Effects of smoking and smoking cessation on productivity in China

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I.   Introduction

1. Aim of Project

We will study smoking and smoking cessation and their impact on worker productivity in China. For several reasons, China is a very important country in which to study smoking. China has a high prevalence rate, especially for men. Additionally, a concern is that the rate for females may rise as they become more 'Westernized'. Because China is a large country with a high prevalence rate, China has more total smokers than any other country. This makes tobacco use a critical public health problem in this country and also makes China a unique case study for researching tobacco use and productivity.

China is also a major producer of tobacco and the government benefits financially due to tobacco production. Thus the government is of two minds about smoking prevention and smoking cessation, it may primarily be concerned about the financial loss that it would suffer if smoking rates decline. Thus our emphasis on productivity losses due to smoking and the benefits to quitting may be influential in indicating that there are financial gains to preventing smoking and in encouraging cessation.

Through collaboration with the Center for Health Statistics Information, Ministry of Health in China, we will be able to use a large, nationally representative data set from

China. This is the Chinese1998 National Health Services Household Survey conducted by the Ministry of Health. These data would be available to us only through our collaborations with the Ministry of Health. The data have been collected but have not yet been cleaned and used for the analyses of smoking, smoking cessation, and alcohol consumption related issues. Thus we will be the first to use these data to analyze smoking related issues.

The data set contains information on smoking, smoking cessation, alcohol, and gender, among other factors. Thus we will be able to study many topics related to the smoking, smoking cessation, alcohol consumption, and gender issues.

We aim to:

- Access and clean the data through our collaborations with the Center for Health Statistics Information, Ministry of Health, China.

- Quantify the impact of smoking and smoking cessation on productivity in China, especially absence from work and focus on gender differences.

- Compare the findings from China to findings from a similar data set in the US (Sindelar et al. 2003).

2. Background and Significance

Importance and growing prevalence of smoking in China

It is reported that China is the largest tobacco producer and consumer in the world. One third of all smokers in the world are now in China (Lam, He et al. 1997; People's Daily 2000). Based on China's Second National Survey of Smoking in 1996, the smoking rate was 37.6% for total population. This rate was 66.9% for men and 4.2% for women. Compared to the results from 12 years ago in the 1984 National survey, the smoking

prevalence increased, the average number of smokers increased, and the starting age decreased (Yang 1997).

The current low rate of quitting smoking high rate of relapse

The increase and already very high prevalence of smoking in China shows the urgency of the interventions not only to preventing new smokers, but also reducing the number of current smokers, i.e. to increase the success of quitting smoking.

Based on the Second National Survey of Smoking, 16.8% of all current smokers want to quit smoking. About 9.4% smokers are presently trying to quit and among all current quitters, 3.6% have quit the smoking habit for over 2 years (Yang 1997). Among the people who gave up smoking, 47% responded that the reason that they quit was due to a present illness; 34% to prevent illness; 15% because of disapproval of family members; and 9% from knowledge learned through health education (Yang 1997).

The results of high percentages of people quitting smoking due to a present illness suggest for us to control potential "healthy smoker effect" or the "ill quitter effect" or both while we investigate the effects of quitting smoking on work's productivity.

Studies have shown that smoking is associated with greater absences from work. However, none of these studies have examined whether there are gains to quitting until a few very recent studies.

Several studies in the US indicate that smokers are more likely to be absent from work as compared to non-smokers (Athanasou 1975). However, most of these studies have important limitations such as: small sample sizes, samples that were not nationally representative and no, or only limited, control variables. Thus, with few exceptions, they do not offer convincing results of the magnitude of the impact of smoking on absences

(Ault 1991; Bertera 1993; Leigh 1995). Importantly, only two of these studies delineate former and current smokers (Robbins, Fonseca et al. 2000; Halpern, Shikiar et al. 2001) but they do not address the issue of gains to quitting. None of the studies examine the impact of time since quit. No studies have examined these issues in China.

In summary, better understanding of the effects of smoking and smoking cessation on worker productivity will aid in taking more effective measures to reach such goals. Our focus on productivity is particularly relevant to the Chinese situation as the government is concerned about the negative financial impact of smoking prevention and smoking cessation. Since China is a large producer and the government is directly involved in production, by estimating the negative impacts of smoking on productivity, the other side of the financial impact can be quantified and emphasized.

