"Impact of Decadal Reforms on Efficiency and Productivity of Indian Banking Sector: A DEA Approach"

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❑ In the last decade, the Indian banking system has exhibited resilience and surpassed many challenges arising from both domestic and global economic environment

❑ The improvement in asset quality was primarily led by strong macroeconomic fundamentals and effective regulatory and supervisory oversight, mainly focusing on creating a level playing field, creation of strong banks through mergers and capital infusion, improving governance practices expanding the reach and quality of financial services, and enhancing the adoption of digital banking while ensuring customer interests were protected and most importantly ensuring that financial sector was well-cushioned with capital and liquidity buffers during the pandemic

❑ In this context, the paper aims to find the impact of the decadal regulatory measures on efficiency and productivity of banks in India by employing the non-parametric approach of data envelopment analysis for 2005–06 to 2022–23

❑ To isolate the productivity change over the years, the Malmquist Productivity Index is further decomposed into technological change and efficiency change to see the overall productivity over the years

❑ **The results show that contrary to popular perceptions, the performance of PSBs are much better compared to private and foreign banks**

- *The estimated results indicate that during the sample period starting from FY06 till FY23, the overall banking industry operated at 81.21% level, i.e., inputs could have been reduced by 18.79% for producing the same level of output. The bank group wise results for FY06-FY23 indicate that contrary to popular perceptions, PSBs are the leader and operating at 82.76%, Pvt Banks are operating at 79.59% and FBs are at 78.15%. The overall productivity for the period has witnessed an increase of around 6% in the TFP growth, which is primarily due to higher efficiency change and lower change in technological progress*

- RBI increasing the risk-weights and capital for regulated entities' unsecured loans and credit cards outstanding, as also exposure to NBFCs in Oct'2023 might have come as a surprise to most sections of the markets but it reinforced the 'Proactivity' of the regulator to fortify the moats of the financial fabric during the Good Times itself. Subsequently, banks' credit exposure to NBFCs has come down to 9.4% of ASCB's gross advances in April'24 against 9.7% in April'23. Further, of the ~9400 NBFCs present in the ecosystem today (~13,000 in 2005-06), only 26 are allowed by the RBI to accept deposits (241 in Mar'2014) and 15 largest NBFCs, commanding ~23% of sectoral assets, are categorized in Upper Layer under Scale Bed Regulation with proportionate regulatory stringency in place that bodes well for the resilience of the financial system

- The unsecured loans, as a percentage of SCB's credit outstanding, stood at 10.5% (Mar'24) and may show a restricted growth moving ahead weighed by regulatory glare

- The fortification of the banking system, buoyed by tailwinds of higher capital adequacy ratios/CET1, LCR/PCR, RoA/RoE, lower gross to net NPAs levels, better usage of alternate data (GST/IT) for credit underwriting and wherewithal to stand shocks as vouched by stress test models under both Baseline as also Stressed case scenarios signify the resurgence of the 'neo' approach to balanced tenets of banking, sans irrational exuberances, as credit saturation of New To Banking (NTB) customers takes center stage under FI 2.0 with a rapid tilt towards Platformization that boosts efficiency and cuts costs

❑ Credit cards, now totaling ~10.1 million in numbers have average outstanding of ₹26,000 (Jan'24) with rollovers/revolvers in check….This pales in comparison to total card O/S of US$1.13 billion for the 167 million US card holders, increasingly under default pressure as interest rates have risen fast

❑ India's stock markets growth sojourn has been underpinned by an overwhelming proportion of domestic investors (~150 million plus now) who are increasingly bolstered by the proven wealth creation proposition ingrained by equities in the long run…Interestingly, here too, regulator is shunning the risky derivatives-style assets to average unseasoned investors through a mix of financial / behavioral dictums, nudging them to invest, and not speculate!

❑ Globally, the size of the non-bank financial intermediation (NBFI) sector declined by 3% in 2022, which is the first notable decrease since 2009 (FSB Global Monitoring Report on Non-Bank Financial Intermediation'2023). However, Economic Function 2 (EF2) entities i.e., entities undertaking lending activities, which are akin to NBFCs in India, exhibited a growth of around 10% which is the highest among all five economic categories of the NBFI sector monitored by the FSB. India thus accounts for third largest share of EF2 assets after the US and the UK is thus not an exception to the global trend…

❑ The household sector post pandemic jolt moved towards physical assets over financial assets and has now again started to move towards financial assets in sync with a young age that is becoming more attuned to wealth creation, duly enabled by emergence of India's DPI (Digital Public Infrastructure) fanning a global partnership, spanning both DMs as also EMs along financial innovation that impact ease of living the MOST!

