HOW MIGHT UNIVERSAL HEALTHCARE INSURANCE INCREASE PREVENTIVE CARE USE IN THE UNITED STATES?
A COMPARISON OF THE UNITED STATES AND TAIWAN

A Thesis
submitted to the Faculty of the
Graduate School of Arts and Sciences
of Georgetown University
in partial fulfillment of the requirements for the
degree of
Master of Public Policy

By

Tiffany Raetine Hsiou, B.A.

Washington, DC
April 6, 2010
HOW MIGHT UNIVERSAL HEALTHCARE INSURANCE INCREASE PREVENTIVE CARE USE IN THE UNITED STATES?
A COMPARISON OF THE UNITED STATES AND TAIWAN

Tiffany Raetine Hsiou, B.A.

Thesis Advisor: Yuriy Pylypchuk, Ph.D.

ABSTRACT

Background: In the next few years, the United States will undergo comprehensive health care reform that aims to expand health insurance coverage to 95 percent of Americans. This thesis offers an analysis of how individual demand for preventive health care may change as a result of having nation-wide health insurance expansion. Taiwan serves as an example of a nation that has already undergone nation-wide health insurance expansion. Method: By comparing preventive care use rates in the United States and Taiwan, I examine the effects of having a universal single payer health care system in Taiwan on preventive medical care use. Conclusions: I find two important results. One, I find that the Taiwanese system has almost entirely eliminated the positive correlation between income and use of health care services, while the U.S. system has not. Contrary to the economic theory of increased demand as a result of decreased prices, my findings suggest that price is not a strong determinant of one’s degree of participation in preventive care. Two, I find that people in the United States use more preventive health care than people in Taiwan. This thesis concludes that while Taiwan’s universal health care insurance system did not lead to as high rates of preventive care use as the U.S., it did greatly reduce inequality of access to healthcare due to socioeconomic differences.
Thank you …

Yuriy for your unwavering support, enthusiastic interest and dedicated guidance,
Congresswoman Judy Chu for your inspiring work to reform healthcare in Congress,
Ambassador Jason C. Yuan for your leadership between the United States and Taiwan,
My friends at the Taipei Economic and Cultural Representative Office in Washington, DC for
your hard work and dedication that inspired my academic interest in Taiwan and helped me to
obtain the Taiwanese data, Deputy Ambassador Ta-Tung Jacob Chang, Executive Officer Lisa
Li-Hsin Chuang, Chuan Chuan Yuan, Lawrence, Stacey Lin, Oliver Liao, Chou Wen, Jason
Chao, James Lin, Gary Wang, Ting Kaku, Steve Huang, Chiachi Kang, Administrative Director
Wang, Cultural Director Jeffrey Wang, Catherine Ruhuei Cheng, and Lily Samson,
My friends at the Office of Congresswoman Judy Chu, Amelia Wang, Allison Rose, Carlos
Uriarte, Lelaine Bigelow, Lisa Strumwasser, Eric Stecklow, Cyndy Hernandez, Aaron
Larrimore, Patricia Choi, Frank Refuerzo, and Christian Arana, for your contagious passion to
improve federal policy; you motivate me to study public policy and healthcare reform and made
me believe that policy study can make a difference,
My family Joseph, SuWen, Melody, Desiree, and Derrick for your encouragement, patience and
love, and a special thank you to my Dad, whose intellectual foresight and interest in Taiwan
inspired the formulation of this thesis,
Shin-Yi Chou, Jin-Tan Liu, Hsien-Ming Lien, Hsing-Yi Chang, Ken N. Kuo, Ann Shih, and
Michael Chen, for kindly and generously supporting me in my research efforts through e-mail
even though we have never met; it is your dedication to academia and research that enable
younger students like me to learn, grow, and contribute to the future of academic research,
The Georgetown Public Policy Institute, Eric Gardner, Jennifer Blanck, Kerry Pace, Leslie
Evertz, Emmett Griffin, Neenia Barlatt, Felecia Langford, for giving me the opportunity and
resources to study public policy,
My professors, classmates and T.A.s Barbara Schone, Nada Eissa, Emily Sama Martin, James
Habyarimana, Igor Kheyfets, Jessica Nysenbaum, Roshini Prakash, Marielle Kress, Marika
Butler, Azadeh Meshkaty, Julia Vlajic, Marita Lamb, Sofia Mussa, Laura Recchie, for your
friendship and patience while teaching me statistics.
# TABLE OF CONTENTS

Chapter 1. Introduction ................................................................................................. 1
Chapter 2. Motivation .................................................................................................. 3
Chapter 3. Policy Question ......................................................................................... 8
Chapter 4. Background on the Taiwan Health System .............................................. 10
Chapter 5. Literature Review .................................................................................... 14
Chapter 6. Methodological Approach ....................................................................... 21
Chapter 7. Estimation Strategy .................................................................................. 25
Chapter 8. Data Description ....................................................................................... 26
Chapter 9. Empirical Model ....................................................................................... 28
Chapter 10. Results .................................................................................................... 29
Chapter 11. Limitations .............................................................................................. 37
Chapter 12. Policy Implications ................................................................................ 39
Chapter 13. Suggestions for Future Research ............................................................ 45
Chapter 14. Conclusion .............................................................................................. 46
Chapter 15. Tables ...................................................................................................... 49
References ................................................................................................................... 54
Chapter 1. Introduction

On March 21, 2010, after years of Congressional and public debate, President Obama signed a healthcare reform bill into law that covers almost all of the uninsured citizens of the United States. The bill on healthcare reform requires, among many other changes, that all Americans (with some exclusions) have health insurance, and expands insurance coverage to 32 million Americans. The bill also creates competitive health insurance market places, expands Medicaid, closes current existing gaps, and requires certain types of employers to provide coverage for their employees. Currently, roughly 83 percent of citizens in the United States are uninsured. When the reform is fully phased in, 95 percent of eligible Americans will have a federally prescribed minimum level of health care.

The reform bill mandates that all new health insurance plans must provide coverage for preventive services for no out of pocket costs by 2018. Currently, almost all standard preventive health care services in Taiwan are free. By looking at Taiwan’s utilization rates of free preventive care services, United States policymakers are able to gain insight into how consumers will respond to price changes in preventive medical care services as a result of the healthcare reform.

This thesis specifically asks: what does the evidence show regarding differences in preventive healthcare use in Taiwan and the United States?; how does an individual’s personal characteristics affect his/her decision to use preventive healthcare measures?; and how does living in Taiwan play a role in one’s decision to use medical care as compared to living in the
United States? These questions are able to reveal to U.S. policy makers what they can expect to see in the future in regards to preventive care use in the healthcare market.

This two country comparison study examines how health insurance status, education, income and other variables affect one’s demand for preventive care in the United States and Taiwan in the year of 2005. Presumably, having health insurance in both countries will significantly lower the price of preventive care, raise rates of preventive care use, produce healthier populations, and save costs to society and government in the long term. Successful promotion of preventive health care use requires a careful examination and analysis of the different economic and demographic factors that lead an individual to receive preventive care. This thesis uses a two country model to examine and then analyze these economic and demographic factors that affect medical care use and discusses their policy implications for the future of healthcare in America.
Chapter 2. Motivation

"Extraordinary hardships are placed on the uninsured who live every day just one accident or illness away from bankruptcy. These are not primarily people on welfare. These are middle-class Americans. Some can't get insurance on the job. Others are self-employed, and can't afford it... Many other Americans who are willing and able to pay are still denied insurance due to previous illnesses or conditions that insurance companies decide are too risky or too expensive to cover” (President Obama, December 2009).

To address these concerns, the 2010 health insurance reform bill has promised to make insurance affordable to more Americans than ever before and bans discrimination practices based on preexisting conditions. The fact that the U.S. Congress has made such sweeping changes motivates in depth research of how other countries have responded to healthcare insurance reform that makes healthcare more accessible to more people.

Since the United States has mandated that all Americans hold health insurance, policy makers must ask how this public policy change will affect the health outcomes of the previously insured and previously uninsured, the supply and demand of the healthcare market, and government costs in the long run. By increasing the number of Americans who have health insurance over the next few years, the health care reform lowers the high out of pocket cost of treating unexpected health conditions. Spreading out the costs and the risks across different pools of people allows previously uninsured individuals to be granted with the ability to purchase healthcare. The new ability to purchase medical care will alter peoples’ decisions to consume free preventive care check-ups and tests. By examining the effects that lower preventive care costs have on medical care utilization in the United States and Taiwan, this paper aims to
identify the most effective means for health policy to stimulate activity in the preventive health care market.

