

Summary of Research Papers

1. "Demand for Health under *ex ante* Moral Hazard," with Gerard Russo, presented at the 2006 Inaugural Conference of the American Society of Health Economists

This paper presents a dynamic model of investment in health. The model explicitly recognizes illness as random utility losses. Illness occurs according to a non-homogeneous Poisson process, whose intensity function has health stock as its argument. A representative individual's lifecycle behavior of consumption and investment in health capital is then examined under a continuous-time optimal control framework. With the introduction of health insurance, individual behavior under *ex ante* moral hazard is examined and conditions for optimal insurance are derived. The results of the model suggest that a lack of health insurance during young ages and guaranteed care by Medicare program at older ages can provide distorted incentives and cause dynamic inefficiency in individual lifetime health investment. Such inefficiency may explain the dilemma of high medical expenditure coupled with relatively poor health outcomes by the Americans.

2. "A Zero Augmented Negative Binomial Model in the Analysis of Medical Care Count Data," *under peer review*

This paper addresses the overfitting problem in the modeling of health care utilization count data by proposing a zero augmented negative binomial model (ZANB). In contrast to the popular two-part model approaches where the binary and the count processes are modeled with two separate data generating processes, ZANB conforms the two processes by imposing that parameters from the binary model and parameters from the count model should be linear transformations of each other. This constraint effectively reduces the number of free parameters by nearly half to mitigate the risk of overfitting. ZANB also avoids several theoretical difficulties encountered in the two-part models: weak identification between simple count models and two-part models; 'odd' aggregate effects; inefficient utilization of information. Besides the theoretical appeals, analyses on real

data confirm the good statistical properties and demonstrate superior prediction accuracy of this new estimation regime.

3. “Monte Carlo Evidence on the Robustness of Zero Augmented Negative Binomial Model,” *in progress*

This paper conducts a number of Monte Carlo simulation experiments under data generating assumptions of negative binomial, hurdle, and two-part model. Based on experimental data, the robustness of ZANBM is compared against the other estimators under two pairs of performance criteria: mean prediction bias and mean squared prediction error; elasticity bias and elasticity squared error. Graphical check of the predicted distributions is also presented.