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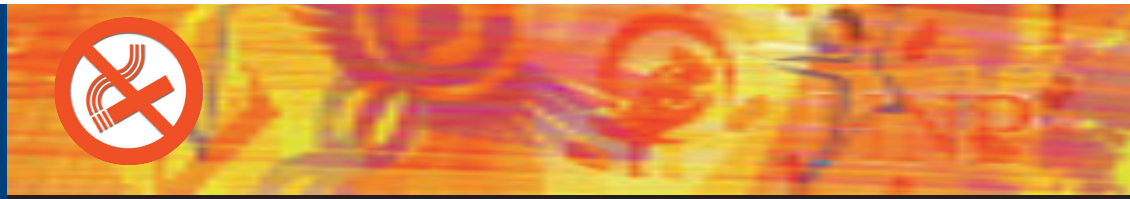

HNP DISCUSSION PAPER
Economics of Tobacco Control Paper No. 3

Economic Analysis of Tobacco and Options for Tobacco Control:

China Case Study

Teh-Wei Hu and Zhengzhong Mao

December 2002

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ECONOMIC ANALYSIS OF TOBACCO AND OPTIONS FOR TOBACCO CONTROL

China Case Study

Teh-Wei Hu and Zhengzhong Mao

Completed September 2000, published December 2002

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Health, Nutrition and Population (HNP) Discussion Paper

ECONOMICS OF TOBACCO CONTROL PAPER NO. 3

Economic Analysis of Tobacco and Options for Tobacco Control: *China Case Study*

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Paper prepared for the World Bank and RITC (Research for International Tobacco Control) at the International Development Research Center, Ottawa, Canada

Abstract: More than 320 million people in China smoke, which accounts for nearly one-third of all the smokers in the world. Almost two-thirds of adult Chinese men are smokers. On the other hand, tobacco production is a state-run enterprise that provides substantial earnings and tax revenue for the government. This paper addresses this policy dilemma by analyzing the impact of an additional cigarette tax on the entire economy.

Economic analyses have shown that price elasticities of the demand for cigarettes range from –0.40 to –0.70. At a price elasticity of –0.54, for instance, a 40 cent increase in tax from 1.60 yuan per pack to 2.00 yuan tax per pack (raising the retail price from 4.00 yuan to 4.40 yuan) would reduce consumption by 4.57 billion packs, generate additional central government revenues of 24.74 billion Yuan and save 1.44 to 2.16 million lives. The increase in central government tax revenue would be twice as large as the total losses in industry revenue, tobacco farmers' incomes and local tax revenue (12.27 billion Yuan). Therefore, considering both the health and economic benefits, additional taxation on cigarettes in China would be a desirable public policy for the Chinese government to consider.

Keywords: tobacco, China, tobacco tax, cigarette tax, economics of tobacco, economics of tobacco control, smoking, tobacco policy, price elasticity, demand for cigarettes.

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I. INTRODUCTION

China has a very high prevalence rate of cigarette smoking. According to a 1996 Chinese national survey, 63% of adult males (age 15 and over) and 3.8% of adult females were current smokers (Chinese Academy of Preventive Medicine, 1997). These prevalence rates indicate that there are over 320 million cigarette smokers in China, which accounts for nearly one-third of the smokers in the world (Collishaw, 1998). Moreover, it has been estimated that there are 460 million second hand smokers in China (Zhu, 1996). In other words, more than two-thirds of the Chinese population in the country face health hazards that can be attributed to smoking. Given the size of its smoking population, China consumes more cigarettes than any other country in the world. It also produces more cigarettes than any other country. In 1997, China produced 33.67 million cases or 84.18 billion packs (one case consists of 2,500 packs) of cigarettes and used 1.31 million hectares for tobacco production (China Statistics Bureau, 1998).

It is well known in developed countries that cigarette smoking has major hazardous health consequences. In past decades, many developed countries have adopted various tobacco control policies to reduce cigarette consumption. As a result, per capita cigarette consumption in developed countries has been declining. On the other hand, among developing countries such as China, the negative health consequences of smoking are less well known. For instance, in the 1996 Chinese national survey, 61% of those questioned responded that cigarette consumption posed no harm to their health (Chinese Academy of Preventive Medicine, 1997). Many government officials in the Ministry of Health and public health professionals in China have recognized the importance of tobacco control, and have made a substantial effort to discourage cigarette consumption through a public health campaign. However, they have been unable to convince the State Development and Planning Commission and the Ministries of Finance, Economics and Trade and Agriculture to support tax increases as a means to control tobacco.

Obviously, there is a policy conflict between public health concerns and the economic benefits of tobacco production. In China, cigarettes are produced by a state-run enterprise that has provided substantial earnings for the government. Also, tobacco cultivation is a major source of farmers' incomes in many poor regions. This conflict of interest among policymakers in public health and economics constitutes a major dilemma for the Chinese government.

In this paper, we address this policy dilemma by describing and then by analyzing the economic costs and consequences of cigarette consumption in China, and the economics of tobacco production in both the agricultural and industrial sectors and tobacco foreign trade and smuggling. Finally, we address various tobacco control options in China and their policy implications with the hope of helping government policymakers in China and international organizations, including the World Health Organization, the World Bank, the International Monetary Fund and the Food and Agricultural Organization, to consider alternative policy instruments to promote the tobacco control agenda.

II. HEALTH COSTS AND CONSEQUENCES OF SMOKING

Cigarette smoking is harmful to one's health, causing premature death through smoking-related illnesses including lung cancer and cardiovascular disease. Smoking is also responsible for substantial healthcare costs and lost productivity due to illness and premature death.

Two studies have estimated the health and cost consequences of smoking in China. Jin et al. (1995) estimated the economic costs of smoking in China based on 1989 epidemiological data on smoking-related diseases, including cancers, coronary disease, stroke, hypertension, respiratory diseases, and ulcers. They estimated that 896,000 premature deaths occurred in 1989 due to smoking related illness. The human capital approach was used to estimate the value of lost productivity that resulted from illness or premature deaths due to smoking at 20.13 billion Yuan (or US$2.42 billion, 1 US$=8.3 Yuan).

Based on data on the utilization of health care (inpatient days and outpatient visits), Jin et al. (1995) estimated that 6.94 billion Yuan in medical care expenditures were attributable to smoking. Rural areas accounted for 62% and urban areas for 38% of these costs. Men accounted for 71% and women 29%, due to the higher prevalence and longer history of smoking among men. Of the total estimated medical costs, respiratory illness (other than lung cancer) accounted for 58.8% of all medical care expenditures due to smoking; circulatory diseases accounted for 14.5%; and stroke, hypertension, and other illnesses accounted for the rest. Together, the medical care costs (6.94 billion Yuan) and loss of productivity (20.13 billion Yuan), added to a total cost in one year (1989) alone of 27.07 billion Yuan. This total economic cost of smoking of 27.07 billion Yuan was larger than the total government tax revenue derived from cigarettes, 24 billion Yuan in 1989. The tobacco-attributable medical care costs, 6.94 billion Yuan, amounted to about 0.40 percent of the gross domestic product (1770 billion Yuan) in 1989. The combined value of lost productivity and medical care costs, 27.07 billion Yuan accounts for about 1.5% of GDP in China. Overall, these figures indicate that if the rate of smoking prevalence and the amount of cigarettes consumed among men and women in China continue to increase, the economic burden of smoking will increase substantially in the future.

A more recent study by Jiang and Jin (2000) using the 1998 mortality study of one million deaths in China (Liu, 1996) estimated that 514,100 premature deaths occurred in 1998 due to smoking-related illness. Of these premature deaths, 210,00 deaths occurred through cancers, 190,300 deaths as a result of respiratory system diseases and 113,700 were caused by diseases of the circulatory system. The estimated number of premature death is much smaller than the previous study due to different data sources. Even then, the estimated loss of productive person-years due to cigarette smoking would be 1.146 million person years, using age 60, the year of retirement in China as the cut-off point for productive age.