Perspective on Indian Banking: Policy Reforms & Growth

Indian Banking Reforms:1947 to 2024

Pre-Independence period

- The Swadeshi Movement; birth of many small and local banks;
- Most failed mainly due to poor governance

Third Generation

- Nationalization of 20 major private banks in two phases (1969 and 1980)
- Introduction of priority sector lending (1972)

1991–2024

1947–1967

1947

1967–1991

Second generation

- Concentration of resources in a few business families or groups
- Neglected credit flow to agriculture/SMEs

Fourth Generation

- Dismantling interest rate controls
- Fresh licenses to private and foreign banks to infuse competition
- Introduction of prudential norms
- Strengthening of capital base as per the Basel norms
- Creation of small and payment banks
- Shift to External Benchmark Linked pricing
- Reforms in NBFC and Cooperative Banks
- Thrust on Financial Inclusion
- Creating of payments infrastructure and thrust to digital payments through NEFT, RTGS, UPI, CBDC & Mobile payments

Indian Banking : 5th Generation Reforms from 2014 Onward to serve as enablers in Amrit Kal

SBI
The banker to every Indian

Banking sector collaborating with Start-ups /NBFCs / MFIs to usher into Banking 4.0 model of digital customer centricity

Major Consolidation in Banking:12 PSBs currently with capacity to augment Banking & Financial services in a Digitally oriented economy

IFSC (International Financial Services Centre)- providing innovative FinTech & Structured Financial Products/Services of next level @ GIFT city

GST- The backbone of efficient, business friendly taxation architecture

IBC- Fast resolution of unviable businesses with exit mechanism for promoters

NBFID- Principal Development Financial Institution (DFI) for infrastructure financing

NARCL (Bad Bank) & IDRCL (India Debt Resolution Co.)- Distressed debt and assets to get access to dedicated ARCs

Establishment of Neo Banks / Digital Banking Units (DBUs) across the country to move towards a 'less cash' economy

Cash Flow based lending- Credit saturation through Co-lending, Digitisation, and multiple Data Points assimilation

Central Bank Digital Currency (CBDC)- First Launch by a major Central Bank under Wholesale & Retail segments

Indian Banking Sector: 2024 vis-à-vis 2014

Key Banking Indicators

Parameters			FY14	FY20	FY23	FY24	FY24 over FY14 (Times)
Credit Growth	(₹ Trn)		60	103	137	164	2.7x
	(YoY%)		13.9	6.1	15.0	20.2	
Deposits Growth	(₹ Trn)		77	136	180	205	2.7x
	(YoY%)		14.1	7.9	9.6	13.5	
Net Profit	(₹ Bn)		809	109	2632	3100	3.8x
CRAR		%	13.0	14.8	17.1	15.9	--
GNPA Ratio			3.8	8.3	3.8	3.0	
NNPA Ratio			2.1	2.9	1.0	0.7	
PCR			44.7	66.2	74.0	75.6	
Return on Assets (RoA)			0.8	0.1	1.1	1.3	
Return on Equity (RoE)			9.5	1.2	12.3	13.2	
NIM			2.7	2.9	3.7	3.7	

Source: RBI, ratios as on Dec'23 (Governor's Statement: April 5, 2024)

	FY14	FY24
Total Number of Banks/FIs in India	12175	9471
of which, PSBs	27	12
Private Banks	20	21
Foreign Banks	43	45
Small Finance Banks	-	11
Payment Banks	-	6
RRBs	56	43
NBFCs	12029	9327
Total Branches	123277	162901*(1.3x)
ATMs	160055	218815(1.4x)
Financial Inclusion (Number of PMJDY a/cs in Cr)	-	51.94

*March 2023

Consolidation leads to bigger and stronger Banks/FIs (12 PSBs)

