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政治經濟學之兩篇實證研究: 貪污、所得與民主

Two Essays on Political Economics: Corruption, Income and Democracy

莊宗翰
Tsung-Han Chuang

指導教授: 劉錦添 博士
Advisor: Jin-Tan Liu, Ph.D.

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To my parents, Prof. Liu, girl friend and people who ever help me.

Simon Chuang
June, 2010

中文摘要

此論文包含兩篇關於政治經濟學議題的實證文章:

第一部份**: Corruption and Its Determinants**

貪污一直是當代社會中重要的問題，想要有效的解決貪污，必須先瞭解影響貪污的因素為何。本篇透過跨國長期追蹤資料來分析貪污的形成原因，我們以國際透明組織 (TI) 所發布的貪腐映像指數 (CPI) 作為主要的分析對象，再加上政治因素、經濟因素與文化因素三大類解釋變數來作討論；其中最重要的議題是，本文將探討經濟發展與貪污的非線性關係。我們預期貪污問題會伴隨著經濟發展日漸惡化，然而當貪污問題惡化到某個程度後，由於經濟情況的提昇，貪污問題將慢慢的改善，此一過程在圖形上來看，將成為一倒 U 字形的分佈。實證結果顯示，貪污程度與商業自由、貨幣自由、財務自由、投資自由、財產權的保障程度、國際連結度、通貨膨脹、教育程度與新教徒佔人口百分比呈現負相關。另一方面，政府規模愈大的國家與前共產國家則明顯地有著較嚴重的貪污問題。研究結果亦發現，隨著經濟成長，貪污問題將持續惡化直到人均所得 1808.04 美元後開始獲得改善。

第二部份**: Democratic Perception and Political Behaviors**

本篇探討民主認知對政治行為的影響。是否參與投票、是否參加集會遊行等政治活動取決於人們的理性行為，首先，我們討論教育與其他解釋變數如何影響民主認知，教育程度較高的人是否會有較高的民主認知、民主知識；我們進一步研究，對民主知識愈瞭解的選民，參與政治活動的情況是否愈踴躍? 有別於過去的研究皆以歐美等先進國家為分析對象，透過亞洲民主動態調查資料庫 (East Asia Barometer)，我們取得台灣與日本兩個不同發展程度的東亞國家資料來進行分析。為了能正確的得到估計結果，我們建立聯立方程組模型來估計民主認知與政治參與兩條行為方程式，並預期參與政治活動的人有較高的民主認知，同樣的，參與政治活動也會帶給受訪著更多的民主經驗，進而提昇其民主認知。最後實證結果顯示，民主認知隨著教育程度的提昇而提昇，特別是大學教育有著最明顯的影響；而民主認知越高的受訪者顯著地有較高的政治活動參與率，反之，參與政治活動對於民主認知的形成也有正面的幫助。

Abstract

This master thesis includes two empirical studies on the political economics:

Section 1: Corruption and Its Determinants

In this thesis, we use the corruption perception index (CPI) data from Transparency International to study the relationship between corruption and its determinants, which include several political and economic freedom variables. One of the most significant contributions in this thesis is our attempt to find a non-linear relationship between corruption and economic development. We expected that graphically this relationship would be an "inverse-U". Mostly, we found that corruption continuously deteriorates until PPP GDP per capita reaches US$1808.04 and then the level of corruption decreases. In other cases, we find that corruption is negatively related to business freedom, monetary freedom, financial freedom, investment freedom, property rights, export and import percentage of GDP, inflation, education and Protestantism. Instead, corruption is positively related to government size as well as communist dummy variables.

Section 2: Democratic Perception and Political Behaviors

The aim of this article is to determine how education affects people's political participation. In this thesis, two kinds of political behavior are discussed: voting and attending campaign meetings or rallies. We estimate each political behaviors according to two factors: political participation and political perception (knowledge). We estimate how education and other individual characteristics affect our political knowledge, whether better understanding of democracy will make people more likely to engage in political affairs, and further more examine what makes a country more democratic? Otherwise. In order to solve the simultaneous problem of politic behaviors and democratical perception, we constructed a simultaneous model, and used it as our main analysis method. By using a unique data set *East Asia Barometer*, we acquired individual level data to answer these questions. The results indicate that when other factors remain constant, education plays an important role in forming people's democratical perceptions, which positively affect people's decision to engage in political activities.

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1 Corruption and Its Determinants

1.1 Introduction

Will continuous economic growth worsen the degree of corruption or can increases in income and wealth solve the problem? We try to answer these questions in this thesis. Corruption is one of the most common criminal behaviors in the public and private sectors, and it is also of great concern to investors, government and the general public. Can we find a shortcut to knowing when a country will become more transparent? Brown and Shackman (2007) find that in the short run, one unit of increase in GDP per capita causes an increase in corruption, but also that GDP per capita is negatively related to corruption in the long-run. We follow their research and try to find out some economic theory to explain this phenomenon, and also take their advice to control more variables.

First, let us introduce the definition of corruption; the most popular definition of corruption is: the misuse of public office for private gain, or private gain via public authority, or the abuse of public power for private benefit or profit. Such is the definition offered by the World Bank, International Monetary Fund, and Transparency International.[1] This definition has been extensively used in several papers, especially in cross-country empirical researches. Here we also adopt this definition in our subsequent discussion. Corruption happens because a government's intervention in using absolute power to manage scarce resources like land, oil, patents and licenses. There are several different theories to explain how the degree of corruption changes in relation to economic development; we will briefly introduce these theories.

There are some theories that can explain how corruption problems initially arise. At the beginning of a country's development, their society is very simple, with few economic activities and few industries, and since the government is still very primitive at this early stage, there is little interference in economic activities; therefore, the industrialists do not have to bribe the government. When coun-

[1] See Ades and Di Tella 1999; Treisman (2000). Kunicova 2001 and Sandholtz and Gray (2003), and so forth.

tries begin to develop, society become richer, and lots of social problems arise. Citizens will ask the government to provide more social welfare and legislation. Government, as a public service supplier will try to meet the public's demands, as a result the government will increase expansion of public and state activities. This phenomenon is called "Wagner's law" named after Adolph Wagner. Wagner (1983) suggested 3 crucial reasons for these empirical relationships. Firstly, the government's function as a provider of social insurance, health care, etc, expands over time which implies that the income elasticity of demand for publicly provided goods such as education, is greater than 1. Secondly, industrialization needs much more money, and consequently the government has to provide the necessary capital and investment directly or indirectly. Thirdly, since the society becomes more complicated, it needs more complex laws and means of enforcement, as well as greater public spending on law and order, and socioeconomic regulation. Empirically, there are several studies that support this hypothesis.

Ram (1987) uses international comparable data on income and government expenditure for 115 countries, covering the period from 1950 to 1980, and the results support Wagner's hypothesis (law). Barro (1991) also tests the relation between government expenditure and per capital income, and the final results show that funding for education, social insurance and welfare require the ratio of spending to GDP to rise along with the level of per capita income. However, these reasons cause governments expand their scope of operations, and thus lead to more opportunities for corruption.

In the second stage, corruption problems stop increasing and begin to decrease for various reasons. Abizadeh and Gray (1985) test time-series and cross-section data for 53 countries, grouped into three categories: poor, developing, and developed countries, utilizing the Physical Quality of Life index, and discover some interesting results. Their empirical work suggests that the hypothesis (Wagner's law) only holds true in the developing group of countries. Abizadeh and Gray (1985) obtain similar results; their model shows us that, in the developing countries, interventions will increase when per capital income increases;[2] and although

[2] Here we consider government expenditure as one of signals of governmental intervention,

the government will expand, it will also be constrained for other reasons. They argue that government will take companies' externalities into consideration; for instance, companies' profits will decrease when a government interferes too much and then the government will get less tax. In the end, the government will reduce its intervention for fear that the companies will produce less or just shut down; so the intervention (expenditure) will decrease when becomes developed. Thus, the authors suggest that an inverse U-shaped relationship between per capita income and government intervention is possible.

The linkage between governments' spending or intervention and corruption can be explained by the lack of efficiency, larger governments usually signify inefficiency and complex burdensome bureaucracy. Goel and Nelson (1998) examine the effect of government size on corruption by public officials, and the results show that government size (particularly in relation to spending by state governments), does indeed have a strong positive influence on corruption. Mauro (1998) also empirically reports that the expenditure of governments is significantly associated with the corruption index, most notably in the cases of transfer payments, social insurance and welfare payments. Tanzi (1998) analyzes corruption related to the provision by the government of goods, public goods are linked to investment projects, procurement spending and extra budgetary accounts, and the results show that all of these factors induce corruption behaviors. To sum up, we can say that more government intervention means more expenditure, and more expenditure and intervention means the greater likelihood of more corruption. However, there's also the possibility of decreasing corruption like by increasing the opportunity cost of being arrested. As the famous crime theory modeled by Becker (1968) implies, when public servants or agencies become wealthy, the opportunity cost of corruption becomes so high that they will not engage in corruption.[3] This argument also supports our hypothesis that the relationship between corruption and per capita income will finally be a negative one.

more intervention means more tax, expenditures and regulations.

[3] We only want to support the idea that in the second stage, a corrupt agency will become transparent because of the cost of being arrested; for more information please see Becker (1968) and the other studies.

Apart from examining the non-linear relationship between corruption and GDP PPP per capita, we also focus on the effect of different kinds of freedom on corruption. Freedom means free choice or free action, and if there's greater economic freedom, then people can choose not to bribe a government agency for the purpose of hastening administrative speed, or business people can make investments anywhere without restriction. Furthermore, regarding the effect of political freedom, Ali and Isse (2003) suggest that countries with fewer political rights tend to have more corruption problems. In this paper we include business freedom, trade freedom, monetary freedom, investment freedom, financial freedom and the freedom of property rights, and we seek to discover which freedom has the most significant effect on corruption.

