ANALYSIS OF BANKS TOTAL FACTOR PRODUCTIVITY BYAGGREGATE LEVEL

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ABSTRACT

The breeze of deregulation in the managing an account frameworks cleared crosswise over different economies of the world amid the most recent three decades. These deregulatory approaches have been embraced with the sole target to expand efficiency and profitability dimension of banks. It is, further, been normal that the strategies like disassembling regulated financing costs structure, evacuation of passage obstructions, constraining state mediations and upgrading the job of market powers, will cultivate rivalry in the business sectors. These adjustments thusly helped the execution of keeping money industry by teaching them in asset the board and placing them for a situation where their survival and achievement will rely upon their capacity to adjust and work effectively and profitably in the new monetary condition .

Keywords: Aggregate level, Public sector banks, Private sector banks, Foreign sector banks.

1.INTRODUCTION

The most difficult errand in working out the profitability measure is the choice of inputs and yields Reserve Bank of India, 2008; Singh, 2014, Arora and Arora, 2013; In this manner, so as to pick the suitable blend of inputs and yields, affectability investigation has recommended the choice of inputs and yields that can be received for TFP measurement. The dimension of efficiency has just been dissected in the present compostion by fusing the inputs and yields utilizing intermediation show. In addition, to have a far reaching investigation as far as efficiency and its parts for the keeping money segment in India amid the post-deregulation period, the present area fuses the salary approach demonstrate as opposed to intermediation approach because of measurably noteworthy connection coefficient with the talked about model in section.

The yield vector comprises of net-intrigue pay Kumar and. The variable net-premium pay catches net gain gotten by the banks from advances, ventures and other affirmed securities though, non-premium salary represents pay got from the cockeyed sheet exercises. Because of nonstop changes in the saving money condition, the inability to fuse these exercises may truly downplay yields of bank. Then again, number of representatives, loanable assets and settled resources are joined as the inputs for estimating the TFP of banks in India amid the post-deregulation period.

2. METHODOLOGICAL FRAMEWORK

MPI is an application of DEA with panel data utilized to calculate indices of TFP changes.) suggested three main advantages of this approach. Firstly, it does not require profit maximization or cost minimization assumption. Secondly, it does not require information on the input and output prices. Finally, if the researcher has the panel data, it allows decomposition of productivity changes into two components, i.e., technical efficiency change, or catching up, and technology progress or changes in the best practice. Following the Malmquist input-based productivity index can be written as

$$m_i(x_{t+1}, y_{t+1}, x_t, y_t) = \frac{d_i^{t+1}(x_{t+1}, y_{t+1})}{d_i^t(x_t, y_t)} \left[\frac{d_i^t(x_{t+1}, y_{t+1})}{d_i^t(x_t, y_t)} X \frac{d_i^{t+1}(x_{t+1}, y_{t+1})}{d_i^{t+1}(x_t, y_t)} \right]^{\frac{1}{2}}$$

The ratio outside the braces represents change in relative efficiency between year t and t+1, whereas, the geometric mean of two ratios inside the braces represents shift in the technology between the two time periods. However, the HMTFP index was introduced and the rationale for computing classic MPI does not measure properly changes in productivity at the time of changes in returns to scale. O'Donnell (2010b) refers that the TFP indices can be expressed in terms of aggregate quantities so as to be multiplicatively complete. As described earlier, the class of multiplicatively complete TFP indexes includes the well known Paasche, Laspeyres, Fisher, Tornquist and HMTFP indexes. Out of all these, only the HMTFP index and FPTFP index can be computed without price data. Another TFP index that can be computed without price data is the Malmquist TFP index of However, MPI is not multiplicatively complete, hence, cannot be regarded as a valid measure of productivity change The HMTFP is actually a ratio of Malmquist output and input quantity indices and it is named so because of its origins to Hicks and as confronted by and also discussed The HMTFP index operates as follows:
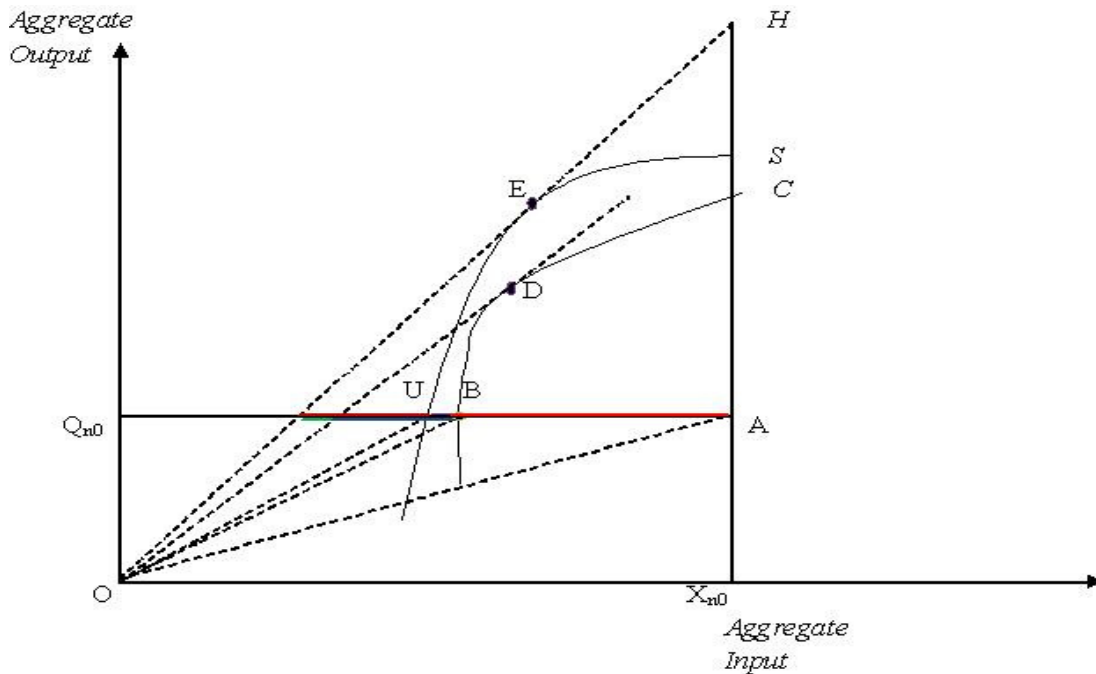
$$TFP_{HM}^{t,t+1} = \left(\frac{D_0^{t+1}(x^{t+1},y^{t+1})D_0^t(x^t,y^{t+1})}{D_0^{t+1}(x^{t+1},y^t)D_0^t(x^t,y^t)} \cdot \frac{D_I^{t+1}(x^t,y^{t+1})D_I^t(x^t,y^t)}{D_I^{t+1}(x^{t+1},y^{t+1})D_I^t(x^{t+1},y^t)} \right)^{\frac{1}{2}}$$

