

Research Statement –Rui Wang

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As an applied microeconomist, my research consists of theory-driven analyses of socio-economic impacts of public policies. My current focus is on public health and healthcare policies, specifically the effect of price transparency on healthcare negotiated prices. In addition to this ongoing research, I am also examining the impact of water pollution on infant health, and the effectiveness of a disease management program on healthcare costs. The purpose of this statement is to provide details about these papers, my additional studies, and future projects.

My job market paper, entitled “Price Transparency and Healthcare Costs: The Case of the New Hampshire Healthcare Market”, analyzes the effect of price transparency on supply side changes to healthcare spending. While prior literature has studied consumer responses to healthcare price transparency, seldom of them pay attention on supply-side responses, particularly the insurer response. From the standpoint of healthcare spending reduction, the supply-side response to price transparency is more important because a relatively small share of consumers benefit from searching for low-cost providers while all consumers in the market benefit from negotiated prices changes. The contributions of this paper are that I extend the understanding of supply-side response to price transparency, and first offer price information as one explanation for the heterogeneity in the effect on negotiated price contracts.

I begin by examining the supply-side effect of New Hampshire Healthcost (NHHC) on negotiated prices of imaging services in New Hampshire. NHHC is a public website that initially disclosed the bundle prices of 31 common outpatient procedures. Two sources of variation are used to construct difference-in-differences (DID) estimators to identify the plausible causality. One is the observed pre- and post-negotiated price, and another is the variation in disclosure of prices across procedures. Through comparing the negotiated prices of the procedures, with and without price information, before and after the introduction of NHHC, I identify the overall effect of NHHC from both the demand and supply sides. To exclude the effect of consumer response, I introduce the fixed effects of the intersection of providers, procedures, and insurers, which controls for heterogeneity caused by consumers choosing different procedures, insurers, or providers. Considering that inconsistencies between CPT codes and procedure descriptions on the website may direct consumers and insurers to respond to procedures that did not match website information, I also utilize the spill over effect on these types of occurrences. With the addition of the spill over effect, I find NHHC reduced negotiated prices by 1.3%, due to supply-side response, throughout 2008-2010. Given that the average total payments of these procedures was \$586 prior to NHHC and there were 439,454 related visits after NHHC was launched, this is an approximate \$7.40 reduction per visit and \$3,241,788 in total savings. This finding also survives various robustness tests. Additionally, I perform event studies, showing that the negotiated prices did not reduce until the second year after the NHHC was launched, and that this reduction may come from the eventual increase of negotiated discounts and the decrease in provider charges.

To expand upon previous studies, I further investigate the insurer-provider renegotiation, which is a mechanism for price transparency to reduce negotiated prices. First, I develop a theoretical model in which insurers face uncertainty about the provider’s costs or bargaining

parameters. This model shows that price transparency reduces insurer uncertainty and the negotiated prices for those insurers who pay more than their competitors prior to price transparency. I then empirically examine the heterogeneous contracting behavior of insurer-providers by introducing a third variation of negotiated prices that insurers paid before the NHHHC. I find a larger reduction for insurers that were paying in the top quintile of prices relative to their competitors prior to NHHHC. To check whether low-cost providers would collude to charge more, I conduct similar triple difference specifications but from the provider perspective. I do not find consistent significant effect on the increase in the prices. Taking advantage of the unique feature of the data, I also directly study insurer-provider renegotiation and find the effect of NHHHC could be substantially attributed to renegotiation. Taken together, this paper demonstrates that price transparency has the potential to reduce healthcare expenditure. To the best of my knowledge, mine is the first paper that studies insurer-provider renegotiation under the price transparency policy. This paper has received financial support from the School of Liberal Arts (\$2500) at Tulane University.