The rest of the paper is organized as follows: section 2 we present a literature review of some corruption-related articles, and introduce what discover concerning corruption; in section 3 we introduce our data resources and some basic statistics, and also list and clearly define all of the hypotheses; in the 4th section, we construct 2 models for analysis and begin to present our empirical work. Here we use different econometric methods to analyze our model. In the end, we find that no matter what methods are applied or what variables we include, the evidence robustly supports our hypothesis that corruption is non-linearly correlated to log GDP PPP per capita; however, the turning point seems less reasonable. We find out the turning point (around **US$2000**), is too small and might arrive too early. However, we discuss this problem in the empirical section. Last, section 5 presents the conclusion of our research and offers further suggestions.

1.2 Literature review

1.2.1 Corruption and Economic

Income The first empirical study on the relationship between corruption and economic growth was carried out by Mauro (1995), Mauro states that corruption lowers investment, and thereby reduces the economic growth. But he only focuses on the economic growth, but he does not study how economic growth (or income) affects the degree of corruption. Treisman (2000), on the other hand, tests the effect of income on corruption, and concludes that rich countries are perceived to be less corrupt than poor ones, according to empirical results. Paldam (2002) used cross-country data in his analysis, and the results also reveal that the economic transition from poor to rich strongly reduces corruption. Contrarily, in recent research, Brown and Shackman (2007) argue that their empirical results reveal that when GDP per capita increases, corruption actually increases in the short-term; however, when in the long-term, this trend is reversed. Brown suggests that the "explanation for this result concerning the impact of corruption on GDP per capita is that the relationship is non-linear." Haque and Kneller (2005) used cross-country data for 87 countries from 1980 to 2003 to tests corruption and development in non-linear form. They employ a formal threshold model developed by Hansen, and use non-linear models to search for the breaking points in the relationship between corruption and development, which are statistically preferable to linear regressions.[4]

Inflation Paldam (2002) suggests that the more chaotic an economy is, the higher the corruption, and the clear sign of economic chaos is the rate of inflation. He also argues that governments in some cultures have chosen regulatory policy regimes that make them both more inflationary and more corrupt. In Beets (2005) research, he also found out that nations with more perceived corruption tended to have a higher inflation rate. Braun and Tella (2004) use a principle agency model to argue that more inflation variability increases the cost of auditing an agent's

[4] The authors also apply the non-linear model to culture and openness to international trade; they suggest that it would be more precise to use a non-linear form.

behavior because of information problems, and their empirical evidence suggests that the higher inflation and inflation variability, the higher level of the corruption.

Population Country size is a potential problem in so far as larger countries might have more corruption opportunities. Fisman and Gatti (2002) point out that the larger the country is, the more complicated the government system and the more numerous the public servants, the more red tape and opportunity for bribes. At the same time it is harder for a large country to control its corruption problem. Banerjee (1997) develops a model to explain demand and supply of public goods (services). In a large country, public goods are scarce and inhabitants are numerous so the demand for education or hospital is almost always greater than the supply; the model suggests that corruption is more likely to happen in this kind of situation. For the purpose of controlling country size, we use population as a proxy and expect a positive relationship between size and corruption.

Wages in the Civil Service Based on Becker's (1968) theory, mentioned above, we argue that whether or not public agencies accept bribes depends on its opportunity cost. Tanzi and Wickham (1997) and Tanzi (1998) develop and test two efficiency wage models of corruption in the public sector, respectively. In their empirical analysis, the results point to a negative relationship between corruption and wages across developing countries. Sandholtz and Gray (2003) use average income as a proxy to determine the relationship between corruption and civil servants' wages, the results support the hypothesis. Azfar and Nelson (2007) use a novel laboratory experiment to prove that the wages of officials affect corruption. By running a game, they concluded that increasing government wages and increasing the difficulty of hiding corrupt gains can reduce corruption.

International Integration Sandholtz and Gray (2003) suggest that corruption is determined by international integration via 2 channels: the first mode consists of economic incentives, which alter various actors and the costs and benefits of engaging in corrupt acts, and second mode works through social integration and the transmission of values and norms. Then they test the hypothesis "the more a

country is tied into international networks of exchange, communication, and organization, the lower its level of corruption is likely to be." Using total trade/GDP, gross foreign direct investment per capita, years of membership in the UN and other measures to check the hypothesis; they find that empirical results do support the hypothesis. Ades and Tella (1999) also examine the same relationship; the authors use the share of imports in GDP as proxy for the degree of international integration. The relationship appears to be markedly negative.

1.2.2 Corruption and Politic

Democracy In recent studies, the democratic process has become an important issue of corruption, especially after the collapse of the Soviet Union in 1990. Tanzi (1998) tests the hypothesis that the longer the experience with democratic rule the lower the level of corruption. Tanzi generates a variable *Democratic Year* to capture the number of years since that 1984 a country has had democratic rule. He empirically finds that the relationship between corruption and democracy is a negative one. Similarly, Sandholtz and Koetzle (2000) use the indices of political right and civil liberties made by *Freedom House* for 192 countries, and they also find a negative relation in the empirical results. However, the relationship between corruption and democracy is, as yet, inconclusive. As Qizilbash (2008) points out, there are two views about the effect of democracies, one pessimistically supported by Shleifer & Vishny and the other optimistically supported by Amartya Sen.[5] [6] However, both views have their shortcomings and merits, and the question is still under debate. More and more scholars believe there is a non-linear relationship between democracy and corruption, although the reason is not that explicit. Mohtadi and Roe (2003) develop a two-sector endogenous growth model to show that the different growth speed affects the degree of corruption. If both young and mature democracies grow faster than countries in the mid stage of democratization, this would produce a "U" effect. They conclude: that "As rent

[5] Shleifer & Vishny(1998) suggest that the egalitarian tendencies in some democracies will promote corruption, echoing the pessimistic views attributed to Plato and Aristotle.

[6] Since debate about the view point of these two schools about democracy is not our main purpose, we just briefly mention the ideal; for further interesting please read Qizilbash (2008).

seeking is modeled in a monopolistically competitive model, this means less rent per agency but more rent seeker. This mechanism produces an inverted-U effect." The latest empirical study by Rock (2009) finds an inverted U relationship between the durability (age) of democracy and corruption. He found that the turning point in corruption occurs rather early in the life of new democracies, between 10 to 12 years.

Freedom There are several types of freedom like economic freedom, press freedom, property rights, business freedom, fiscal and investment freedom, etc, and all of these freedoms are highly correlated with corruption. Ali and Isse (2003) test the relationships between corruption and political freedom and economic freedom; they ascertain that political freedom is negatively correlated with corruption, but they do not find the correlation coefficient to be statistically significant. Paldam (2002), however, finds that a country with many regulations and little economic freedom has a greater potential for rent seeking and tends to have higher corruption. Goel and Nelson (2005) specifically focus on examining different components of economic freedom, and they find that not all components are equally effective in reducing corruption. They summarize that greater economic freedom, rather than greater political freedom, seems to be a more effective deterrent to corrupt activities. Besides, Brunetti and Weder (2003) point out that a free press is potentially a highly effective mechanism of external control on corruption; using panel data, they find negative relationship between freedom press and corruption.

Legal System Several empirical works suggest that countries with a common law system, as mostly existed in Britain and its former colonies, would have better government and fewer corruption problems. Porta et al. (1990) argue that a common law legal system is associated with superior government, and appears to have better protection of property rights as compared to the civil law system typically associated with the former colonies of continental Europe. Treisman (2000) finds that the former British colonies have significantly fewer corruption problems, not just in the older settled colonies, but also in more recently acquired

African and Asian crown colonies and mandates.[7]

Government Size Government size is an indicator by which to measure the monopoly power of the government. A government with large expenditures and many employees always implies a highly correlation level with corruption. For example, Goel and Nelson (1998) use the United States state-level panel data from 1983 to 1987 to examine this hypothesis, and their results show that the more a state expends, the greater the corruption. Goel and Budak (2006) use annual pooled data from 1998-2002 for transitional countries to examine the relationship between government size and corruption, surprisingly, they finally found that bigger government seems to reduce corruption in transitional nations.[8] They further explain: "Instead of increasing bureaucratic red tape, government spending in the transition years was probably aimed at strengthening the monitoring and policing mechanisms." However, the effect of government size seems somehow ambiguous, and depends on different situations, but the majority of empirical evidence supports the argument that government size is positively related to corruption.[9]

1.2.3 Corruption and Culture

Religion Religious tradition is one of the most important historical traditions because different religions mold different cultural attitudes towards social hierarchy. Porta et al. (1997) infer that "hierarchical religions", such as Catholicism, Eastern Orthodoxy and Islam would entail less challenge to the office-holders;[10] furthermore, these religions, compared to Protestantism, tend to have less egalitarian or individualistic aspects. Treisman (2000) summarizes the effect of religion. First, he points out that religion may influence how individuals view their loyalties to family (as opposed to other citizens), and he argues it may affect the level

[7] Also see Pellegrini and Gerlagh (2008).

[8] Transition countries include Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, the Czech Republic, Estonia and some other former USSR countries.

[9] See Goel and Nelson (1998), Mauro (1998) and Tanzi (1998).

[10] The religions here are empirical results from Porta et al. (1997).

of nepotism.[11] Second, he adds that religion could affect corruption levels via the historical pattern of influence that developed in the different settings, between church and state. Treisman's empirical results reveal out that a country with a higher percentage of Protestants tend to have less corruption. Paldam (2001) further suggests that Reform Christianity and tribal religions would decrease the level of corruption,[12] and that the South and East Asian religions are negatively but insignificantly correlated.

Education Education, as human capital, increases the opportunity cost of engaging in corruption, because schooling can increase the return to legitimate work both for the bribees and bribers; higher wage rate will reduce their incentives to engage in bribery. Glaeser and Saks (2004) suggest that highly educated voters are more willing and able to monitor public employees and to take action when these employees violate the law. They explain that a causality problem might happen since political attention is luxury good, and only people who have higher incomes and education can participate in it, because education makes it easier to learn about politics. Furthermore, education may make individuals value more highly the importance of staying politically involved. So countries which are richer and whose people are better educated may produce people more willing to supervise corrupt activities and make them able to take action against these public agencies. Glaeser and Saks used America state-level data to investigate the effect of education on corruption; they find that the more educated states have lower degrees of corruption. The same conclusion is presented by Dreher et al. (2007). They use cross-country level school enrolment rate data to prove the relationship; they also find that the more educated a country is, the lower the corruption level.

