Faculty Development Program for IIHMR Group of Institutions

Review of Indian Health System in terms of Health Expenditure and Financial Risk Protection

Date: April 17, 2021

Dr. Pankaj Talreja
Assistant Professor
IIHMR, Jaipur

Dr. Pankaj Talreja is a "Master Teacher" trained by Indian School of Business(ISB), Hyderabad. He is an Assistant Professor at the International Institute of Health Management Research, New Delhi. He received his Post Graduate Diploma in Hospital Administration from Institute of Management Studies, YMCA, New Delhi in 2001. Since then he has been part of various National Health Programmes. After twenty years of illustrious career, Dr. Pankaj is pursuing his passion for Healthcare Finance.

IIHMR DELHI | INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH

Review of Indian Health System in terms of Health Expenditure and Financial Risk Protection

Dr. Pankaj Talreja

17th April 2021

About IIHMR Delhi

- IHMR Society (Not-for-profit), established 1984

- Mission: To improve health through academics research, consultancies and networking in health, health IT & hospital management

- Four Campuses: Jaipur, Delhi, Bangalore & Kolkata

An Overview of Indian Health System

- India has made remarkable progress

  ➢ Life expectancy has increased from approximately 58 years in 1990 to 68 years in 2017

  ➢ Eradicated diseases like polio, small pox.

- Despite this, face challenge

➢ High burden of Dual disease = Persistent Infectious disease and Rising Chronic diseases.

➢ Demographic transition: Geriatric population: Geriatric diseases also on rise.

➢ The goal of Indian health system : Provide Access to Equitable Affordable Quality health services.

Health System and Economic Growth

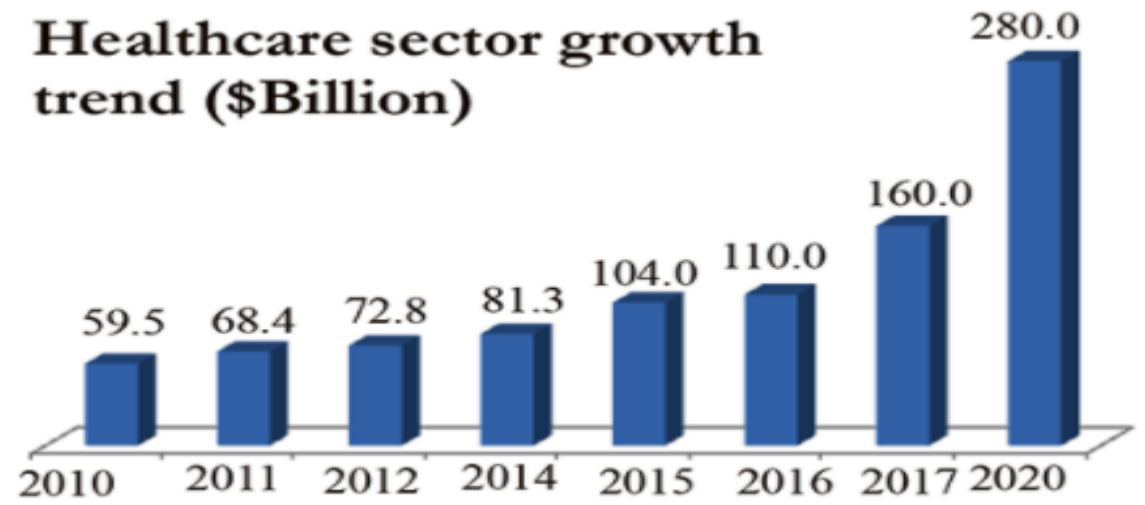**Motivation to look into health systems :**