Where, D_O (*i*, *o*) and D_I (*i*, *o*) are output and input distance funct (2009) developed a methodology for computing and decomposing the HMTFP index.

Figure 1.1.: Measuring and Decomposing TFP Change
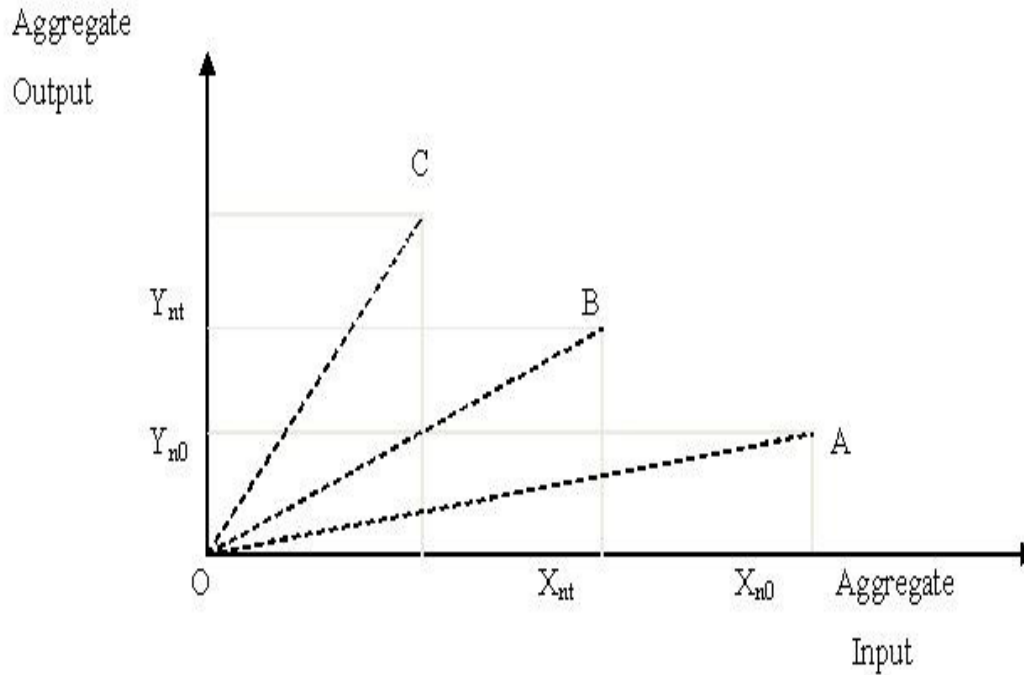
Figure 1.2: InputOriented Decompositions of TFP Efficiency

Source: O'Donnell, 2010a

To be progressively clear, a precedent has been spoken to in the Figure 6.1. The TFP of basic leadership unit n in period 0 and t is given by the slant of the beam going through the starting point and point An and the slant of the beam passing the root and point B. As needs be, change in TFP between the two time frames is TFPn0, nt and it tends to be measured as the proportion of incline 0B/slant 0A. This capacity to speak to TFP record as the proportion of slants of beams in total yield space is utilized in HMTFP to conceptualize a few elective disintegrations of efficiency change (Arjomandi and Valadkhani, 2010). Figure 6.1 exhibits that change in TFP between periods 0 and t can be disintegrated with reference to a point E as TFP n0, nt = (incline 0B/slant 0C) x (slant 0C/slant 0A). O'Donnell (2008) gives further bits of knowledge into the connections between total amounts to conceptualize diverse segments of TFP change like measures of specialized change and different measures of efficiency change. The FPTFP record pursues all the conations, sytheses and properties as talked about in the event of HMTFP approach. Further, HMTFP approach neglects to fulfill the transitivity saying of list number hypothesis while estimating the execution of DMUs. Thus, the present investigation additionally utilized FPTFP way to deal with figure the execution of the keeping money part in India over the timeframe. The record for FPTFP measure is as per the following

$$TFP_{bu,at} = \frac{D_i(i_0 o_{at} t_o)}{D_i(i_0 o_{bu} t_o)} * D_o(i_{bu} o_0 t_o)/D_o(i_{at} o_0 t_o)$$

Where D_o and D_i are Shephard (1953) output and input distance functions and t_0 denotes a representative time period.

