PRICING MODELS IN HEALTHCARE SERVICES

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Abstract

Rising healthcare costs are a major concern around the world. Expenditure on healthcare is increasing at a higher pace than income and inflation. These rising costs reduce the access to affordable and quality healthcare. According to 2016 PwC report, the main reason behind this trend is the pricing of healthcare services[1]. In healthcare, prices are not based on market based approach which is evident from the fact that even for common procedures there is significant variation in prices among healthcare providers. This is because consumers lack the awareness of appropriate price for a given service and hence are not able to influence the price. The need to bring free market influences and price transparency in healthcare industry has led to the introduction of package pricing/ flat fee, where the patients pay a fixed price for the entire treatment before receiving the treatment.

This fixed pricing strategy has now shifted the burden of risk due to cost uncertainty towards the healthcare provider/ hospital. Therefore, it is important for a healthcare provider to study its costs and make better pricing decisions in the presence of uncertainty which is the focus of this dissertation.

In my first problem, I study the pricing decisions of a healthcare provider under cost uncertainty for both risk neutral hospital maximizing its returns and risk averse hospital minimizing its risk characterized by Value at risk. I present multiple bounds on price according to different objectives of a hospital. I then combine these two contrasting objectives to analyse the tradeoff between risk and returns. I propose an efficient pricing interval for the pricing of a healthcare service and analytically prove that the optimal price would always lie between the risk minimizing and profit maximizing price. I also demonstrate the effect of demand and cost parameters on the optimal pricing decisions numerically.

Capacity constraint is a major factor in healthcare delivery, thus making capacity allocation an important decision. Also, under package pricing, revenues are now dictated by the treatment types a hospital offers as the price is now fixed for all the different treatments a hospital might offer. In my second chapter, I extend pricing problem to include capacity allocation decisions

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to find the optimal case mix for a healthcare provider. I derived conditions under which a hospital would offer package pricing. I solve case mix problem for a risk neutral hospital maximizing its returns/ expected profit and a risk averse hospital minimizing its Value at risk with i.e. VaR_α. I propose an efficient allocation interval which combines the two objectives where the hospital can choose the optimal allocation and pricing based on their risk-return trade-off.

In my third chapter, I make extensions to the pricing problem in two ways, first by including doctor as a decision maker who put effort to reduce cost along with the hospital and secondly by including quality as one more decision variable along with the price for the hospital. I analyse the interaction (joint, simultaneous and sequential) of two decision makers - hospital and doctor on the optimal decisions. My results show that under high cost uncertainty, the hospital put more cost reduction efforts by incentivising doctor. I conclude that for price sensitive consumers, hospital as first mover is the best strategy to follow and for quality sensitive consumers' doctor as first mover is the best strategy to follow. I also show that these comparisons of interaction models are of much more importance under high cost uncertainty and low value of the cost reduction capabilities of the doctor. Extension of the models, when the price is regulated by a third party shows that for a hospital, sequential interaction with the doctor as the first mover is the best strategy to follow.