There is strong relationship between health and economic growth. Health integral input to productivity
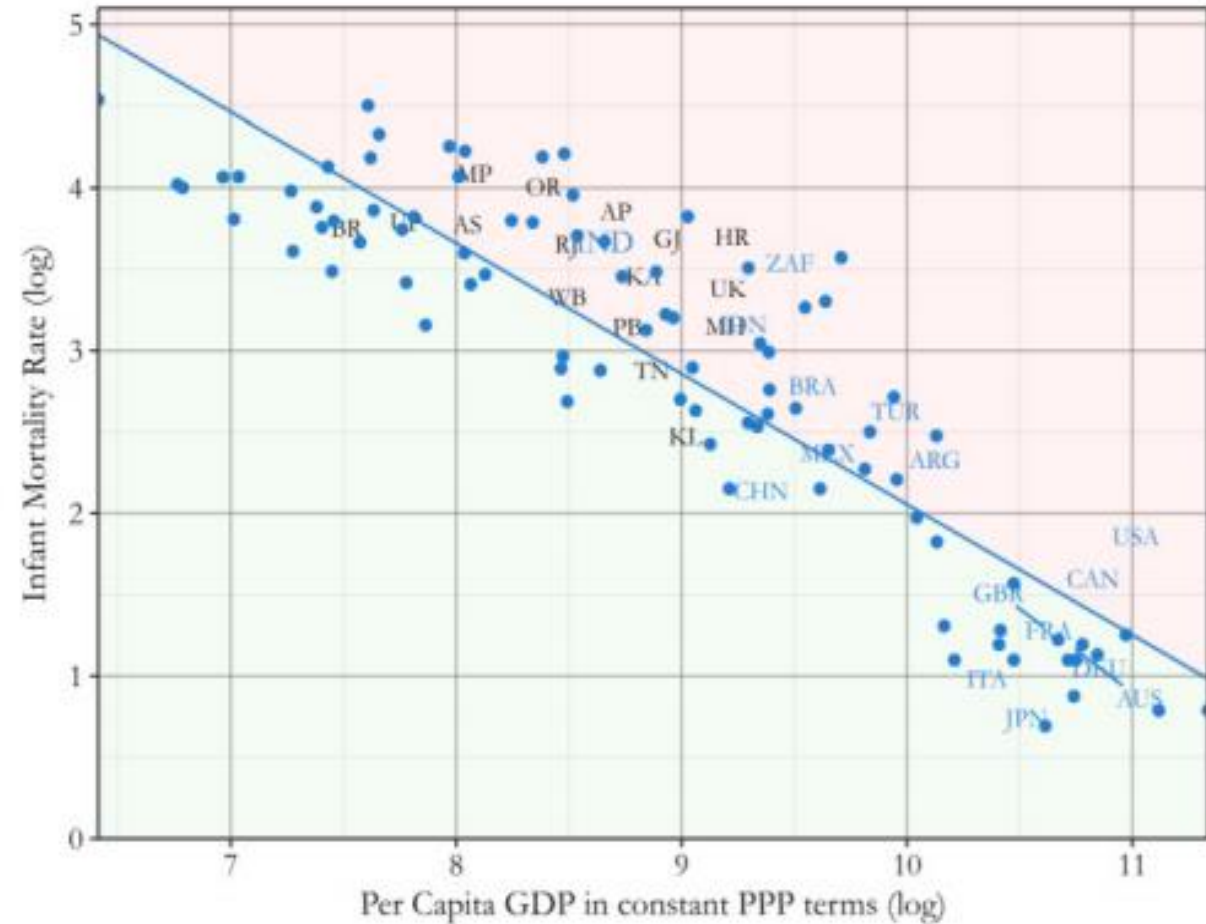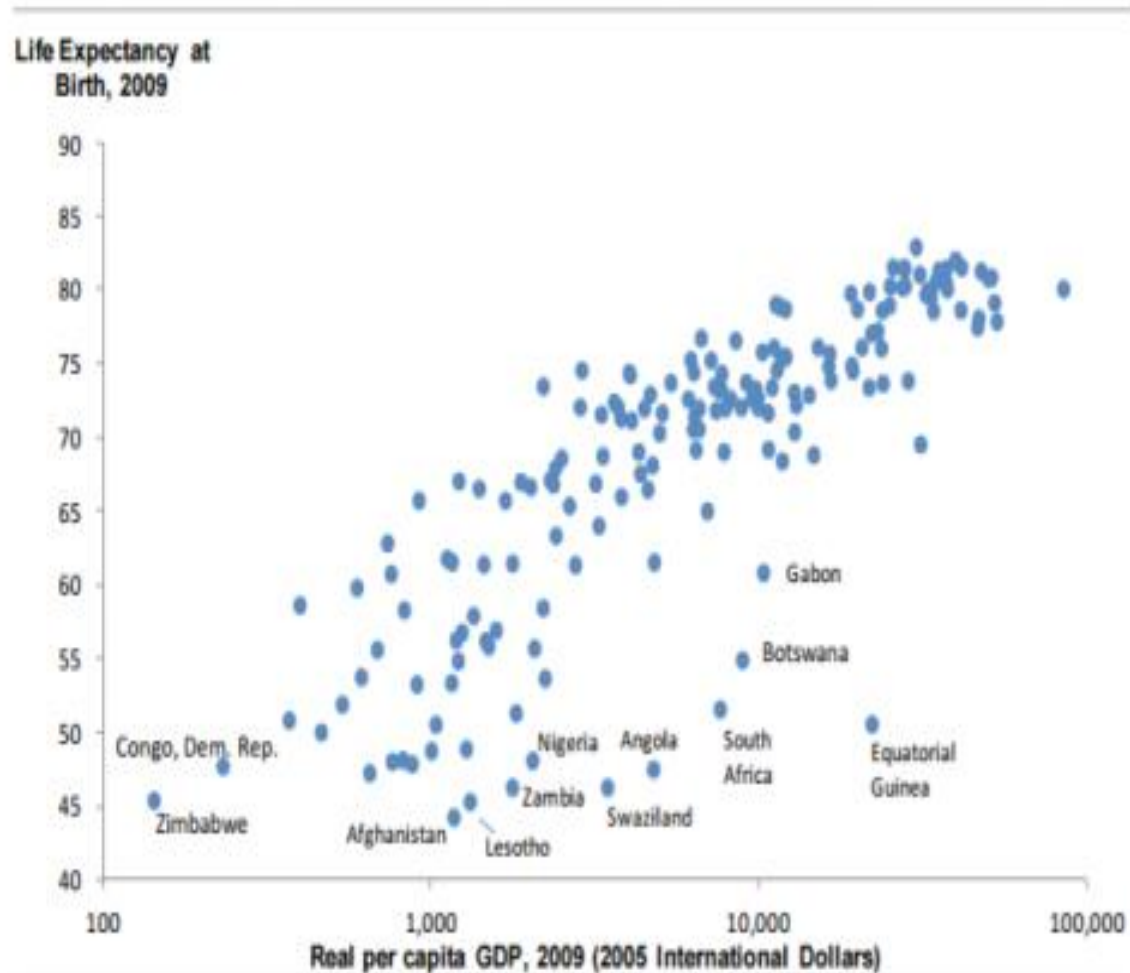
Source: Indian economic survey 2016-2017

ADVANTAGE INDIA

Healthcare sector growth trend ($Billion)

Year	Value
2010	59.5
2011	68.4
2012	72.8
2014	81.3
2015	104.0
2016	110.0
2017	160.0
2020	280.0

Healthcare market in India is expected to reach US$ 372 billion by 2022, driven by rising income, better health awareness, lifestyle diseases and increasing access to insurance.