3.AGGREGATE LEVEL ANALYSIS FOR PRODUCTIVITY OF BANKS

The estimates for profitability measurement are accounted for in the Table 6.1 and are ordered into three diverse possession gatherings while assuming that the specialized relapse is disallowed and the innovation is accepted to display VRS. The Table 6.1 presents the measures of aggregate factor profitability change (dTFP) and its segments including specialized change (dTech) and efficiency change (dEff) for three distinctive proprietorship gatherings, specifically, open, private and remote area bank bunches over the timeframe. The table furthermore expounds the segments for dTech as far as input-oriented specialized efficiency change (dITE), blend efficiency change (dIME) and remaining input-oriented scale efficiency change (dRISE). Assessed esteem more prominent than unitary delineates efficiency development and in actuality, not exactly unitary presumes profitability relapse. The Table 6.1 records the TFP changes and its distinctive segments for total gathering of individual banks, amid the period 2009 -2012 2013-14. To comprehend the evaluated outcomes by HMTFP record, the investigation at first made a total dimension of examination for PSBs, PrSBs and FSBs, separately. The assessed estimation of 0.981 delineates normal decay of 1.9 percent for PSBs over the time of study. The incentive for dTFP ranges from 1.051 to 0.784 (amid 2013-14). This delineates a normal enhancement of 5.1 percent amid 1995-96 and decrease of 21.6 percent amid 2013-14 for PSBs in India. Be that as it may, the outcomes for estimates over the time of two decades speak to vacillations for the efficiency change. On the comparable lines, TFP change for PrSBs and FSBs delineates relapse in profitability by 2.9 percent and 1.3 percent, individually over the example time frame. Furthermore, change in TFP ranges from 1.033 to 0.839 for PrSBs and 0.951 to 0.807 for FSBs amid 1995-96 to 2013-14. This reveales slight improvemt of 3.3 percent amid 1995-96 and relapse of 16.1 percent amid 2013-14 for private area banks, while, a relapse of 4.9 percent amid 1995-96 and 19.3 percent amid 2013-14 for outside segment banks in the dimension of aggregate factor efficiency. Besides, while investigating the examination for banks over the timeframe, the examination additionally give the confirmations in to of standard deviation and coefficient of variety for the individual gatherings crosswise over various

profitability measures. It very well may be featured from the Table 6.1 that the variety as far as efficiency measures for open and private banks reflects more extensive changes, while, then again, there has been vacillations seen as far as coefficient of variety for outside part banks. The comparative elucidation additionally shows up for the parts of profitability over the bank bunches over the timeframe.

In spite of the fact that dTFP can be disintegrated into two fundamentally unrelated segments, in particular, dTech and dEff which mirrors the reason for development or relapse in absolute factor efficiency. The normal estimation of 1.192, 1.106 and 1.100 for PSBs, PrSBs and FSBs amid the period 1995-96 to 2013-14 reflects advance in innovation by 19.2 percent, 10.6 percent and 10.0 percent in particular gatherings. Concerning, with the special case to a few years (1996-97, 1997-98, 1998-99, 2002-03, 2004-05, 2009-10, 2011-12 for PSBs, PrSBs and FSBs separately), it ought to be noticed that by investigating scope of results from the table amid 1995-96 (1.425, 1.279 and 1.087) to 2013-14 (1.071, 1.241 and 1.021), the managing an account industry estimates were more noteworthy than solidarity, in this way, recommending generally innovative advancement in the saving money industry.

Then again, the normal score for dEff 0.830 (PSBs), 0.898 (PrSBs) and 0.842 (FSBs) show by and large relapse in efficiency change over the timeframe. The outcomes delineate 17.0 percent, 10.2 percent and 15.8 percent relapse in efficiency change for the individual gatherings over the timeframe. The gauge of dEff, in this manner, mirrors that the profitability decay for the investigation time frame is because of wasteful development of banks on the creation outskirts. Notwithstanding, being subject to segments like dITE, dIME and dRISE, the examination attempted to recognize major dependable giver of relapse saw in efficiency change for managing an account segment in India. It has been uncovered from the rundown insights of table 6.1 that the normal estimation of dITE (0.978, 0.987, 0.962), dIME (0.967, 0.985, 0.962) and dRISE (0.920, 0.897, 0.903) for PSBs, PrSBs and FSBs over the example time frame show that the relapse in efficiency is inferable from negative difference in dRISE pursued by dIME and dITE, separately. The aftereffects of dITE, dIME and dRISE uncovered relapse of 2.2 percent, 3.1 percent and 8 percent for PSBs, individually. Therefore, 1.3 percent, 1.4 percent and 10.0 percent relapse for PrSBs has been experienced. Plus, 3.8 percent relapse in the event of dITE and dIME and 7.0 percent for FSBs, individually, has been watched.