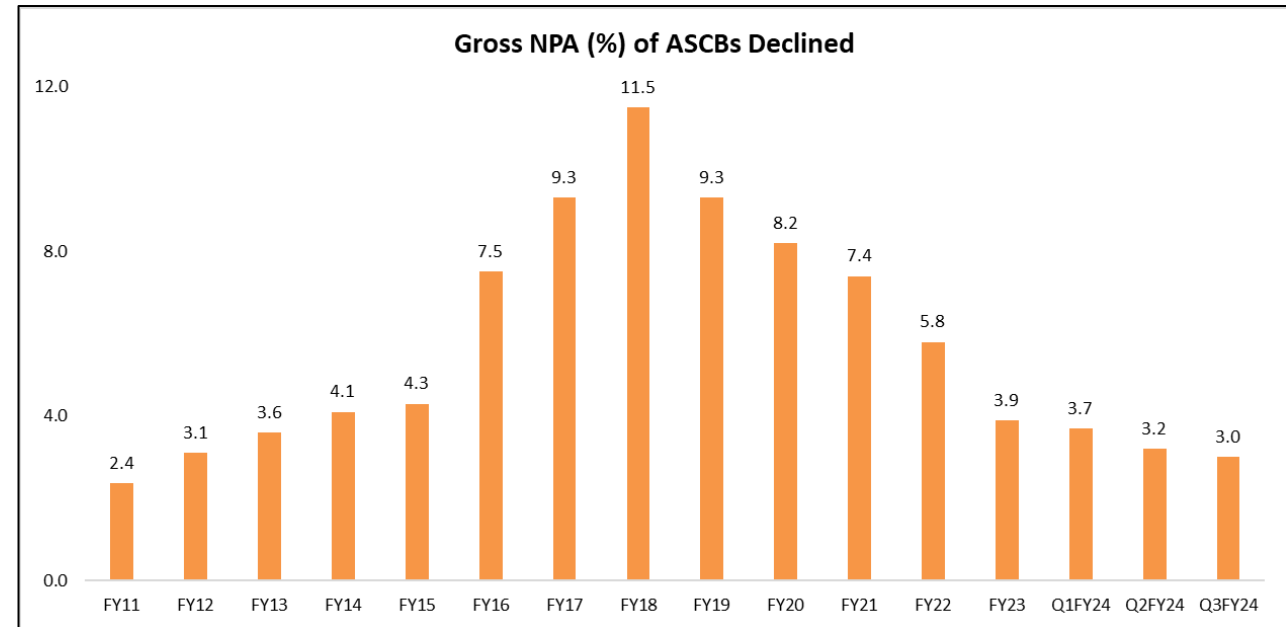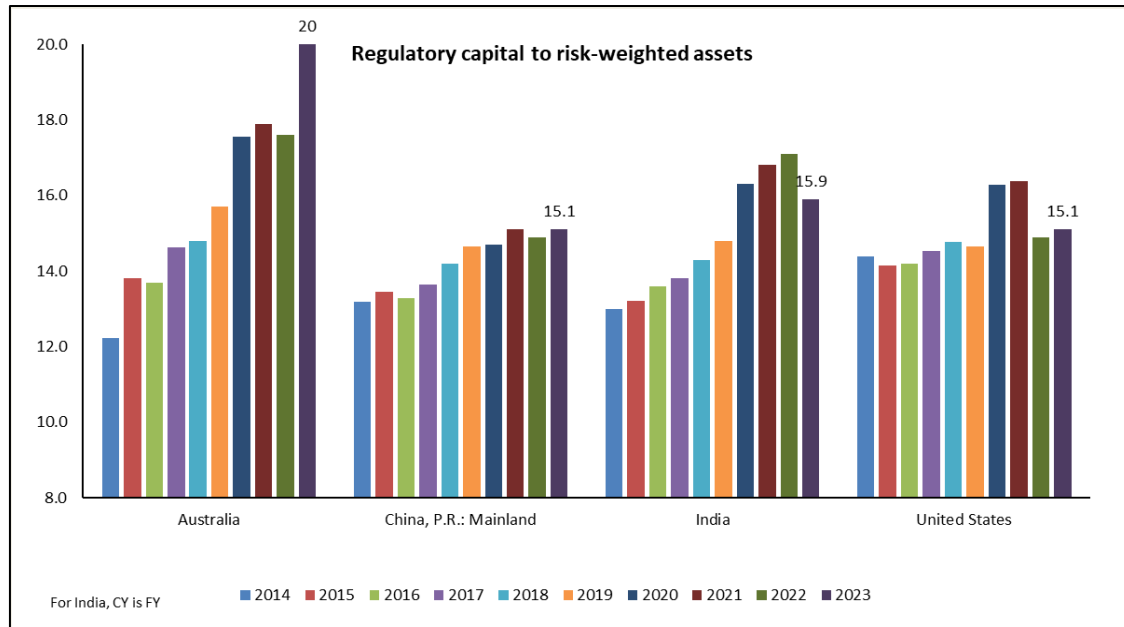New type of Banks opening new vistas for customers on the periphery

Consolidation leads to more profitable non-Bank players in synergy with Banks

Biggest Financial Inclusion plan in the world to bring the unbanked under ambit of Banking and Social Securities

Structure of India's Banking Sector: FY23				
Banks Groups	Market Share (%)			
	Offices	ATMs	Deposit	Credit
PSBs	55.5	63.1	59.0	54.3
SBI*	15.4	29.3*	22.6*	19.1*
PSBs_Ex SBI	40.1	33.2	36.3	34.7
Pvt Banks	25.9	35.1	32.4	37.8
Foreign Banks	0.5	0.6	4.5	3.6
Payment Banks	0.1	0.0	0.1	-
SFBs	4.1	1.3	0.9	1.3
RRBs	13.8	-	3.2	3.0
LABs	-	-	-	-
SCBs	**100**		**100**	**100**
Source: RBI *31 March 2024				

Indian Banking Sector remains adequately capitalized & comparable to developed economies…..

SBI
The banker to every Indian

❑ GNPA ratio of SCBs ratio declining to 3.0% in December 2023. Asset quality improved across all the major sectors

❑ Macro stress tests for credit risk reveal that SCBs would be able to comply with the minimum capital requirements even under severe stress scenarios. The system-level CRAR in September 2023, under baseline, medium and severe stress scenarios, is projected at 14.9%, 14.0% and 13.1%, respectively

Regulatory capital to risk-weighted assets

For India, CY is FY   ■2014 ■2015 ■2016 ■2017 ■2018 ■2019 ■2020 ■2021 ■2022 ■2023

Gross NPA (%) of ASCBs Declined

FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	Q1FY24	Q2FY24	Q3FY24
2.4	3.1	3.6	4.1	4.3	7.5	9.3	11.5	9.3	8.2	7.4	5.8	3.9	3.7	3.2	3.0

Shift from Traditional Banking to Digital Banking

Trends

❑ Increased use of Smartphones in delivering banking services: Smartphone users expected to reach 1 billion by 2026