[11] Nepotism is often correlated with corruption problem; higher nepotism will worsen bureaucracy and cause higher corruption.

[12] Reform Christianity includes Protestants and Anglicans.

1.3 Data Descriptions and Hypothesis

Our dataset was collected from several different resources, and the variables include CPI score, PPP GDP per capita, consumer price index, export/import percentage of GDP, political freedom index, economic freedom index, gross male secondary education enrollment (%), population, percentage of Protestants, law origin dummies, culture group dummies and communist country dummies. In addition, some of the relationships to corruption are still under discussion and require proof; accordingly, in each paragraph we list the hypotheses (12 in total) which we want to prove. Table 2 is the summary of the data resources, Table 3 shows the correlations of variables, and Table 4 is the country list. The following are explanations of the regressors.

Measurement of Transparency To test and demonstrate the presented concept, we must have correct and accurate data to help us to derive a convincing result. There are several indices provided by different institutes, and we need a dataset which is cross-country and with a lengthy time series. The corruption indices are measured by different measurement methods and based on several different surveys. Treisman (2000) analyzes the correlation between different perceived corruption ratings, and finds that the perception indices made by Transparency International and those by Business International (BI), International Country Risk Guide (ICRG) and Gallup International are highly correlated, and also that all of them are basically reliable. Hence it should not matter which index is made by which institute. We chose the corruption perception index (CPI) provided by Transparency International (TI) as our object of analysis since it was easier to obtain and has a longer time series.[13] Transparency International is an organization devoted to fighting corruption around the world, and it helps countries to understand and research corruption problems. TI provides a corruption perception index from 1995 to 2008. The corruption perception index ranks the countries of the world, and the index is not formed by a single questionnaire or single poll; it is a poll of polls, collecting the corruption-related data from expert and busi-

[13] All indicators can available via http://www.transparency.org/.

ness surveys executed by a variety of independent and reputable institutions. Take the survey of 2008 for example; the index is composed of data either compiled or published between 2007 and 2008 within 180 countries,[14] and includes 13 surveys of business people and various assessments by country analysts from 11 independent institutions.[15] All of these surveys use the same definition on corruption: the misuse of public power for private benefit. Each of the surveys has its own scale to measure the degree of corruption. TI standardizes these indices and converts them into standard scores. However, the specific methodology can be obtained from the official web site and the metrology is almost the same year to year.[16]

On the corruption perception index scales from 1 to 10, 10 represents the most transparent with least corruption, and conversely 1 means the country has rampant corruption problems and almost no governmental control. For the purposes of easy understanding and to suit our hypothesis, we use 10 to minus the origin scores, and make the higher score represents the more corruption and lower score represents transparency. The mean of CPI is 5.57 with standard deviation of 2.31. For the basic trend of corruption and PPP GDP per capita see Figure 3, and in this figure we can also see the label of the countries.

1.3.1 Economic Variable

Income Income plays an important role in our research. To capture a country's development and wealth without bias we use purchasing power parity (PPP) GDP per capita. The International Monetary Fund (IMF) provides complete cross country data from 1995 to 2008, which perfectly suits our requirements. In the data we have 2398 observations and the mean is 9,824 US dollars with a standard deviation of 11,719 US dollars. At the same time we generate a quadratic term to capture the trend of the nonlinear relationship between corruption and GDP per

[14] Note that the numbers of countries might change every year, like 180 countries in 2008 but only 41 countries in 1995.

[15] Data most obtain from bank report or international institutes and foundations, for example the Country Performance Assessment Ratings by the Asian Development Bank. Otherwise the surveys used is not absolute the same, it may change while some survey is not performed.

[16] Further information and details please see
http://www.transparency.org/content/download/36193/568706.

capita. In addition, we create lnGDP per capita and (lnGDP per capita)^2 which represents nature log PPP GDP per capita and its quadratic term, respectively. After taking the nature log, the relationship scatter can be seen in Figure 1. Finally, we expect that the degree of relationship between corruption and the ln GDP per capita will be nonlinear, and that the degree of corruption will increase at the beginning and finally decrease after the turning point; graphically, it should become an inverse-U shape, and we graph a primary relationship between corruption and ln GDP per capita by year in Figure 2. From this figure we discover some trends that fit our hypothesis. Therefore, we can make our first hypothesis:

- H1: With economic growth and increased income, corruption should first increase and then decrease after peaking. Graphically, it should looks like an inverse-U.

Inflation In our data, we collect the consumer price index to capture inflation problems. The data resource is obtained from the *World Development Indicators* which is directed and published every year by World Bank. The index is based on Laspeyres index for the computation, and the consumer price index will represent the upper limit of inflation faced by a household. Since the higher inflation rate always implies more fluctuation and greater uncertainty, we expect that countries with the least amount of perceived corruption will tend to have a smaller consumer price index. The hypothesis becomes:

- H2: Countries with higher inflation tend to have higher corruption problems, so the relation should be positive.

Export and import Percentage of GDP To measure the degree of international integration, Ades and Tella (1999) use export percentage of GDP to capture the ideal, and we further use export and import percentages of GDP to measure the degree of international integration because we think openness or integration to the global can not only use exports since some countries lack resources. Hence, including the percentage of imports would be more reasonable, and we expect that

countries strongly connected to the world market will tend to be more law-abiding and have less corruption, so the hypothesis is:

- H3: The more a country is tied into international markets, the less the level of corruption.

1.3.2 Political and Culture Variable

Political Freedom We collect political rights and civil liberty indicators from Freedom House; these have been extensively used to analyze democracy related researches. Political rights are often used as proxy for the degree of democratic. We revise the primary indicator and make 7 represent that a country enjoys a high level of political freedom and civil liberty. Where a country scores 1 it means there's almost no political freedom (or civil liberty). Also we add a quadratic term to capture the ideal as suggested by Rock (2009), for the reason that political freedom is an indicator of the democratic degree. Rock proved empirically that the relationship is non-linear. Initially, democratization will induce more corruption in the short run, and then corruption problems diminish as democracy matures. We expect that the relationship between corruption and civil liberty is negative and the relationship between corruption and political rights will be non-linear.

- H4: The relationship between corruption and civil liberty is negative.
- H5: The relationship between corruption and political rights would be non-linear.

Economic Freedom Economic freedom is defined as the fundamental right of every human to control his/her own labor and property. It may be divided into several specific types; in our data we have 10 components: degree of business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption and finally labor freedom.[17] We obtained the data from The Heritage Foundation

[17] We do not use the variable "freedom from corruption" due to it is also estimated by TI's Corruption Perception index, and we do not include "labor freedom" because the dataset is not complete enough.

(www.heritage.org), which is a research and educational institute and think tank. It has published annually *Index of Economic Freedom* since 1995. The indices scale is from 0 to 100, where 100 represents extreme freedom and 0 represents most restricted economic freedom. Each index has its own formula and data resources; basically the methodology and the resources are the same every year.[18] We choose 7 indexes in our analysis, and make the following hypotheses:

- H6: Corruption is negatively correlated to business freedom, trade freedom, monetary freedom, investment freedom, financial freedom and property rights, the greater the economic freedom, the smaller the degree of corruption.

- H7: Larger governments will have more corruption opportunities; hence, the relation with corruption should be positive.

Education We collected both male and female secondary education gross enrollment rates from the World Bank EdStats Query from 1990 to 2008. Secondary education is defined as the stage of education following primary school and which, in most countries, is compulsory. However, we choose gross male secondary education enrollment for analysis for two reasons; on the one hand, secondary education is more common in the world; on the other hand, in the data set, the male's enrollment rate is more complete than that of female's enrollment rate. We expect the relationship with corruption to be negative.

- H8: Education leads to a decrease in a country's corruption problems.

Population As we mentioned before, we want to control for the difference in country size. We follow Fisman and Gatti (2002) and use population as a control variable, and we expect that the larger the country, the more opportunities for corruption.[19] The data is provided by the International Monetary Fund (IMF) and

[18] The detailed methodology is rather complicated; for further information and definition please check the official method note. (www.heritage.org/index/PDF/Index09_Methodology.pdf)

[19] Although Fisman suggests controlling the population, actually there's no theory to predict that more population would have more corruption; however, it is still a good control variable to help us prevent bias.

the unit is in millions of people. The mean is 35.631 million people. The smallest country is Dominica with 0.072 million people and the biggest country is China with 1327.66 million people. The hypothesis is:

- H9: Larger countries will have more corruption problems.

Protestantism Paldam (2001) finds some evidence from his empirical results that reform Christianity, more than any other religion, can decrease corruption. More specifically, we can conclude that countries with more Protestant civics will have less corruption. We use percentages of Protestants in a country to measure the relationship, and define Protestant from Wikipedia: "Protestant includes the following denominations: Assemblies of God, Anglican/Episcopalian, Baptist, Church of God, Church of the Nazarene, Churches of Christ, Congregationalist, Calvinist, Holiness, Lutheran, Mennonite, Methodist, Pentecostal, Presbyterian, Reformed, Seventh-day Adventist, Quaker, 'Evangelicals', non-Denominational Protestants, and other Protestants." The data are obtained from the *CIA World Factbook*, and since the time series data is not available, we just fill in all the countries with the same data in 2009; but it should not be a big problem since the change by year is not what concerns us, we are only concerned with whether a higher percentage of Protestants can lower the degree of corruption.

- H10: Countries with higher percentages of Protestants will have less corruption.

Dummy variables To capture some important characteristics of countries, we added dummy variables. First, we follow Treisman (2000) to examine whether or not different origins of law will cause a country to become more corrupt, and we anticipate countries with laws of British origin will have fewer corruption problems. As Porta et al. (1990) explain: "Common law has developed in England to some extent as a defense of Parliament and property owners against the attempts by the sovereign to regulate and expropriate them." To investigate whether higher government monopoly power would cause higher corruption problems, we use a representative dummy Communist variable to explore this concept (All of the

countries' law origins and Communist country definitions can be found in CIA World Factbook). The hypotheses are:

- H11: Countries whose laws are of British origin will have fewer corruption problems.
- H12: Former or current Communist governments will have more corruption problems.