The Taiwanese single payer universal health insurance system is often touted as a national system that has improved health outcomes, saved government costs, decreased or eliminated inequality of access in the market, and achieved a more equitable distribution of healthcare resources. Until the 2010 health care reform bill was enacted, the United States had a private-public multi-payer mix and not a single payer universal insurance system. It is in the U.S. government’s best interest to conduct a cost-benefit analysis of how much money they can save by spending money now on subsidizing and promoting preventive care and of whether or not it is efficient to make preventive care free as a part of the new health reform. Since Taiwan provides universal health insurance and free preventive care, studying the health data of Taiwan can reveal important trends in healthcare market activity. Thus, to inform U.S. health policymakers about the possible correlation between providing health insurance and increasing use of preventive care services, it will be beneficial to examine the health data of Taiwan.

It is important for health policymakers to study preventive healthcare data because it reveals how populations utilize their health insurance benefits on a day to day basis, and not only during extreme health situations or when faced with terminal diseases. Moreover, preventive care testing and screening may alleviate the huge burden of health care costs by detecting preventable or curable diseases and conditions early on.
For the past fifteen years in Taiwan, middle and lower-income families have had health insurance and ease of access to preventive health care providers. Taiwan is not the only nation that has preceded the U.S. in health insurance reform. Canada, the United Kingdom, and Germany also have universal healthcare systems. These nations have not only reformed their insurance systems to cover more citizens, they have also managed to spend less than the U.S. on healthcare expenditures per person. The Organization for Economic Cooperation and Development (OECD) reported that the United States has spent a larger portion of its GDP on health care than other nations with similar economic development (International Comparisons of Health Care). Furthermore, the U.S. spends more money per year per person on healthcare expenditure than any other nation in the world. In 2002, the United States experienced the highest per capita spending for health care services, spending an average of $5,267 per citizen. Similarly developed countries spent far less than that amount per capita in 2002: Switzerland spent $3,445 per citizen; Norway, $3,083; Luxembourg, $3,065; Canada, $2,931; Germany, $2,817; Iceland, $2,807; and France, $2,736 (International Comparisons of Health Care). In December 2009, President Obama said, "We spend one and a half times more per person on health care than any other country, but we aren't any healthier for it”.

These apparently disproportionate health care expenditures between the U.S. and other developed countries have motivated my study focused on international comparisons of health care markets. Given the fact that countries that provide universal health care to all their citizens are spending less than the United States, the current inefficiency of the American health system
should particularly motivate policy makers to re-evaluate the structure of the U.S. health insurance system and identify the goals they are trying to achieve with reform. It is important to clarify the goals of universal health insurance: will the focus be on helping to pay for emergency or extremely expensive medical procedures, or will it be on supplying preventive healthcare with the hopes of early detection and improving overall health status? Also, does a system of universal health care save more money in the short run or in the long run? It is essential for decision makers to understand how health insurance expansion will help them to achieve their goals so that both system performance and the health of populations can be improved.

Data from the World Health Organization further has motivated my exploration into international comparison of preventive care. It finds that “virtually all countries are under-utilizing the resources that are available to them. This leads to large numbers of preventable deaths and disabilities; unnecessary suffering, injustice, inequality and denial of an individual's basic rights to health” (World Health Organization). Thus, if the goal of universal health care is to improve the health of populations, policy makers should utilize resources such as preventive health care measures to decrease preventable deaths and cut costs of expensive medical treatment.

This study hopes to inform American policy makers about how universal healthcare has affected the utilization of preventive care services in Taiwan. This data aims to help policymakers make more informed decisions how to subsidize and promote preventive health
care in the United States in the future. Furthermore, it investigates how increased insurance coverage that made preventive healthcare free changed the health care consumption in Taiwan.
Chapter 3. Policy Question

Many policy questions must be answered as we move forward in the process of healthcare reform. One such question is whether or not the U.S. government should adopt policies that increase spending on prevention and how the U.S. government can induce people to use preventive measures once they are accessible and affordable. Preventive care, though it may raise costs and be more expensive in the short run, can ultimately increase life span in the population as a whole. Proponents of preventive care say that it can reap long-term financial savings by detecting diseases early on. According to the World Health Report, 75% percent of U.S. health care spending goes to treat chronic diseases, many of which could be prevented from developing in the first place (The World Health Report). If 75% of health care spending goes to treat chronic diseases, it would only be logical to make a policy that funds more preventive care to address chronic diseases early on and prevent them from developing. President Clinton said, “long term costs to the health system will be lower if we have comprehensive preventive services” (Kenkel 2000). Preventive care "results in longer, healthier, and more productive lives - yielding savings that don't typically show up on a score sheet," says Linda Douglass, the communications director for the White House Office of Health Reform (Political Punch, 2009).

Opponents of increased spending on preventive care point to evidence that “prevention usually adds to medical expenditures, contrary to the popular view that it reduces them” (Kenkel 2000). This is true when interventions are delivered to large groups, of whom only a very small fraction would get the disease and thus benefit from the test in the first place.
Though it may not always be the cheaper alternative in the short run, prevention may nevertheless be a desirable policy because it has the potential to save money and has positive externalities on society (Kenkel 2000). The relevant policy questions are: should the government commit to increased preventive care use as a goal, or is this too costly a policy to implement? Policy makers must also identify what types of people actually choose to use preventive care and whether availability of preventive care has actually resulted in its increased consumption. It is imperative that the United States study the demographics of groups who are already using preventive care the most to learn how to create the most effective and efficient preventive care policies. For example, if high income or education is a strong determinant of preventive care use, the health policy makers can use this information to better target their campaigns and incentives to get people to increase their use of preventive care. Taiwan serves as a great example of a country that may be able to answer these pertinent policy questions.
Chapter 4. Background on the Taiwan Health System

Taiwan is a country where all citizens, regardless of their income level, marital or employment status, can afford health insurance. Taiwan’s National Health Insurance (NHI) is a single payer universal health insurance system that has attracted world-wide attention for its broad political and social appeal. The Taiwan Legislature launched NHI in March 1995 to cover everybody who was previously left out of the coverage system. Before NHI, only 59% of the population enjoyed coverage. Today 98% of the population is covered in the NHI program. More and more countries’ governments, including the United States, are considering and adopting the administration of their health care insurance through government. Since universal health care looks after the health of their entire population, Taiwan’s approach is socially appealing. Taiwan’s universal health insurance program provides economic, political, and social models that the United States can examine. Specifically, U.S. policy makers may be interested in whether universal health insurance improves overall health outcomes, promotes more regular use of healthcare through preventive healthcare behaviors, and whether or not universal health insurance reduces inequality of access to healthcare.

Taiwan’s National Health Insurance was incorporated into the existing free market system in 1995. It allows consumers free choice of providers and offers providers free choice of practice methods under a single governmental payer. The NHI is universal, mandatory, and comprehensive. All citizens must enroll in the program. The Bureau of National Health Insurance (BNHI) is the government run insurer under direct supervision of the Department of
Health. The Bureau is the only legitimate insurer to implement the National Health Insurance Program. Taiwan’s hospitals adopt a closed-staff system and are dominated by the private sector. Physicians are primarily salaried by hospitals. There is no current gate-keeper system in Taiwan. Patients are free to go to any clinic or hospital.

The payment system is made of three branches, the insured, health care providers, and the BNHI. The BNHI collects premiums from the insured and issues them insurance cards. The premium is calculated based on insured individual’s salary and is shared by the employer, the employee and the government. The NHI health care providers offer the insured medical services when such services are requested. The healthcare providers provide medical services according to the contract. The insured must pay a certain amount of co-payment when using the services. When patients receive medical services, such as outpatient care, hospitalization, or pharmaceuticals, they need to share part of the expenses. Providers will in turn claim medical expenses from the Bureau, and the BNHI pays the healthcare providers on a global budget payment scheme.

The benefits under NHI are very comprehensive. The program covers inpatient care, outpatient care, laboratory tests, pharmaceuticals, dental services, traditional Chinese medicine, day care for the mentally ill, and nursing home care. Expensive medical services, such as MRI scans and organ transplantation are covered as well.

The NHI is financed by the aforementioned premiums collected from the employees, employers, and the government. The insured persons are grouped into six categories and are
subject to different premiums calculations and contribution shares. For low-income households, the government subsidizes 100% of the premiums. The co-payments that must be paid at the time of service also have specific calculations. The co-payments are affordable payments, approximately equivalent to $1.50 US dollars. Providers have the option of charging registration fees at different rates, however, from $1.50 to $10.00 US dollars depending on whether the patient is referred by his/her family doctor. If the patient has a hospital stay, most patients pay 10% of the medical expenditure for hospital stays under 30 days.

