and deposit
 - ▶ Output: Loans
- **Value added approach**
 - ▶ Inputs: Employee expenses, operating expenses and interest expenses
 - ▶ Output: Loans and deposit
- **Data:** 37 commercial banks; 90% of total banking assets.
 - ▶ 19 PSBs, 11 private banks, 7 foreign banks.
- Sample period: 2002-2018
- Source: Prowess database of CMIE.

Summary of DEA results

All banks

- 2002: Average efficiency -43.9% and 5.4% banks were on the efficiency frontier.
- 2011: Average efficiency - 87.8% and 21.6% banks were on the efficiency frontier.
- Percentage of efficient banks goes up till 2011 and after that it goes down.

PSBs vs Private

- Intermediation approach: 2008-2015- efficiency scores of PSBs are higher than private banks; reversed from 2016 onwards.
- Value added approach: 2009-2018- efficiency scores of private banks are higher

Summary of MI results

Average efficiency gains for all banks: Intermediation approach

Periods	MI	TC	EC
2003-2006	1.014	0.892	1.177
2007-2010	1.054	1.001	1.056
2011-2014	1.024	1.038	0.987
2015-2018	0.946	0.969	0.987
2003-2010	1.034	0.946	1.117
2011-2018	0.985	1.003	0.987
2002-2018	1.010	0.975	1.052

- ① **2003-2010**: An increase in average efficiency of 3.4%.
- ② **2011-2018**: A decrease in average efficiency of 2.2%.
- ③ **2002-2018**: Average efficiency improvement only by 1%.
- ④ Efficiency change ('catching-up') more important than technology change.

Efficiency gains for bank groups: Intermediation approach

- **2003-2010:** Efficiency of PSBs improved by 5.9%, and for private banks, by 1.4%.
 - ▶ For PSBs, gains from frontier shift (technological change) were greater than gains catching up effect.
- **2011-2018:** Efficiency of PSBs declined by 2.3%; for private banks, it was stagnant at 0.2%.
- **2002-2018:** Average efficiency score for PSBs larger than private banks indicating superior improvement in productivity.

Top 5 banks by efficiency gains, 2002-2018

PSBs	Private
Allahabad Bank	H D F C Bank Ltd.
Canara Bank	Karnataka Bank Ltd.
Oriental Bank Of Commerce	Federal Bank Ltd.
State Bank Of India	Axis Bank Ltd.
Indian Bank	South Indian Bank Ltd.

How to interpret efficiency gains in banking?

- Conventional measurement: Indian banking sector witnessed significant productivity gains till about 2010.
- An important output is credit extended by banks.
- If a bank gives out a higher volume of loans, this shows up as a rise in productivity.
- Irrespective of the quality of credit extended by the bank.
- Consequences would be seen a few years later when much of the loans go bad.
- Periods of rapid credit growth will show strong productivity gains but could be periods where credit quality goes down.

Productivity growth followed by worsening bank balance sheet

- 2003-2010: Bank credit grew by 25%, especially for PSBs.
- 2002-2010: Steady productivity growth.
- Post 2010: NPAs in the banking sector began rising.
- NPAs peaked in 2018 at 11.1% for the banking system and 14.6% for PSBs.
- Raises questions about how we measure productivity and how we interpret the results.

Conclusion

- Indian banking sector experienced steady productivity growth, PSBs more than the private banks, during 2002- 2010.
- Technology change (frontier shift) was more important for PSBs whereas private banks benefitted from faster efficiency change (catching up to the frontier).
- 2011 onwards productivity growth slowed down dramatically.
- Decline in productivity from 2015 onwards, led by PSBs.
- 2002-2018: no significant growth in productivity.
 - ▶ A new set of metrics that factor in the unique nature of banking business may be needed.

Thank you.
rajeswari.sen@gmail.com
harshv89@yahoo.com