The Government of India aims to increase healthcare spending to three percent of the Gross Domestic Product (GDP) by 2022.

The world's largest government funded healthcare scheme, Ayushman Bharat was launched on September 23, 2018.
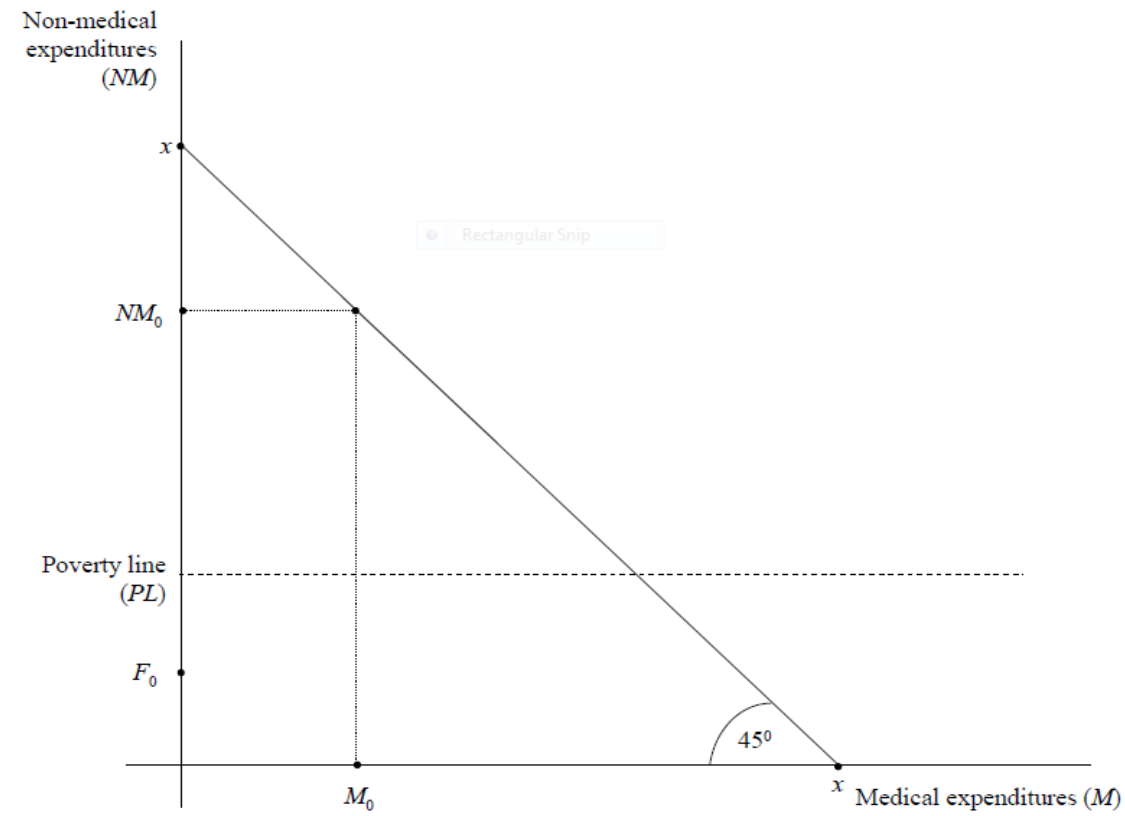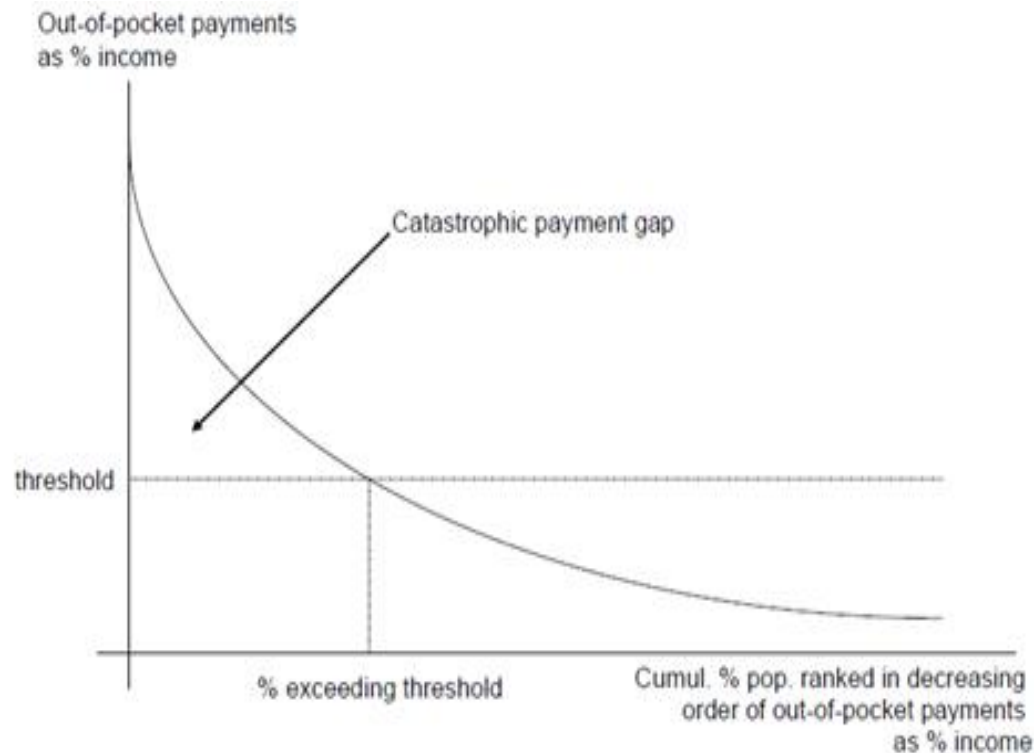
Research Objectives

1. To analyze the incidence of catastrophic health expenditure in India across various income quintiles belonging to rural and urban regions.