The second paper uses the Flint water crisis as a natural experiment to estimate the effect of *in utero* exposure to water pollutions on health at birth. This paper, entitled “Something in the Pipe: Flint Water Crisis and Health at Birth”, is coauthored with Professor Xi Chen from Yale University and Professor Xun Li from Wuhan University. Matching vital statistics birth records with various sources of data, this paper employs a DID method, as well as a synthetic control approach to identify the causal impact on key birth outcomes. The results estimated by the two methods are consistent and survive a series of robustness checks and placebo tests. These suggest that the crisis modestly increased the probability of low birth weight (LBW) by 1.1-1.8 percentage points but had little effect on the length of gestation or prematurity. Moreover, this paper finds larger and statistically more significant effects on the probability of LBW and very low birth weight (VLBW) among infants born to black mothers, or less educated mothers, compared to those born to white and college-educated mothers. Heterogeneity also exists by the timing and duration of the gestational exposure. Larger effects on LBW and VLBW are found for infants exposed in each trimester. This paper finds little evidence on sex ratios, suggesting that the scarring effect may dominate the mortality selection effect. In addition, little evidence is found on the length of gestational week or likelihood of prematurity, suggesting that LBW and VLBW are mainly driven by being born too small rather than too soon. I have presented this paper in Yale University, and at the 7th Conference of the American Society of Health Economists and the 40th Annual Fall Research Conference of Association for Public Policy Analysis & Management.

The third paper of my dissertation, entitled “Can Diseases Be Managed to Cost Less?”, uses propensity scores in conjunction with DID to examine the effect of a diabetic disease management program launched by Blue Cross and Blue Shield in Louisiana (BCBSLA) on healthcare utilization and expenditure. Using the claims and program operation data of BCBSLA, this paper compares the changes in healthcare utilization and expenditure between members who participate in the program and members who do not participate. Considering the potential selection bias caused by voluntary participation of the program, I calculate propensity scores based on members’ health risk scores and other characteristics to match nonparticipants with participants. Given that participants are assigned different levels of intervention by health risk scores, I also use the regression discontinuity design to exploit plausibly random variation around the different stratification criteria, providing evidence on the heterogeneous effect by the intensity of the interventions. This study is selected for funding by Blue Cross and Blue

Shield in Louisiana (BCBSLA) and Tulane University Partnership for Healthcare Innovation. It is still in progress and expected to be finished by March of 2019.

Besides these studies, I have two coauthored publications. The first one, entitled “Childhood Obesity in China: Does Grandparents’ Coresidence Matter? ”, which examines the effect of grandparents’ coresidence on childhood weight (published in *Economics & Human Biology*). Based on China’s unique culture, this paper introduces the number of parents’ siblings as an instrumental variable to address the potential endogeneity of grandparents’ coresidence. My coauthor and I find grandparents’ coresidence significantly increases the weight of grandchildren by increasing the intake of fat and protein in urban areas and by decreasing physical activities in rural areas. The second published paper is “Are U.S. Obesity Rates Converging?”, which borrows the idea of convergence on economic growth to determine whether the obesity rates are converging in the United States. This paper employs a spatial autoregressive model to construct β convergence estimator, which refers to the process with higher (lower) initial values experiencing slower (faster) growth than a series with lower (higher) initial values. The result shows β convergence occurred for obesity rates, over-weight rates, and overweight and obesity rates over the period of 1996 to 2001 and it varied across regions. The coefficient of variation also is computed to examine the existence of σ convergence and the result suggests the cross-sectional distribution of obesity and overweight rates was narrowing from 1996 to 2013 or several sub-periods. These findings imply that more policies and regulations should be placed on the regions where β convergence occurred and policies could be ineffective in some periods with absence of σ convergence.

I also have two papers in progress. One estimates the dynamic effect of price transparency in the long run. This is a natural follow-up paper to my job market paper and I already have some preliminary results. Another paper examines the impact of pre-diabetes or metabolic syndrome disease management programs on health outcomes, which is an expansion of the third paper of my dissertation and also is cooperated with BCBSLA.

I am working on many projects concurrently because I have been able to successfully focus on my comparative advantage in research and find others to complement my skill-set. Thanks to these collaborations, since the beginning of my Ph.D. program, I have been able to publish two papers and have two cooperated projects utilizing unique confidential data. To this end, and as an assistant professor in your department, I will continue with my general strategy of collaboration in research, not only with the faculty but also with motivated students. Given the value of solo-authored papers in our profession, I will also work on more such papers. Finally, I should note that my research projects will continue to analyze various public health problems or healthcare policies with the idea of providing clear policy recommendations. A main focus of mine will be on public health or health economics, especially how to reduce healthcare expenditure without sacrificing the quality.