❑ Internet users increased from merely 250 million in 2014 to ~1 billion in 2022 and expected to reach 1.5 billion by 2037

❑ UPI based payments model: expected to touch 500 million by end of 2024 (250 million as of now)

❑ Zero or minimum hops between customers' aspirations and delivery of services/goods

❑ A 'Digital Bank' within the Bank: Embedded Finance, Delivery of credit through PAPL products and robust fraud management

Outlook

❑ Move towards Open Banking

❑ Leveraging AI & Analytical Capabilities for delivering/offering various financial & non-financial products

❑ ONDC is expected to bring revolution in promotion of e-commerce….benefitting medium/small sellers primarily

❑ Cloud will be the single biggest banking technology…branches too will metamorphose into a virtual experience center!

Challenges
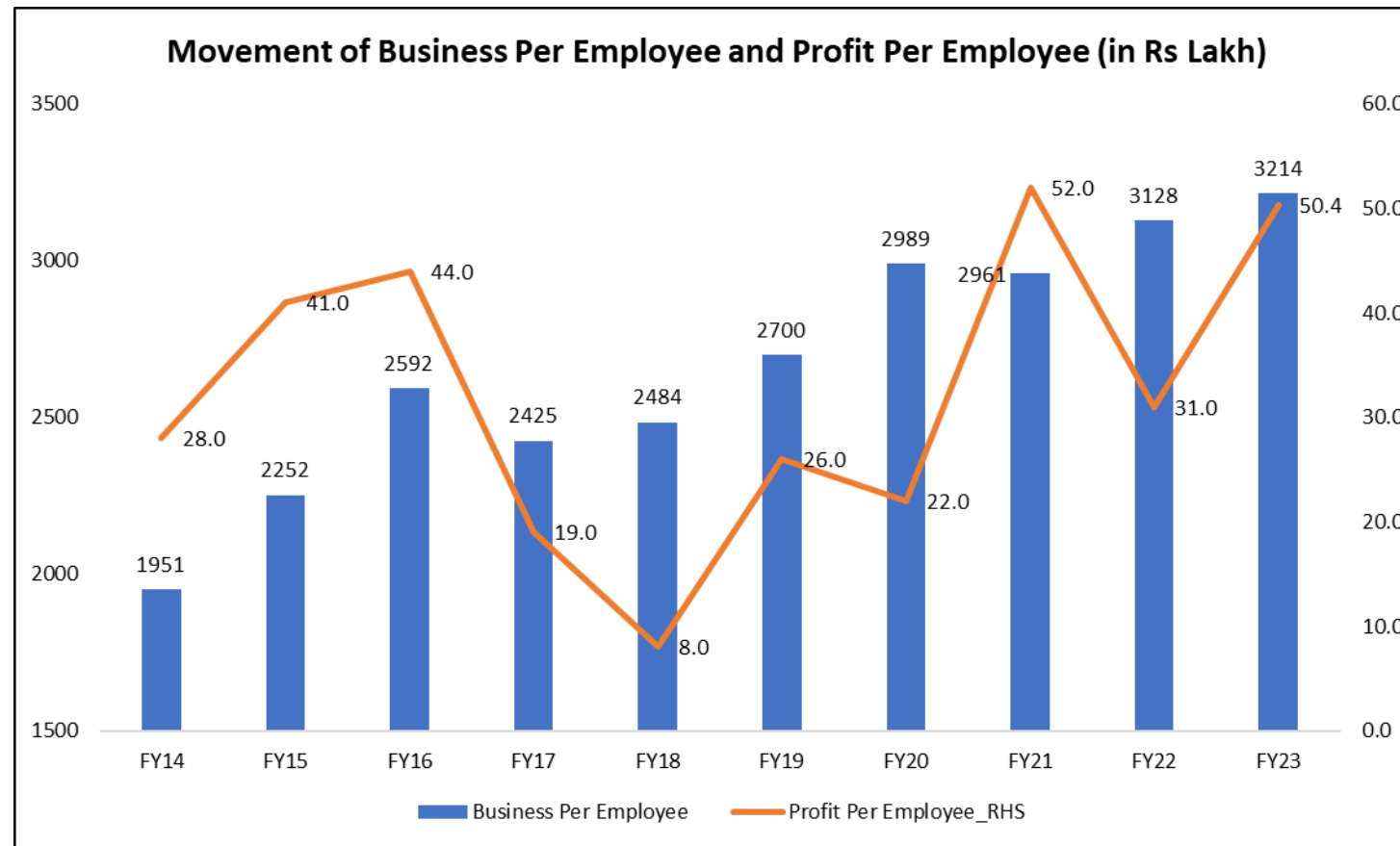
❑ Banks to re-orient their staff and culture towards "Digital-first" mindset

❑ Cost and Infra Management through digital Channels

❑ Sustainable Skillsets

❑ Cybersecurity & Online Frauds

Measuring Efficiency & Productivity of Indian Banking Sector: A Date Envelope Analysis Approach

Why is Measuring Efficiency Required?