Taiwan’s NHI has 98% citizen enrollment rate and has made healthcare accessible to all citizens. The remaining 2% of non-participants are those living overseas for a long term or are unwilling to participate in the program because of personal wealth. These certain individuals are so wealthy that they do not need to enroll in the health insurance program to help pay for medical treatments. There are more than 18,000 healthcare providers contracted with the BNHI. To address inequality of access, the BNHI opted to have many measures increase access to populations in offshore island or mountainous areas. For example, the Integrated Delivery System Plan that encourages doctors to work in these areas focuses on the 48 outlying islands and mountainous areas of Taiwan.

The Taiwan model has been recognized by many economists as an ideal way to set up a healthcare insurance system. The health outcomes in Taiwan can lend insight to U.S. policy makers who study the structure of the health insurance system. Today, U.S. policy makers debate
the benefits of universal health care, how an affordable option can be set up in the U.S., and whether or not a public health insurance system can actually work in implementation.

One big issue brought up in the U.S. debate is the affordability of such a proposed health system. The U.S. policy makers must consider how the finances of the system will be administered and also weigh the costs of preventive care against the long term benefits of preventive care. In order to help answer these questions, I have observed and analyzed the differences in personal characteristics that may lead one to use preventive care in the U.S. and Taiwan. Because some countries can spend less and achieve better health outcomes and higher rates of preventive care use, comparing an individual’s income to his/her access to healthcare may be a good indicator of how efficiently and effectively a nation’s health system is structured. An efficient and effective system would allow its citizens to consume good quality health care on a regular basis at an affordable price that is within their means.
Chapter 5. Literature Review

My study is particularly focused on preventive care. Like past studies, I am looking at preventive care service use because these services are an important component of health care costs and can improve health of a society as a whole. Preventive services “may result in earlier stages of diagnoses (e.g., through cancer screening) and may help identify individuals at increased risk for particular diseases (e.g., cardiovascular disease)” (Bednarek and Schone 2003). Preventive care use may reduce medical costs, increase productivity, and prolong life (Bednarek and Schone 2003). Contrary to the recent Congressional Budget Office reports that say preventive care use would increase costs, Messonier and colleagues found that the clinical and community/ policy related interventions were cost effective or cost saving (Bednarek and Schone 2003).

Another paper, focused specifically on the economics of primary prevention, investigated the apparent lack of economic evidence in favor of prevention (Schwappach 2007). The general opinion about preventive care is that, contrary to curative care, prevention has no identifiable beneficiaries and is commonly characterized by immediate costs and delayed benefits. Schwappach and colleagues hypothesized that the lack of economic evidence in favor of preventive care has led to low government spending on preventive care. Data shows that 3.2% of government health expenditures are spent in prevention category in 19 OECD countries (Schwappach 2007). Such low government spending in preventive care is not desirable from a social welfare perspective. At the end of the literature review searching for economic evidence of
effective preventive care, Schwappach and colleagues found that there actually is a significant amount of relevant economic evidence in favor of prevention, despite important remaining gaps. The majority of the studies were cost-effect analyses that used “life years gained” as the measure of effectiveness or benefits of preventive care. The study concludes that there is a great need for government to engage more actively in the economic evaluation of prevention (Schwappach 2007).

Several economic theories support my hypotheses that individuals with health insurance have increased use of preventive care primarily because universal health insurance makes using healthcare more affordable and approachable. One economic finding is that receipt of preventive services is strongly associated with insurance and usual source of care, where one has access to healthcare at a clinic or meets with a physician regularly. The Commonwealth Fund did a study on insurance coverage and receipt of preventive care and found that individuals without health insurance were less likely to have a regular care provider, more likely to delay or forgo needed medical care, preventive services, and prescription drugs, and more likely to have poor health outcomes (The Commonwealth Fund). The study also found that health insurance coverage leads to better health outcomes: insurance coverage was associated with higher rates or preventive care use among both lower-income and higher-income individuals (The Commonwealth Fund). In the study, Receipt of Preventive Care Among Adults: Insurance Status and Usual Source of Care, insured adults with regular source of care were found most likely to have received preventive care services, compared to uninsured adults without regular care (DeVoe 2003).
Conversely, when people lack insurance or a regular source of care, their access to necessary services is reduced, which may result in poorer outcomes (DeVoe 2003).

Improving preventive service delivery to the entire U.S. population requires not only expanding health insurance coverage and improving access to comprehensive and continuous primary care services but also implementing the recommended amount of checkups. A 2003 study on receipt of preventive care found that only 54% of survey respondents had received the physical examination recommended by the U.S. Preventive Task Force as a way to provide an opportunity for early detection of cancers and other illnesses. The study highlights the relevant health promotion issue of how the government must increase access by not only providing affordable insurance, but also following through with the recommended amount of tests and treatments once the individual is insured.

Another study looking at variation in preventive service use discusses the economic theories behind preventive care. A paper by Bednarek and Schone, *Variation in Preventive Service Use Among the Insured and Uninsured: Does Length of Time Without Coverage Matter?*, says that lacking health insurance alters health care use and results in delays in seeking care (Bednarek and Schone 2003). Using regression analyses, Bednarek and Schone found that individuals with continuous coverage during the period of their study had dramatically higher rates of preventive service use than individuals who lacked coverage for that time period (Bednarek and Schone 2003). Thus, they reinforce the idea that insurance does incentivize and increase preventive care use. Also important to note, their evidence shows that preventive service
use falls especially below recommended levels for minorities, the poor and the less educated. Another study finds that uninsured individuals are less likely to receive preventive services: “In particular, being uninsured significantly reduces the receipt of routine checkups, cholesterol checks, influenza immunizations, blood pressure checks, Pap smears, breast exams, and mammograms” (Bednarek and Schone 2003). Bednarek and Schone also cite another study which concluded that those without insurance were less likely to receive periodic screening for hypertension (via blood pressure checks) than those with private or public insurance, with no significant difference between the publicly and privately insured (Bednarek and Schone 2003).

The Handbook of Health Economics chapter on prevention presents conceptual and empirical arguments to encourage prevention and poses the question of whether prevention can lower total medical expenditures (Kenkel 2000). Donald Kenkel says there is a public good from prevention related research and development, and there are several positive externalities of preventive care. For example, externalities of vaccinations and other preventive health actions better the work force, lead to a stable economy, and lower prevalence of disease. Kenkel also discusses the policy-relevant questions of the effectiveness of policy interventions to encourage prevention. He makes a noteworthy discussion about past literature that studies insurance’s effect on preventive care. Whether improved access actually leads to more preventive care use depends on the responsiveness of the demand, or the elasticity of the demand for preventive care. The demand for preventive care is derived from one’s perception that they are at risk of a certain
disease or condition, one’s preference for taking care of oneself, one’s ability to purchase the preventive care, and one’s knowledge of preventive care’s benefits.

Current trends in U.S. health care promotion policy have improved consumer access to preventive services by making policies for the private market that benefit the public good. Many states have passed laws mandating that private insurance plans cover preventive services. In addition, Human Maintenance Organizations (HMO) place great emphasis on prevention, and Medicare and Medicaid offer better coverage for preventive care now than in the past (Kenkel, 2000).

Furthermore, Kenkel cites a study by RAND called Health Insurance Experiment (HIE) that found differences in medical care usage are due to health insurance status (Kenkel, 2000). Specifically, “the proportion of women receiving preventive care in any one year is somewhere between 3 and 7 percentage points higher in the group receiving free care than in the groups with less complete insurance” (Kenkel, 2000). The RAND HIE also indicated that increased membership in HMOs increased the use of preventive services. HMO members who had specific insurance coverage for preventive visits were found to use more preventive care than people with conventional insurance. This implies that in the United States, if people had better access to care, they would most likely consume it. Therefore, if it is the government’s policy goal to use more preventive care for all people—regardless of education, personal wealth, or employment— it is worth considering creating insurance specific to preventive services. The U.S. can consider
setting aside specific money for programs in Medicare, Medicaid and private insurance systems to promote preventive care.

While the study mentioned above may have found that type of insurance, specifically one focused on preventive care, to be a strong predictor of health care consumption, some studies have found that “expanding health insurance” by lowering prices or insuring more people, “will not lead to substantial improvements in the receipt of clinical preventive services” (Kenkel 2000). This study instead points to the availability of time to consume healthcare and regular source of care as the most important factors determining demand for preventive care services such as immunizations.