The study used 1998 national health services survey data to estimate the direct medical costs attributable to smoking. It was estimated that 347 million outpatient visits and 1.52 million inpatient admissions were attributable to smoking related illnesses. These were valued at 17.1 billion yuan for outpatient visits and 5.8 billion Yuan for inpatient services. Total direct medical costs added to 22.9 billion Yuan. The total cost of medical services in China during 1998 was 377.6 billion Yuan (Ministry of Health, 2000). Thus, smoking caused 6% of the total medical costs in China. This study did not make further estimates about the value of productivity losses due to smoking. However, the earlier study (Jin, et al 1995) estimated productivity losses as being about three times the cost of direct medical costs.

These estimated costs are most likely to be of very conservative magnitude. At least 57% of the population were second-hand smokers (China Technology Press, 1997), and would also generate smoking-attributable medical care costs. Also, China has a relatively short history of smoking machine-processed cigarettes compared to western countries. Epidemiological studies have shown that it will take at least twenty to thirty years to realize the full impact of smoking-related chronic illness. As the population of smokers has grown in the past thirty years, the total burden of illness will undoubtedly increase in the future. Therefore, more premature deaths and a higher economic burden due to cigarette smoking will occur in China in years to come. Analysis done for the World Bank report, "Curbing the Epidemic" (1999) projected that in China, about one million deaths due to smoking would occur by the year 2010, two million deaths by 2025 and three million deaths by 2050.

In sum, given the magnitude of negative health consequences and the high economic cost burden to China, it would be important for the Chinese government to increase its efforts to implement public health and economic tobacco control policies in the near future.

III. TOBACCO LEAF PRODUCTION IN THE AGRICULTURAL SECTOR

Tobacco growing areas in China have been increasing over the past twenty years, from 0.397 million hectares in 1980 to 2.161 million hectares in 1997 (China Statistical Yearbook, 1997), an increase of 444%. Between 1995-96 and 1996-97, the rate of increase was about 28.5% per year. On the other hand, the total cultivated area under agricultural production in China was 146.4 million hectares in 1980 as compared to 153.9 million hectares in 1997, representing an increase of 5.2%. In other words, the rate of increase in land used for tobacco cultivation is much higher than the overall rate of increase in agricultural land use, as shown in Table 1. As a percentage of the total agricultural land, tobacco cultivation increased from 0.3% in 1980 to 1.4% in 1997.

Table 1. Tobacco Growing, Production, and Value in the Agricultural Sector, 1980-1997

Year	Tobacco growing area (in 1,000 hectares)	Total agricultural plantation are (in million hectares)	Tobacco production (in million metric tons)	Price of tobacco leaf (yuan/metric ton)	Value of tobacco (billions of yuans)
1980	397	146.4	0.71	1,579	1.13
1981	587	146.3	1.28	1,934	2.47
1982	889	146.0	1.85	1,960	3.62
1983	572	145.3	1.14	1,969	2.27
1984	715	144.8	1.54	1,973	3.04
1985	1,077	143.6	2.07	2,021	4.19
1986	895	144.2	1.37	2,025	2.78
1987	913	144.9	1.63	2,144	3.51
1988	1,304	144.9	2.34	2,296	5.37
1989	1,503	146.5	2.40	2,193	5.27
1990	1,342	148.4	2.26	2,520	5.69
1991	1,562	149.6	2.67	2,537	6.77
1992	1,849	149.0	3.12	2,587	8.04
1993	1,835	147.7	3.04	2,831	8.59
1994	1,302	148.2	1.94	3,222	6.25
1995	1,309	149.9	2.07	3,682	7.63
1996	1,683	152.4	2.95	4,437	13.07
1997	2,161	153.9	3.91	3,962	15.48

Sources: China Statistics Bureau, *China Statistical Yearbook; Rural Statistical Yearbook of China; Price Statistical Yearbook of China*, Beijing: China Statistical Publishing House, various volumes.

Tobacco leaf production in China was 7.17 million metric tons in 1980 compared to 39.08 million metric tons in 1997, an increase of 445%. The productivity of tobacco land use has not increased; a hectare produced 1.82 metric tons in 1980, and 1.81 metric tons of tobacco in 1997. According to 1997 world tobacco leaf production statistics, China's total production was 69.7 million metric tons, and China produced 56% of the total tobacco leaf volume in the world.

There are several reasons that explain the expansion of land use for tobacco production. First of all, according to Chinese agricultural experts, tobacco is a cash crop that is easy to grow and inexpensive to maintain. Furthermore, tobacco farmers can cross-plant between the tobacco crop seasons so that the residuals of one tobacco crop can be used as fertilizer for another crop. Second, the economic returns from tobacco leaves are much higher than other grain crops. However, it should be noted that the price of tobacco leaves varied by as much as 20 times, depending on the leaf quality. Third, some provinces, such as Yunnan and Guizou, have hilly mountains that, Chinese tobacco experts claim, have to rely on tobacco production as the main source of income for farmers, given the climate and land/soil conditions. Fourth, some local governments encourage farmers or even set a minimum production quota for each farmer to produce tobacco leaves, even though there has been a surplus of tobacco leaves in the market. The local government can levy a fixed percentage of tax (30% of tobacco leaf values before 1999, reduced to 20% since 1999) as their major source of local government revenue. As a result, there was a warehouse surplus of about 70 million metric tons of tobacco leaves by 1997. In fact, the cigarette manufacturing industry only needs 40 million metric tons each year. Therefore, there has been a strict order from the central government to reduce tobacco leaf production and to reduce the inventory to 20 million metric tons by the year 2000. In other words, there has been a policy in central government to reduce the tobacco growing area in recent years (Zhu and Xu, 2000).

It has been estimated that there are about 800 counties involved in tobacco production and about 5.6 million tobacco farming households in China (Nie, 2000). There were 236.9 million agricultural households in 1997 (China Agricultural Yearbook, 2000), so tobacco-farming households comprised 2.3 percent of all Chinese farming households. It should be noted, however, that most tobacco farmers produce other agricultural crops as well. Their income does not rely entirely on tobacco. China's tobacco farming is done on a very small scale, with an average of less than 3 hectares per tobacco farmer (China Agricultural Survey, 2000).

The Chinese government runs the tobacco companies, and the government buys tobacco leaves from farmers. In fact, there is a price support system for tobacco leaves. The Economic Planning Commission and the China Tobacco Company set the price of tobacco leaves, so the central government would like to have a strict production quota. On the other hand, local governments rely on tobacco leaf production as a source of local tax revenue. Therefore, sometimes local governments ignore quotas imposed by the central government and encourage farmers to produce more than the allowed amount.

The tobacco leaf price set by the government has fluctuated over the years. The price increased from 1,597 Yuan per metric ton in 1980 to 3,962 Yuan per metric ton in 1997. While the nominal price increased 2.48 times, the consumer price index increased 3.44 times over the same time period. Therefore, tobacco farmers did not fare as well as the general economy, and faced a decrease in the real price for their tobacco.

Finally, it is important to examine the economic role of tobacco leaf production in relation to total agricultural production. Recent data, as shown in Table 1, (1997) indicates that tobacco contributed only about 1.8% of the total value of agricultural production (22.9 billion Yuan / 1,258.5 billion Yuan). Therefore, as a whole, tobacco production is not a major sector in the Chinese agricultural economy. However, this relatively small percentage of the total value of agricultural production has a major economic impact in some regional economies. Tobacco growing areas are concentrated mainly in the Yunnan, Guizhou, Sichuan, and Henan provinces, which account for 51% of total tobacco production in China. These provinces are all relatively poor. Tobacco growing is a major source of income for farmers and local government in these provinces, and as shown in the following tobacco industrial sections, the amount of value added in tobacco processing makes further contributions to the regional economies. One

option in tobacco control policy is to encourage tobacco farmers to consider developing other cash crops, such as fruit trees, sunflowers, tea and herbal plants. Intensive research is needed on crop substitutes within the Ministry of Agriculture, perhaps with the assistance of international organizations such as the Food and Agriculture Organization (FAO) and the World Bank.