2. To estimate the impact of catastrophic health expenditure on poverty gap across rural and urban regions in India.

3. To study the impact of health insurance cover on health expenditure in Indian scenario.

4. To understand the factors affecting the financial performance of Indian Pharmaceutical industry (largest component of health expenditure).

5. To analyze the difference in the retail prices and public procurement rates of Rajasthan Medical Services Corporation (RMSC) of selected dental diseases in Indian adult population.

Research Methodology

The research methodologies have been listed objective wise, along with the analysis and the findings.

Approaches that have been used for objective 1 and 2 are as follows:

➢ **Catastrophic Expenditure Method:** Healthcare expenditure as a proportion of total household expenditure if it exceeds 10 percent then the household has faced catastrophic health shock.

➢ **Impoverishment Approach:** A household is classified as impoverished by OOP its pre-payment income (x) lies above the poverty line (PL) and the post medical expenditure the household lies below the poverty line.

Research Objective 1: To analyze the incidence of catastrophic health expenditure in India across various income quintiles belonging to rural and urban regions.

Null Hypothesis

The incidence of catastrophic health expenditure across income quintiles in rural area is equal to the incidence of catastrophic health expenditure in urban regions.

$$I(C) = 0$$

Alternate Hypothesis

The incidence of catastrophic health expenditure across income quintiles in rural area is not equal to the incidence of catastrophic health expenditure in urban regions.

$$I(C) \neq 0$$

Data Source:

Data on health statistics is taken from social consumption survey of 71st round of National Sample Survey(NSS): Jan-June 2014.

Sample Size: The total number of households canvassed was 36480 in rural India and 29452 in urban India. All India 65932 households have been included in this survey.

It includes data on cost of treatment of AYUSH (alternative schools of medicine) along with allopathic medicine and hospitalization rates of both public hospitals and private institutions.

Household characteristics and demographic particulars from each household on expenditure on health services for institutional and non-institutional care is also recorded for both rural and urban areas as well as for various states.

Research Findings

Income Quintile Groups	Proportion of Households Spending t on Healthcare		Proportion of Households facing Catastrophic Health Expenditure	
	Rural	Urban	Rural	Urban
Q1 (Poorest 20%)	0.7695	0.7385	0.0917	0.0608
Q2	0.8204	0.7869	0.1138	0.0940
Q3	0.8403	0.8111	0.1417	0.1042
Q4	0.8563	0.8309	0.1783	0.1275
Q5 (Richest 20%)	0.8682	0.8432	0.2407	0.1797
Overall (Average)	0.8253	0.8121	0.1424	0.1261
All India	0.8202		0.1361	

- In quintile 1 (bottom 20%) of rural areas 76.9% people have spent out of pocket in health systems while, out of this proportion 9.1% faced catastrophic health expenditure (which exceed total household expenditure by 10%). Similarly in rural areas Quintile1 results show that 73.8% people spent OOP, while 6% faced catastrophic health shock.

- Overall In India about 82% people spent OOP in both rural and urban areas, while 13.6% face catastrophic health shock by OOP spending more than 10% of total household expenditure.

- Rural areas always have higher incidence of catastrophic expenditure across all income quintiles. This indicates that rural areas are more vulnerable to health shocks as compared to urban areas.

t-test to test the difference between Rural and Urban catastrophic health expenditure

	Catastrophic Health Expenditure (Urban)	Catastrophic Health Expenditure (Rural)	t-test value (Pr: T < t)
Quintile 1	9810.18 (19.27)	14900.27 (10.44)	-25.05 (0.00)***
Quintile 2	13810.73 (18.08)	17440.39 (8.59)	-19.16 (0.00)***
Quintile 3	17940.3 (19.72)	20170.74 (8.69)	-11.0 (0.00)***
Quintile 4	22790.25 (21.50)	23800.24 (8.27)	-4.85 (0.03)**
Quintile 5	37180.13 (47.14)	39560.22 (57.24)	-4.66 (0.07)*

Note: Values in parenthesis show standard errors. *** *Statistically significant at 1 percent;* **at 5 percent; * at 10 percent

Research Findings

Poverty Measures	Rural	Urban
Gross Poverty Headcount (in %) (Pre OOP)	43.61 (0.25)	25.46 (0.25)
Net Poverty Headcount (in %) (Post OOP)	50.04 (0.25)	31.86 (0.27)
Poverty Impact: Net Headcount -Gross Headcount (in %)	6.42 (0.11)	6.40 (0.12)
Gross Poverty Gap (in Rs. per day) (Pre OOP)	3.96 (0.03)	2.77 (0.03)
Net Poverty Gap (in Rs. per day) (Post OOP)	17.11 (0.09)	13.43 (0.12)
Poverty Impact: Gross Poverty gap- Net Poverty gap (in Rs. per day)	13.15 (0.06)	10.66 (0.09)
Total Population (Population which will cross Poverty line due to Health Expenditure)	786,883,111 (47.21million)	337,605,952 (21.61 million)

- There is approximately an increase in headcount ratio by 6.4 % after adjusting for health expenditure across both rural and urban areas. This indicates that approximately 6.4 % more people are pushed below the poverty line due to health expenses.

- While the poverty impact measured in terms of the poverty gap shows higher poverty deepening in rural areas than urban areas. The poverty gap in rural areas increases by Rs13.15, while in urban areas the increase in poverty gap is approximately Rs.10.66 if health expenditure is accounted.