❑ There has been a policy shift toward consolidation of PSBs to create strong and efficient banks to support economic growth in the country in the last

❑ This motivates one to check the efficiency & productivity of banks in India

❑ In this section we will address the following questions

- How efficient are banks in India?

- Does efficiency increased productivity of the banks?

❑ A bank is considered as efficient if there is no way it can produce more outputs with the given level of the inputs or vice-versa. Economic efficiency of a Bank comprises

- **Technical Efficiency (TE) = Pure Technical Efficiency (PTE) x Scale Efficiency (SE)**

❑ To measure TE of banks, there are several techniques, by using data envelopment analysis (DEA), stochastic frontier approaches (SFA) and financial ratio analysis

❑ **Ratio analysis** (Business per Employee, Profit per Employee etc) are the simplest methods to analyse the efficiency scores of the banks they have various inherent limitations that make them less valuable in presence of more advanced parametric and non-parametric techniques

❑ **DEA vs SFA:** Estimation of these efficiency based on production frontier (input-output method) : DEA determines production frontier non-parametrically and SFA estimates production frontier parametrically

  • SFA is a regression-based approach and assumes an underlying functional form (Cobb Douglas, Translog, etc.)

  • DEA on the other hand is a non-parametric technique and does not assume any underlying functional form

❑ DEA technique is more flexible in the sense that it allows use of multiple input and output vectors while calculating the efficiency scores of the decision-making units unlike SFA where we can use only a single output and single or multiple input variables

❑ **So, we use DEA technique in our Model**

Traditional Methods of Efficiency Measures....

❑ Most widely used techniques to measure efficiency in banks are: Business per employee and Profit per employee

❑ As business continuously increases and employees are declining.. so it will increase continuously, which misrepresents efficiency

❑ Further, this doesn't consider the technology changes in measuring efficiency

Movement of Business Per Employee and Profit Per Employee (in Rs Lakh)

	Business Per Employee	Profit Per Employee_RHS
FY14	1951	28.0
FY15	2252	41.0
FY16	2592	44.0
FY17	2425	19.0
FY18	2484	8.0
FY19	2700	26.0
FY20	2989	22.0
FY21	2961	52.0
FY22	3128	31.0
FY23	3214	50.4

❑ Against this background, this study is an attempt to find out the efficiency and productivity changes in Indian Banking system post the mergers and the 4 R strategy employed by Government and RBI along the following points:

- To find the impact of recent Government measures on Efficiency of Individual banks. Further, to access the relative efficiency of banks among the peer groups like public sector banks (PSBs), private banks (Pvt Banks) & foreign banks (FBs)

- To measure the productivity change in the banking sector over the years

❑ **Data:** The study considers period between 2006-07 to 2022-23 (16-Years), which includes 3-major crisis, *global financial crisis in 2008, asset quality issues in banking sector following recognition of NPA and finally COVID-19 pandemic in 2020 faced by the banking industry*

❑ The sample consists of 43 banks (12-PSBs, 19 PVT Banks and 12-FBs) listed in appendix, having operations consistently in all the years of the sample period 2005-06 to 2022-23 (18 years)

❑ The primary source of the data used is RBI Handbook of Statistics on Indian Economy, Statistical Tables Related to Banking and other reports like Annual reports, Trends and Progress of Banking, Financial Stability Report etc. To get the latest data, Individual banks Annual Report and other public disclosers has been followed

❑ As many banks were merged during the study period, the earlier year's data were merged to have a better comparison. The selected 43 banks for our study cover 96.5% of the assets of the banking system. The selected 12-FBs cover more than 80% of the assets of the total foreign banks in India

Variables used in the Model

□ These variables are selected, on the basis that the efficiency measurement focusing on internal control and productivity of banks

Nature of variables	Variable name	Variable Description
Input Variable	Fixed Assets (FA)	Fixed assets of the bank
	Borrowings (BOR)	Borrowings by the bank
	Operating expenses (OPEEXP)	Operating Expenses of the bank
	Employees Cost (EMPLCOST)	Payments to and provisions for employees
	Offices (OFFICES)	Number offices of the Bank
Output Variable	Investments (INV)	Investments by the Bank
	Advances (ADV)	Advances by the Bank (Loans)
	Deposits (DEP)	Total Deposits of the Bank
	Net Income (OTHINCONII)	Net Interest Income Plus Other Income
	Profit (PROFIT)	Net Profit/Loss of the Bank

Methodology to Measure Efficiency & Productivity

- This study employs DEA and MPI to assess the efficiency and change in productivity of banks in India for the period, 2005-06 to 2022-23

- The DEA is employed mainly due to two reasons: Firstly, it enables to decompose technical efficiency (TE) to pure technical efficiency (PTE) and scale efficiency (SE), Secondly, the DEA based Malmquist approach measures the productivity and efficiency over time. Thus, the use of DEA permits us to use the same methodology consistently throughout the paper

- To measure efficiency (TE), we use the input-oriented model, which aims at minimizing inputs consumed by the Banks for the same target of outputs. The DMU is efficient when the score is 1 and vice-versa. A Bank is inefficient or at low-efficiency level for a score < 1. For example, a value of 0.80 of a DMU indicates that 20% reduction of all inputs (while maintaining the output level) would be needed to reach the efficiency