However, different cultures mean different traditions and conventions, and these may mark distinct regions. Paldam (2002) suggests there are some "within" and "between" cultural differences regarding corruption. We adopt the cultural area approach to control these endogenous differences. We control the culture groups: African, Oriental, OECD countries and Latin American as Paldam (2002) suggests. One difference from Paldam is that we obtain more countries, so we have more compete data, and more information can help us control these differences more precisely. Detailed definitions and a list of countries regarding the dummy variables can be seen in Table 1.

1.4 Empirical Analysis

1.4.1 Model

In order to ascertain the true effects on corruption, we constructed model 1 as a benchmark for our further analysis. Model 1 uses an adjusted CPI score as our dependent variable,[20] and GDP PPP per capita and its quadratic term as our major independent variable. Furthermore we use two groups of independent variables. The first group comprises economic variables including: (1) export % of GDP, (2) inflation and (3) ln FDI. The second group has cultural; and politically-related variables, including: (1) degree of business freedom, (2) government size, (3) monetary freedom, (4) financial freedom, (5) investment freedom, (6) property rights, (7) democracy index, (8) gross male secondary education enrollment (%), (9) former/current Communist dummy, (10) English law origin dummy and (11) percentage of Protestants. The regression model can be expressed by the following equation:

$$I_{it} = Z_{it} + \alpha_1 GDP_{it} + \alpha_2 GDP_{it}^2 + \delta \mathbf{Z}_{economic} + \gamma \mathbf{C}_{culture} + \varepsilon_{it} \qquad (1)$$

where I_{it} is the corruption perception index in country i in year t and, GDP_{it} is GDP PPP per capita in country i in year t, GDP_{it}^2 it is the quadratic term, $\mathbf{Z}_{economic}$ is the matrix of economic variables, $\mathbf{C}_{culture}$ is the matrix of culture and political variables, and ε_{it} is an error term. Finally, α and γ are parameters to be estimated.

In the second model, we replace GDP PPP per capita with nature log GDP PPP per capita and also the quadratic term. The new model becomes:

$$I_{it} = Z_{it} + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{it}^2 + \phi \mathbf{Z}_{economic} + \psi \mathbf{C}_{culture} + \epsilon_{it} \qquad (2)$$

and all the other variables remain the same as in the model 1. We use these two models to test our hypotheses. We start by using the ordinal least square (OLS) method and then try the general least squares (GLS) random effect method and the GLS fixed effect method. Finally we choose the GLS random effect method as our main econometric analysis method.

[20] As we mentioned before, to get an inverse U shape we use 10 to minus CPI index and make the higher score represent greater corruption.

1.4.2 Econometric Method and Results

At first, to get a rough figure, we regress the CPI score on the PPP GDP per capita and its quadratic term to test our hypothesis, by using the robust-ordinal least square (OLS) method. The regression result can be seen in Table 5 column 1. As we can see, all of the regressions cannot meet our expectations of getting an inverse U curve; instead we get a U curve where the coefficient of GDP PPP per capita is -0.197 and for the square term, it is 0.0019 as Figure 3. Even if we control some economic variables like inflation rate and population in column 2, and control some cultural and political variables like average freedom score and democracy indices in column 3 the results still remain the same. For further testing, we added a cubic term of PPP GDP per capita and expected that the results might graphically look like an N curve, i.e. the corruption problem might first increase as a result of economic growth, then decrease and finally increase again.[21] The test results of the guess are in Table 5 column 4 to 6. The result of the guess is rejected since the coefficient of GDP PPP per capita in column 4 is -0.250, and 0.0044 for the quadratic term and -2.42e-05 for the cubic term, so the relation between corruption and GDP PPP per capita first decreases and then increases. The result does not match our economic intuition and seems unreasonable. Even after we add more regressors, the results are still incorrect, as in column 6 where we include most of the variables and the relationship still retains a U-shape.[22]

However, all these results imply that Model 1 is not good enough to encompass our ideas. We assume that the problem might be that the variation between country to country, year to year, is too huge; hence, to get a correct result, we alternatively try to use Model 2; we take the nature log of PPP GDP per capita and also generate a quadratic term, and then use OLS to make the same estimate again. In Table 6, column 1, we regress the CPI score, GDP PPP per capita and its quadratic term. Fortunately the estimated results fulfill our hypothesis. In col-

[21] Actually, there's no hypothesis or theory to support the N-shape trend, but we can try the same ideal from the environmental Kuznets curve; that is, some evidence reveals that the relationship between pollution and GDP is an N-shape.

[22] We also try the competing model, and add all the regressors; however, the result still can not meet our expectation.

umn 2, we first control the economic variables and in column 3 we add political and cultural variables. We can see that after controlling these variables, the effect of income becomes more obvious and the relationship to corruption reveal a non-linear trend. Columns 4 and 5 are separately estimated by using the general least square (GLS) random effects and fixed effects. Furthermore, Figure 4 is the graphical relationship of the OLS estimation, and Figures 5 and 6 are the graphs using GLS random effects and fixed effects. From the figures and regressions, we can see that the differences between the different estimating methods do not show overwhelming change, and this makes us believe the hypothesis is correct. For the following analysis, we choose GLS random effect as our main analysis method since we can have usefully suitable characteristics of panel data.

We get a strong result that in the relationship between corruption and nature log GDP PPP is non-linear, and specifically speaking, it is an inverse-U shape. No matter what method we apply or what variables we include, the inverse-U relation just changes slightly. Table 7 presents the estimated results of Model 2 by using the GLS random effect method. Column 1 shows a simplified relationship between corruption and GDP PPP per capita and it can be seen graphically in Figure 5. In column 2 we add economic variables and control cultural groups and population. As we expected, the percentage of export of GDP is negatively correlated to corruption, i.e. a country highly connected to the world tends to have less corruption as Sandholtz and Gray (2003) suggest. At the same time, we can see that a country with more inflation tends to have greater chaos inducing more corruption, where the coefficient is 0.00412. In Table 7 of column 3, we try to regress the corruption perception index on freedom variables, and find that 6 of the 8 economic freedom variables are statistically significant; we have evidence to show that corruption is negatively correlated with freedom of business, freedom of trade, monetary freedom, freedom of investment and property rights. The result means that hypothesis 6 is accepted, and implies that economic freedom plays an important role in reducing corruption problems. Furthermore, we also find the evidence, as expected, that larger government size means more corruption.

In Table 7 of column 4 we try to control some cultural variables in the basic

model. The result shows that more education and higher civil liberty can reduce corruption, and that countries with a higher Protestant percentage rate have less corruption due to the Protestant ethic emphasizing the egalitarianism and individualism. Another interesting discovery is the relationship between corruption and democracy. We get an inverse-U relationship as Rock (2009) suggests. The coefficients of political right and its quadratic term are 0.434 and -0.0485, respectively.[23]

Finally, Table 8 is our complete model which includes both cultural and economic variables. By adopting the GLS random effect method, the panel data is separated into 13 year groups, and on average, each year group has 50 observations. The coefficient of ln GDP is 2.370 and its quadratic term is -0.158, and separately they are statistically significant at the 99% and 98% confidence level, respectively. By calculation, we can easily get the turning point (critical value) 7.5, and after taking the anti-log, we have PPP US$1808.04. This implies that a country's degree of transparency will decrease as its economy starts to develop, and that the corruption problem keeps deteriorating until the PPP GDP reaches US$1808.04. After that turning point, the country's transparency situation starts to improve, as its economy matures.

In the complete model, the economic freedom variables, like business freedom, investment freedom and degree of property rights are still statistically significant. All of the variables are negatively correlated with the degree of corruption; but we can not find any evidence to prove that monetary freedom and trade freedom reduce corruption problems. More surprisingly, government size (spending) is not significantly positively correlated to corruption as we had hitherto thought. Expansion of government size might increase bureaucracy and red taps hence increase opportunities for further corruption opportunity; but if we consider the example here we would no longer be surprised, Singapore's CPI score was 0.8 in 2008 (which is in the top 5 transparency countries) with government spending score 93.9, and in the same year, the United State's CPI score is 2.7 with govern-

[23] We use political rights from the *Freedom House* as an index to proxy for democracy, which is extensively used in several literatures.

ment spending score of 59.8, and in Zimbabwe the CPI score is very high, about 8.2, but their government spending score is only 24.1! So we can conclude that high government spending does not necessarily entail serious corruption problems. However, there is one thing worth mentioning: government spending has many different purposes, and might not always have negative consequences. For example, Mauro (1998) shows that when government reduces education expenditure the corruption problem worsen. So it is better to understand the purpose of spending before we jump to conclusions; however, to constrain our limited sample, we can not take further step.

As for the economic variables, the empirical results only support hypothesis 4, that is, in the full model we find international trade (export plus import percentage of GDP) is significantly negatively correlated to GDP PPP per capita, but we can not find inflation's effect to be significantly, as well as the regression result we presented before. We guess that inflation sometimes implies economic expansion, so it is hard to conclude that inflation is a bad phenomenon, as steady inflation may even be a good economic sign. As for democracy (political rights), the regression results show that there is a non-linear relation to corruption instead of a linear relation; the same result looks like a inverse-U shape as Rock (2009) obtained,[24] and this implies that democracy would not immediately help with a country's transparency; instead, becoming democratic must first survive a dark period and then the situation would gradually change. However after a certain degree, democracy can help to reduce corruption problems. The regression also shows that civil liberty is negatively correlated to corruption because more civil liberty can give people more freedom to choose and avoid corrupt public agencies.

Now we turn to the effect of education, education plays an important role in many aspect related to corruption; we find evidence indicating that a country with a higher gross male secondary education enrollment rate will have a smaller corruption problem, no matter in which model or method. Also, in the full model, we

[24] One difference to Rock's empirical work is that Rock found an inverted U relationship between the "durability" of democracy and corruption, and what we focus on is the relationship between democratic "degree" and corruption, so our research further supports that the inverse-U relationship does extensively exist.

find that the coefficient is -0.0099, which means that one more percentage increase in the gross male secondary enrollment rate can decrease the corruption level by 0.0099 grades. This result supports the hypothesis that education can help people to better understand the political system and be able to say no to these corrupt agencies or they fight them by not voting for corrupt candidates. Furthermore, education would increase the opportunity cost to engage in corruption since higher education always implies higher income expectation, and engage in corruption would make the corruption officer lose his/her job and be sentenced.