When all is said in done, managing an account industry at total dimension in time arrangement

investigation encounters relapse in dTFP aside from the timeframe of 1995-96, 1996-97, 1999-00, 2000-01, 2002-03, 2003-04, 2005-06, 2006-07 for PSBs; 1995-96, 1999-00, 2000-01, 2002-03, 2003-04; 2005-06, 2006-07, 2012-13 for PrSBs; 1999-00, 2000-01, 2002-03, 2007-08, 2008-09 for FSBs, separately. Also, wherever the profitability decay has been watched, it is for the most part a direct result of negative change in efficiency and its partner segments. In any case, the profitability development saw amid a few years is because of mechanical advancement which balance the impact of efficiency change under various responsibility for period. While it has been seen that efficiency measure is the capable part for the decrease in the profitability development yet such segment further relies on the dimensions of ITE, IME and RISE. In this manner, the outcomes obviously demonstrate that the RISE part as the reason for decrease saw in the efficiency measure over the timeframe pursued by different segments. Since, dRISE is the distinction between TFP at an in fact and mix efficient point and TFP at the purpose of most extreme efficiency. In this way, the outcomes deciphers that while making any development around the unhindered boondocks (counting diverse input and yield blends) the banks throughout the years are not portraying any enhancement in TFP. It is basically because of the reason of activities at wasteful and less profitable scale estimate. Accordingly, being a reason for efficiency relapse, the banks working close to the unhindered wilderness are not working at the MPSS. Consequently, there is have to address their scale estimate in order to work at the ideal scale of generation. Subsequently, on a normal, ISE and RISE implies that while holding the input and yield blend settled and enabling the dimension to differ banks even in the wake of changing the scale of activity are appearing and are working underneath the dimension of MPSS. Comparable, elucidation additionally holds for banks under various proprietorship bunches over the timeframe.

Also, it has been seen that banks throughout the years discovered dimension of unadulterated specialized efficiency extensively on the lower side showing over work of inputs. On the other hand, they are additionally encountering blend inefficiency. This reasons by utilizing the base measure of inputs, banks are not ready to create on productive unlimited boondocks even in the wake of changing the input blends. Accordingly, it may be proposed that as far as blend efficiency there is have to settle on levelheaded basic leadership and usage of profitable accessible assets in the saving money division of India, to work on the proficient wilderness. In this way, the outcomes from the examination shows that imperative part for development in TFP has been dTech and as opposed to this dRISE development over the time of concentrate for various proprietorship banks is impressively negative. Along these lines, the real reason for efficiency relapses (aside from some period if there should be an occurrence of open,

private and remote segment banks) and this might be because of different operational variables present inside the banks.

The aggregate analysis for the productivity change put forward macro view of the banking sector. But, a micro level and more comprehensive analysis can be more helpful to prepare a more empirical framework. Similar to Table 6.1, summary results of different estimated measures of dTFP and its components, detach and dEff for individual banks after the initiation of reforms are provided in the Table 6.2. In addition to this, three components of dEff are also reported in the form of dITE, dIME and dRISE, respectively.

Table 1.1: Estimates for Total Factor Productivity (Aggregate Level)

Public Sector Banks

	dTFP			dTech			dEff			dITE			dIME			dRISE		
Year	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV
1995-96	1.051	0.252	0.240	1.425	0.277	0.194	0.778	0.159	0.205	0.858	0.114	0.133	0.945	0.117	0.124	0.854	0.123	0.144
1996-97	1.022	0.091	0.089	1.492	0.143	0.291	0.467	0.324	0.221	1.125	0.213	0.171	0.981	0.075	0.077	1.416	0.372	0.263
1997-98	0.963	0.140	0.145	1.233	0.173	0.241	0.717	0.296	0.240	0.981	0.115	0.105	0.917	0.042	0.042	0.868	0.209	0.192
1998-99	0.968	0.163	0.168	1.095	0.246	0.305	0.808	0.298	0.272	0.903	0.151	0.145	0.913	0.050	0.049	0.903	0.279	0.268
1999-00	1.031	0.150	0.146	1.229	0.278	0.226	0.783	0.136	0.173	0.903	0.104	0.115	0.975	0.044	0.045	0.909	0.141	0.155

2000-01	1.076	0.079	0.074	1.027	0.153	0.149	1.048	0.195	0.186	1.012	0.070	0.070	1.001	0.035	0.035	1.035	0.1704	0.164
2001-02	0.992	0.069	0.069	1.446	0.397	0.274	0.491	0.177	0.361	0.829	0.113	0.136	0.978	0.088	0.090	0.605	0.1796	0.296
2002-03	1.100	0.096	0.087	0.814	0.166	0.204	1.352	0.244	0.181	1.024	0.083	0.081	0.968	0.050	0.052	1.350	0.2106	0.156
2003-04	1.036	0.078	0.075	1.806	0.166	0.092	0.563	0.092	0.163	0.960	0.072	0.075	0.997	0.017	0.017	0.588	0.0769	0.129
2004-05	0.964	0.177	0.184	0.498	0.108	0.216	1.235	0.255	0.206	1.122	0.302	0.247	1.003	0.094	0.094	1.254	0.2988	0.238
2005-06	0.942	0.200	0.212	1.326	0.151	0.114	0.699	0.128	0.183	0.876	0.204	0.233	0.998	0.014	0.014	0.812	0.1367	0.167
2006-07	0.958	0.175	0.183	1.191	0.328	0.275	0.752	0.170	0.226	0.848	0.181	0.214	0.999	0.022	0.022	0.901	0.0898	0.098
2007-08	0.825	0.163	0.197	1.141	0.253	0.222	0.723	0.155	0.214	0.888	0.182	0.205	1.034	0.098	0.095	0.788	0.1179	0.149
2008-09	0.994	0.210	0.211	1.129	0.105	0.093	0.881	0.202	0.229	0.917	0.186	0.203	0.996	0.050	0.050	0.965	0.0580	0.060
2009-10	1.073	0.128	0.119	0.785	0.119	0.152	1.305	0.197	0.151	1.109	0.105	0.095	0.980	0.036	0.036	1.145	0.1676	0.146
2010-11	0.955	0.424	0.443	1.492	0.250	0.167	0.741	0.134	0.181	1.113	0.337	0.257	0.883	0.193	0.219	0.672	0.1949	0.289
2011-12	0.751	0.298	0.523	1.234	0.186	0.151	0.656	0.203	0.309	0.945	0.051	0.054	1.001	0.026	0.026	0.703	0.1783	0.253