- Note: Poverty Line (Monthly)= Rs 512.74 Tendulkar Report: Planning Commission.

Research Methodology

Research Objective 3: To estimate the impact of health insurance cover on health expenditure in Indian scenario.

Data Analysis Model: Multivariate regression model

$$HE_i = \alpha_0 + \beta_0\, I_i + \beta_1 D_i + \beta_2 E_i + \varepsilon_{it}$$

where

HE_i: Health Expenditure of ith household.

I_i: Health Insurance of ith household (Dummy variable indicating 1 for presence of Health Insurance cover otherwise 0)

D_i: Vector of Socio-Demographic control variables of ith household (Age, education, religion, caste)

E_i: Vector of Economic control variables of ith household (MPCE, safe drinking water, toilet facility)

Data Source: 71st round of National Sample Survey(NSS): Jan-June 2014

Sample Size: The total number of households canvassed was 36480 in rural India and 29452 in urban India. All India 65932 households have been included in this survey.

Research Findings

Independent Variables	Coefficient	t stat (P>0)	95% Confidence Interval
Insurance	-11529.07	-7.99 (0.0) ***	-14357.26 – (-8700.88)
Urban (Base Category Dummy Rural)	5768.20	4.66 (0.0) ***	3339.7 – 8196.71
Household Size	2407.4	11 (0.0) ***	1978.3 – 2836.5
Education	433.5	3.29 (0.0) ***	175.37 – 691.62
Religion (Hindu and Others) (Others is Base Category Dummy Others)	1387.2	1.11 (0.26)	1065.02 – 3839.41
Caste	-1316.78	2.07 (0.03) **	-2563.48 – (-70.07)
Toilet	4214.97	3.12 (0.0) ***	1569.81 – 6860.13
Drainage	4452.02	3.47 (0.0) ***	1937.91 – 6966.11
Age	58.12	2.20 (0.02) **	6.26 – 109.98
Gender (Base Category Dummy Female)	-178.64	-0.16 (0.87)	-2316.669 – 1959.385
Number of observations	14315	F (12, 14302)	45.71
R-squared	0.037	Prob > F	0.00

Insurance is statistically significant and negatively associated with health expenditure. With insurance coverage, the health expenditure reduces on an average by Rs. 11,529.

Urban areas (as compare to rural)also on an average have higher Health expenditure by Urs. 5768. Increase in household size also on average increases the health expenditure by Rs. 2407.

As education increase health expenses also increases. SC, ST and OBC have less health expenditure than General caste. With income rise proxy like toilet, drainage facility especially in rural areas the health expenditure also rises. Aging also increases the health expenditure.

Research Methodology

Research Objective 4: To understand the factors affecting the financial performance of Indian Pharmaceutical industry (largest component of health expenditure).

Panel Data Method: Random Effects (based on Hausman Test Result Value: 4.1)

Equation:

$$Profit_{it} = \alpha_0 + \alpha_1\, mktsz_{it} + \alpha_2\, frmsz_{it} + \alpha_3\, Exp_{i,t} + \alpha_4\, Imp_{i,t} + \alpha_5\, Ad_{i,t} + \alpha_6\, Raw_{i,t} + \alpha_7\, Power_{i,t} + \alpha_8\, Wage_{i,t} + \alpha_9\, MA_{i,t} + u$$

Where:

- Profit is the ratio of profit after tax to sales of firms

- Mktsz represents market size of firms (measured as market share of firms in the industry.

- Frmsz resents firms size as proxied by its fixed assets.

- Exp is a variable representing Export intensity. Imp is a variable representing Import intensity.

- Adv is a variable representing Advertisement intensity. Raw is a variable representing Raw material use intensity.

- Power is a variable representing Power use intensity. Wage is a variable representing Wage intensity.

- *MA* is a variable representing mergers and acquisitions.

Methodology Continued for Objective 4

Data Source: CMIE Dataset

Data on a set of selected pharmaceutical companies is collected from PROWESS database of Centre for Monitoring Indian Economy (CMIE), Mumbai.

Time frame Selected for Study: 1990 to 2016

The chosen time period is relevant from the context of policy reforms as Indian Patent Act underwent important amendments during this period.

Sample Size: 56 NSE Listed Pharmaceutical companies selected. Therefore the total number of observations are 56*26= 1456.

Research Findings

	Coefficient	Std Error	Z- Stat	P value
Market Size	1.13	0.10	2.1	0.09*
Export Intensity	1.97	0.10	19.04	0.00***
Firm Size	-0.20	0.09	-1.18	0.12
Import Intensity	-1.79	0.33	-5.28	0.00***
Advertisement Intensity	1.02	1.55	0.66	0.51
Raw Material Intensity	0.75	0.35	2.09	0.03**
Power Use Intensity	3.24	1.01	3.21	0.00***
Wage Intensity	5.93	0.42	2.03	0.00***
Mergers &Acquisitions	10.1	0.19	14.93	0.003***
Intercept	1.37	0.37	0.06	0.66
Wald Chi2	8606.02	Hausman Test Value: 3.32		
R-sq: within	0.05	Breusch-Pagan Test Value: 75.72		
R-sq between	0.98			
R-sq overall	0.97	*** Statistically significant at 1 percent; **at 5 percent; * at 10 percent		

Wald Chi square value is statistically significant. Moreover R square is also satisfactory indicating the explanatory power of the model.

Mergers and acquisition show statistically significant positive correlation with pharmaceutical profitability. This hints towards market concentration and monopolies leading to higher prices of medicines.