In the Handbook of Health Economics, Gerdtham and Jonsson conducted an international comparison of health expenditure and an econometric analysis behind nations’ spending behavior. They concluded that aggregate income appears to be the most important factor explaining health expenditure variation between countries. The size of the estimated income elasticity was high, and this indicated that health care is a luxury good.

These findings have implications for the United States and Taiwan. In Taiwan, health care is not a luxury good because it is affordable to all. An increase in income does not give the individual more ability to purchase healthcare in Taiwan. In the United States, health care is a luxury good, which means that most people will not be able to afford consuming health care

unless their income increases. However, some policymakers disagree with this outcome and believe that reducing income inequality will maximize the social welfare, while others do not feel it is the government’s role to interfere in market determination of prices of commodities like health care services.

The World Health Organization is one institution that believes that social welfare through government provided health care should be a government priority and that universal healthcare is an ideal way to maximize social welfare. "It is especially beneficial to make sure that as large a percentage as possible of the poorest people in each country can get insurance," says Dr Frenk of the World Health Organization. "Insurance protects people against the catastrophic effects of poor health. What we are seeing is that in many countries, the poor pay a higher percentage of their income on health care than the rich" (Frenk, World Health Organization).

This has many implications for the United States. Compared to Taiwan, the poor in the United States are spending a much higher percentage of their income on health care than the rich in the United States. In many countries without a health insurance safety net, many families have to pay more than 100 percent of their income for health care when faced with sudden health emergencies. In other words, illness forces them into debt. Families in Taiwan, however, can be rich or poor, and still never have to pay more than 100 percent of their income, or anywhere near that, for health care. The insurance structure in Taiwan generates a more equitable distribution of health care access. In the United States, the 2010 reform hopes to provide more affordable health insurance options for low income families in the future.
Chapter 6. Methodological Approach

My methodological approach compares preventive care use rates in Taiwan and the United States while controlling for insurance coverage, education, income, and other personal characteristics that may influence one’s decision to consume preventive care. Presumably, comparing the health data between the two countries can reveal differences in Taiwan as a result of their universal health insurance.

Insurance coverage is very important in predicting whether one will use preventive care for the following reasons. Health insurance lowers the barrier to accessing preventive care by lowering price, increasing communication with health professionals, and offering special preventive care programs. Additionally, once an insured person makes contact with a health center or physician, the probability of demanding preventive care may increase. It is of interest to examine the probability and volume of use as they might differ between uninsured and insured groups, because once contact is established with a health center or physician, the medical system itself might influence utilization behavior (Lairson and Swint). If one has health insurance in the United States, the type of plan will determine that individual’s price of preventive care. For example, an individual in a certain health insurance program may pay less for preventive care checkups than an individual in another type of insurance program. Since insurance plan determines price, and economic theory says that price of a good determines one’s demand for it, insurance status is included in my model of predicting demand for preventive care in the United States.
Aside from the insurance coverage dummy variable, I have also controlled for other x variables in the regression that will help predict y. Income is one of the other x variables in my conceptual model that is particularly of interest to policymakers. Lairson and Swint’s study *A Multivariate Analysis of the Likelihood and Volume of Preventive Visit Demand in a Prepaid Group Practice* estimated the likelihood of preventive visits for all persons and the volume of preventive visits for users. They found that income and insurance were the most significant economic variables in the likelihood equation (Lairson and Swint). As expected, income is a strong predictor of demand for preventive care, and since medical care can be seen as a normal or luxury good, income is directly associated with the quantity of goods and services demanded.

The income variable in Taiwan and United States is predicted to yield interesting yet complicated results because in Taiwan, unlike in the United States, one’s income level does not determine whether or not they are insured. Taiwanese citizens of all levels of income are automatically ensured once they enroll in the national health insurance program. Lairson and Swint mention that evidence suggests that as insurance broadens and deepens, as it has in Taiwan since 1995, income becomes less of a factor in determining medical care utilization. My literature review suggests that insurance does increase demand for preventive care, but having insurance to subsidize preventive care costs does not ensure that one will consume preventive care. In other words, even if care is essentially free in Taiwan in monetary terms at the time of service, its consumption still requires the expenditure of time and resources on behalf of the insured (who is giving up time that could be spent on making money to see the doctor), the
doctor, and the government. It may also have implications for the insured’s ability to earn income in the future. Insurance can influence demand for preventive care in opposite directions: “The more one earns, the higher the current cost of medical care consumption, but also the higher the expected future return if some health problem is ameliorated” (Lairson and Swint).

Though Taiwanese persons’ individual income cannot help to determine their insurance status, Taiwanese citizen’s individual income may determine their knowledge of and desire for preventive care if their high income results in them being highly educated. In the United States, persons of higher wage will likely invest more in health, suggests Grossman in Lairson and Swint, because of a higher rate of return to such investment in future health. Having higher level income (middle class or well-off) in the United States will be a strong determining factor of one’s desire to invest in preventive care because high income usually correlates with high levels of education, and high levels of education usually correlate with knowledge of healthcare measures. In contrast, in Taiwan, having high or low income will not be a meaningful predictor of personal motivation to increase use of preventive health care measures, unless the income variable correlates with education level. If high income leads to high education achievement and low income leads to low education achievement in Taiwan, then the income variable will be a significant determinant of medical care utilization.

Relevant work that has been done in this area is very helpful to my research because it shows models of how other people have compared health outcomes across countries. A relevant paper is How Much Might Universal Health Insurance Reduce Socioeconomic Disparities in
Health? A Comparison of the US and Canada by Decker and Remler. My research asks a similar question, but instead looks at US and Taiwan. Some ideas borrowed from the Decker and Remler paper assist the development of concluding policy implications of my study. The independent characteristics – education level, insurance status, income, or other factors— that lead one to use the dependent variable of preventive care and their relative magnitudes have important policy implications. After examining the magnitudes and directions of these coefficients, this paper aims to see if universal healthcare insurance, or increased insurance coverage, will be able to increase preventive care use in the United States.
Chapter 7. Estimation Strategy

The estimation strategy is to examine how health insurance affects the demand for preventive care and the association between lower income and lower use of preventive care in the United States and Taiwan. The dependent variables are the following preventive care measures: cholesterol check, stool occult test, blood pressure check, mammogram screening, flu shot, dental check, and whether one smokes or not. Each individual is asked whether they had the preventive care test in the past 12 months. These preventive care measures are good indicators of how often one consumes preventive health care services and have the ability to reveal a chronic situation early on which can save the patient a lot of money.

The demand for medical care/preventive care is derived from a more basic demand for good health. The amount of preventive care consumed is a function of price, time, income constraints, and other economic and socio-demographic factors associated with medical care utilization. Some constraints that I have controlled for are age, gender, income, marital status, family size, self reported health status, education level, and employment status.

I used a linear probability model to try to predict the likelihood that one will use preventive care based on their personal characteristics. My dependent variables are binary, taking on values of 1 = consumed the preventive care in the past 12 months, or 0 = did not consume the preventive care in the past 12 months.

---

Chapter 8. Data Description

The data is comprised of two countries’ national health survey data. The data sets are Taiwan’s 2005 National Health Insurance Survey (NHIS) and United States’ Medical Expenditure Panel Survey (MEPS) collected by the Agency for Healthcare Research and Quality of years 2004, 2005, and 2006. The year 2005 was chosen because the Taiwan National Health Insurance Survey has only been conducted in 2001 and 2005. They are currently working on NHIS 2009. Thus, I choose to also look at the year 2005 and its surrounding years in order to produce more reliable estimates.

The data used from each survey were personal characteristics and common measures of preventive health care in each survey that reveal how often an individual uses preventive health care measures. I appended three years of MEPS data to create more data points to use. In order to do this, I renamed and reformatted all the variables that I wanted to control for separately in each year before appending the three years together.

I chose the seven preventive care variables used in this study because they were the preventive care variables that the two surveys had in common. Additionally, the two surveys asked about these preventive care variables in the same time period, which is within the last 12 months. I recoded the data separately in both countries’ data sets and generated many new variables so that the answers in Taiwan and the United States would be identical and compatible in format and content. After making all the variables in both countries’ data sets compatible for statistical analysis use, I appended the Taiwan and U.S. data sets together.
In order to isolate the effect of being in Taiwan’s health insurance system to specifically see if universal health insurance is an important factor in determining preventive care use rates, I created a variable Taiwan that I would set equal to 1 in Taiwan and equal to 0 in the United States data sets. I then created a data set in which there were equal numbers of Americans as Taiwanese for the most reliable results. To accomplish this, I generated random variables in the larger data set, U.S. MEPS, and extracted from this data set a certain amount of observations equal to the number of observations that I had in the Taiwan data set. Thus, I created a data set with equal number of Taiwanese and Americans, with the American observations being randomly picked. I ended up with 13,039 observations of Americans and 13,028 observations of Taiwanese. These results are listed in Table 4.