Year	dTFP Mean	SD	CV	dTech Mean	SD	CV	dEff Mean	SD	CV	dITE Mean	SD	CV	dIME Mean	SD	CV	dRISE Mean	SD	CV
2012-13	1.150	0.417	0.334	1.276	0.317	0.248	0.883	0.202	0.229	1.066	0.057	0.053	1.014	0.130	0.128	0.957	0.141	0.147
2013-14	0.784	0.509	0.721	1.017	0.284	0.279	0.883	0.136	0.154	1.111	0.091	0.082	0.798	0.235	0.295	0.762	0.243	0.319

Private Sector Banks

Year	dTFP Mean	SD	CV	dTech Mean	SD	CV	dEff Mean	SD	CV	dITE Mean	SD	CV	dIME Mean	SD	CV	dRISE Mean	SD	CV
1995-96	1.033	0.290	0.281	1.279	0.391	0.306	0.673	0.187	0.277	0.807	0.152	0.188	0.897	0.100	0.111	0.597	0.291	0.488
1996-97	0.956	0.201	0.210	0.548	0.159	0.290	1.335	0.339	0.254	1.022	0.190	0.186	1.018	0.096	0.095	1.235	0.302	0.244
1997-98	0.924	0.124	0.135	1.006	0.143	0.167	0.976	0.259	0.265	1.037	0.144	0.139	0.972	0.041	0.043	0.968	0.201	0.208
1998-99	0.839	0.159	0.190	1.072	0.248	0.347	0.723	0.289	0.270	0.984	0.129	0.131	0.907	0.061	0.069	0.964	0.203	0.197
1999-00	1.011	0.300	0.270	1.052	0.370	0.351	0.840	0.387	0.461	0.972	0.235	0.242	0.976	0.041	0.042	0.946	0.341	0.361
2000-01	1.032	0.132	0.128	1.003	0.234	0.233	1.042	0.211	0.203	0.975	0.119	0.122	1.011	0.035	0.035	1.056	0.166	0.158
2001-02	0.979	0.191	0.195	1.563	0.311	0.199	0.614	0.177	0.289	0.828	0.139	0.168	0.996	0.076	0.076	0.662	0.195	0.294

2002-03	1.018	0.076	0.075	0.809	0.204	0.252	1.300	0.224	0.172	1.029	0.148	0.144	0.985	0.047	0.048	1.283	0.199	0.155
2003-04	1.061	0.177	0.167	1.528	0.386	0.253	0.575	0.200	0.348	0.916	0.172	0.188	1.002	0.024	0.024	0.652	0.211	0.323
2004-05	1.045	0.159	0.152	0.658	0.186	0.283	1.357	0.291	0.215	1.161	0.171	0.147	1.017	0.047	0.040	1.137	0.229	0.202
2005-06	1.024	0.134	0.131	1.231	0.269	0.219	0.819	0.254	0.310	0.979	0.159	0.163	1.015	0.042	0.041	0.838	0.198	0.236
2006-07	1.022	0.127	0.124	1.281	0.308	0.240	0.775	0.180	0.232	0.921	0.106	0.115	0.966	0.084	0.087	0.871	0.136	0.157
2007-08	0.976	0.159	0.163	1.113	0.143	0.128	0.884	0.173	0.195	1.059	0.193	0.182	0.989	0.036	0.037	0.844	0.110	0.131
2008-09	1.076	0.081	0.075	1.114	0.289	0.259	0.971	0.151	0.156	1.025	0.111	0.108	1.014	0.015	0.014	0.935	0.123	0.132
2009-10	0.987	0.220	0.222	0.725	0.209	0.288	1.288	0.352	0.273	1.015	0.154	0.152	1.007	0.058	0.058	1.070	0.165	0.154
2010-11	0.860	0.299	0.347	1.461	0.270	0.185	0.580	0.190	0.328	1.024	0.269	0.217	0.949	0.159	0.167	0.763	0.189	0.248
2011-12	0.747	0.447	0.599	1.114	0.329	0.296	0.748	0.241	0.329	0.859	0.139	0.162	1.000	0.038	0.038	0.767	0.184	0.240
2012-13	1.015	0.363	0.276	1.224	0.404	0.330	0.779	0.220	0.282	1.050	0.122	0.116	1.040	0.120	0.115	0.830	0.258	0.311
2013-14	0.839	0.508	0.605	1.241	0.406	0.327	0.776	0.176	0.227	1.091	0.180	0.165	0.944	0.241	0.256	0.660	0.239	0.362