With China's entry into the World Trade Organization (WTO), there is a potential threat to China's cigarette industry and thus to tobacco farmers. To improve the quality and efficiency of tobacco products, it is extremely important for the Chinese government to consolidate the production of tobacco leaves and discourage low quality leaves through a pricing policy or production restriction. In essence, these policy options will reduce the number of tobacco farming households and their reliance on tobacco products. This will also make the negative consequences on tobacco farmers of any increase in taxes on cigarettes less severe in future. Many policymakers see farmer welfare as one of the most important economic barriers to stronger efforts to reduce cigarette consumption in China.

In sum, the empirical evidence has shown that so far, the economic role of tobacco farming in the overall agricultural sector is relatively small both in total value of production and farming employment. Informal discussions with staff at the Ministry of Agriculture indicate that even in some important tobacco producing regional areas, the impact is perhaps greater for local tax revenues than tobacco farmers. Some farmers are reported to be reluctant to grow tobacco, given the decline in real prices, their fears that they may not be able to sell their crop, and the relatively labor-intensive nature of tobacco cultivation. Working with local governments and tobacco farmers would be a critical part of a tobacco control policy agenda.

IV. CIGARETTE MANUFACTURING INDUSTRY

The tobacco industry is a state monopoly in China. It is organized under the China National Tobacco Administration, now known as the State Tobacco Manufacturing Administration (STMA) which falls under the Ministry of Economic and Trade. The China National Tobacco Company, a part of the STMA, oversees about 180 factories across China, situated in almost every province and the four major cities (Shanghai, Beijing, Tianjin and Chongqing). There are more than 2,000 cigarette brands in China. Even though the China National Tobacco Company is a monopoly, it has numerous branches that compete with each other within several major tobacco leaf producing provinces, such as Yunan, Henan, etc. These branches are quite decentralized in the sense that each branch company has to be self-sufficient and is allowed to retain its profits. In some instances, provincial tobacco companies even set trade barriers for out-of-province cigarettes, in order to promote their local products (Tuan, 2000).

According to 1999 data, the top five cigarette manufacturing provinces are Yunan, Henan, Shangdong, Hunan and Hubei. Cigarette manufacturing is a much valued industry. However, not all provincial cigarette manufacturing companies make a profit. The most profitable ones are in Yunan, Shanghai and Zejiang, while manufacturers in Helongjiang, Hainan and even Guizhou lost money in 1999. This suggests a need to consolidate the cigarette manufacturing industry. In fact, the China National Tobacco Company has a plan to reduce some 180 factories to about 100 factories and encourage the closing factories to produce other products.

As shown in Table 2, China's tobacco industry produced 15.2 million cases of cigarettes in 1980 (each case contains 2.500 packs or 50,000 cigarettes). By 1997, production increased to 33.67 million cases, an increase of 121 percent. The production value increased from 8.10 billion Yuan in 1981 to 129.60 billion Yuan in 1997, a 16-fold increase in nominal value. However, in terms of the relative share of the total

value of national industrial production, the tobacco industry only contributed 1.57 percent in 1980, which decreased to 1.14 percent by 1997. In other words, the role of cigarette production in the industrial sector has been declining. However, the 1990 China population census reported that approximately 500,000 persons were employed in the tobacco manufacturing industry, which represents 0.51 percent of total employment in the manufacturing industry (China Statistics Bureau, 1991). Employment numbers maintained the same level through the year 2000. There were also about 3.5 million people engaged in retail cigarette sales (Zhu, 1996), which amounts to 0.6 percent of the total employed population. However, it should be noted that few retailers sell only cigarettes. Therefore, there would be only a minimal potential negative effect on retail employment if tobacco taxes were to increase and cigarette sales were to fall.

Table 2. Cigarette Production, Value and Relative Share of Total Industrial Growth, 1980-1997

Year	Cigarette Production (million cases)	Total value of cigarette output (billion yuan)	Total output of all industry (billion yuan)	Percent of output of tobacco industry
1980	15.20	8.1	515.4	1.57
1981	17.04	9.9	540.0	1.84
1982	18.85	11.2	531.1	2.11
1983	19.38	11.2	646.1	1.74
1984	21.35	12.6	761.7	1.66
1985	23.45	14.4	971.6	1.49
1986	25.61	22.4	1,119.4	2.00
1987	28.48	27.7	1,381.3	2.01
1988	30.50	34.8	1,822.4	2.02
1989	31.52	45.1	2,201.7	2.05
1990	32.60	51.2	2,392.4	2.14
1991	31.00	54.7	2,662.5	2.06
1992	32.79	64.6	3,459.9	1.87
1993	33.36	77.6	4,840.2	1.60
1994	33.98	98.9	7,017.6	1.38
1995	34.72	180.3	9,189.4	1.09
1996	33.99	120.2	9,959.5	1.21
1997	33.67	129.6	11,373.3	1.14

Sources: PRC National Statistical Bureau, *China Statistical Yearbook; China Light Industry Yearbook; 1990 National Demographic Survey;* indices from *Almanac of China's Economy* (1998). Beijing: China Statistical Publishing House, various volumes

Beginning in 1986, the China National Tobacco Company started joint ventures with foreign tobacco companies such as R.J Reynolds and the British American Tobacco Company. With the decline of cigarette sales in the United States, major U.S. tobacco companies have increased their investments in cigarette manufacturing in China. China has welcomed these joint ventures in order to improve the quality of Chinese-produced cigarettes, as well as to increase the volume of cigarette exports to foreign countries. It has been estimated by the China National Tobacco Company that the total production from joint ventures is limited to no more than 1 percent of the total domestic market, about 300,000 cases. These joint venture products were subject to a higher tariff ex-factory, set at about 200%-250% of the world market price. Foreign tobacco companies welcome the tax relief required as a condition of WTO membership.

V. TOBACCO INTERNATIONAL TRADE AND SMUGGLING

With the monopoly status of the China National Tobacco Company and China's long-standing restriction on tobacco imports, China's foreign trade in tobacco and tobacco products has been minimal. During 1995-1999, China's total official cigarette imports and exports were a mere 0.8% of total domestic sales on average. Thus, the development of China's tobacco industry has clearly depended on the domestic market.

The high tariff has been a major barrier to foreign cigarette imports to China. The tax on imported cigarettes was 244% in 1997, reduced to 217% in 1999 (with subsequent further reductions). This has encouraged a large amount of smuggling of foreign brands into the Chinese market. It is quite obvious for visitors in urban China to observe numerous foreign brands of cigarettes readily available in retail stores and from street vendors.

There are no official statistics of the magnitude of smuggling, but several sources have used informal surveys or interviews to estimate the approximate amount. The China National Tobacco Company has a direct interest in cigarette smuggling and takes an active role in trying to prevent it. They estimate that consumption of smuggled cigarettes is equal to about 10% of legal domestic consumption, i.e 300,000 cases of smuggled cigarettes, given that legal domestic consumption is about 3 million cases. The official consumption statistics were 3.46 million cases in 1998. This would put the smuggled percentage at around 8%-9% of total consumption.

As alternative estimate could be derived from a survey of retailers and street vendors in urban China. An informal, personal survey in four urban cities (Beijing, Shanghai, Chengdu and Guangzhou) among retailers and street vendors indicates that 20% to 40% (30% being the average) of their total sales are foreign brands. It is reasonable to assume that rural farmers consume mostly domestic and local brands (which are cheaper), and that only urban residents smoke foreign brands. Since 30% of the total Chinese population resides in urban areas, the total national percentage would be about 9% (30% of the urban market for foreign brand cigarettes times 30% of the population).