- To see the productivity change over the years, this study used the Malmquist Productivity Index (MPI), which further decomposed into two components, namely a catch-up index and a frontier-shift index. The catch-up index measures the internal efficiency change, while frontier shift index measures the technological change. MPI>1 implies that total factor productivity progress has occurred, while MPI<1 and MPI=1 indicates deterioration in total factor productivity and no productivity change respectively

❑ The estimated results indicate that the mean technical efficiency of the sample banks was at 91.72% in FY06 and increased to 93.9% in FY10 but declined thereafter to below 90% during FY11-14. However, it started to increase in FY17 & FY18 but declined there after till FY21, may be due to COVID-19 pandemic. While the TE index is now improving with the increase in banking business.

❑ However, if we look the full sample period starting from FY06 to FY23, the overall banking industry operates at 81.21% level, i.e., inputs can be reduced by 18.79% corresponding to the same level of output

Technical Efficiency (TE) Score of Indian Banking Industry
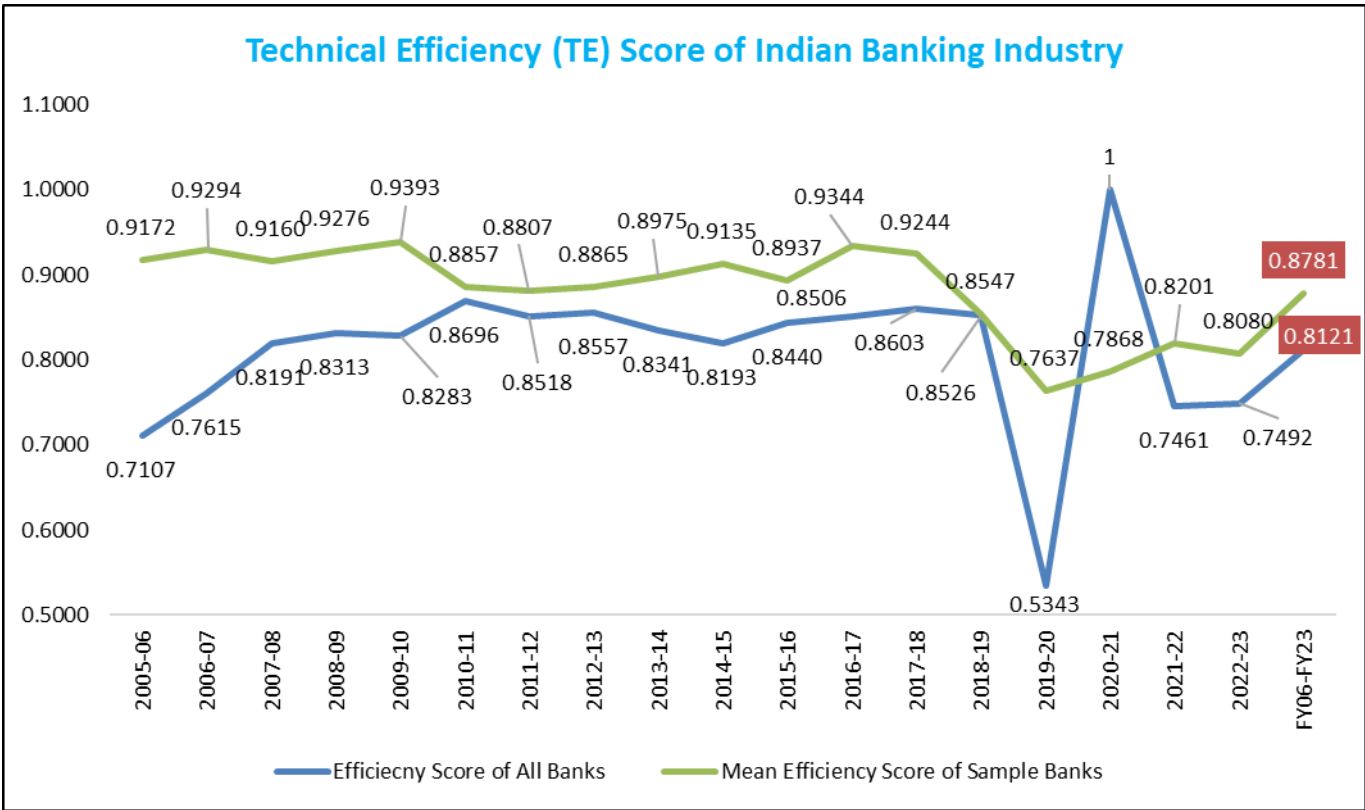
- The table highlights technical efficiency of the bank groups in 4-periods:
  - PSBs are better efficient than private banks except FY19-23, which may be due to merger and rationalisation of business, branches, and employees.
  - Despite many structural changes, PSBs are operating at 82.76%, compared to ASCB at 81.21%.
  - SBI has remained efficient and better than all the bank group in all the 4-study period
  - In overall study period, pvt banks operating below 80% level, which is primarily due to DCB Bank and IDFC First Bank. It seems takeover of weaker banks affected the efficiency in private sector.

