

Optimal Control Theoretic Approach to Health Care Investment

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Abstract

Health care is ever more important with aging population. Assuming the number of doctors per patient is a good proxy for patient satisfaction, optimal investment in number of doctors may be in the form of investment in local doctors which requires heavy investment in universities and laboratories, and transferring foreign doctors into the country who require considerably higher salaries than local doctors. No additional investment is required for foreign doctors.

An optimal control methodology is employed to determine the optimal investment plans for the two alternative sources of doctors to maximize the net (of costs) patient satisfaction over a time horizon. Two models are considered. In one, the population is assumed to remain constant and in the other population is assumed to be increase at an exponential rate.

It found that a nation with insufficient number of doctors at the beginning of the time horizon should increase the investment in local doctors gradually while employing foreign doctors as to equate their salaries to the marginal satisfaction of the patients. An equilibrium exists and it is stable.

Keywords

Health Care, Optimal Control, Investment Plans

Biography

Dr. Mustafa Akan is an Associate Professor at Dogus University where he teaches finance, quantitative methods in business, economics, and insurance. He also teaches optimal control theory at Industrial engineering department at Bosphorus University. He has a BS in electrical engineering (Robert College), an MBA (Bosphorus University) and Ph.D in management (Northwestern and Bosphorus Universities). He worked as a treasurer and deputy general manager in charge of treasury and investment banking in leading Turkish banks for 10 years. He was the CEO of UAP (Union Assurance de Paris), Generali and Liberty Insurance companies for 17 years. His research interests are economics and management applications of optimal control theory, dynamic modelling, and revenue maximization.