Last but not least, we come to discuss the dummy variables; first, from Table 8 we obtain magnificent evidence that former or current Communist countries would have more corruption problems, and on average a 0.397 higher corruption perception index score than other types of government, so we may say that stronger government monopoly power would entail more corrupt behavior since the government is the only supplier of public service (i.e., due to the lack of competition). Finally in the regression, we find some statistical evidence to support the hypothesis that countries with Protestant majorities tend to have fewer corruption problems; one more percentage of Protestants can reduce the CPI score by 1.031! Although our measurement method may not be the best method, that use year 2009's statistics to represent every year is not specific enough, the result, however, is quite robust and trustworthy.

1.4.3 Discussion

In this paragraph, we discuss the unreasonable turning point we derived earlier. The turning point is US$1808.04, and is around the 10% percentile in 2008 and the 25% percentile of 1995; there are 21 countries under this GDP PPP per capita level in 2008 and 42 countries 1995, the turning point for 1995 is quite reasonable, but not for 2008. We think the underestimation might be caused by the following problems: (1) the period we include is too short (14 years) and this makes the trend of inverse-U not significant, and (2) the range of corruption perception index score is too small, so it is hard to capture the change of corruption. We find the first problem from empirical evidence, we use the same model and variables as in

Table 9 and only include observations from 2005 to 2008; as a result, we find that the nonlinear relationship just disappears; the coefficient of ln GDP PPP per capita is 1.125 and its quadratic term is -0.072, and both of them are not significant. So we can infer that the length of the time period would seriously affect our results.[25] As for the second problem, we first can compare our result with environmental Kuznets curve hypothesis literature; take Grossman and Krueger (1995) for example: the authors find that pollution will first increase and then decrease when per capita income reach US$8000.[26] However, we know that pollution emission is a continuous variable and the range is very wide, so we can easily determine its variation. Instead, the corruption perception index provided by Transparency International ranges from 0 to 10, so it is very hard to capture the slight variation of corruption except for dramatic political scandals happen which cause apparent changes.[27]

Beside these two problems, we also consider that the problem may be caused by an incorrect GDP PPP per capita dataset, to check whether this is a problem, we use different GDP PPP per capita source data from World Bank (WB) to estimate the same model once again. Replacing GDP PPP per capita data from IMF with data from World Bank, and using our full model in Table 8, we find out that the nonlinear relationship becomes insignificant, the coefficient of GDP PPP per capita is 0.312 and -0.041 for its quadratic term, and only the squared term is significant. However, other variables, compared to the original regression, do not show much difference, so we think the main problem might not be the data sources, since using other GDP PPP per capita data do not help to improve the result; instead since it makes the result worse, this possibility can be excluded. For further research, we suggest that one can find a better index to measure corruption;

[25] We also tried other lengths of years; however, the results still reveal a trend that the longer the period the greater possibility that the non-linear relationship would occur.

[26] The purpose of environmental Kuznets curve is very similar to our study, Grossman try to find a inverse-U relationship between pollution and GDP per capita, and finally he discovers that the theory is applicable to predict the trend of pollution emissions.

[27] To fix this problem, we rank the CPI score (higher rank means more corruption problem), and then transform the rank into percentile. We use the percentile as a corruption index to run the same estimation; however, the results are still not very well, and we find the coefficients of ln(GDPpc) and $(\ln \text{GDPpc})^2$ are 2.37 and -0.158.

at least the range should be larger, and it would even be better if the time series could also be longer.

1.5 Conclusion

There are a number of researchers and studies arguing that the relationship between corruption and GDP PPP per capita is an inverse-U shape, corruption rising with GDP PPP per capita, up to a point, and then declining, but seldom offering comprehensive and empirical evidence to support the hypothesis. Following the theories and models that economists found/used before, the results of the article present several empirical evidences regarding how economic and political factors effect corruption, by using the corruption perception index provided by Transparency International, as our dependant variable. We regressed the corruption perception index (CPI) score on economic variables, political variables and culture variables. Our main purpose was to find a non-linear relationship between corruption and GDP PPP per capita, and we also wanted to know what kind of freedom would be the key to reduce corruption. However, in the end, we found robust evidences to support that the relationship between corruption and GDP PPP per capita is an inverse-U as in Figure 7, and that the expected turning point is about US$1808.04. The policy implications of this study are somehow encouraging: economic growth can help poor countries escape from the extremely awful situation of corruption, although before the corruption problems are reduced, people must suffer rampant corruption problems during a period of time.

On the other hand, economic freedom and political freedom both play an important role in reducing corruption. For economic freedom variables, business freedom, investment freedom and property rights have the greatest effect on corruption, and these outcomes quite match our intuition; that is, if businessmen have more business and investment freedom, they do not have to bribe the public agencies to get permits or licenses. In addition, higher protection regarding property rights can guarantee that properties would not be confiscated or violated, so citizens would not need to bribe officials for fear of losing these properties. Political freedoms contain civil liberty and political rights; our empirical results show that

one score increase in civic liberty can reduce the CPI score by 0.154, which is a rather powerful factor to affect corruption. Political rights are used as a proxy for a country's degree of democracy; following Rock (2009) and Mohtadi and Roe (2003) we get a non-linear relationship between corruption and democracy, and graphically it appears as an inverse-U shape. However, this is a major discovery to support the hypothesis. This result implies that governments might have to suffer a period of corruption before they accumulate enough democratic experiences.

For political policy-makers, the results of this study show that there are some effective strategies to combat corruption around the world. Education is one of the shortcuts to reduce corruption, since we find that one percentage increase in the gross male secondary education enrollment rate can reduce the CPI score by 0.0099. Political system reform also appears to be an important factor in fighting corruption; governments which want to monopolize everything tend to have more corruption problems, and we can learn a lesson from the former or current Communist countries; on average, these Communist countries have a 0.397 higher CPI score than other political type countries. Besides, this study reveals good news for Protestant countries: a percentage increase in Protestant numbers can significantly lower the CPI score by about 1.03 units. Last but not least, if the governments can always keep their countries open to the world they will have fewer corruption problems, and we prove this effect by attesting to the relationship between corruption and value of foreign trade being negative.

The issue about corruption has been discussed for a long time. Scholars, politicians and citizens all want to study the problem and try to prevent it from happening; however, it is such a complicated problem and cannot be solved in a limited time. In this paper we provide view points for reducing corruption problems, and the encouraging results reveal that corruption can finally be reduced, although we need more patience and time in dealing with this problem. About corruption, we still require further investigation; if the data can be more complete and the time series longer, we believe we can obtain a better analysis in the future.

2 Democratic Perception and Political Behaviors

2.1 Introduction

We are not innately democratic; from barbarian to civilized, humans have evolved over many thousands of years, We became more democratic via experiencing and learning, and in this process, accessed information like education and the emergence of mass media have played an important role. In this thesis, the research questions we want to answer are as follows; firstly, how does education affect people's democratic perception and political engagement? Secondly, does a better understanding of democracy make people more willing to engage in political activates? Or do people decide to engage in political activities by considering other aspects, such as opportunity cost of time, economic situation and other living conditions. Answering these questions can help us to understand the mechanism whereby education affects people's political behavior. To help the discussion to proceed more smoothly, we first provide some definitions here. "Democratic perception" is defined as the degree of understanding democracy and its spirit; for example, people can realize the advantages of democracy and know their rights and responsibilities well in a democratic country,[28] also termed democratic perception. "Political activities" extensively includes all kind of activities and behavior related to politics, including attending demonstrations, voting, joining a political party, attending a campaign meeting or rally, and so forth.

In regard to political behaviors and education, many economists and political scientists discussed the relationship between education and voter turnout in their studies. Under their frameworks, they supposed that citizens are rational, and that their behaviors respond to incentives; therefore, they will vote if the benefit exceeds the cost. For instance, Matsusaka (1995) explains voter turnout patterns by constructing a decision-theoretical model on the impact of education (information) on turnout; the model suggests that when utility-maximizing citizens receive

[28] By using questionnaire questions we can quantify a person's democratic conception into scores, and which can be used to measure one's accomplishments and attitude to democracy; however, detail methods we will explain in the data descriptions section.

higher payoffs from voting they become more confident regarding their decision to vote, and this makes them more willing to vote. Friedman (1962) points out that "A stable and democratic society is impossible without a minimum degree of literacy and knowledge on the part of most citizens and without widespread acceptance of some common set of values. Education can contribute to both." However, education has always been found to have an impressive influence on political participation; it helps people in two ways; Dewey (1916) suggests that education can increase a person's human capital and develop his/her habits and communication skills. Besides, education can improve people's ability to gather information and solve problems and education can enrich people's knowledge, both of which are crucial to a person preparing to participate in political activities or to discuss public issues; clearly, education is the foundation for exploring political aspects. To sum up, we can say that education is the stepping stone for understanding the underlying principles, becoming more democratic, and helping people to learn how to act in regard to political affairs; education will not only affect a person's democratic perception but also effect his/her political behavior. Moretti (2003) summarized the prior literatures which explain why education would affect democracy and how this makes a country better. First, voters who are more educated may have a better understanding of candidates' and political parties' position because education improves cognitive skill. The second possible channel to affect democracy is education, which will increase civic participation like raising voter turn-out rate; greater civic participation improves social decision-making, and education can increase the quality of political decisions.

However, deciding whether or not to engage in politics does not simply depend on one's education; choices will be made according to one's preferences, time allocation and other external factors. Just like the famous time allocation theory modeled by Becker (1965), rational persons will allocate their non-working and working time efficiently. For instance, higher education translates into better salary,[29] thus education would increase the opportunity cost of engaging in polit-

[29] For the theory and empirical evidence, see Angrist and Krueger (1991). They estimated the impact of compulsory schooling on earnings by using the quarter of birth as an instrument for education. By using the IV method, the authors found that pupils who have longer schooling years

ical activities, meaning that a substitute effect would induce people to work more and spend less time on non-working activities. Conversely, there are also other possible factors which might affect people's decision to engage in political activities, like an interest in political affairs, or the economic and social conditions of the country might also affecting one's choice;[30] for example, when the economy is booming, people can earn money easier and faster, and this makes people prefer to allocate more time to participate in political activities; if economic is declining, people would rather use more time to produce, and pay little attention to politics.