Foreign Sector Banks																		
	dTFP			dTech			dEff			dITE			dIME			dRISE		
Year	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV
1995-96	0.951	0.348	0.366	1.087	0.468	0.430	0.827	0.222	0.268	0.922	0.184	0.200	0.863	0.217	0.251	0.718	0.221	0.308
1996-97	0.852	0.279	0.328	1.028	0.142	0.184	0.714	0.440	0.429	0.921	0.322	0.349	1.016	0.205	0.202	0.979	0.321	0.328
1997-98	0.939	0.442	0.471	1.088	0.198	0.224	0.884	0.384	0.435	0.863	0.194	0.225	0.982	0.109	0.111	0.953	0.286	0.300
1998-99	0.895	0.241	0.270	1.052	0.256	0.315	0.646	0.321	0.308	1.033	0.222	0.214	0.985	0.126	0.128	0.922	0.193	0.209
1999-00	1.194	0.297	0.297	1.017	0.475	0.467	0.824	0.262	0.319	0.848	0.244	0.288	0.955	0.118	0.124	0.995	0.357	0.359
2000-01	1.041	0.215	0.207	1.022	0.296	0.290	1.006	0.281	0.280	1.049	0.182	0.174	0.986	0.065	0.066	0.960	0.243	0.253
2001-02	1.023	0.317	0.310	1.354	0.334	0.246	0.622	0.178	0.286	0.904	0.270	0.298	1.006	0.075	0.074	0.764	0.202	0.264
2002-03	1.146	0.300	0.262	1.063	0.320	0.301	1.126	0.295	0.262	1.073	0.253	0.236	1.003	0.098	0.097	1.083	0.249	0.230
2003-04	0.983	0.291	0.296	1.221	0.405	0.332	0.709	0.203	0.287	0.929	0.237	0.255	0.955	0.154	0.161	0.834	0.255	0.305

2004-05	1.095	0.613	0.559	0.703	0.195	0.277	1.272	0.308	0.242	1.106	0.314	0.284	1.013	0.056	0.055	1.081	0.2897	0.267
2005-06	1.059	0.246	0.232	1.189	0.420	0.353	0.826	0.253	0.306	0.965	0.218	0.226	0.962	0.210	0.226	0.896	0.2948	0.328
2006-07	1.013	0.268	0.265	1.147	0.641	0.559	0.756	0.306	0.405	1.032	0.206	0.200	1.018	0.043	0.042	0.751	0.2815	0.375
2007-08	1.064	0.177	0.167	1.290	0.221	0.171	0.833	0.167	0.201	1.024	0.245	0.240	0.978	0.062	0.064	0.832	0.1546	0.186
2008-09	1.157	0.333	0.288	1.072	0.137	0.127	1.079	0.321	0.297	1.078	0.283	0.263	0.987	0.074	0.075	1.015	0.2041	0.201
2009-10	0.784	0.284	0.362	1.333	0.192	0.276	0.695	0.342	0.257	0.916	0.271	0.266	0.972	0.069	0.067	0.882	0.1717	0.157
2010-11	0.891	0.409	0.459	1.272	0.331	0.260	0.612	0.236	0.387	0.796	0.330	0.414	0.951	0.100	0.105	0.823	0.1649	0.199
2011-12	0.791	0.436	0.552	0.876	0.196	0.224	0.805	0.175	0.217	0.874	0.379	0.433	0.990	0.069	0.070	0.878	0.247	0.281
2012-13	1.060	0.368	0.347	1.062	0.322	0.304	0.977	0.124	0.127	1.050	0.238	0.226	0.921	0.148	0.160	0.927	0.2051	0.221
2013-14	0.807	0.410	0.508	1.021	0.296	0.290	0.793	0.252	0.318	0.889	0.264	0.296	0.738	0.266	0.360	0.860	0.1731	0.201

Note: dTFP= change in productivity scores, dTech= change in technology; dEff= change in efficiency level; dITE= change in input oriented technical efficiency; dIME= change in mix efficiency; dRISE= change in residual scale efficiency. 2. SD= standard Deviation; CV= coefficient of variation

4. QUARTILE REPRESENTATION FOR TOTAL FACTOR PRODUCTIVITY

The keeping money area in India went under the changes procedure amid the underlying long stretches of 1990s. There have been changes in the approaches since the money related deregulation occurred in the year 1997-98. In this manner, such activities may have gotten the explanation behind decay the efficiency scores amid the underlying long periods of the examination. On the other hand, the extension of branches and the association of high interest in the underlying years could be the mindful factor for the decrease saw to start with. Be that as it may, the getting up to speed impact as clarified already may be the dependable segment for increment on the efficiency scores after the year 2000-01. Be that as it may, managing an account division in India has not indicated much enhancement in the adjustment in profitability file is still works beneath the proficient generation wilderness. In the present sub segment, a bank and year-wise similar examination of efficiency development for banks is introduced.

Investigating the estimates of TFP change the banks under quartile 1 speaks to saves money with normal dTFP score beneath the primary quartile. These banks are being considered as frail entertainers as far as change in efficiency development over the timeframe. It has been featured that amid 1996-97, 4 PSBs, 6 PrSBs and 6 FSBs fall under the quartile I. Then again, 2 PSBs, 2 PrSBs and 1 FSBs shows up under classification I amid 2013-14

It has been reflected from the Table 6.3 that banks at first under the quartile I can move under larger amounts over the period. The banks situated under the quartile II work with the normal profitability score just most likely because of the ominous condition for the activities. Saves money with dTFP score among first and second quartile can fall under this quartile. Out of 58 banks, just 7 banks (4 PSBs, 2 PrSBs and 1 FSBs) and 5 banks (1 PSBs, 2 PrSBs and 2 FSBs) are recorded in this quadrant amid 1996-97 and 2013-14, individually. The banks under this classification can make persistent enhancement as far as efficiency and benefit by the reception of various item blend and business methodologies.