In order to compare preventive care use rates between Taiwanese and Asian Americans, I took out from U.S. MEPS the observations that were denoted as of Asian descent and again created the Taiwan variable as described above. I then generated random numbers in the now larger Taiwan data set and extracted a certain number of observations equal to the number of Asian Americans in MEPS. Here I created a data set with equal number of Taiwanese and Asian Americans to observe the effect of being in Taiwan on one’s chances of using preventive care services. I ended up with 3,950 observations of Asians in America and 3,950 observations of Taiwanese for this data set. These results are listed in Table 5.
Chapter 9. Empirical Model

The empirical model of this study looks at how a person’s characteristics, such as age, marital status, income, education level, self-reported health status, and employment status affect or predict their chances of having undergone preventive health care check-ups or procedures in the past year. This model examines how several personal characteristics determine use of seven binary preventive health care variables. The estimation strategy is to see if the coefficients on personal characteristics, such as income and education level, can determine one’s use of preventive health care. These measures are good indicators of how often one consumes preventive health care services. The measures or preventive care were included in both countries’ surveys in 2005 and have the ability to reveal a chronic situation early on and save the patient a lot of money. Taiwan has universal health insurance and the United States does not. This shapes the hypothesis that those who have health insurance will behave differently than those who do not have health insurance.
Chapter 10. Results

Table 1 summarizes the percentage of people in U.S. and Taiwan who answered that, yes, they had undergone that preventive health care measure in the past 12 months. Because Taiwan has universal health care coverage and the U.S. does not, I differentiated between those in the United States who have insurance coverage and those who do not. The U.S. Asians group in Table 1 represents U.S. respondents of Asian ethnicity ages 25-64 regardless of whether they are insured or not. Table 1 displays information about the general trends in preventive care use in the United States and Taiwan. Particularly, 90% of insured Americans have had their blood pressure checked, versus 63% of those who are uninsured. There are notable differences between U.S. and Taiwan use of stool occult tests to screen for colorectal cancer, mammograms for females over 50 years old to screen for breast cancer, and receipt of flu shots; in these three areas, the United States surpasses Taiwan in preventive care use.

Two pieces of relevant information can be taken from Table 1. First, Table 1 shows a clear trend that the insured individuals in the U.S. have a higher incidence of preventive care use than uninsured individuals in the U.S. Second, U.S. Asians and Taiwanese have equal use of dental check-ups in the past 12 months. U.S. Asians have higher use of preventive care across all other variables except “smoke”, a variable which denotes individuals who have smoked in the past 12 months.

Here, it is important to note that the preventive care variable “Smoke” is expected to be different from the other variables in that it does not show how much an individual uses
preventive care to take care of their health. Rather, smoke is used as a measure of how unhealthy a person is, or how they have not stopped smoking as a preventive health care measure. Table 1 shows 21% of insured respondents in the U.S., 33% of uninsured respondents in the U.S., 10% of Asian respondents in the U.S. and 34% of insured Taiwanese have smoked in the past 12 months. Main results on the “Smoke” variable are supposed to be in the opposite direction than the other variables because having smoked in the past 12 months worsens health, whereas the other preventive care measures improve health. Main conclusions here are approximately the same amount of uninsured Americans and Taiwanese smoke, 33% and 34% respectively.

Analysis of Table 1 raises the question of why the United States screens for certain types of cancer more than Taiwan does. In the other measures of preventive care, the differences between Taiwan and U.S. are not as large and noticeable. Table 1 gives preliminary results to compare means across the board for different populations. Table 1 is limited because it cannot describe the effects of having health insurance in the United States, nor can it identify the effect of universal health insurance in Taiwan on preventive care use.

As we take a more in depth look at the preventive care data from the two countries, we can isolate and identify the statistically significant differences in preventive care use in the two countries. Education, income and marital status should have different effects on preventive care use in the two different nations, and this is reflected in my results in Tables 2 and 3. Each country’s results have been estimated separately first in Table 2 for Taiwan and in Table 3 for the United States.
Table 2 shows the effects of income, education and marital status on decisions to use preventive care in Taiwan. The income column says that if one’s monthly income in Taiwan goes up to the next category (each category is 5,000 $NT [New Taiwan Dollars], or roughly up $160 US Dollars), then that individual’s chance of getting a cholesterol check goes up by 0.001 percent, or 0.1 percentage points. The income effect on cholesterol check use in Taiwan is statistically significant at the 0.05 level but not large in magnitude.

As we look down the income column in Table 2, the rest of the coefficients on income are not significant or large in magnitude. Analysis of this regression highlights the largest benefit of Taiwan’s universal healthcare system – the fact that Taiwan’s National Health Insurance has countered the economic principle of a normal good. If an item/commodity/service is a normal good, then the more income that one has, the more ability that individual has to consume more of the normal good. If consumption of preventive health care is seen as a normal good, then the more income one has, the more they will be able to afford it. It is predicted that a higher income will correlate with higher consumption of preventive health care.

However, because Taiwan has a universal health care system that insures 98% of its population under National Health Insurance, it is expected that in Taiwan higher income will not correlate with higher consumption of preventive care. In other words, one’s income does not determine their ability to afford preventive health care in Taiwan because the government has made healthcare accessible and affordable to all citizens. In Taiwan, citizens of all income levels have health insurance, and thus, income in Taiwan is not hypothesized to be a strong factor in
determining whether one consumes preventive health care. In Table 2, the results show that income level in Taiwan indeed does not affect one’s chances of consuming preventive health care since none of the coefficients on income, besides cholesterol check, in Table 2 are significant.

Conversely, the results in Table 3 for the United States show that one’s income level does statistically significantly affect one’s chances of consuming preventive health care. The income column that displays the effect of income on probability of using preventive care shows that income is a statistically significant predictor of whether one will use preventive care in the United States for every single preventive care variable I studied. One’s income does determine his/her ability to afford preventive health care in the United States, and the coefficients on income in the U.S. regression are all statistically significant at the 0.01 level.

Education also has different effects on preventive care use in the U.S. and Taiwan. Specifically, being a college graduate has a large statistically significant effect on preventive care use for all preventive care variables in Taiwan. In Taiwan, being a college graduate, as compared to a high school dropout, increases one’s probability of having cholesterol check by 15.6 percentage points, stool occult test by 70 percentage points, blood pressure check by 11.8 percentage points, mammogram screening by 30 percentage points, flu shot by 5.7 percentage points, and dental check by 16.7 percentage points. Also in Taiwan, college graduates are 19.8 percentage points less likely to smoke than high school drop outs.
In the United States, being a college graduate, as compared to a high school dropout, increases one’s probability of having cholesterol check by 41 percentage points, decreases one chance of stool occult test by 4 percentage points, increases chance of blood pressure check by 8.7 percentage points, increases chance of mammogram screening by 7 percentage points, decreases chance of flu shot by 6 percentage points, and increases chance of dental check by 13.4 percentage points. An American college graduate is 5 percentage points less likely to smoke than an American high school dropout.

Analysis of the effects education has on preventive care use in Taiwan and the U.S. emphasizes the notion that more education increases one’s knowledge and income, and therefore increases one’s use of healthcare. My evidence supports the theory that education has a strong effect on health care use. Higher education correlates positively with higher income which, in turn, usually results in ability to afford healthcare, insurance, and health promoting lifestyle practices.

I predicted that education would have a stronger positive effect on preventive care use in the United States than in Taiwan because health care is more expensive in the United States, and one must be educated in order to purchase health care. Additionally, being educated and having knowledge of the importance of care is an important factor in moving people to doctors’ offices. The data reveals that the results are split. Education has a stronger effect on probability of stool occult test, blood pressure test, mammogram, flu shot, dental check and smoking in Taiwan than
in the United States. It is also worth noting that there is only a minor difference in education’s effect on dental checks and smoking in the U.S. and Taiwan.