In this paper we try to fix some problems ignored by former studies, and explore some new issues. Prior researches have already achieved some wonderful results regarding education's influence on turnouts, but these studies do not take other political activities into consideration. For instance, attending a campaign meeting or rally and trying to persuade others to vote for a certain candidate or party are also important political behaviors. However, turnout is not the only way to measure people's political engagement or democratic degree, so we use one more political behaviors to study education's effect on democracy. Most papers on education and political behaviors concentrate on single country analysis, seldom dealing with a cross-country individual level analysis. While prior researches usually focus on well developed western countries, we do not have much empirical evidence about the above mentioned hypothesis in developing countries, so one of the most important contributions of this paper is that we provide two different developing countries' evidence to support the hypothesis. Compared to the other studies, we are able to provide a comprehensive analysis on education' effect on people's political activities since we have a complete relevant dataset.

We present estimations by using democratic perception score, individual's education level and other individual information obtained from *East Asia Barometer*, which provides us with nine Asian countries' (Mongolia, Philippines, Taiwan, Thailand, Indonesia, Main land China, Japan, Singapore and Vietnam) individual

would have higher earnings in the future.

[30] People who are highly interested in politics might also cause some simultaneous problems in econometric analysis, to solve this problem, we construct a simultaneous model. Further analysis will be presented in the empirical section.

response samples.[31] We choose some questions to generate a democratic perception index for analysis, and we also use some questions to measure people's political behavior, like voting and participating in demonstrations. The rest of the paper is arranged as follows: in the next section we review some related literatures on democracy and education, and provide a brief summary at the end of the section. In section 3, we will introduce the data set, and explain what questions we used for the analysis; after discussing the sample, in section 4 we try to model the formation of democratic perception, and how democratic perception affects people's behavior. In the same section we show our empirical work results and explain the econometric method we have applied. Finally, section 5 offers the conclusion; we then discuss the results and sum up what we discovered in this paper.

2.2 Literature Review

We first introduce some theories and empirical works related to how education affects democracy. Lipset (1959) discussed the possible requisites of democracy, and found a correlation between democracy and economic development is positive by using some basic statistics, he suggested that prosperity would stimulate democratization, a concept called the "Lipset/Aristotle hypothesis" by the later scholars (also known as the development-democracy-growth hypothesis). Lipset emphasized that more education and an increased of middle class are the key elements to develop democracy; in Lipset's research, the results imply that economically well developed countries have a greater chance to achieve and sustain democracy.[32] The earliest discussion specifically focused on education and democracy origins was by Dewey (1916), he argued that education will increase a person's human capital and also develop one's habits and skill of communication. He pointed out that "education develops one's ability to gather and interpret information and to solve problems on many levels; it increases one's control

[31] Data can be acquired from http://www.jdsurvey.net/eab/eab.jsp.

[32] For empirical evidence and more details, see Pourgerami (1998); he shows that economic growth has strong and highly significant positive effects on democracy.

over events and outcomes in life." All these abilities are the basis of developing democracy; once people are well educated, they will have a better understanding of democracy and enough knowledge to engage in political activities. These two studies provide some basic analysis of the relationship between education and democracy; however, we still lack a comprehensive model or theory to explain the phenomenon.

Barro (1999) is one of the pioneers who started to analyze the determinants of democracy. Using a panel data from more than 100 countries from 1960 to 1995, democracy was measured by a subjective indicator of electoral rights. In the end, he ascertained that democracy rises with per capita GDP, primary schooling and a smaller gap between male and female primary school attainment. But he did not find any evidence to support the belief that democracy is significantly related to school attainment at the secondary and higher levels. Brady et al. (1995) tried to construct a resource model of political participation; they found out that civic skills, like writing letters or organizing meetings, would be affected by job skill acts, organizational skill acts, church skill acts, English spoken skill and years of schooling. They explained that civic skills, time and money are important resources to determine communication and organizational capacities which are essential to political activity. Applying two-stage least squares (2SLS) analysis, in the first stage, they regress political acts on free time, family income, skill acts, language abilities, and formal educational experiences.[33] Finally, they find that socioeconomic resources and psychological engagements would drive greater political participation. In addition, they also considered the problems of endogeneity; that is, if the political interest is endogenous, then the OLS estimates may be biased. To solve the problem, they use institutional involvement as an instrument variable which is not directly correlated to political participation, and they also find a robust result as before. However this paper provides a relatively systematic and empirical-based analysis structure.

As for the influence of education level on democracy, Dee (2004) examined

[33] Political acts here is estimated by 1988 presidential election, giving campaign money, working informally with others on community, campaign work between January 1988, and so forth.

the effects of education level on adult civic engagement and attitudes; his empirical results suggest that educational attainment, both at the post-secondary and the secondary levels, has large and independent effects on most measures of civic engagement and attitudes. Similar results can also be found in Milligan et al. (2004); the authors argued that education can improve citizens' interest and knowledge of political issues, their involvement in the political process as well as the effectiveness of their political participation. So the authors test whether more educated voters have better information on candidates and campaigns; after all, the empirical work supports the hypothesis. By using the OLS and IV methods, they found a strong and robust relationship between education and voting for the United States' sample; however, the hypothesis is rejected for the United Kingdom case.[34] [35] Recent research (Spilimbergo (2009)) used a unique panel dataset on foreign students starting in the 1950s, and found that education is so powerful that foreign-educated individuals would foster democracy in their home countries!

Except for the argument that education can enable people to vote, some studies focus on the role of information. Feddersen (1996) analyzed two-candidate elections and used it to construct an information model; he demonstrated the existence of a special phenomenon, *swing voters' curse*: citizens with less information tend to abstain rather than vote, even though voting is so easy and will not cost anything. Feddersen's model implies that more schooling increases the turnout rate due to education helping people learn how to collect information. Matsusaka (1995) used a parsimonious economic model of voter turnout to explain rational citizens' voting behavior; finally, the model and empirical evidence showed that if a person believes it is his/her duty to vote, s/he may abstain if s/he is not confident about making the right choice, and the key to getting people to vote is more information is provided. Besides quantity of information, Ghirardato and Katz (2003) showed that the quality of incorporating information affected voting behavior and therefore was also important; they suggested that poor quality of information will lead citizens to choose to abstain. Overall, when discussing political participation,

[34] One thing worth mentioning is that one of their data set for the UK is the *Eurobarometer* survey which is the same survey system as *East Asia Barometer* we used.

[35] Similar researches include Moretti (2003) and Glaeser et al. (2007).

information should also be considered.

On the other hand, there are some counter arguments regarding whether education can enhance democracy, Acemoglu et al. (2005) used the Freedom House Political Rights Index to measure the degree of democracy, and collected other variables in a cross-country panel data set. Applying the fixed-effects OLS method, they presented that countries with higher education level do not necessarily have a greater tendency to become more democratic, and they suggested that the cross-sectional relationship between education and democracy might be caused by other omitted factors which influence both education and democracy instead of a linear causal relationship. Eventually, their paper raised two important questions: one is, "Is there no long-run causal relationship between education and democracy?" And the other is, "What are the omitted factors influencing both education and democracy, captured by the country fixed effects?" To settle the weak instruments and endogeneity problem, Bobba and Coviello (2007) suggested that the lagged levels of education can systematically predict changes in democracy by considering a different identification assumption for education, and using additional and more informative moment conditions to instrument all the regressors. After the revision, their final outcome showed some evidence of a statistically significant relationship between past levels of education and changes of democracy.

We can make a brief summary here, there are two dimensions by which to discuss the relationship between education and democracy: the first one is how education and information affect the degree of democracy in a country, and the second one is how education affects individuals' political acts as well as their preference for democracy. The theory linking education and democracy is still under debate, and can not be generalized to every country. Although there is a lot of empirical evidences support the hypothesis, part of the empirical works involves an endogeneity problem.[36] Otherwise, we find that most researches pay

[36] The same problem also occurs in the empirical work that studies the relation between eduction and health; many papers argue that education and health both affected by people's time preference ("future orientation"); most ways used to solve the problem involve applying the 2SLS method and finding a good instrument variable. For further information, Grossman (2005) carried out a very brilliant research and analysis on the endogeneity problem.

attention to a single country analysis; seldom has a cross-country individual level analysis been made. Besides, prior researches usually focus on well developed western countries; we do not have much data regarding the hypothesis in developing countries; so one of the most important contributions of this paper is that we provide evidence related to developing countries to support the hypothesis. Compared to the studies we mentioned before, we can offer a comprehensive analysis of education's effect on people's political activities since we have a complete dataset. Furthermore, former studies basically focus on education's effect on voter turnout; however, it is not the only way to measure people's political engagement or democratic degree. So we will estimate one more political activity: attending a demonstration, protest march or a campaign meeting, and we expect to find the same result as we did in regard to voting.

2.3 Data Descriptions

2.3.1 Main Analysis Object

Our analysis on a cross country project is based on *East Asian Barometer*, which is a comparative survey of attitudes and values toward politics, power, reform, democracy and citizens' political actions in East Asia. The surveys have been implemented in ten East Asian countries: Hong Kong, Indonesia, Japan, mainland China, Mongolia, the Philippines, South Korea, Taiwan, Thailand and Vietnam. In each of the ten countries, a national research team administered a country-wide face-to-face survey using standardized survey instruments to compile the required micro-level data under a common research framework and research methodology.[37] The survey was composed of two round surveys; the first round was carried out between 2001 and 2003, and the second round, between 2005 and 2008. The questionnaires used have slight differences, and some of the questions are not exactly the same; therefore, for fear of any inconsistency, we choose the first round survey for our analysis. The definition of the variables and descriptive statistics

[37] For the technical methods, please see http://www.jdsurvey.net/eab/EABTechnical.jsp for more details.

can be seen in Table 11.

