Theoretical Framework & Methodology

In this study, we first conduct some detailed comparisons on diabetes patient’s demographic backgrounds (education, income, occupation etc.) in both countries from year 2000-2011 by using datasets from U.S. National Health Interview Survey (NHIS) and China Health and Nutrition Survey (CHNS) for China sample. In 2000, prevalence rate of diabetes in 2000 is 4.63%, and it rose to 7.32% in 2011. Rising in prevalence rate of diabetes is consistent with China data, with a 1.05% in 2000 and 3.10% in 2011.

The Aggregate Effect of Diabetes on Economic Development

Background This paper aims at examining the interactions between economic development level and diabetes prevalence rate. With increasing income, people tend to spend more on food without any moderation, but meanwhile people from richer countries are also able to spend more on health care. China and U.S. are the two largest diabetes population in the world, with China as an example of developing countries and U.S. as a developed country. For this paper, we use National Health Interview Survey (NHIS) for U.S. sample and China Health and Nutrition Survey (CHNS) for China sample. In 2000, prevalence rate of diabetes in 2000 is 4.63%, and it rose to 7.32% in 2011. Rising in prevalence rate of diabetes is consistent with China data, with a 1.05% in 2000 and 3.10% in 2011.

Finding Our model can theoretical establish the interaction between economic development level and diabetes prevalence rate, and quantify how diabetes epidemic may affect labor productivity, unemployment rate and other aggregate economic outcome. Moreover, by using U.S. as a benchmark, the paper also predicts the trend of future diabetes prevalence rates among different demographic groups in China. Our results suggest that diabetes prevalence rate in top 10 percentile income group and college education group may decline moderately in the future China as the economy grows.

Difference of percentage in distribution of education level between diabetic and non-diabetic group. In figure 1(a), we can see that non-diabetic group in US completed higher education, compared to diabetic group in both 2000 and 2011. In China, the situation is starting to align with the trend of U.S. in 2011, as shown in figure 1(b).

Theoretical Framework & Methodology In this study, we first conduct some detailed comparisons on diabetes patient’s demographic backgrounds (education, income, occupation etc.) in both countries from year 2000-2011 by using datasets from U.S. National Health Interview Survey (NHIS) and China Health and Nutrition Survey (CHNS). We then develop a quantitative economic model to match those stylized facts we observe from data. In our theoretical framework, agents make consumption and saving decisions by optimizing their life-time utilities. Agent’s income source is from providing efficiency labor each period and earn wage accordingly. A diabetic epidemic shock will refer to a permanent reduction in the efficiency labor supply, and an increasing trend of health care expenditure. If the household is endowed with capital, the household problem can be written into this equation:

\[ V(N_t^d, N_t^n, K_t) = \max_{\pi_t} \left[ \pi_t V(N_{t+1}^d, N_{t+1}^n, K_{t+1}) + \beta V(N_{t+1}^d, N_{t+1}^n, K_{t+1}) \right] \]

subject to

\[ c_t + K_{t+1} = A_t K_t^\theta L_t^{-\theta} + K_t (1-\delta) \]

And the transition matrix is as below:

\[ \pi_t = \begin{pmatrix} (1-\gamma_t)(1-p_t) & (1-\gamma_t)(1-p_t) \\ (1-\gamma_t)(1-p_t) & (1-\gamma_t)(1-p_t) \end{pmatrix} \]

Where \( N_t^i \) is the number of agent \( i \) in time \( t \), \( \pi_t \) is the probability that youth agent turning old, \( \gamma_t \) is the mortality rate of agent \( i \) in period \( t \), \( c_t \) is consumption, \( \eta_t \) is the percentage of young agent in household, \( \beta_t \) is subjective discount factor, \( K_t \) is capital stock in period \( t \), \( L_t \) is labor supply in period \( t \), \( A_t \) is productivity, \( \delta \) is capital depreciation rate, \( \theta \) is capital share, \( p_t \) is probability of not getting diabetes and \( q_t \) is probability of recovering from diabetes.

From figure 2, we can clearly see that average working hours of diabetic group and non-diabetic group is similar, but diabetic group suffers more work-loss day.

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Figure 3 shows the growth rate of income level in China. Growth rate at period \( t \) is calculated as (mean of income in period \( t \) – mean of income in period \( t-1 \) ) / mean income in period \( t-1 \). We can see that personal income level of diabetic group decline sharply since 2009, and growth of household income in non-diabetic group is catching up in 2011.