In sum, while there are no official statistics on the magnitude of smuggling, the cross validation from two sources (industry and retailers) suggests that most likely, 8 to 9 percent of domestic consumption comes from illegal, smuggled sources. This amount of smuggling implies that the Chinese government loses about 15 billion Yuan (or US $1.8 billion) in tax revenue each year.

As a condition of China's WTO entry, two major changes will be made. One is to reduce the import tariff on cigarettes, which will enhance the competitiveness of imported cigarettes in the Chinese market. It was estimated by the China Tobacco News (China Online, May 16, 2000) that the market price of a popular brand (such as Marlboro or 555) could fall from 11 Yuan (US$1.33) to 8 or 9 Yuan per pack. In 2000, the price of foreign brands was slightly higher than the most popular domestic brands, such as "Hong-Ta-Shan," which were about 10 Yuan, but much lower than other upper-class brands, such as Zhong-Hua, which were about 20 Yuan per pack. The second change is to gradually relax and then abolish the non-tariff barriers such as quota and license controls. Without the protection of tariff and non-tariff barriers, and given foreign cigarette marketing tactics (i.e. advertisement and other brand promotion), and their tar-nicotine content, it is most likely that within a short time after China's entry to the WTO,

imported cigarettes will attract a large portion of Chinese smokers. Domestic cigarettes could lose ten to twenty percent of the market share within a few years (Hsieh, Hu and Lin, 1999), as happened in other Asian markets (Chaplouka and Liaxuthai, 1996).

The Chinese government, particularly the China National Tobacco Company, has begun to worry about the impact of WTO. In recent years, the government has seriously enforced the anti-smuggling law, removing fake brands, improving the quality of domestic brands and implementing a ban on tobacco advertisement. The Chinese government has organized an inter-departmental committee (e.g. consisting of the National Economic Planning Commission, Ministry of Finance, Ministry of Health, Ministry of Agriculture, etc.) to participate in the negotiations for an international Framework Convention on Tobacco Control, which is likely to include provisions on smuggling.

VI. CIGARETTE SALES, CONSUMPTION, AND PRICING

Cigarette sales consist of domestic production minus exports plus imported cigarettes. Smuggled cigarettes are generally not included in official statistics. Cigarette sales in China increased 135% from 14.68 million cases in 1980 to 34.57 million cases in 1997, as shown in Table 3. Cigarette sales have increased every year since 1980, except the year 1996 in which there was a slight decline. Increased total cigarette sales are partially due to an increase in the smoking population, as the population in China itself has been increasing. However, even adjusted for population growth, per capita annual cigarette consumption also increased from 40.56 packs in 1980 to 70.90 packs per capita in 1997, an increase of 74.8%.

Table 3. Cigarette Sales, Consumption, and Price, 1980-1997

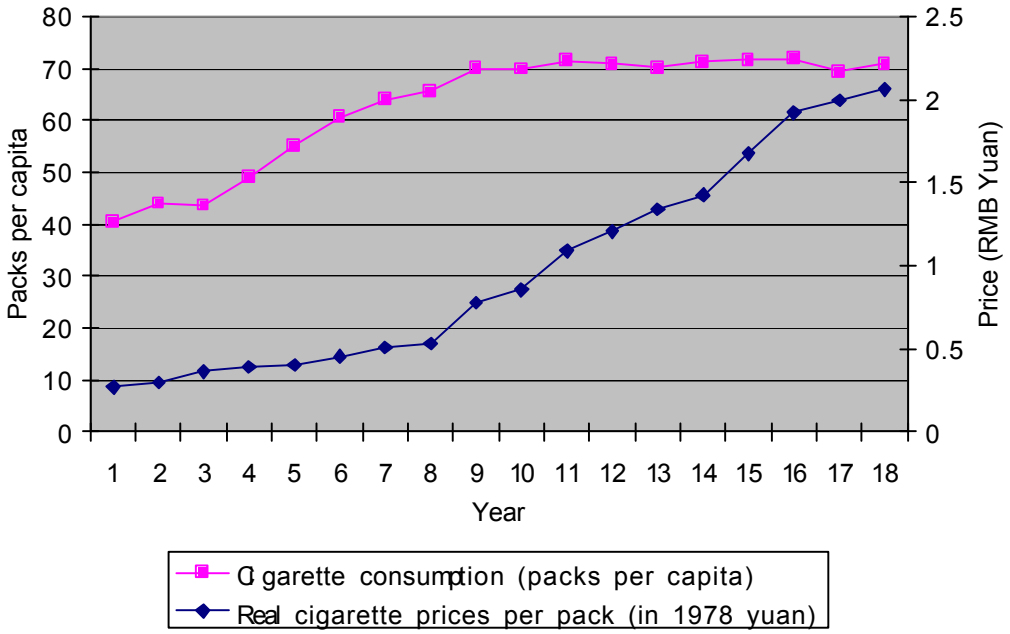
Year	Cigarette Sales (1,000 cases)*	Cigarette consumption (packs per capita)	Real cigarette prices per pack (in 1978 yuan)
1980	1,768	40.56	0.2692
1981	1,594	43.97	0.2952
1982	1,613	43.61	0.3608
1983	1,830	48.97	0.3896
1984	2,061	55.10	0.4008
1985	2,208	60.61	0.4518
1986	2,381	63.90	0.5071
1987	2,546	65.65	0.5331
1988	2,665	69.98	0.7784
1989	2,878	69.89	0.8547
1990	3,017	71.49	1.0882
1991	3,110	70.86	1.2063
1992	3,220	70.02	1.3375
1993	3,290	71.21	1.4268
1994	3,385	71.59	1.6732
1995	3,493	71.93	1.9213
1996	3,400	69.39	1.9961
1997	3,457	70.90	2.0641

Sources: China Statistics Bureau, *China Statistical Yearbook;* Beijing: China Statistical Publishing House, various volumes
* 1 case = 2,500 packs or 50,000 cigarettes

Between 1987 and 2000, several publications and surveys documented the percentage of smokers as varying from 33% to 44% in different regions in China (Chinese Academy of Preventive Medicine, 1997; Mao, Hsieh, Hu 2000; Hu and Tsai, 2000). According to the 1992 national household survey (China Statistics Bureau, 1993), urban annual per capita expenditures in China on cigarettes were 54.28 Yuan, higher than health care and medial expenditures (41.51 Yuan), or alcohol and soft drink expenditures (45.92 Yuan). In Sichuan Province, 67.5% of males were smokers, and 8.4% of females were smokers. Smokers consumed an average of 13 cigarettes per day per person (Mao, Hsieh, Hu, 2000).

Table 3 also presents cigarette prices per pack, expressed in 1978 Yuan. The constant dollar price figure indicates that in real terms, after taking inflation into account, the price of cigarettes increased between 1980 and 1997 from 0.27 Yuans to 2.06 Yuans per pack, representing an increase of 630%. Real prices are an important determinant of cigarette consumption. Price elasticity is a measure of the effect of changes in cigarette prices on changes in cigarette consumption. Figure 1 depicts the relationship between price and cigarette consumption in China. Knowing the price elasticity of the demand for cigarettes will enable policymakers to predict the effect of imposing additional cigarette taxes on cigarette consumption as well as the impact on government revenue.

Figure 1: Cigarette Consumption (packs per capita) and Real Prices Trends, 1980 - 1997



Source: PRC Statistical Bureau, *China Statistical Yearbook*, Beijing: China Statistical Publishing House, various volumes

Price elasticities are obtained statistically by estimating a demand function for cigarettes. In a basic demand function, consumption is determined by the price of cigarettes, personal disposable income and other sociodemographic variables that reflect consumer tastes and preferences. Two types of data can be used: aggregate time-series data and individual household cross-section data. Price elasticities can be broken down into two parts: the price elasticity of smoking participation is a measure of the likelihood of

being a smoker or not, given prices; while the conditional price elasticity applies only to people who smoke, and measures the change in the amount smoked in response to changes in prices. Smoking participation affects the smoking prevalence rate, while conditional price elasticity affects the intensity of smoking.