Education has a stronger effect on one’s decision to get a cholesterol check in the United States. The United States’ mean individual income is much higher than the mean individual income in Taiwan, and it is logical that education would have a stronger effect on preventive care use in the United States. Education is probably a stronger predictor of one’s probability to get a cholesterol check in the United States than in Taiwan because more people in the United States are at risk of coronary artery disease and heart attack resulting from a diet heavy in fats and oils. We can assume that educated Americans will likely be aware of this heightened risk of heart attack and seek cholesterol checks on a regular basis. Educated individuals in Taiwan, on the other hand, can be assumed to not be at as high of a risk to heart disease due to a generally healthier diet, and therefore do not get cholesterol checks as often as Americans do.

Tables 4 and 5 display the difference between Taiwan and United States chances of having used preventive care measures. Table 4 shows the difference between preventive care use for Taiwanese and all Americans. Table 5 shows the difference between preventive care use for Taiwanese and Americans of Asian ethnicity. The numbers displayed are coefficients on the binary variable “Taiwan” = 1 if respondent is in Taiwan and insured by Taiwan’s National Health Insurance, and = 0 if in the United States.

The coefficients reported in Tables 4 and 5 on Taiwan capture the differences between people in two countries conditional on other controls. The differences in Table 4 are mostly
negative, with the exception of dental checks and smoking being positive. Holding all other controls constant, this means that people in Taiwan, in comparison to people in United States, are less likely to use cholesterol checks by 0.1 percentage points, less likely to use stool occult tests by 29.4 percentage points, less likely to use blood pressure checks by 1.7 percentage points, less likely to use mammogram by 14.8 percentage points, less likely to get flu shots by 0.2 percentage points, more likely to have dental check by 27 percentage points, and more likely to smoke by 12 percentage points.

In Table 5 we see that when all other controls are held constant, people in Taiwan, in comparison to Asians in the United States, are less likely to use cholesterol checks by 5.1 percentage points, less likely to use stool occult tests by 35.3 percentage points, less likely to use blood pressure checks by 7 percentage points, less likely to use mammogram by 3 percentage points, less likely to get flu shots by 42 percentage points, more likely to have dental check by 34 percentage points, and more likely to smoke by 20 percentage points.

There are many policy implications that can be taken from these results in Tables 4 and 5. The main difference is that respondents in Taiwan were insured under National Health Insurance, whereas the respondents in the United States may or may not have health insurance. The observed differences in Table 4 and 5 between the two countries’ use of preventive care can be attributed to cultural differences, health promotion differences, or other unobserved differences between the two populations and their conception of health care and preventive care. For example, perhaps the Taiwanese do not believe in the effectiveness of these tests, or perhaps the
Taiwanese government does not recommend using the tests as often as American doctors do. Another possibility is that these types of tests are only used in Taiwan on an individual basis when the doctor suspects that something is wrong. The test may not be as widely publicized and promoted. If the public is not made aware of certain health risks or available preventive care measures, they may be less likely seek preventive care services.

It is clear that more individuals smoke in Taiwan than in the U.S. My results also show that the National Health Insurance has done an effective job at increasing use of regular dental check-ups in Taiwan. This may even be due to the fact that a lot more people in Taiwan smoke. It could also be because most people are well aware about the risk of poor oral hygiene. Being educated and aware of the issue greatly increases one’s chances of medical care utilization to address the issue, and many people are aware of oral hygiene.

The differences in other preventive health care measures can be attributed to health promotion efforts specific to each country. For example, when analyzing the mammogram variable, it is possible that the U.S. doctors may recommend for females over 50 to get mammograms more often than the Taiwanese doctors do. The difference in stool occult tests may be attributed to the difference in diets in United States and Taiwan that I mentioned previously; if the nation’s food supply is heavy in fats and fast food, more people will have colon cancer, high cholesterol and high blood pressure. If more people have these conditions, then people’s general awareness of those conditions will go up. Accordingly, they might then take steps to learn about the issues and how to treat them early on.
Chapter 11. Limitations

This study relates inequality in income of individuals to inequality of their use of preventive health care. I looked into the correlation across individuals in their personal income and their personal health status, and in the comparison of this relationship in the U.S. and Taiwan. The data demands of such a study are difficult to meet since there are so many inherent differences between the two countries’ cultures, education, income, conception of healthcare. Furthermore, there are major differences in the way the health system is set up in each country. Next, the data on personal incomes of individuals were collected in different formats. In the U.S. it was a continuous variable of yearly income, and in Taiwan it was categorical individual monthly income. To address this, I transformed the income variable so that they were roughly equivalent in both countries by converting US dollars to New Taiwan Dollars, transforming year to month income, accounting for 2004-1005-2006 inflation, and separating them into appropriate categories. Another empirical problem in comparing income in the two countries is that both the mean and relative variation of income is significantly greater in the United States. The mean income in the U.S. is significantly greater than Taiwan, and this could have affected the results to come out smaller in magnitude than they would have been if the two populations, Taiwan and U.S., had more similar income mean and distribution across the population.

Another large limitation is in the way the health surveys were taken. The survey asked respondents if they had undergone the preventive care procedure in the past 12 months. It is very likely that a respondent had been interviewed at a time when they had not had the procedure
done in the past 12 months, but perhaps had it done in the past 13 to 15 months. Therefore, had the individual indeed used preventive care recently but just happened to be surveyed more than a year later, this would greatly bias our results and limit the policy conclusions that we can draw from these results.
Chapter 12. Policy Implications

It is commonly supposed that a publicly funded single payer health system will deliver better health outcomes and distribute health resources more fairly than a multi-payer system with a large private component. A universal healthcare system is also supposed to induce higher amounts of medical care utilization because the universal healthcare has made the services more affordable for more people. In other words, Taiwanese citizens are expected to be in better health and have high rates of preventive health care use.

Based on my analysis of preventive health care measures in Taiwan and the U.S., I found two important results. One, there is overall a greater incidence of preventive healthcare use in the United States. Two, Taiwan has almost entirely eliminated the tendency for engagement in health care to positively correlate with income, whereas the United States has not.

The policy implications for my first finding suggest that although Taiwan’s preventive care services are free and should induce the consumer to use the free commodities, the demand for preventive care in Taiwan may not be high to begin with. If the Taiwanese citizens demanded preventive health care tests highly and the services suddenly became free of cost in 1995, they would have immediately increased their consumption of these free services. However, my findings in this thesis hypothesize that the demand for preventive care in Taiwan was not very high even before National Health Insurance, leading the Taiwanese consumers to not have a strong response to the sudden decrease in prices of preventive health care.
According to my statistical analysis, the United States has a higher rate of use of preventive care than Taiwan. This difference can simply be attributed to difference in preferences for using preventive care measures in the two countries. Many reasons can contribute to this stronger preference in America. Thus, the fact that the U.S. uses more preventive care is not a measure of how well each nation’s health system works or how readily available the services are. Rather, it is merely a measure of American preference to use preventive care more than the Taiwanese preference.

My study is not the only one that has discovered and analyzed America’s strong preference for and high probability of using a lot of preventive care services. A paper by O’Neill and O’Neill written in the National Bureau of Economic Research also found that, in comparison to Canada, the U.S. has a stronger preference for using preventive care (O’Neill and O’Neill, 2007). Specifically, they found that cancer screenings are used significantly less in Canada than they are used in the U.S., especially when the percentages who said they had been screened quite recently are compared (O’Neill and O’Neill, 2007).

This study comparing the U.S. and Canada is integral to my analysis of my results. I found that Taiwan uses lower rates of preventive care than the U.S., and they also found that Canada uses lower rates of preventive care than the U.S. Both Taiwan and Canada have universal healthcare insurance and single-payer systems where preventive care services are virtually free of out-of-pocket costs. This implies that Taiwan and Canada have set up successful models in which their citizens can use preventive care, but the general public perception of
preventive care tests and preference for them is not high. Contrastingly, the U.S. perception of and preference for preventive care is very high.

The policy implications suggest that if the current U.S. healthcare reform does in fact make preventive care services free to American consumers who hold health insurance, it is likely that Americans will increase their use of preventive care because they already have a very high preference for the commodity before the price was lowered. The U.S. healthcare market should take this policy implication into serious consideration when calculating the future costs of healthcare. Incorporating virtually free preventive healthcare in the U.S. is predicted to greatly increase consumption, which will spike up healthcare costs, require more healthcare providers in the country, and require more resources, such as medical facilities, nurses, doctors, and healthcare system administrators. The U.S. Congressional Budget Office and Department of Health and Human Services ought to consider creating a long-term budget plan to strengthen and expand the healthcare system now, so that it is able to withstand the strong increase in demand for preventive care in the next few years.