The model suggests that the performance in terms of its profitability of a firm depends positively on Market share and market size, Lagged values of Raw material use intensity, power use intensity and wage intensity. However, profitability is inversely associated with firm size. This is due to X-inefficiency phenomenon: Due to increased entry of competitive firms, the profit margins go down.

Research Methodology

- **Research Objective 5:** To analyze the difference in the retail prices and public procurement rates of Rajasthan Medical Services Corporation (RMSC) of selected dental diseases in Indian adult population.

- *Research Design: Cost analysis: It is a partial economic evaluation that focuses on the estimation of costs associated with medicines.*

- The initial step was to prepare a list of medicines used in the selected dental lesions according to standard treatment guidelines.

- Standard treatment guideline were developed for four levels of health care which were in conformity with the Indian Public Health Standards.

- The levels of care were Level 1 – Solo: Physician clinic, Level 2 – Six to ten bedded healthcare facility, Level 3 – Thirty to hundred bedded healthcare facility, Level 4 – Hundred or more bedded healthcare facility.

- In the next step the above mentioned list of medicines was broken down into the formulations based on the medicines and their specific dosage forms and strengths. Next, for each formulation, we tried to identify the relevant packs in the PharmaTrac database.

Data Source:

PharmaTrac Data (Year 2014), RMSC officially approved procurement sheets from the RMSC website, Burden of disease in India from National commission on macroeconomics and health; published secondary data review. The data of Pharmatrac provided maximum retail price (MRP) and price to retailer (PTR) as per the medicine pack size.

Dental Caries

Level Of Care	Drug	Strength	Schedule (Hours)	Length of treatment (Days)	Total Units	Cost of treatment in Private Market (Rs)	Cost of treatment with RMSC Rates (Rs)	Difference in treatment Cost per patient (In %)	Treatment price Difference (In %)	Ratio
Level 1-3	Cap Amoxycillin	500mg	8hourly	5	15	170.23	57.16	197.79	**197.79**	**2.98**
	Tab Paracetamol	500mg	8hourly	5	15					
	Tab Ibuprofen	400mg	8 hourly	5	15					
	MW Cholrhexidine	0.2%-5Ml	12hourly	15	150 mL					
Level 4	Cap Amoxycillin	500mg	8hourly	5	15	177.0	61.81	186.47	**186.47**	**2.86**
	Tab Metronidazole	400mg	12hourly	5	10					
	Tab Ibuprofen	400mg	8 hourly	5	15					
	Tab Paracetamol	500mg	8hourly	5	15					
	MW Chlorhexidine	0.2%-5Ml	12hourly	15	150 mL					

Dental Periodontitis

Level Of Care	Drug	Strength	Schedule (Hours)	Length of treatment (Days)	Total Units	Cost of treatment in Private Market (Rs)	Cost of treatment with RMSC Rates (Rs)	Difference in treatment Cost per patient (In %)	Treatment price Difference (In %)	Ratio
Level 1-3	Tab Ciprofloxacin	500 mg	12 hourly	5	10	131.85	41.43	218.23	218.2	3.18
	Tab Metronidazole	400 mg	12 hourly	5	10					
	MW Chlorhexidine	0.2% -5mL	12 hourly	15	150 mL					
Level 4	Tab Ciprofloxacin	500 mg	12 hourly	5	10	248.02	70.35	252.57	252.57	3.53
	Tab Metronidazole	400 mg	12 hourly	5	10					
	Tab Ibuprofen	400 mg	8 hourly	5	15					
	MW Chlorhexidine	0.2% -5mL	12 hourly	15	150 mL					

Research Findings

- The pharmaceutical cost of treatment of dental caries as well as periodontitis is approximately 3 times higher if retail price is considered instead of RMSC public procurement costs.

- The percentage difference in the value of medicines used for treating a single patient dental caries using RMSC procurement rates at level 1 to level 3 of care is approximately 198% lower than market prices of the same formulations.

- Similarly, the percentage difference in the value of medicines used for treating a single patient with dental caries using RMSC procurement rates at level 4 of care is approximately 195% lower than market prices of the same formulations.

- The percentage difference in the value of medicines used for treating a single patient dental periodontitis using RMSC procurement rates at level 1 to level 3 of care is approximately 218% lower than market prices of the same formulations.

- Similarly, the percentage difference in the value of medicines used for treating a single patient with periodontitis using RMSC procurement rates at level 4 of care is approximately 252% lower than market prices of the same formulations.

t-test to test the difference between Market retail price & public procurement price according to level of care

Level of Care	Disease	t-test value	Probability Pr.(T < t)
Level 1-3	Dental Caries	14.09	0.003***
Level 4	Dental Caries	23.44	0.01**
Level 1-3	Dental Periodontitis	10.99	0.08*
Level 4	Dental Periodontitis	23.09	0.01**

Note: *** Statistically significant at 1 percent; **at 5 percent; * at 10 percent

Conclusion

- Health systems are extremely complicated in principle, so it is not easy to reach conclusions about the appropriate role of the state in the health sector.

- But it is evident that Indian health industry suffers from gross inadequacy of Government expenditure which has forced individuals to contribute more in the form of out of pocket expenditure.

- The financing through the way of out of pocket expenditure is the most inefficient lacking all the principles of insurance (prepayment, risk pooling and cross subsidization).

Conclusion Contd.

- This situation needs an immediate attention where not only increase in the contribution of public finance is required but also needs an effective allocation and regulation.

- Public procurement can significantly reduce medicine prices, which form a large component of health expenditure in India.

- Competition policies can also help in reducing the monopolies in pharmaceutical industry by regulating the mergers and acquisitions and thereby reduce medicine monopoly prices.

Conclusion Contd.