Several price elasticities have been estimated using Chinese data. Using the Sichuan Province cross-sectional household survey data, the price elasticity of smoking participation was estimated at -0.89 and the conditional price elasticity for the quantity smoked was estimated at –0.18. Combining these two figures, the overall price elasticity of demand for cigarettes is calculated at –0.68 (Mao and Jiang, 1997). Based on time series (1981-1993) annual data in Sichuan, the price elasticity was estimated to be in the range of –0.4 and –0.91 (Mao, Jiang, Gong, et al. 1997). A recent study (Mao, Hsieh and Hu, 2000) combined individual survey data from 1995 in Sichuan and Fujian with approximately four thousand individual respondents, and estimated that the price elasticity of smoking participation was –0.49 and the conditional price elasticity for quantity smoked was –0.28. Based on these two figures, the overall price elasticity of cigarette demand was calculated at –0.52. This estimate implies that a ten percent increase in cigarette prices would lead to a 5.2 percent decrease in overall cigarette consumption. All of the estimates above are limited to one or two provinces only.
In this paper, we use aggregate time series data (1980-1997) for all of China to estimate the price and income elasticities of the demand for cigarettes. The estimated price elasticities range from –0.54 to –0.64 (depending on the exact specification of the estimation model), all statistically significant at the one percent level. In view of this national estimate, together with provincial estimates, it is safe to say that price elasticities of the demand for cigarettes in China range between –0.50 and –0.65. These estimated price elasticities are somewhat higher than developed countries, but are quite comparable to other developing countries. In general, price elasticities are higher in developing countries than in developed countries given the relatively low income level in developing countries, that makes people react more sensitively to price changes.

In China, smoking rates and the quantity of cigarettes smoked increase with income. This pattern is somewhat different from developed countries. The estimated results from Sichuan and Fujian Provinces (Mao, Hsieh, Hu, 2000) show that the income elasticity of cigarette demand was around 0.20 during the 1995 survey. These results suggest that cigarettes are a normal good in China. The national aggregate time series demand model indicates that income was not statistically significant but has a value ranging from 0.05 to –0.10. The lack of statistical significance of the results from the time-series data may be due to multi-collinearity problems between price, income, and the time-trend that make the coefficients from either income or the time trend become not statistically significant.

VII. CIGARETTE TAX AND GOVERNMENT REVENUE

In China, the cigarette tax is considered a product tax that is levied on manufacturers or during importation. Cigarettes are valued (for tax purposes) at the producer level, according to the wholesale price, which consists of the cost of production and producer profits. No additional tax is levied at the retail level, since there is no sales tax collection system in China. This taxation practice, perhaps owing to the fact that cigarette production is a state-run enterprise, is different from standard international practice, where tax rates are expressed as a percentage of the retail price. In China, the state enterprise is directly responsible for collection of the tax revenue when the product is shipped to market. The government levies two components of taxation on producers: the producer value added tax, which is about 17% of the producer price and an additional 50% of the wholesale price as a consumption tax. Thus, from the producer's point of view, the tax paid to the government is 67% of the producer price. However, if the

amount of tax paid by the producer is expressed relative to the retail price of cigarettes, the effective tax rate is 38%.

In terms of either the magnitude of the effective tax rate (almost 40%) or the producer product tax rate (67%), effective tax rates in China are not as high as in many other countries, such as Denmark (87%), the United Kingdom (87%) and other developed countries (Lynch and Bonnie, 1994). In other words, there still may be some leeway for China to impose additional taxes on cigarettes.

As shown in Table 4, China collected 5.74 billion Yuan from cigarette taxes in 1980. By 1997, cigarette tax revenue had increased to 90 billion Yuan, representing a 15.68-fold increase in nominal terms. Even excluding the general retail price inflation multiplier of 3.3, the rate of revenue increase is impressive. Considering all tax revenue from commerce and industry, the Chinese government revenue increased about 13-fold over this period. Cigarette taxes contributed 11.24 percent of industrial and commerce tax revenue in 1980 and 13.58 percent in 1997. The cigarette tax share reached its highest point in 1996 at 15.74 percent.

The proportion of cigarette taxes in overall government tax revenue is shown is Table 4, indicating that between 1980 and 1997, it fluctuated between 5.91 percent and 13.94 percent. However, in most years, revenue was between ten and eleven percent. In 1997, it was 10.93 percent. In short, cigarette tax revenue is an important and reliable source of funds for the central government.

The importance of the role of cigarette tax is further amplified by other factors: 1) the tax levied by local governments on tobacco leaves, which is their major source of tax revenue in farming provinces, 2) both the local government and the central government's share of the cigarette product tax, and 3) the China National Tobacco Company is a state enterprise which provides much value added profit in addition to taxes to the central government.

Therefore, a recommendation to raise the cigarette tax rate would raise concern by local governments as well as the central government that it would result in a reduction of cigarette consumption, which would reduce the demand for tobacco leaves and reduce cigarette production. Thus, there would be less government revenue from tobacco production and cigarette consumption. The next section of this study will provide detailed analyses to show that the apprehension surrounding the issue of tax revenue can be alleviated.

Table 4. Cigarette Tax Revenue, 1980-1997

Year	Cigarette tax (in billion yuan)	Industrial and commercial tax (in billion yuan)	Total government tax revenue (in billion yuan)	Cigarette tax as a percentage of industrial and commercial tax	Cigarette tax as a percentage of total government tax revenue
1980	5.74	51.05	57.17	11.24	10.04
1981	7.58	54.75	62.98	13.84	12.03
1982	9.76	62.32	70.00	15.66	13.94
1983	10.25	68.88	77.56	14.88	13.21
1984	10.80	80.94	94.74	13.22	11.29
1985	12.06	109.75	204.08	10.99	5.91
1986	14.50	120.00	209.07	12.06	6.94

1987	17.00	128.25	214.04	13.26	7.94
1988	21.00	148.57	239.05	14.13	8.78
1989	24.00	176.05	272.74	13.63	8.79
1990	27.00	185.90	282.19	14.52	9.57
1991	28.00	198.11	299.02	14.13	9.36
1992	30.50	224.42	329.69	13.59	9.25
1993	41.00	319.42	425.53	12.83	9.63
1994	55.00	458.97	512.69	14.05	10.73
1995	71.00		603.80	15.47	11.76
1996	83.00	527.00	690.98	15.74	12.01
1997	90.00	662.70	823.40	13.58	10.93

Sources: PRC Statistical Bureau, *China Statistical Yearbook*. Beijing: China Statistical Publishing House, various volumes.

VIII. TOBACCO CONTROL OPTIONS

Given the negative health consequences of cigarette smoking, it is certainly justifiable to consider implementing stronger tobacco control policies. There are two types of tobacco control options: one is through imposing additional taxes on cigarettes, while the other consists of various non-price instruments, including anti-smoking media campaigns, educational programs, prohibition of smoking in workplaces and other public places, and banning of tobacco advertising. The two compliment each other. With respect to non-price programs, China has banned most cigarette mass media advertising (except for billboards and magazines) and has implemented prohibitions on smoking in public places. However, actual compliance with this policy has varied across the country. Additional efforts on non-price control programs need to be considered.