Within the U.S. itself, we can make the distinction between insured adults and uninsured adults, whereas in Taiwan we cannot make such a distinction. I found that insured adults with a regular source of care are most likely to have received preventive care services, compared to adults without regular health insurance and without regular source of care. Conversely, when Americans lack insurance or a usual source of care, their use of preventive services is reduced. Having usual source of care and health insurance are both important to achieving national
prevention goals. The policy implications are that if the U.S. government wants people to consume more preventive care, they should begin by making health insurance available to more people and consider making preventive care medical tests and procedures free of out-of-pocket charges. Clearly, the U.S. government has already taken these policy implications into consideration as they have already incorporated all these ideas – of providing insurance and making preventive healthcare free – into the recent healthcare reform.

My second important finding is that Taiwan has decreased inequality of access to healthcare based on one’s income, and the United States has not. In the United States, aggregate income appears to be the most important factor in explaining preventive care utilization. In Taiwan, I found that aggregate income is not a significant factor in explaining preventive care utilization. In America, income and insurance status are the most significant economic variables in the equation to predict volume of preventive visit demand. This implies that right now in the U.S., one must be generally wealthy or gainfully employed in order to consume health care, and the less wealthy or unemployed individuals have little to no access to health care. Evidently, Taiwan has successfully equalized the playing field by making healthcare accessible to all citizens, regardless of their income and employment status. The United States health system, however, currently discriminates against the poor and the unemployed in the health care market.

Both of my findings discussed above come together to support the main policy implication of my statistical analysis: that having health insurance to subsidize preventive care costs does not ensure that one will consume preventive care. This is a very important finding that
U.S. policy makers must contemplate. Even if you subsidize a certain activity or make it free to promote its use, you cannot guarantee that the population receiving the subsidy will automatically form a demand for that activity. The chances that the targeted population will respond to the price change depend on the targeted population’s original demand for the good or service. This is evident in my statistical findings of this thesis: the Americans had a higher original demand for preventive care, and they used more of it. The Taiwanese have a lower original demand for preventive care, and they used less of it. Thus, public health interventions that are designed to make a targeted population undergo a certain test must not only make that test free of charge. The public health intervention must also directly try to affect that population’s original demand. The intervention efforts should analyze the population’s characteristics, understand how the group’s education and income level may produce demand for certain items, examine the group’s perception of health care and try to educate that group on why they may want to create a demand for the specific test.

As insurance was extended to cover the entire population of Taiwan, more citizens had access to health care, and income became less of a factor in determining medical care utilization. However, as my results prove, even if care is essentially ‘free’ in Taiwan, the new found affordability and ability to purchase such tests is not enough to induce people to get the test. The citizens must understand that they are at risk of a certain disease or condition before they will comprehend the importance of using preventive tests. Ability to purchase is not enough of an incentive for people to use medical care, and policy makers need to understand this important
result. If the certain disease or condition – colon cancer, breast cancer, and coronary disease – is not presented to the targeted group as a serious health risk, and if the public is not educated about particular condition in school or in daily life, they are likely to not be concerned with getting that preventive care test, even if it is virtually costless to take the test.

What would Taiwan have to do to increase their use of preventive health measures to levels similar to the United States? The policy implication is that any major health care reform that is intended to increase preventive health care utilization or increase preventive health care practices must partner public health education with the ability to purchase. In other words, health insurance must be partnered with public health promotion and outreach campaigns to increase awareness of disease risks in attempts to create a demand for the preventive care. Educational health promotion campaigns can support universal health insurance systems and improve health outcomes of populations by introducing new health risks into a culture that may not be traditionally aware of it.
Chapter 13. Suggestions for Future Research

A suggestion for future research would be to compare preventive care use rates before and after National Health Insurance, namely comparing use rates at a time before 1995 and sometime after 1995. This will give a better estimate of the changes in preventive care use as a specific response to the new lowered price of preventive care. My study looks at the year 2005, ten years after the National Health Insurance was implemented in Taiwan. It is useful to know that even after preventive care was made free in Taiwan, the Taiwanese use a lower rate of preventive care than Americans use. However, it may be even more useful to look at the before and after effects of the National Health Insurance in Taiwan.

Another idea for future research is to follow preventive healthcare use rates closely in the next few years in the U.S. and set up a study that can compare preventive care use rates before and after the healthcare reform. We can then evaluate the reform’s effects on preventive care use in the U.S. and see by how much the rates go up since the preventive care was provided free of cost.
Chapter 14. Conclusion

In the next few years, the United States will undergo comprehensive health care reform that aims to expand health insurance coverage to 95 percent of Americans. By comparing preventive care use rates in the United States and Taiwan in 2005 conditional upon other characteristics such as education and income, I find two important statistics that can help inform future health policy in the U.S. One, I find that as a result of its universal healthcare system, Taiwan has almost entirely eliminated the positive correlation between income and use of health care services, while the U.S. system has not. Second, I find that having a universal single payer health care system in Taiwan has not caused Taiwanese citizens to use a higher rate of preventive medical care services than U.S. citizens.

Contrary to the economic theory of increased demand as a result of decreased prices, my findings suggest that price is not a strong determinant of one’s degree of use of preventive care. My analysis of this unexpected finding is that there are other factors besides price that determine one’s degree of use of preventive care. Namely, one’s demand for the preventive care, which is derived from one’s personal perception of risks and diseases, is a strong determinant of whether or not they will use preventive care, regardless of whether the test is expensive or if it is free of cost.

This thesis concludes that while universal health care insurance did not lead to high rates of preventive service use in Taiwan, this is probably because the Taiwanese do not have as strong a preference for preventive care use as Americans do. When taking into consideration the
fact that Americans also have a higher preference for preventive care use than Canadians, this thesis predicts that Americans’ individual demand for preventive health care will likely increase as a result of having nation-wide health insurance expansion because Americans already have a high preference for using preventive care.

The statistical analysis of this thesis also highlights the success of Taiwan’s National Health Insurance in making income an insignificant factor in predicting preventive health care use. We have yet to see if, after healthcare reform, the United States can also make income an insignificant factor in predicting whether one will use preventive healthcare. Even though the U.S. healthcare reform does not enroll all citizens in a public health insurance system, the fact that preventive care services will be free with health insurance may actually make income a less significant factor in predicting preventive care use.

In conclusion, after examining the Taiwanese system, if it is the U.S. government’s policy goal to increase preventive care for all people—regardless of education, personal wealth, or employment—it is worth trying to affect the demand for preventive care on top of lowering the price of preventive care. “Expanding health insurance” by lowering prices or insuring more people, “will not lead to substantial improvements in the receipt of clinical preventive services” (Kenkel, 2000). Taiwan proved Kenkel’s point, namely that just because something is free does not mean that people originally wanted that free product or service. Likewise, in the U.S., having insurance to subsidize preventive care costs will not entirely ensure that one will consume preventive care.
Policy makers should be aware that consumption of a free product still requires a personal knowledge of disease risks, a personal desire to counter these risks by using preventive care, and the expenditure of time and resources on behalf of the insured individual, the doctor, and the government. The U.S. health care market should seriously consider creating public health campaigns to address the demand for preventive care in order to help populations to use the free health services that will be provided after health care reform. Only then can the U.S. increase the rate of preventive care use and, thereafter, move towards long term cost savings and long term improvement in the health of the population.
Table 1: Percentage of Preventive Care Use in the Last 12 Months for 25-64 Year Olds

<table>
<thead>
<tr>
<th></th>
<th>U.S. Insured</th>
<th>U.S. Uninsured</th>
<th>U.S. Asians</th>
<th>Taiwan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>0.58</td>
<td>0.29</td>
<td>0.51</td>
<td>0.31</td>
</tr>
<tr>
<td>Stool Occult</td>
<td>0.39</td>
<td>0.37</td>
<td>0.45</td>
<td>0.08</td>
</tr>
<tr>
<td>Mammogram •</td>
<td>0.61</td>
<td>0.35</td>
<td>0.55</td>
<td>0.25</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>0.90</td>
<td>0.63</td>
<td>0.79</td>
<td>0.58</td>
</tr>
<tr>
<td>Flu Shot</td>
<td>0.24</td>
<td>0.10</td>
<td>0.23</td>
<td>0.09</td>
</tr>
<tr>
<td>Dental Check</td>
<td>0.49</td>
<td>0.17</td>
<td>0.39</td>
<td>0.39</td>
</tr>
<tr>
<td>Smoke</td>
<td>0.21</td>
<td>0.33</td>
<td>0.10</td>
<td>0.34</td>
</tr>
</tbody>
</table>