- Healthcare is a fundamental human right and benefits of a healthy nation have always been common knowledge. This research has been an attempt to empirically define the various costs associated with healthcare.

- The initial results have been suggestive that due to out of pocket payments, a sizeable population does experience catastrophic health shocks and impoverishment at worse.

- Insurance does seem to be a good hedge to out of pocket expenditure, but since it is an indirect cost, the long term sustainability is an another dimension which could be an area of further exploration.

- Medicines have been the largest component of out of pocket payments, and thus there was a need to look at Structure Conduct Performance of Pharmaceutical Industry.

Policy Implication

- The catastrophic health expenditure is higher in rural areas than urban areas across all income groups. Moreover 47 million people in rural areas and 21 million people in urban areas cross poverty line (impoverishment) due to healthcare expenses by OOP. There is dire need for providing corrective policy measures to provide financial risk protection in Indian health system.

- Financial protection by Insurance is a remedial policy measure. Insurance has statistically significant and negatively associated with health expenditure. With insurance coverage, the health expenditure reduces on an average by Rs. 11,529.

- It was noted that that the highest component of health expenditure in both rural as well as urban areas is medicines accounting for 68% to 72% of health expenditure. Mergers and acquisition show statistically significant positive correlation with pharmaceutical profitability. This hints towards market concentration and monopolies leading to higher prices of medicines. Competition policies and acts would be useful policy measures to check monopolies and higher prices of medicines

- Public procurement of medicines is an efficient measure to reduce procurement prices of medicines by a scale of 3-4 times than retail prices.

Publications

- Talreja, Pankaj and Kalra, Rosy. 'Pharmaceutical Cost Analysis of Dental Diseases: An Indian Scenario'. International Journal of Risk & Safety in Medicine, vol. 31, No. 3, pp. 165-177, 2020

- Talreja, Pankaj and Kalra, Rosy. 'Finally Medicines are affordable: Success Story of innovative public procurement model'. Indian Journal of Economics & Business, Vol. 17, No. 3, pp. 93-104, 2018

- Talreja, Pankaj and Kalra, Rosy. 'Cost Analysis of Dental Disease Drugs in India: Efficiency in Central Procurement System'. Health and Population - Perspectives and Issues, Vol. 42, No. 1 – 2, pp. 138-150, 2019

References

- Peters DH, Yazbeck AS, Sharma RR et al. 2002. Better health system for India's poor: findings, analysis and options. Human Development

- Network, Health, Nutrition and Population series. Washington DC: The World Bank.

- Van Doorslaer E, O'Donnell O, Rannan-Eliya RP et al. 2006. Effects of payments for health care on poverty estimates in 11 countries in Asia: an analysis of household survey data. The Lancet 368: 1357–64.

- Berki SE. 1986. A look at catastrophic medical expenses and the poor. Health Affairs 5: 138–45.

- Wagstaff A, Van Doorslaer E. 2003. Catastrophe and impoverishment in paying for health care: With applications to Vietnam 1993–98. Health Economics 12: 921–34.

- Peters DH, Rao SK, Fryatt R. 2003. Lumping and splitting: the health policy agenda in India. Health Policy and Planning 18: 249–60.

- Xu K, Zeramdini R, Klavas J et al. 2003. Household catastrophic health expenditure: a multicountry analysis. The Lancet 362:111–7.

- Krishna A. 2004. Escaping poverty and becoming poor: who gains, who loses, and why? World Development 32: 121–36.

- Russell S. 2004. The economic burden of illness for households in developing countries: a review of studies focusing on malaria, tuberculosis, and human immunodeficiency virus/acquired immunodeficiency syndrome. American Journal of Tropical Medicine and Hygiene 71(Supp. 2): 147–55.

- O'Donnell O, van Doorslaer E, Rannan-Eliya RP et al. 2007. The Incidence of public spending on healthcare: comparative evidence from Asia. World Bank Economic Review 21: 93–123.

References

- Ahuja R. 2004. Health insurance for the poor. Economic and Political Weekly 39: 3171–8.

- Government of India. 2005. National Health Accounts India (2001–2002). New Delhi: Ministry of Health and Family Welfare.

- Mahal A, Sakthivel S, Nagpal S. 2005. National health accounts for India. In: National Commission on Macroeconomics and Health (NCMH). Financing and delivery of health care services in India. NCMH Background Papers. New Delhi: Ministry of Health and Family Welfare, Government of India, pp. 256–63.

- Garg CC. 2006. Is health insurance feasible in India? Issues in private and social health insurance. In: Prasad S, Satyamala C (eds). Securing health for all: dimensions and challenges. New Delhi: Institute for Human Development, pp. 430–50.

- Russell S. 2004. The economic burden of illness for households in developing countries: a review of studies focusing on malaria, tuberculosis, and human immunodeficiency virus/acquired immunodeficiency syndrome. American Journal of Tropical Medicine and Hygiene 71(Supp. 2): 147–55.

- NCMH. 2005. Report of the national commission on macroeconomics and health. New Delhi: Ministry of Health and Family Welfare, Government of India.

- Sakthivel S. 2005. Access to essential drugs and medicines in financing and delivery of health care services in India. In: National Commission on Macroeconomics and Health (NCMH). Financing and delivery of health care services in India. NCMH Background Papers. New Delhi: Ministry of Health and Family Welfare, Government of India, pp. 185–212.

- Xu Ke, David B Evans, Kei Kawabata, Riadh Zeramdini, Jan Klavus, Christopher J L Murray. *Household catastrophic health expenditure: a mult-icountry analysis.* The Lancet • Vol 362 • July 12, 2003

References

- Ranson, M.K. *Reduction of Catastrophic Health Care Expenditures by a Community based Health Insurance Scheme in Gujarat, India: Current Experiences and Challenges.* Bulletin of the World Health Organization. 80(8): 613-31. 2002

- Pradhan, M and N. Prescott. *Social Risk Management Options for Medical Care in Indonesia.* Health Economics 11:431-46. 2002.