Quartile III comprises of the banks wherein dTFP score lies among middle and third quartile. Along these lines, the banks under this quadrant need to make ideal use of their assets accessible at their end. Out of 58 banks, 23 banks (9 PSBs, 7 PrSBs, 7 FSBs) amid 1996-97 and 2013-14 fall under the quartile III. The high score of profitability gives a thought that the earth inside which the banks are working is great one. The quartile IV contains the star entertainers having dTFP scores over the third quartile. The quadrant gives outline that the banks in the fourth quartile are the most beneficial and astounding

entertainers in the example. The star entertainers are reasonable for benchmarking and can turn into the good examples for the low performing banks. The outcomes represent 16 (9PSBs, 2PrSBs, 5 FSBs) and 12 (6PSBs, 2PrSBs, 4FSBs) out of 58 banks in various possession bunches set out components of the ideal and benchmark quartile. These outcomes feature compelling execution of banks over the time of two decades. Consequently, it very well may be finished up from the exchange that banks under various proprietorships can move at upper quartiles. Be that as it may, then again, there has likewise been disintegrations watched for banks under various gatherings over the timeframe.

As a rule, it has additionally been additionally seen from the quartile portrayals of the efficiency of business banks that out of three proprietorship gatherings, the banks underneath the normal (middle) bring down execution, need imperativeness as far as the profitability in managing an account activities. In this manner, these banks can be considered as upset banks and subsequently, these banks additionally have the potential for upgrades as far as efficiency as these banks have an inclination of advancing toward the upper quartiles consistently.

Further, these banks might be under-resourced and most likely have absence of proper aptitudes in giving the new innovation. In this manner, these banks should attempt to audit their tasks and the board approaches in order to evacuate the precariousness in the efficiency development.

5.CONCLUSION

The examination reports that in spite of the fact that the efficiency change has been the reason for relapse in lower profitability of banks, yet lingering input scale inefficiency (one of the parts of efficiency change) is the real issue for banks in India. In this manner, banks ought to likewise focus on working at the purpose of most beneficial scale measure in order to be scale effective and in this way enhancing the general efficiency while working at the unlimited boondocks and permitting the input, yield blend and level to fluctuate.From the above exchange, it very well may be reasoned that banks are demonstrating higher profitability while moving from one point of outskirts to the next yet keeping money segment can additionally move to the point where the beam from the cause is digression to the generation boondocks, characterizing the purpose of most extreme conceivable efficiency, such development requires better abuse of the scale economies. As a result there is huge opportunity to get better in Indian banks regarding unadulterated and blend efficiency. In this way, it is recommended that the banks appearing because of scale inefficiency should deliver at the most beneficial scale measure

and work at the ideal scale of generation. Likewise, there ought to likewise be center around the best possible administration of the important assets in order to deliver at the efficiency wilderness. Subsequently, the present examination gives the suggestions to the approach creators that they should execute such measures which improve efficiency of banks, in this manner, not concentrating just on the innovative perspectives but rather alternate parts too. The banks should utilize their inputs in progressively effective way and with appropriate administration, in order to expanding the execution by working at productive scale.

REFERENCES

1. Arora, S., &Kaur, S. 2008 . Diversification in Baning Sector in India : Determinants of Financial Performance. The Indian Journal of Commerce , 1 (3) : 13-21

2. Bakshi, S. 2013. Corporate Governance in Transformation Times. IBA Bulletin, 25 (3) : 65- 70

3. Bhattacharya, P. C., & Subramanian, M. 2015 . Trends and composition of Bank Credit in India. Finance India , XIX : 493-512

4. BHADRAPPA HARALAYYA , P.S.AITHAL ,STUDY ON PRODUCTIVE EFFICIENCY OF BANKS IN DEVELOPING COUNTRY, International Research Journal of Humanities and Interdisciplinary Studies (www.irjhis.com) ISSN : 2582-8568, Volume: 2, Issue: 5, Year: May 2021, Page No : 184-194.Available at : http://irjhis.com/paper/IRJHIS2105025.pdf

5. BhadrappaHaralayya ; P. S. Aithal . "Study on Model and Camel Analysis of Banking" Iconic Research And Engineering Journals Volume 4 Issue 11 May 2021 Page 244-259. Available at https://irejournals.com/paper-details/1702750

6. B. Haralayya and P. S. Aithal, "A Study On Structure and Growth of Banking Industry in India", International Journal of Research in Engineering, Science and ManagementISSN (Online): 2581-5792 Volume 4, Issue 5, May 2021.Page no 225–230. Available at:https://www.journals.resaim.com/ijresm/article/view/778/749.

7. BhadrappaHaralayya, Retail Banking Trends in India ,International Journal of All Research Education and Scientific Methods (IJARESM) ISSN:2455-6211, Volume: 9, Issue: 5, Year: May 2021, Page No : 3730-3732. Available At

http://www.ijaresm.com/uploaded_files/document_file/Bhadrappa_Haralayyaqscw.pdf

8. BHADRAPPA HARALAYYA, P.S.AITHAL, FACTORS DETERMINING THE
    EFFICIENCY IN INDIAN BANKING SECTOR : A TOBIT REGRESSION ANALYSIS",
    International Journal of Science & Engineering Development Research (www.ijsdr.org)
    ISSN:2455-2631, Vol.6, Issue 6, page no.1 - 6, June-2021, Available
    :http://www.ijsdr.org/papers/IJSDR2106001.pdf

9. BHADRAPPA HARALAYYA, P.S.AITHAL, STUDY ON PRODUCTIVE EFFICIENCY
    OF FINANCIAL INSTITUTIONS, International Journal of Innovative Research in
    Technology ISSN: 2349-6002, Volume 8, Issue 1, Page no: 159 – 164,June-2021 Available:
    http://ijirt.org/master/publishedpaper/IJIRT151514_PAPER.pdf

10. BHADRAPPA HARALAYYA , STUDY OF BANKING SERVICES PROVIDED BY
    BANKS IN INDIA, International Research Journal of Humanities and Interdisciplinary
    Studies (www.irjhis.com) ISSN : 2582-8568, Volume: 2, Issue: 6, Year: June 2021,Page No
    : 06-12, Available at : http://irjhis.com/paper/IRJHIS2106002.pdf.