Past literature and actual evidence have shown that higher cigarette taxes would be the most effective and efficient tobacco control policy to reduce cigarette consumption. It is effective because consumers are responsive to the increase in price through taxation and will reduce cigarette consumption. It is efficient because the collection mechanism is relatively straightforward and already in place. It is simply based on the actual quantity of cigarettes produced or sold, the so-called excise tax, so that the administrative costs are relatively low as compared to other methods of taxation. The cigarette tax rate in China, about 40%, is relatively low compared to many other countries, where average tax rates around 70% are common. Furthermore, a serious need exists in China for health promotion campaigns and their financial support, which may include an anti-smoking media campaign, and school health education programs. A small portion of the additional cigarette tax revenues could be used for health promotion and disease prevention programs. A number of countries in the world, such as the United States, Australia, Egypt and Nepal have been using tobacco tax revenue to pay for tobacco control programs as well as for health care services or health insurance premiums for the poor.

Questions that remain include:

- What information is needed to decide the amount of tax to be imposed on cigarettes?
- How much additional tax revenue could be generated for the government?

- What are the potential limitations and negative consequences of higher cigarette taxes?

If the purpose of a cigarette tax is to control tobacco smoking and at the same time maximize revenue, then the magnitude of price elasticity of demand for cigarettes will be an important reference point. The higher the price elasticity (in absolute value), the more responsive the consumers are in reducing cigarette consumption in response to higher prices. Furthermore, since the price elasticities of the demand for cigarettes are less than one, the percentage increase in prices is always higher than the percentage decrease in quantity (i.e. cigarette consumption), so the total tax revenue will always increase, not decrease.

Several factors determine how much tax should be imposed. One major factor relates to the objective of reducing cigarette consumption. For instance, the U.S. (California 1988) passed a law to increase cigarette tax by 25 cents per pack with one goal: to reduce the cigarette smoking prevalence rate from 25% to 15% by the year 2000. Or, in 1993, the U.S. Presidential Office, under its Health Security Act, proposed a 75 cent per pack increase as one source of revenue to finance health insurance programs and estimated that it would prevent 900,000 premature deaths. The other figures relate to: (a) consumers' ability to bear the additional financial burden; (b) the government's revenue target; and (c) the magnitude of the potential negative impact on the cigarette industry and on smuggling.

To illustrate the possible impact that an increase in cigarette tax would have on cigarette sales and on tax revenues, 1997 price and sales data are used. Since the estimated price elasticity is a point estimate with a confidence interval, it would be best to provide a range of elasticities to simulate the impact of an increase in cigarette tax. We use a range of price elasticities from –0.40 to-0.70. The value of –0.40 is the usual magnitude of price elasticity for Western developed countries. The value of –0.70 is typical of low income countries. Estimates from Chinese time series data are between –0.54 and –0.64. We use these 4 estimates and assume that the tax rate increases (valued at retail price level) from the current 40% to 50% (i.e. a 25% increase in tax rate) or from 40% to 60% (i.e. a 50% increase). We also assume that the retail price is 4 Yuan. While many affluent urban smokers pay 10 Yuan to 20 Yuan per pack, the majority of smokers, especially those in rural areas, pay, on average, around 2 to 4 Yuan.

Table 5 provides the simulated impact of a tax increase on cigarette consumption and tax revenue. For instance, at a price of 4 Yuan per pack and a 40 cent increase in tax from 1.60 Yuan to 2 Yuan/pack), the new retail price would be 4.4 Yuan/pack. At a price elasticity of –0.54, cigarette consumption would fall by 4.57 billion packs (a 5.4% reduction in consumption) and additional tax revenue would be 27.74 billion Yuan (an 18.3% increase in tax revenue).

Table 5: Increase in cigarette tax and its impact on consumption and tax revenue*

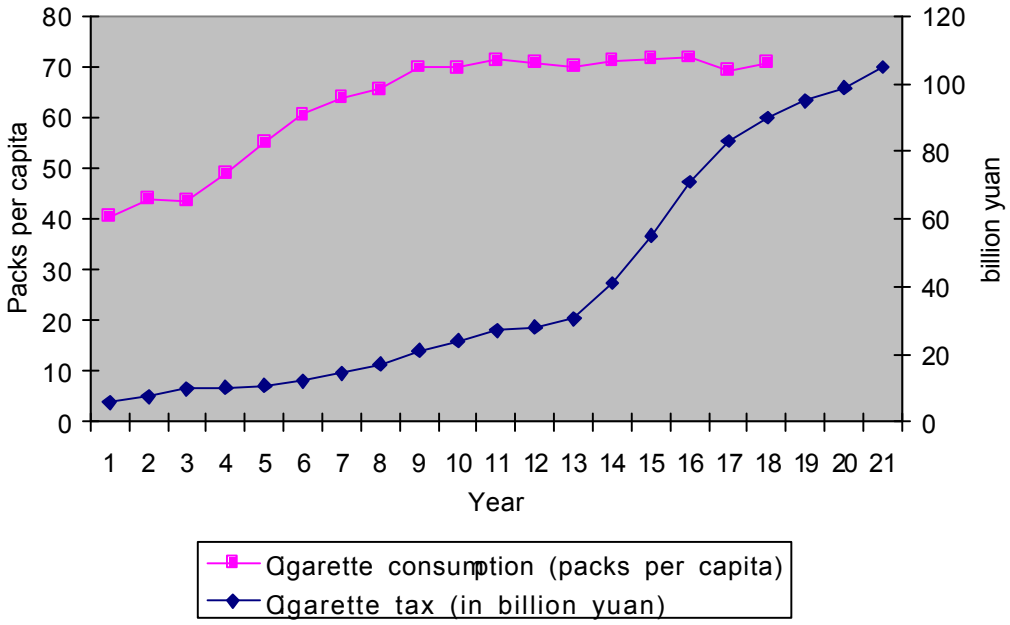
	Decrease in consumption		**Increase in cigarette tax revenue**	
	Million Packs	**%**	**Billion Yuan**	**%**
Increase in tax 25%				
Elasticity				
-0.40	3389.4	4.0	27.12	20.0
-0.54	4575.7	5.4	24.74	18.3
-0.64	5338.3	6.4	23.22	17.1

-0.70	5918.5	7.0	22.03	16.3
Increase in tax 50%				
Elasticity				
-0.40	6778.0	8.0	59.65	44.0
-0.54	9151.4	10.8	56.81	41.9
-0.64	10676.6	12.8	54.98	40.6
-0.70	11862.9	14.0	53.55	39.5
* We use 1997 data to calculate all results of this table. The average retail price was 4.00Yuan/pack, and the proportion of tax was 40%, 1.60 Yuan/pack				

Source: Authors' estimates

From Table 5, it can be concluded that an increased cigarette tax in China would lead to a decrease in cigarette consumption and an increase in tax revenue. This result is due to the fact that the percentage decrease in quantity consumed is greatly offset by the increase in prices (through the increase in tax). The greater the absolute value of price elasticity, the bigger the reduction in consumption, but the increase in tax revenue will be less. This relationship is depicted in Figure 2.

Figure 2: Cigarette Consumption (packs per capita) and Cigarette Tax Revenue (billion yuan), 1980 - 2000



Source: PRC Statistical Bureau, *China Statistical Yearbook*, Beijing: China Statistical Publishing House, various volumes

The price elasticity of the demand for cigarettes can be decomposed into two parts: the elasticity of participation (or quitting) and the conditional elasticity of quantity demanded among smokers. The ratios of these two components vary, from one-third of the effect being from smokers who quit and two-thirds from reduced consumption among the remaining smokers, to half of the elasticity accounted for by quitting and half by reduced cigarette consumption.

With a 25% tax rate increase (40 cents) at the 4 Yuan retail price (with a 40% tax base), the retail price would increase by 10% to 4.40 Yuan. Using the price elasticity of –0.54 as an example, with 320 million smokers in China and a 10% increase in price due to tax, 1.8 % (5.76 million) to 2.7% (8.64 million) smokers in China would quit smoking. Using epidemiological analysis estimates reported by the World Bank (1999), 1.44 million to 2.16 million Chinese lives could be saved by a price increase of 10% or a tax increase of 25%.

