Abstract: We consider price competition models for oligopolistic markets, in which the consumer reacts to relative rather than absolute prices, where the relative price is defined as the difference between the absolute price and a given reference value. Such settings arise, for example, when the full retail price earned by the “retailer” is reduced by virtue of a third party offering a subsidy or a rebate or in prospect theoretical models in which customers establish a reference price and base their choices on the differentials with respect to the reference price. When choosing among the various competing options, the consumer trades off the net price paid with various other product or service attributes, as in standard price competition models. The reference price may be exogenously specified and pre-announced to the competing firms. Alternatively, it may be endogenously determined, as a function of the set of absolute prices selected by the competing firms, for example the lowest or the second lowest price. We review five different application areas where the above model structure arises. We then characterize the equilibrium behavior under a general reference value scheme of the above type; this in a base model, where we assume that the consumer choice model is of the general MultiNomialLogit (MNL) type. We also derive comparison results for the price equilibria that arise under alternative subsidy schemes. These comparisons have important implications for the design of subsidy schemes.

We proceed to apply our results to the Medicare insurance market, both in terms of its existing structure, as well as in terms of various proposals to redesign the program, in particular the Wyden-Ryan plan. We show that implementation of the latter plan in 2010 would have reduced the capitation rates, on average by 18.5% and enabled savings of 16.2% in the governments’ costs. These numbers are significantly larger than traditional estimates obtained under the assumption that the plans’ premia and market shares would not be affected by the new capitation rate scheme. For beneficiaries continuing to opt for the traditional Medicare plan, the average monthly cost is roughly $64.

Bio: Lijian LU received his PhD degree in Decision, Risk, and Operations Division from Columbia Business School. His research interests are in the area of data-driven decision-making in operations management and service systems. He focuses on developing principles and practical methods for data-driven optimization and statistical estimations for big dataset in digital economy. He studies the implications of these on market design, experiment design, and service provision in supply chain management, revenue management, online service platforms, and finance-operations interface. His articles have appeared in leading journals, including Management Science, Manufacturing and Service Operations Management and Mathematics of Operations Research. His work has recognized with the 2018 INFORMS George Nicholson Student Paper Competition.