11. BHADRAPPA HARALAYYA, P.S.AITHAL , ANALYSIS OF BANK PERFORMANCE
    USING CAMEL APPROACH", International Journal of Emerging Technologies and
    Innovative Research (www.jetir.org | UGC and issn Approved), ISSN:2349-5162, Vol.8, Issue
    5, page no 305-314, May-2021, Available at: http://www.jetir.org/papers/JETIR2105840.pdf

12. BHADRAPPA HARALAYYA, P.S.AITHAL, ANALYSIS OF BANK PRODUCTIVITY
    USING PANEL CAUSALITY TEST, Journal of Huazhong University of Science and
    Technology ISSN-1671-4512, Volume 50, Issue 6, Page no: 1 – 16, June-2021 Available at:
    https://app.box.com/s/o71lh776opeypauvzucp9esntjwur9zf

13. BHADRAPPA HARALAYYA, P.S.AITHAL, INTER BANK ANALYSIS OF COST
    EFFICIENCY USING MEAN, International Journal of Innovative Research in Science,
    Engineering and Technology (IJIRSET) e-ISSN: 2319-8753, Volume 10, Issue 6, Page no:
    6391-6397, June-2021 Available at:
    http://www.ijirset.com/upload/2021/june/97_INTER_NC1.pdf

14. BHADRAPPA HARALAYYA, P.S.AITHAL , ANALYSIS OF TOTAL FACTOR
    PRODUCTIVITYAND PROFITABILITY MATRIX OF BANKS BY HMTFP AND FPTFP,
    Science, Technology and Development Journal ISSN : 0950-0707, Volume 10, Issue 6, Page
    no: 190-203, June-2021 Available at: http://journalstd.com/gallery/23-june2021.pdf

15. Kumar, S., &Gulati, R. 2011 . Income-Generating Efficiency of Public Sector Banks in India: An application of Data Envelopment Analysis. ArthVijnana , 11 (2) : 103-126.

16. Kumar, S., &Verma, S. 2011 . Technical Efficiency,Benchmarks and Targets: A Case Study of Indian Public Sector Banks. Prajnan , XXXI : 275-299.

17. l, R., &Saluja, R. 2012 . E-Banking :The Indian Scenario. Asia Pacific Journal of Marketing & Management Review , 1: 4-9

18. Lal, R.C. 2007. Banking Transformation through IT in India. Journal of Commerce and Trade, 2 (2) :46-48

19. Latha, K. 2012 . Non-Performing Assets in Banks: An Analytical Study. Business Analyst , 23 Majumdar, U. S. 2000 . Universal Banking-A Bird's Eye View. The Management Accountant , (II) :35. Malhotra, M. 2009. Banks and Capital Adequacy Ratio implications for Indian Economy. The Management Accountant.

20. Mathur, H. P. 2009 . Indian Banking Challenges Ahead. Yojna , 2 : 45

21. Haralayya, Dr. Bhadrappa and Saini, Shrawan Kumar, An Overview on Productive Efficiency of Banks & Financial Institution (2018). International Journal of Research, Volume 05 Issue 12, April 2018, Available at SSRN: https://ssrn.com/abstract=3837503

22. Haralayya, Dr. Bhadrappa, Review on the Productive Efficiency of Banks in Developing Country (2018). Journal for Studies in Management and Planning, Volume 04 Issue 05, April 2018, Available at SSRN: https://ssrn.com/abstract=3837496

23. Basha, Jeelan and Haralayya, Dr. Bhadrappa, Performance Analysis of Financial Ratios - Indian Public Non-Life Insurance Sector (April 30, 2021). Available at SSRN: https://ssrn.com/abstract=3837465.

24. Haralayya, Dr. Bhadrappa, The Productive Efficiency of Banks in Developing Country With Special Reference to Banks & Financial Institution (april 30, 2019). Available at SSRN: https://ssrn.com/abstract=3844432 or http://dx.doi.org/10.2139/ssrn.3844432

25. Haralayya, Dr. Bhadrappa, Study on Performance of Foreign Banks in India (APRIL 2, 2016). Available at SSRN: https://ssrn.com/abstract=3844403 or http://dx.doi.org/10.2139/ssrn.3844403

26. Haralayya, Dr. Bhadrappa, E-Finance and the Financial Services Industry (MARCH 28, 2014). Available at
    SSRN: https://ssrn.com/abstract=3844405 or http://dx.doi.org/10.2139/ssrn.3844405

27. Haralayya, Dr. Bhadrappa, E-payment - An Overview (MARCH 28, 2014). Available at
    SSRN: https://ssrn.com/abstract=3844409 or http://dx.doi.org/10.2139/ssrn.3844409 .

28. Agarwal, M., Athanasios, G. N., &Kusum, W. K. 2013. An Analysis of Efficiency and Productivity Growth of the Indian Banking Sector. Finance India , XVII : 511-521.