Recent work by Jiang and Jin (2000) estimated that the total direct medical cost attributable to smokers each year was 22.9 billion Yuan or 72 Yuan per smoker (22.9 billion/320 million smokers). If 5.76 million to 8.64 million smokers quit, this could generate medical cost savings of between 415 million Yuan and 622 million Yuan. If we use Jin et.al's (1995) estimated loss of productivity due to premature death of approximately 22,466 Yuan per person (20.13 billion Yuan/896,000 premature deaths), the 1.44 million to 2.16 million averted deaths would also prevent a loss of productive value of between 32.35 billion Yuan to 48.53 billion Yuan.

In sum, a cigarette tax increase in China could reduce cigarette consumption, generate more government tax revenue, save lives, reduce medical care costs, and increase productivity.

One of the issues related to a tax increase is whether part of the additional revenue from the cigarette tax would be dedicated for tobacco control use, such as an anti-smoking media campaign, health promotion, disease prevention, or even for subsidizing low-income individual health insurance premiums. This is a so-called earmarked tax. Public finance experts have argued that earmarking may not be a good tax budgeting procedure, since it introduces rigidities and does not permit proper allocation of general revenue among competing needs. On the other hand, one may argue that tobacco tax earmarking may be appropriate, in line with the benefit taxation principle, which asserts that inducing better health behavior and health status contribute to better expenditure decisions. During the past decade, earmarking tobacco tax for health care has been a popular fiscal instrument as well as public health policy in several countries around the world, such as the U.S., Australia, Egypt, Finland, and others. An earlier paper (Hu, Xu, and Keeler, 1998) has shown that although a tax increase would cause a loss of consumer (smoker) welfare, the magnitude of the loss can be offset by a positive gain of consumer surplus by nonsmokers as well as lower negative effects of smoking among smokers.

IX. CIGARETTE TAX AND ITS NEGATIVE IMPACT ON THE ECONOMY

An increase in cigarette taxes would reduce cigarette consumption. Therefore, it would have a negative effect on the cigarette industry and tobacco farmers. It would be important to estimate this negative

impact so that government policymakers can make well-informed overall decisions concerning cigarette taxes.

When an additional tax is levied on cigarettes, the immediate impact is a reduction in sales, which leads to a reduction in revenue as well as employment in the cigarette industry. Overall, the cigarette manufacturing industry employs about 500,000 persons, which represents 0.51 percent of total employment in manufacturing. The value of cigarette production was 129.60 billion Yuan in 1997 (33.67 billion cases or 84.17 billion packs), which contributed 1.14 percent of the national industrial production. Additionally, 3.5 million persons are engaged in retail cigarette sales, approximately 0.6 percent of the total employed population.

If we use the example of a hypothetical 25% tax increase on a 40 percent tax base, as shown in the earlier section, the reduction in sales would be 4.57 billion packs (estimated at the price elasticity of –0.54). Excluding the estimated 10 percent foreign/smuggled cigarettes, the net impact on domestic cigarette sales would be 4.11 billion packs, which is approximately a 4.88 percent reduction in sales. With a net price of 2.4 Yuan/pack (excluding tax, 4.4 Yuan minus 2 Yuan), the industry revenue loss would amount to 11.71 billion Yuan. Compared to the 1997 value of cigarette production, the industry would lose 9 percent of its total revenue, equivalent to 0.1 percent of the value of national industrial production (1.14% multiplied by 9%). The average profit of the cigarette manufacturing industry is 10.3 percent (China Markets Yearbook, pp.224, 1999) of total revenue. Thus, the loss of profit would be 1.20 billion Yuan.

If we assume employment to be a linear function of production volume, with a loss of sales of 4.88% in the domestic cigarette industry, employment could drop by 4.88%, which is about 24,400 persons, or about 0.025 percent of total employment in manufacturing. The effect on retail employment could be minimal, since only a few street vendors rely solely on cigarette sales. A reduction of 4.88% in sales would not result in the termination of retail businesses.

It should be noted that with the world trend of declining cigarette consumption and WTO participation, the China Tobacco National Company is already in the process of eliminating inefficient factories and consolidating production. Thus, the increase in tax and reduction in cigarette consumption could provide further impetus to improve the efficiency of cigarette production. A reduction in cigarette consumption could encourage the cigarette manufacturing industry to diversify into other products. Furthermore, the amount of money smokers would save from cigarette consumption would be likely to be spent instead on other food or household goods. Therefore, the net effect on the entire economy of increasing the cigarette tax could be smaller than these estimates, and smaller than many people might fear.

Chinese tobacco farmers have been over-producing tobacco leaves in recent years. In 1997, farmers produced 39.08 metric tons using 2.161 million hectares with an average productivity of 1.81 metric tons per hectare. Tobacco leaf production contributed 1.8% to total agricultural plant production. It takes 0.041 metric tons of tobacco leaves to produce one case of cigarettes (2500 packs) (Wang and Li, 2000). Thus the reduction of 457 billion packs or (1.83 million cases) due to a 25% tax increase would imply a reduction in the demand for tobacco leaf of 0.0893 million tons. The average government purchase price for tobacco leaves was 242 Yuan per 50 kilograms, thus tobacco farmers would lose 432.4 million Yuan, which is only 2.8% of the total value of tobacco leaf production in 1997. Given an average productivity per hectare of 1.808 metric tons, farmers could reduce the area under tobacco by 49,000 hectares.
It should be noted that a reduction of 49,000 hectares for tobacco leaf production does not necessarily mean that these lands would be idle. They could be used to grow for other plants, including other cash crops like tea and sunflowers. The return from these crops may not be as high as from tobacco, but would offset to some extent the lost revenue from tobacco. Therefore, the actual loss of revenue to

tobacco farmers would be much less than 432.4 million Yuan. This is why researchers in the Ministry of Agriculture do not hold a pessimistic view of the future of tobacco farmers, even if there were to be a tax increase on cigarettes.

The reduction in sales of tobacco leaves at the farm level implies a loss of local government tax revenue. As mentioned earlier, local governments encourage farmers to sell tobacco leaves in order to collect their local revenue. The local tax rate was 30% before 1999 (20% since 1999). Since tobacco farmers would lose 432.4 million Yuan, the local government could lose 129.7 million Yuan.

The above economic analysis suggests that while an increase in tobacco tax has a negative impact on the cigarette industry's revenue, profit and employment, tobacco farmers' income and acreage plantation, and revenue at the local government level, these negative impacts are much smaller than the gains in central government tobacco tax revenue and medical cost savings as well as the millions of lives saved.

Considering the loss of revenue for the cigarette industry and the income of tobacco farmers, based on the earmarked tax principle, the government may wish to grant subsidies to the cigarette industry and to tobacco farmers to help them to transfer to other manufacturing industries or to enable farmers to switch to other production opportunities such as tea, sunflowers and other cash crops.

X. CONCLUSIONS AND RECOMMENDATIONS

Many countries around the world have taken the initiative to control cigarette use because of its impact on public health and healthcare costs. China is in a unique position because its relatively high smoking prevalence provides a large tax base; therefore, a cigarette tax increase would have significant effects in generating additional central government revenue and reducing cigarette consumption.

As for the economic impact of additional tobacco taxes on the agricultural sector and on employment in the cigarette manufacturing industry, the data indicate that tobacco's overall contribution to the agricultural economy and manufacturing industry is small, around 1% to 2%.