II.   Hypotheses

We hypothesize the following:

- Smoking will adversely affect productivity in China as it has been shown to in the United States.

- Former smokers in China will eventually 'catch-up' in terms of their lost productivity, although this effect may take several years to materialize.

These relationships may be different in China due to a multitude of factors, including but not limited to: genetic differences, higher smoking prevalence, occupation or industry differences, differences in the age of smoking onset, differences in smoking frequency or intensity, differences in health care systems, cultural differences, the presence or lack of

other risk factors (e.g. alcohol consumption), and political and economic factors. Most of these differences are beyond the scope of this initial project. However, we anticipate that while the basic relationship between smoking and productivity will replicate that found in the U.S., some significant differences may be observed.

III.   Design and Methods

1. Data

The data used in this project are from the Second China National Health Service Survey (1998), which is conducted by the Ministry of Health, PRC. The China National Health Service Survey has been conducted every 5 years since 1993. It is a large, nationally representative sample. The multistage stratified sample of over 56,000 households was selected nation-wide for each survey. For our analysis, we select only those individuals that are full-time workers, and those who are ages 18-65 in urban areas. In rural areas, we consider the farmer whose ages are 18-65 and are full time workers, and include them in our analysis.

The information that is related to this analysis is included in the following table:

1998 Data - "China National Health Survey" –key variables	
Measurement of Smoking	**Measurement of Productivity loss**
• Do you currently smoke?	• Loss of working or school days due to illness in the past two weeks.
• How many years have you smoked?	
• How much do you smoke everyday? < 10 Cigarettes, 10-19, or 20 and above	**Measurement of health status**
• Compared to the past two years, has the amount you smoke each day increased or not changed?	• General Health Status: Excellent, Very Good, Fair, Poor
• If you are not a current smoker, have you ever smoked in the past?	• Chronic Disease status: by diagnosis
	• Hospitalization status
• If you are not a current smoker but have quit smoking, how long ago did you quit?	• Clinical Visit status-use of medical care
	• Disability status (ADL measure)
Measurement of Drinking	
• Do you drink very frequently?	**Measurement of demographics and SES status**
• How many times do you drink each week?	
• What kind of wine or liquor do you drink?	• Age, sex, education, occupation, health insurance status, income, exercise
• How much do you drink each time?	
• How many years ago did you start to drink?	

2. Variables

a.   Dependent variable.

The dependent variable is the number of days missed from the work in the last two weeks due to sickness. This is the variable that represents productivity loss due to smoking. Based on the Survey in 1998, the number of days missed from the work in the

last two weeks due to sickness is 308 days per thousand populations (Ministry of Health 1999).

b.   *Key independent variables.*

Smoking, the amount and length of smoking, smoking cessation, the length of smoking cessation, and the alcohol consumption will be our key independent variables. We expect the smoking, the amount and length of smoking will have positive relationships with productivity loss. We also expect that the overall ex-smoking group's productivity loss will be reduced compare to the current smokers. However, the productivity loss might be increase during earlier period of smoking cessation and will be reduce at the later stage of smoking cessation. We expected that there is interaction effect between smoking, smoking cessation and alcohol consumption on productivity loss.

c.   *Control variables*

We control for a variety of other factors that might affect days absent from work. These variables include socio-economic status and demographic characteristics, such as age, gender, income, education, and occupation. Importantly, we need to control for the health status in order to control the "healthy smoker effect" or the "ill quitter effect" or both since the current smokers might the self-selected as relative healthy population, and quitters might be the people who might have ill health problems. Both these self-selection problems could alter the expecting results and leads to misinterpretation of the effects of smoking and quitting on the work's productivity.

Another important variable that needs to be controlled is the severity of smoking. It is very possible that the lighter smokers find it relatively easier to quit smoking as

compared to heavier smokers. Lighter smoking may have relatively less impact on the work's productivity than heavier smoking.

IV. Analysis

We will use multiple regression analysis and econometric models following the study of Sindelar et. al. While a binary indicator of any days absent due to sickness last two weeks is used as our dependent variable, logistic regression will be used and odds ratios will be estimated for ease of interpretations. When the number of days absent due to sickness is used as our dependent variable, Ordinary Least Square (OLS) regression or Poisson regression will be used for the estimation.

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