- Wagstaff, A and E. van Doorslaer. *Catastrophe* and Impoverishment in Paying for Health Care: With Applications to Vietnam 1993-98. Health Economics 12: 921-34. 2003.

- Russell, S. *The Economic Burden of Illness for Household in Developing Countries: A Review of Studies Focusing on Malaria, TB and HIV/AIDS.* American Journal of Tropical Medicine and Hygiene 71 (Supp 2). 147-55.

- Su Tin Tin, Bocar Kouyaté, & Steffen Flessa . *Catastrophic household expenditure for health care in a low-income society: a study from Nouna District, Burkina Faso.* Bulletin of the World Health Organisation. Volume 84, Number 1, January 2006.

- Musgrove Philip and R. Zeramdini. *A Summary Description of Health Financing in WHO Member States.* Commission on Macroeconomics and Health Working Paper Series Paper No. WG3 : 3. Date: June 2001

- Krishna, Anirudh, M Kapila, M. Porwal and V. Singh. *Why Growth is not Enough: Household Poverty Dynamics in Northeast Gujarat, India*. Journal of Development

- Studies, Vol. 41, No. 7. October 2005.

- Krishna, Anirduh. *Pathways Out of and Into Poverty in 36 Villages of Andhra Pradesh, India.* World Development Vol. 34, No. 2, pp. 271–288, 2006.

Descriptive Statistics of the SCP Model

Variable	Mean	Std. Dev.	Min	Max
Profit After Tax	207.4233	1918.48	-8790	28850.7
Mktsize	5.823145	2.289402	-2.30259	11.57629
Frmsize	5.850888	2.270068	-2.30259	12.654
Marketshare	0.062893	0.1359	0	1
Totalassets	4376.328	21106.77	0.1	313014
ExpInt	0.408998	0.657225	6.84E-05	9.924157
ImpInt	0.333473	1.948209	0.000146	34.66667
AdvInt	0.058349	0.129065	0	2.333333
Rawmaterial_Int	0.587165	0.400426	-0.56044	5
Power_useInt	0.11792	0.537331	0.000253	9
WageInt	0.455451	3.478904	0.005233	69

Literature Review

- Pandey, A., et. al. (2018) showed that the proportion of households experiencing catastrophic health expenditure in India increased 1.5 times between the 1993–2012 expenditure survey. It was highest among households with older people.

- The study by Krishnan, P. G., & Savitha, N. (2019) shows that there exists a linear relationship among public health expenditure, population, and GDP. India's health spending found to very less when compared with America, England and China.

- Pandey A, Kumar GA, Dandona R, Dandona L (2018) found that catastrophic expenditure was higher in the high and higher-middle economic state groups than the low and lower-middle groups. Catastrophic Health Expenditure was distributed equally among the rich and poor because of the substantial increase among the poor over time.

- Srinath R, Yadav J (2019) Households experienced CHS nearly 4 times higher (37 percent) in private hospitals as compared to public hospitals (10 percent) due to high out of pocket payments.

Literature Review

- Anh, T. T., Binh, D. T. T., & Duong, N. V. (2014) revisited the SCP paradigm to understand the impact of market concentration and market share on profitability in case of Vietnamese firms. A positive correlation was found between market concentration and market share of rims and profitability of firm.

- Paper by Xu et al (2003) documents catastrophic health expenditure in 59 countries and the related out-of-pocket expenses in those countries. They identified preconditions for catastrophe are low paying capacity, absence of health insurance and out-of-pocket payment as the main mode of health financing.

- Other study done by Su et al (2017) noted catastrophe is correlated with the amount of household health care utilization, economic status and the duration and frequency of illness in an adult member of household and the presence of chronic illness episode in any member of house.

- Study done by Krishna et al (2015) , Krishna (2006) on village level determined that due to high health expenses, high rate of interest charged on debt in villages and social expenses associated with illness are the main reasons behind descent of household into poverty.

Literature Review

- In a study by Peters et al. (2012) the results showed that there is an increase in 2.2% population which go below poverty line because of health payments by out-of-pocket mode.

- While van Doorslaer et al. (2006) also pointed that approximately 37 million people in India went below the poverty line in 1999-2000 due to high out-of-pocket payment for healthcare expenses.

- The negative impact of high proportion of out-of-pocket payment is documented in studies done by Berki (1986), Wagstaff and Van Doorslaer (2003) which points towards an increase in inequity and more people pushed into poverty due to high OOP.

- Other studies done by Peters et al (2002), Xu et al (2003), Krishna (2004), Russell (2004), O Donnell et al (2007) points towards link between high OOP and catastrophic expenditures related to healthcare.

Literature Review

- Study by Philip et al (2001) uses multi-country level data indicating that with low incomes the OOP is proportionately very high and also quiet variable ranging from 20 to 80 percent of total health spending.

- A report by the National Commission for Macro-economics and Health (NCMH 2005) illustrates that the expenditure on drugs accounts a substantial proportion of health expenses in India. Study by Sakthivel (2005) reports that approximately three-quarters of health expenditure is on medicines.

- McDonald (1999) used time series analysis to study the determinants of profitability of Australian manufacturing firms. He found out significant positive impact of firm's market concentration on its performance but fails to find any significant impact of market share on profitability of firm.

- According to Feeny S. and Rogers M. (1999) worked to understand the role of market share and market concentration and diversification on profitability of 722 Australian firms data.