Bank-Group-wise Average Technical Efficiency				
Bank Group	FY06-FY10	FY11-FY18	FY19-FY23	FY06-FY23
PSBs	0.8772	0.8814	0.6920	0.8276
SBI	1	0.9739	0.9656	0.9788
Pvt Banks	0.8378	0.8202	0.7153	0.7959
FBs	0.8390	0.7922	0.7070	0.7815
ASCB	0.7902	0.8482	0.7764	0.8121

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❑ In relative performance of individual banks, among PSBs, SBI performs relatively better and scored 97.88% during the full sample period FY06-FY23, followed by UBI at 92.53%

❑ Among the private banks, HDFC bank has scored 97.96% followed by Axis Bank at 94.43%.

❑ Among foreign banks, JP Morgan has scored 1, followed by HSBC Bank at 98.45% TE.

❑ As we followed input-oriented model, so there is a need to cut down their inputs to produce the same level of output, which can be done through budget benchmarks, cost rationalisation etc. The minimum and maximum numbers indicate that there is a divergence in TE among banks.

Top 20 Individual Banks TE Score during the Study Period	
Bank Name	TE Score
J P MORGAN	1
HSBC	0.9845
CITIBANK N.A	0.9842
HDFC BANK LTD.	0.9796
STATE BANK OF INDIA	0.9788
BANK OF AMERICA , NA	0.9475
KARNATAKA BANK LTD	0.9446
AXIS BANK LIMITED	0.9443
IDBI BANK LIMITED	0.9356
UNION BANK OF INDIA	0.9253
UCO BANK	0.9136
JAMMU & KASHMIR BANK LTD	0.9101
CANARA BANK	0.9074
DEUTSCHE BANK AG	0.8999
BANK OF INDIA	0.8986
STANDARD CHARTERED BANK	0.8931
INDUSIND BANK LTD	0.8868
YES BANK LTD.	0.8797
INDIAN BANK	0.8777
BANK OF BARODA	0.8756

❑ The change in Malmquist total factor productivity index is the product of *catch-up and frontier-shift effects*

❑ The TFP change of the entire period FY06 to FY23 is 4.04% (Score: 1.0404), which is contributed by an improvement in efficiency change (catch up) of 3.2 % (Score: 1.0322) and technological change (frontier shift) of 1% (Score: 1.0100)

❑ The bank-wise MPI indicates a mixed result. The PSBs MPI index has improved to 1.0235 in FY12-13 from 0.8498 in FY06-07 but declined thereafter to 0.8868 in FY15-16 and then gained the efficiency to reach 1.0508 in FY21-22 but declined in FY23 due to the decline in frontier shift efficiency numbers. While private banks maintain above 1 MPI scores till FY20-21 due to the technological innovations but declined thereafter to 0.4199 in FY23

Malmquist Index of Total Factor Productivity (Average)												
	ASCB			PSB			Pvt Banks			Foreign Banks		
year	Catch-up Efficiency	Frontier-shift Efficiency	Malmquist Index	Catch-up Efficiency	Frontier-shift Efficiency	Malmquist Index	Catch-up Efficiency	Frontier-shift Efficiency	Malmquist Index	Catch-up Efficiency	Frontier-shift Efficiency	Malmquist Index
FY06=>FY07	1.1096	1.1011	1.2218	1.6078	0.5285	0.8498	0.9454	1.1432	1.0808	0.8654	1.0203	0.8830
FY07=>FY08	1.2838	0.8499	1.0911	1.2713	0.8683	1.1039	0.9902	0.9973	0.9875	1.1575	0.9368	1.0843
FY08=>FY09	1.0737	0.9531	1.0233	1.1007	0.9755	1.0737	0.9719	0.9415	0.9151	0.9193	1.0310	0.9478
FY09=>FY10	0.9657	1.0865	1.0493	1.0553	0.9990	1.0542	0.9569	1.0917	1.0447	0.9775	0.9583	0.9368
FY10=>FY11	1.1289	0.9156	1.0336	0.9349	1.0820	1.0116	1.0149	0.9421	0.9562	0.9002	1.0947	0.9854
FY11=>FY12	0.9527	1.1171	1.0643	1.0663	0.9981	1.0643	1.0020	1.0045	1.0065	1.0622	1.0189	1.0823
FY12=>FY13	1.0270	1.0025	1.0296	0.9954	1.0282	1.0235	1.0393	1.0041	1.0435	1.0422	0.9153	0.9539
FY13=>FY14	0.9822	1.0173	0.9993	0.9895	0.9839	0.9736	1.0151	1.0245	1.0400	1.0640	1.1547	1.2287
FY14=>FY15	0.9515	1.0659	1.0142	0.9849	1.0230	1.0076	0.9451	1.0761	1.0169	0.9186	1.3451	1.2356
FY15=>FY16	0.7945	1.1239	0.8930	0.9814	0.9036	0.8868	0.7154	1.3613	0.9739	0.7884	1.3686	1.0789
FY16=>FY17	1.2495	0.8108	1.0130	1.0080	0.9488	0.9564	1.3131	0.8386	1.1012	1.3012	1.1405	1.4840
FY17=>FY18	0.9892	0.9673	0.9568	1.0342	0.9630	0.9959	1.0384	0.9349	0.9708	1.1121	0.7141	0.7942
FY18=>FY19	0.9165	1.1221	1.0285	0.9210	1.0998	1.0129	0.9689	1.0710	1.0376	0.8541	1.2539	1.0710
FY19=>FY20	0.9858	1.0453	1.0304	1.0440	0.9836	1.0269	0.9319	1.0416	0.9707	0.9341	1.2376	1.1560
FY20=>FY21	0.9172	1.1624	1.0661	0.9054	1.1836	1.0717	1.0302	1.0695	1.1018	0.9090	1.1090	1.0081
FY21=>FY22	1.5811	1.0651	1.6841	0.6789	1.5477	1.0508	0.9635	1.0341	0.9963	0.8725	1.0067	0.8784
FY22=>FY23	0.6392	0.7634	0.4880	1.1796	0.5596	0.6601	0.6125	0.6855	0.4199	0.8885	0.6665	0.5922
Average	1.0322	1.0100	1.0404	1.0446	0.9810	0.9896	0.9679	1.0154	0.9802	0.9745	1.0572	1.0235