We aimed to prove empirically that education will affect people's democratic knowledge and that democratic knowledge will affect people's political behavior. To make the argument clear and robust, we used two different developing level countries for our analysis, and expected to get a consistent result. We compared these two countries according to UNDP *Human Development Index*; first, Japan is reported as a "Very high human development" country, so we obtained Japan sample, surveyed in 2003, to represent a developed country. Second, we used the Taiwan sample surveyed in 2001 to represent a developing country.[38]

Each country includes about 1400 observations,[39] and the explanatory variables can roughly be separated into 10 types: (1) participation in elections, (2) personal background, (3) personal characteristics, (4) social capital, (5) trust in institutions, (6) degree of globalization, (7) political participation, (8) traditionalism, (9) democratic legitimacy and preference for democracy, and (10) citizen empowerment, system responsiveness and political support. The original questions of these variables are listed in Table 16, along with the chosen questions; all asked questions are recorded by ordinal numbers, for example, the responses to question QII90 "Have you voted or not since you became eligible to vote" are never, once, twice, three times and every time, which are separately assigned a code of 0,1,2,3 and 4, respectively.

To capture people's political behavior, we used 2 binary questions: "Did you voted in the last election" and "Have you ever attended a campaign meeting or rally", as our main analysis objects. The political participation rate in each country does not vary too much, and the common point is that the turnout rate is relatively high; from Table 9, we can find that the turnout rate was 77.98% in Japan and 83.24% in Taiwan. As for the percentage of attending a campaign meeting or rally the averagely was around 20%, and Taiwan had lower percentage at 13.48, and Japan's percentage was 15.08.[40]

[38] For the development degree, see UNDP *Human Development Index*, which can be obtained from http://hdr.undp.org/en/.

[39] To be more specific, we have 1418 observations in the Japan sample and 1415 observation in the Taiwan sample.

[40] Actually, there are 4 variables of political behaviors in this sample; the other two questions

One of the most important variables in this paper is "democratic perception"; we generated a quantified variable that could capture the idea; we selected 7 questions, Q132 to Q138, from the catalog "Authoritarian vs. Democratic Values" and totaled the scores as a proxy of democratic knowledge/perception. The questions included, for example, Q132: *People with little or no education should have as much say in politics as highly-educated people*, were meant to measure people's preference for democracy and their understanding of democracy. The other questions we included in this variable can be referred to Table 16; however, each question marks from 1 to 4 with scored 1 representing those the responding disliked democracy (preferring dictatorships) and had less understanding of democracy, and scored 4 representing that responders preferred democracy and totally understood the meaning of democracy. In addition, since some of the responders did not answer all of the questions, we replaced the missing values with each country's average score for the purpose of maintaining the sample size.

2.3.2 Other Explanatory Variables

Except for the variable of democratic perception, another explanatory variable, traditional attitude, was also generated by totaling some questions. The variable "tradition", ranging from 4 to 16, is the total of Q064, Q067, Q068 and Q069. It is used to measure traditionalism (i.e., conservative degree); we believe that religious-cultural traditions tend to decrease people's democratic perception, especially in the East Asia, where Confucianism strongly dominates and fundamentally differs from Western culture. Just like Fukuyama (1995) queried, "Will Asia formulate a new kind of political-economic order that is different in principle from Western capitalist democracy?" Perhaps East Asian has its own style of democracy which Western democracy cannot suit, so here we tried to figure out whether people with deeper traditional beliefs will have lower democratic perception.

To control for different traditional concepts between individuals, we generated

are: "Did you try to persuade others to vote for a certain candidate or party?" and "Did you do anything else to help out or work for a party or candidate running in the election?"; nevertheless, the percentage of people who engage in was too low, so we decided not to include them.

3 religion dummies: Buddhism, Daoism and Roman Catholicism since religion is also a channel for affecting people's thoughts and behaviors. Barro (1999), in his empirical work, shows that when other explanatory variables are constant, Protestant countries are highly democratic, and as Barro's theory about religion and democracy is not clear, so we can just check the empirical results and tell what religion can help people to form their democratic perceptions and encourage people to engage in political activities.[41]

Several studies have ascertained that schooling can help a country become democratic, like Barro's (1999), which found that years of secondary and higher schooling are propitious in regard to democratization. Here, we not only want to argue that education can help both in people's democratic perception and political behavior, but also wish to to specifically know which education stage would most affect people's behaviors and thoughts; hence, we use education level dummies for our analysis, and the dummies denotes respondents' highest education level including: incomplete high school, complete high school, some university/college education, bachelor's, graduate and post graduate degrees.[42] The distribution of each country's education level are shown in Table 10, according to the table; the average education levels is higher in Japan where most respondents had completed high school education.

Most studies regarding the relationship between democracy and GDP per capita focus on the aggregate level; in this paper, we try to find how individuals' income affect them. One of the most prominent theories on democracy and GDP per capita was constructed by Lipset (1959); he suggested that democracy is created and consolidated by the process of "modernization", which involves changes in "the factors of industrialization, urbanization, wealth, and education are so closely

[41] Note that countries have different religion dummies because the religious composition is not identical. In Japan's regressions, we include Buddhism which is accounts for 36.9 %; in Taiwan's regressions, we include dummies of Daoism (11.1 %), Buddhism (24.5 %) and Roman Catholicism (2.5 %).

[42] There is a minor shortcoming in the Japan sample, we cannot find any junior high school level respondent, and this could create a sampling problem; however, we think we can explain the problem by the result of compulsory education and we believe that the respondents were randomly chosen.

interrelated as to form one common factor. And the factors subsumed under economic development carry with it the political correlate of democracy"; in addition, the major concept of modernization theory is that higher income per capita causes a country to be democratic (or higher political engagement).[43] Instead, higher income would have higher opportunity cost to participate in political activities; that is, the substitute effect will offset the benefit of education; attending political activities will take too much time and people would rather spend their time working. As a result, whether or not a person participates in political activities depends on which effect dominates. Therefore, we generated variable *income* to measure people's income level, and encoded it into 5 quintiles, 1 presents the lowest quintile and 5 presents the top quintile.

We follow Glaeser et al. (2007), in controlling for basic demographics: age, gender, number of household members, subjective social status, member of any organization and living in urban or rural; we investigate how these backgrounds affect people's political democratic knowledge and political behaviors econometrically. First, some political science theories explain the relationship between age and political participation; Nie et al. (1974) claimed that the political participation rate will increase with age and start to decrease when reaching a critical age;[44] they further explained the phenomenon by the theory of "startup" and "slowdown", whereby younger people are less concerned with politics since they lack some basics and stable life, like full involvement in the work force, marriage and a family. On the other hand, "slowdown" means older people experience sociological withdrawal as individuals, having retired from active employment, and this would lower their rate of political activity.

We expect that males would be inclined to participate more in political activities, because politics are dominated by males in most Asian countries, and females

[43] There is still some controversy about income's effect; Acemoglu et al. (2007) investigated income and democracy over the past 500 years and argued that income and democracy are positively correlated; they suggested that there is no evidence of a causal effect. However, although it is not the most crucial variable we care about, the omitted variable problems are still deserve consideration.

[44] In their sample, the critical age in United State is between 30 to 50 years, and the result suggest that people aged between the interval have the highest political participation rate.

seldom have the chance to engage in political activities. Medoff (1986) summarized Kilpatrick's (1984) research and suggested the following explanations: (1) physiological constraints (women lack the psycho-social characteristics associated with political leadership), (2) cultural constraints ('politics is man's work'), (3) role constraints (women have been socialized into the lifetime roles of wife and mother) and (4) male conspiracy (men seek to preserve their power positions by imposing restraints barring women from access to positions of influence).

As for other personal backgrounds, we presume that people who live in urban areas would have a higher political sense and greater preference to engage in political activities since they have greater access to education.Membership in any organizations or formal groups could be a good predictor of political participation because people who join organizations or formal groups have better civic skills and would be more qualified to take part in political activities. Furthermore, we think that one's subjective social status will both affect one's political behavior and democratic perception, and we can reasonably expect that social status would be positively correlated with political participation and one's democratic perception since these people have more resources and also are well educated.

Information affects both people's democratic perception and political behavior. Stromberg (2004), based on a voting model, analyzed the effect of radios on turnout rate during a period of the New Deal relief program enforce. The empirical evidence revealed that household with radios tended to support the New Deal program since they have more information than others; consequently, those who have more information were more willing to vote for the New Deal programs. Tolbert and Mcneal (2003) used the NES survey data in the United States to carry out multivariate analysis, and they found that respondents who frequently accessed to the Internet and online election news were significantly more likely to report voting in the 1996 and 2000 presidential elections. Lassen (2004) also checked the argument that whether being informed affects the propensity to vote. He used a natural experiment which can make sure that information is exogenous; in the end, he discovered that the average effect of being informed in regard to the propensity to vote is 20 percentage points. Thus we obtained question Q057

(How often do you follow news about politics?) and labeled it as *info*, as a proxy to measure how information changes people's political behavior and democratic perception. The answers are separated into five levels, and the higher number we encoded represents the higher frequency in following news about politics.[45] We expected that respondents who follow political news more frequently will have higher political perception and political participation rate.

Political interest, as Brady et al. (1995) stated, is a possibly unreliable and endogenous problem; fortunately, we have a control variable, Q056 in our sample, which directly asks respondents how interested they are in politics. Intuitively, we anticipated that the greater the interest in politics the more likely people will search for more political information; this leads them to have a higher political participation rate.

To identify the political participation equation, we also use question Q019: membership in any organization or formal groups, since these people are usually more enthusiastic about politics and pay more attention to political issues; while joining an organization or formal group should not have a direct affect on people's democratic perception; therefore, we expect that these members will have higher participation rate in regard to political activities.

Finally, we controlled for government's performance, Q104 (Satisfied or dissatisfied with the government) and Q008 (Trust in the national government), since the way that government acts might affect people's decision. For instance, if a mayor is involved in several corruption scandals and violating the law, then the citizens will not voting to him/her, or even hold a protest rally against the corrupt agency. Similarly, to controlling for different conditions of society, we include Q024 (Most people can be trusted) and Q001 (How would you rate the overall economic condition of your country today?) in the political participation regressions. Besides, we add SE017 (respondents' subjective social status) to see whether or not the social status of their families will affect people's decision to participate in

[45] Actually, the variable *info* is composed by two questions, which are Q057: how often do you follow news about politics and Q057a: how often follows news about politics in daily newspaper, television and radio. These two questions are basically the same, the only difference is that Q057 is asked in Japan and Q057a is asked in Taiwan.

politics as well as their democratic perception.