The table consists of proportions of each relevant population group who used the preventive health care measure in the past 12 months. The source for the U.S. data is the U.S. Medical Expenditures Panel Survey of 2004, 2005 and 2006. The source for the Taiwan data is the National Health Insurance Survey of 2005. • Denotes only included females over age 50.
### Table 2: Effect of Income, Education and Marital Status on Preventive Care Use in Taiwan for 25-64 Year Olds

<table>
<thead>
<tr>
<th>Preventive Care Variable</th>
<th>Income</th>
<th>High School Grad</th>
<th>College Grad</th>
<th>Married</th>
<th>Divorced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>0.001**</td>
<td>0.034***</td>
<td>0.156***</td>
<td>0.039**</td>
<td>-0.038*</td>
</tr>
<tr>
<td></td>
<td>(0.0005)</td>
<td>(0.009)</td>
<td>(0.012)</td>
<td>(0.0005)</td>
<td>(0.021)</td>
</tr>
<tr>
<td>Stool Occult</td>
<td>0.0002</td>
<td>0.007</td>
<td>0.7***</td>
<td>0.012**</td>
<td>-0.013</td>
</tr>
<tr>
<td></td>
<td>(0.0003)</td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>0.0004</td>
<td>-0.014</td>
<td>0.118***</td>
<td>0.038***</td>
<td>-0.028</td>
</tr>
<tr>
<td></td>
<td>(0.0006)</td>
<td>(0.01)</td>
<td>(0.118)</td>
<td>(0.011)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>Mammogram •</td>
<td>0.001</td>
<td>0.117***</td>
<td>0.299***</td>
<td>0.028</td>
<td>0.046</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.029)</td>
<td>(0.049)</td>
<td>(0.027)</td>
<td>(0.059)</td>
</tr>
<tr>
<td>Flu Shot</td>
<td>0.0001</td>
<td>-0.008</td>
<td>0.057***</td>
<td>-0.004</td>
<td>-0.033*</td>
</tr>
<tr>
<td></td>
<td>(0.0003)</td>
<td>(0.0057)</td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Dental Check</td>
<td>0.0003</td>
<td>0.017**</td>
<td>0.167***</td>
<td>0.037***</td>
<td>-0.023</td>
</tr>
<tr>
<td></td>
<td>(0.0005)</td>
<td>(0.01)</td>
<td>(0.013)</td>
<td>(0.011)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>Smoke</td>
<td>-0.0002</td>
<td>0.004</td>
<td>-0.198***</td>
<td>-0.02**</td>
<td>0.17***</td>
</tr>
<tr>
<td></td>
<td>(0.0004)</td>
<td>(0.008)</td>
<td>(0.01)</td>
<td>(0.009)</td>
<td>(0.018)</td>
</tr>
</tbody>
</table>

The table shows results of regression coefficient estimates with standard errors listed in parentheses below. The dependent variable asks if respondent had the preventive health procedure performed in the past 12 months. *** indicates significant at the .01 level. ** indicates significant at the .05 level. * indicates significant at the .10 level. The sample size is 13,039. The source for the U.S. data is the U.S. Medical Expenditures Panel Survey of 2004, 2005 and 2006. The source for the Taiwan data is the National Health Insurance Survey of 2005. High School Grad and College Grad are to be interpreted in comparison to the baseline of High School Drop-out. Married and Divorced are to be interpreted in comparison to the baseline of Single. The other controls not listed in this table are age, gender, high school drop-out, single, family size, self reported health status - excellent, very good, good, fair, or poor, employed or unemployed. • Denotes only included females over age 50.
### Table 3: Effect of Income, Education and Marital Status on Preventive Care Use in U.S.A. for 25-64 Year Olds

<table>
<thead>
<tr>
<th>Preventive Care Variable</th>
<th>Income</th>
<th>High School Grad</th>
<th>College Grad</th>
<th>Married</th>
<th>Divorced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol Check</td>
<td>0.029***</td>
<td>0.014***</td>
<td>0.41***</td>
<td>0.061***</td>
<td>-0.026***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.006)</td>
<td>(0.008)</td>
<td>(0.0007)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Stool Occult</td>
<td>-0.004</td>
<td>-0.046***</td>
<td>-0.04*</td>
<td>-0.003</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.017)</td>
<td>(0.022)</td>
<td>(0.021)</td>
<td>(0.025)</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>0.025***</td>
<td>0.047***</td>
<td>0.087***</td>
<td>0.068***</td>
<td>0.019**</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Mammogram •</td>
<td>0.022***</td>
<td>0.017*</td>
<td>0.069***</td>
<td>0.097***</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.011)</td>
<td>(0.017)</td>
<td>(0.012)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Flu Shot</td>
<td>0.018***</td>
<td>-0.035***</td>
<td>-0.058***</td>
<td>0.013**</td>
<td>-0.026***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Dental Check</td>
<td>0.04***</td>
<td>-0.003</td>
<td>0.134***</td>
<td>0.101***</td>
<td>-0.005</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.005)</td>
<td>(0.008)</td>
<td>(0.007)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Smoke</td>
<td>-0.013***</td>
<td>0.072***</td>
<td>-0.046***</td>
<td>-0.067***</td>
<td>0.062***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.008)</td>
</tr>
</tbody>
</table>

The table shows results of regression coefficient estimates with standard errors listed in parentheses below. The dependent variable asks if respondent had the preventive health procedure performed in the past 12 months. *** indicates significant at the .01 level. ** indicates significant at the .05 level. *indicates significant at the .10 level. The sample size is 33389. The source for the U.S. data is the U.S. Medical Expenditures Panel Survey of 2004, 2005 and 2006. The source for the Taiwan data is the National Health Insurance Survey of 2005. High School Grad and College Grad are to be interpreted in comparison to the baseline of High School Drop-out. Married and Divorced are to be interpreted in comparison to the baseline of Single. The other controls not listed in this table are age, gender, single, family size, self reported health status - excellent, very good, good, fair, or poor, employed or unemployed. •Denotes only included females over age 50.
Table 4: Marginal Effect of Living in Taiwan on Preventive Care Use Relative to Living in the U.S.

<table>
<thead>
<tr>
<th>Preventive Care Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>-0.001</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Stool Occult</td>
<td>-0.294***</td>
<td>(0.037)</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>-0.017</td>
<td>(0.019)</td>
</tr>
<tr>
<td>Mammogram •</td>
<td>-0.148***</td>
<td>(0.045)</td>
</tr>
<tr>
<td>Flu Shot</td>
<td>-0.002</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Dental Check</td>
<td>0.270***</td>
<td>(0.018)</td>
</tr>
<tr>
<td>Smoke</td>
<td>0.119***</td>
<td>(0.017)</td>
</tr>
</tbody>
</table>

The table shows results of regression coefficient estimates with standard errors listed in parentheses below. The dependent variable asks if respondent had the preventive health procedure performed in the past 12 months. *** indicates significant at the .01 level. ** indicates significant at the .05 level. * indicates significant at the .10 level. The source for the U.S. data is the U.S. Medical Expenditures Panel Survey of 2004, 2005 and 2006. The source for the Taiwan data is the National Health Insurance Survey of 2005. • Denotes only included females over age 50.
Table 5: Marginal Effect of Living in Taiwan on Preventive Care Use Relative to Asians in the U.S.

<table>
<thead>
<tr>
<th>Preventive Care Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>0.051</td>
<td>0.038</td>
<td></td>
</tr>
<tr>
<td>Stool Occult</td>
<td>-0.353***</td>
<td>0.091</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>0.070*</td>
<td>0.394</td>
<td></td>
</tr>
<tr>
<td>Mammogram •</td>
<td>-0.029</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Flu Shot</td>
<td>-0.42*</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>Dental Check</td>
<td>0.341***</td>
<td>0.037</td>
<td></td>
</tr>
<tr>
<td>Smoke</td>
<td>0.199***</td>
<td>0.031</td>
<td></td>
</tr>
</tbody>
</table>

The table shows results of regression coefficient estimates with standard errors listed in parentheses below. The dependent variable asks if respondent had the preventive health procedure performed in the past 12 months. *** indicates significant at the .01 level. ** indicates significant at the .05 level. *indicates significant at the .10 level. The source for the U.S. data is the U.S. Medical Expenditures Panel Survey of 2004, 2005 and 2006. The source for the Taiwan data is the National Health Insurance Survey of 2005. •Denotes only included females over age 50.
References