As an illustration of the impact of an increase in tobacco tax, Table 6 provides a summary of the benefits and costs of raising a tobacco tax rate of 25%. It shows that a 25% tax increase would reduce cigarette consumption by 4.57 billion packs, and raise additional tax revenue of 24.74 billion Yuan. Statistical analysis indicates that between 5.76 million to 8.64 million smokers would quit smoking, resulting in 1.44 million to 2.16 million lives saved. The savings in medical care costs would be 415 million to 672 million Yuan. If one counts the value of productivity gains from preventing premature deaths, the economic value could be 32.35 billion to 48.53 billion Yuan. These monetary benefits would offset the industry revenue loss of 11.71 billion Yuan (including a profit loss of 1.02 billion Yuan), the 24,400 jobs that could be lost in the cigarette industry, the loss of income from sales of tobacco leaf of 432.4 million Yuan (taking account of the surplus of 0.089 metric tons of tobacco leaves), and the loss of local government revenue by 129.7 million Yuan. In essence, the overall monetary benefits far exceed the negative impact on the cigarette industry and tobacco farmers. In financial terms alone, not counting the number of lives saved and medical care cost savings, the gains in central government tax revenue (24.74 billion Yuan) are twice as large as the loss of industry and local government revenue

(12.27 billion Yuan). Figure 3 provides a flow diagram to summarize the benefit and cost analysis of a tax increase on cigarettes in China.

Table 6. Benefits and costs of tobacco tax increase in China

A 25% tax increase (ie. from 40% to 50% tax rate) at a price of 4.00 Yuan/pack, price elasticity at –0.54 (1997 data)	
TOTAL BENEFITS	4.576 billion packs
Consumption reduction	24.74 billion Yuan
Government tax revenue increase	5.47-8.64 million smokers
Quit smoking	1.44-2.16 million
Lives saved	415-627 million Yuan
Medical cost savings	32.35-48.53 billion Yuan
Productivity gains	
TOTAL COSTS	
Cost to cigarette industry	11.71 billion Yuan
Gross revenue loss	1.02 billion Yuan
Profit loss	24,400 workers
Employment loss	
Cost to tobacco farmers and local governments	89,000 metric tons
Reduction in tobacco leaf sales	49,000 hectares
Reduction in plantation area	432.4 million Yuan
Income loss	129.7 million Yuan
Local government tax revenue loss	

Source: Authors' calculations

The Chinese healthcare sector is currently facing limited financing sources, given the current state and local tax structure. Therefore, the option for raising additional revenues from an increased cigarette tax is a golden opportunity for China to finance healthcare reform and activities in health promotion and disease prevention.

International experiences with cigarette taxation and the current status of Chinese cigarette consumption leads to the following conclusions:

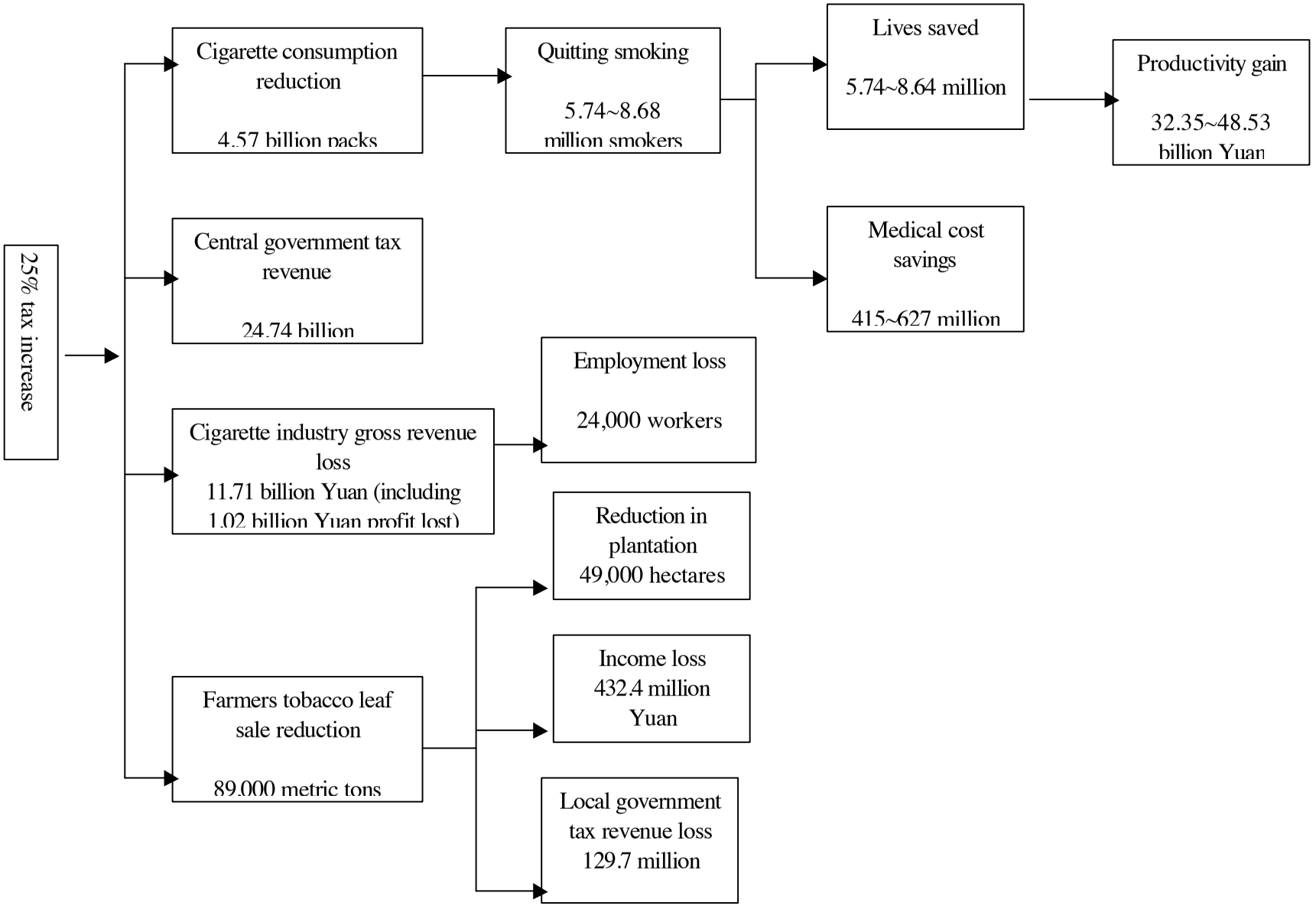
- Tobacco tax policies in China could do much to achieve the objective of reducing tobacco use. Government policymakers should consider using tobacco taxes as an intervention in accomplishing the goals of health promotion and disease prevention.

- Researchers have shown that tobacco taxation is an effective means of reducing cigarette consumption. Using a portion of cigarette tax revenue for anti-smoking activities would further achieve the goals of tobacco control.

China is a major country both in terms of the size of its population and the wide geographic differences in the production of tobacco and the manufacturing of cigarettes. Raising cigarette taxes could be a major political and economic issue. One option that the central government has is a gradual increase in tobacco tax. Another would be to carry out small-scale experiments in certain areas, like many other social and health insurance experiments being implemented in various local areas, to examine the potential impact of additional cigarette taxation on cigarette consumption, government revenue, possible allocation of additional tax revenue to health promotion and healthcare financing, and the Chinese cigarette manufacturing industry and tobacco farm sector. A short-term cross subsidy from additional tobacco taxation to tobacco farmers and the cigarette manufacturing industry may lead to the transfer to other cash crops in the long-term.

Implementing a tax policy would require research on the magnitude of additional cigarette taxation, the economic and social impact of additional taxation, and how additional taxation might be used. International organizations, such as the World Bank, the International Monetary Fund, the Food and Agricultural Organization and the World Health Organization may be able to provide either their technical know-how or financial support to embark on this important tobacco control policy. Beyond taxation, information dissemination about the negative harm to health and the enormous health benefits of quitting would also be an important non-price policy instrument to educate the public and mobilize public consensus that higher cigarette taxes would be an effective means to reduce cigarette use.

Figure 3: Benefits and Costs of a Hypothetical Tobacco Tax Increase in China



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