TFP = Efficiency Change x Technical Change

- TFP Value >1 represents a positive TFP growth

- TFP Value < 1 represents a negative TFP growth

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❑ Comparing the technical efficiency score and productivity change, we summarize the values of both TE and its components and MPI and its components in below table

- The technical efficiency of the sample of 43 banks indicates that efficiency of the banks has declined from 0.9284 in 2006-07 to 0.7637 in 2019-20 but improved thereafter. Similarly, the MPI index also seen declining from 1.2218 in 2006-07 to 0.8930 in 2015-16 but improve thereafter to 1.6841 in 2021-22. However, it declined in 2022-23, due to the decline in catch-up efficiency scores.

- **For PSBs both technical efficiency and MPI score has improved over the years. While for both private sector and foreign banks, both efficiency and productivity has declined significantly during the study period.**

Bank Group-wise: MPI vs Technical Efficiency										
Year	ASCB			PSB		SBI		Pvt Banks		Foreign Banks	
	TE*	TE^	MPI	TE	MPI	TE	MPI	TE	MPI	TE	MPI
2006-07	0.9294	0.7615	1.2218	0.7641	0.8498	1.0000	1.2703	0.8853	1.0808	0.8657	0.8830
2007-08	0.9160	0.8191	1.0911	0.8393	1.1039	1.0000	1.0896	0.8190	0.9875	0.8383	1.0843
2008-09	0.9243	0.8313	1.0233	0.8975	1.0737	1.0000	1.1033	0.8003	0.9151	0.8005	0.9478
2009-10	0.9363	0.8283	1.0493	0.8853	1.0542	1.0000	1.0907	0.8036	1.0447	0.8127	0.9368
2010-11	0.8857	0.8696	1.0336	0.9028	1.0116	1.0000	0.9946	0.7978	0.9562	0.7699	0.9854
2011-12	0.8807	0.8518	1.0643	0.8477	1.0643	1.0000	1.0792	0.7895	1.0065	0.7696	1.0823
2012-13	0.8865	0.8557	1.0296	0.8650	1.0235	0.9546	1.0393	0.8069	1.0435	0.8543	0.9539
2013-14	0.8975	0.8341	0.9993	0.8564	0.9736	0.9654	1.1240	0.8542	1.0400	0.8597	1.2287
2014-15	0.9116	0.8193	1.0142	0.8493	1.0076	0.9658	0.9441	0.8607	1.0169	0.8175	1.2356
2015-16	0.8920	0.8440	0.8930	0.8715	0.8868	0.9610	0.9364	0.7462	0.9739	0.7195	1.0789
2016-17	0.9344	0.8506	1.0130	0.8909	0.9564	1.0000	1.0043	0.8550	1.1012	0.7740	1.4840
2017-18	0.9244	0.8603	0.9568	0.9676	0.9959	0.9442	1.5190	0.8509	0.9708	0.7731	0.7942
2018-19	0.8547	0.8526	1.0285	0.6899	1.0129	0.9030	0.8328	0.7668	1.0376	0.7022	1.0710
2019-20	0.7637	0.5343	1.0304	0.5563	1.0269	0.9252	1.1415	0.7216	0.9707	0.7543	1.1560
2020-21	0.7868	1.0000	1.0661	0.6381	1.0717	1.0000	0.9134	0.7128	1.1018	0.7099	1.0081
2021-22	0.8187	0.7461	1.6841	0.7702	1.0508	1.0000	1.3161	0.7082	0.9963	0.7130	0.8784
2022-23	0.8080	0.7492	0.4880	0.8056	0.6601	1.0000	1.0700	0.6673	0.4199	0.6556	0.5922
Average	**0.8795**	**0.8181**	**1.0404**	**0.8175**	**0.9896**	**0.9788**	**1.0864**	**0.7910**	**0.9802**	**0.7759**	**1.0235**

Source: Authors Calculation   *Average of 43 Sample Banks   ^Full Banking Industry

thank you

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