2.4 Empirical Results

2.4.1 Model

The major purpose of this empirical work is to examine the effect of democratic perception on political behavior. The models we constructed are somewhat unusual in comparison to the prior literature since the models are comprise by two equations, and are estimated by simultaneous equations. The first equation, the democratic perception equation, is used to figure out people's real political behavior and is also a key equation to answer how democratic perception affects people's political engagement. We assume that individuals will maximize their utility while deciding whether or not to participate in political activates; however, based on the framework of these models, the political participation equation used to estimate respondent i's political behavior can be written as follows:

$$Vote_i = \alpha_0 + \alpha_1 Knowledge_i + \alpha_2 \Phi_i + \upsilon_i \tag{3}$$

where $Vote_i$ represents the political behavior, voting and attending a demonstration or rally. Variable $Knowledge_i$ is used to capture the degree of respondents' democratic perception, which ranged from 0 to 28. Φ_i is a vector of variables pertaining to the determinants of political behaviors, such as socio-demographic variables and the variables of the subjective cognition of the society; α_j (j= 0, 1, 2) is the vector of coefficients, and υ_i, is a random error term.

In order to prove the argument that education will directly affect people's democratic perception and, at the same time, to solve the endogenous problem since there might be some unobserved common determinants of political behavior and democratic perception, we construct the democratic perception equation to be estimated as follows:

$$Knowledge_i = \beta_0 + \beta_1 Vote_i + \beta_2 \Omega_i + \nu_i \tag{4}$$

where Ω_i, is a vector of respondents' characteristic variables which might determine their democratic perception, such as socio-demographic variables. Besides,

β_j (j= 0, 1, 2) is the vector of coefficients, and ν_i, is a random error term.[46]

2.4.2 Econometric Method

We first estimated equation 3 and 4, separately, and the results are presented in Table 12 and 13. Since political participation behaviors are measured by binary variables, we estimated equation 3 by probit method, while an ordinary least squares (OLS) regression was used to estimate equation 4. In this case, variable $Vote_i$ and $Knowledge_i$ are treated as exogenous in estimating equations 3 and 4, respectively.

Following the context we described in the introduction section, we believe that there is a simultaneity problem when estimating the relationship between democratic perception and political behaviors; therefore, we tried to estimate of the simultaneous equations. Using the procedure suggested by Maddala (1983); in first stage, the reduced-form equations of political participation and democratic perception are estimated by using the probit model and OLS, respectively. The political participation equation 3 is then estimated using the probit model after replacing $Knowledge_i$ with the reduced-form estimate of $Knowledge_i$. Finally, the democratic perception equation 4 is estimated by OLS after the $Vote_i$ variable is replaced with the probit estimate of the political participation rate from the reduced-form $Vote_i$ equation. However, the procedures can be easily measured by a STATA program, `cdsimeq`, which programmed by Keshk (2003). The command exactly implements the two-stage estimation method described in Maddala (1983) for simultaneous equations models, and the command also automatically implements all the necessary procedures for obtaining consistent estimates for the coefficients as well as their corrected standard errors.

[46] Note that to identify these two equations, we use different explanatory variables in Φ_i and Ω_i; basically, we use more behavior dummies to predict the political behaviors and control environmental conditions because we think that these variables will not directly affect people's thoughts and perceptions.

2.4.3 Results Analysis

The empirical results of single equations are presented in Tables 12 and 13, where Table 12 estimates voting behavior and Table 13 estimates whether the respondents attended a campaign meeting or rally. Otherwise, for the purpose of easily comparing the different developing degree countries, we report the same regression in one table; that is, column 1 would be perception equation and column 2 would be the political behavior equation of Japan, and we also report the marginal effects of Probit estimation in column 3; columns 4, 5 and 6 would be the same estimations for the Taiwan sample.

From Table 12 column 1 and 3, we can find that education significantly improves people's democratic perception. The comparison group is people whose education degree is under high school, and the marginal effect of education is very impressive, especially for university degree: people who graduated from university/college averaged 3 more points than the comparison group did. Overall, we consistently find the effect of education increasing with the different education level in all the perception regressions, both in voting and attending campaign rallies case. While we find that more education does not make people participate more in politics, as we mentioned before, education not only increases people's democratic perception but also raises people's opportunity cost to engage in political activities. In this case, education would make people less willing to engage in political activities, and perhaps they would instead participate in politics by means of donating money to the candidates and rather than directly taking time to vote or attend a campaign.

Under the estimation of the single equation method, we do not find all evidence support the hypothesis that democratic perceptions will affect people's political behavior. We only find that the relationship between democratic perception and voting behavior is positive in the Japan sample. But this result does not discourage us; instead, we take it as a benchmark to compare with the simultaneous model, and we will discuss the regressions in the later paragraph.

The effects of the other explanatory variables on political participation are as was expected. As shown in Tables 12 and 13, males have significantly higher

democratic perception than females do, as do respondents who live in urban areas. The results are similar to Stromberg's (2004); we find that the level of information is positively related to political participation, and we further ascertain that the more information the individual obtained, the higher his/her democratic perception is. An individual's age is negatively related to his/her democratic perception, but positively related to his/her political behavior. These results can be explained by older people in Taiwan and Japan being less educated and having more traditional beliefs; on the other hand, higher participate rate in politics by older people is consistent with the study of Nie et al. (1974), who explain that older people have a better economic basis and steady life, which makes them more willing to engage in political activities.[47]

In the perception equation, we observe that whether people are interested in politics is a good predictor of people's democratic perception: the higher interested in politics the higher the democratic perception is. As for traditional attitudes, the regression results reveal that conventional thoughts and attitudes are negatively related to democratic perception. Finally, people who participate in non-political organizations or formal groups have significantly higher probabilities of engagement in politics and higher democratic perception.

In addition, other variables which we use to identify political behavior equations also meet our expectations. The empirical work shows that people who are more satisfied with the government (Q104) and trust in the national government (Q008) are more likely to vote and attend a campaign meeting or rally. Furthermore, we do not find evidence to support the hypothesis: how people rate the overall economic condition of their country today would affect their political behaviors.

The second method we used to estimate the model was the simultaneous equations model. The results are reported in Tables 14 and 15. We find that democratic perception is positively related to political behaviors in the simultaneous equations model. The results are robust across specifications, including voting behavior in

[47] We also tried adding a quadratic term in age, but the results seem poor because of the insignificance, thus we decided not to add a squared term.

Japan sample and attending a campaign meeting or rally, in both the Taiwan and Japan samples. This finding indicates the significantly positive effect of education on people's democratic perception will inducing people to participate in political affairs. Differing from the significant and consistent results of democratic perception on political effect, in the tables, we observed that people who participate more in political activities will not necessary increase their democratic perception; in spite of that, we still find that this relationship exists in the Japan sample. A plausible explanation for this result is that people who join more political activities will gradually obtain more knowledge about politics and finally increase their democratic perception. In the Taiwan case, to our knowledge, the longitude of being democratic is too short; government and political parties are not well prepared to educate the citizens through political activities.

Based on the outcomes obtained by the simultaneous model, we again confirm the fact that compared to those whose education degree is below high school, the predicted democratic perception was higher in the more educated people. University education has the most remarkable influence: in the Japan sample, people with a bachelor's degree scored about 3 points higher than the others did, and in the Taiwan sample, people with a bachelor's degree have around 1.5 points higher than the others did. To sum up, these results suggest that higher education is necessary to a government which tries to increase the average level of people's democratic perception. Conversely, the substitute effect of education still determines people's political behaviors; the higher the education level, the less willing the individual is to engage in politics.

The empirical results from the simultaneous equation estimation for the socio-demographic and other control variables are similar to those obtained in Tables 12 and 13. Exceptions to this are that traditional attitudes are no longer significantly associated with political behaviors when political participation is treated as an endogenous factor, and whether people join a formal organization is no longer relevant to people's democratic perception and their political behaviors.

Finally, looking into Table 14 column 3 and 4, one might suspect that the estimation on voting behavior is not good enough; the results do not appear to

consistently reflect causality between perception and behavior in each country and political behavior; however, this might be caused by the high turnout rate in Taiwan (90.21%),[48] with almost everyone voting, which would make the variance between individuals very small. Conversely, participation rate in a campaign meeting or rally (around 15%) and turnout rate in Japan (77.98%) are relatively reasonable; hence, we can get appropriate results.

2.5 Conclusions

The analysis in this thesis uses a direct measure of knowledge and cognition of democracy to investigate the determinants of democratic perception and its effect on political behaviors. By using a simultaneous equations model, overall, the empirical results indicate a significantly positive effect of democratic perception on political behaviors. Meanwhile, we also find evidence to support that education, especially university/college education, increases people's democratic perception. The results suggest that the increasing education level has a significantly positive effect on the public's democratic perception, and rising democratic perception will eventually increase people's political participation rate.

In addition, from the estimated regressions, we discovered that age is positively related to political behaviors and negatively related to democratic perception; this can be explained by the fact that elders have more conservative and traditional thoughts, but those not restrained by traditions, are richer and capable of participating in politics. We also ascertained the hypothesis that people who have more information are more likely to vote as Matsusaka (1995) suggested in the single equations model, although the effect of information disappears when we adopt the simultaneous equation model. In summary, males and people who have a higher interest in politics have higher democratic perception, and people who are conservative and traditional have lower political perception. As for political participation equations, we find that government's performance would influence

[48] To our knowledge, year 2000 was the second time Taiwan's presidential election which directly determined by citizens, and the sample was surveyed in 2001, so it is highly possible that respondents' last vote was the presidential election.

people's political behavior; for instance, whether respondents are satisfied or dissatisfied with the government is positively associated to their decision to vote.

Furthermore, we successfully proved that education's benefit exists in two different development level countries: Taiwan and Japan; this implies that under different developing conditions, education can always be an efficient way to make people understand democracy better. We also generalize the idea that education increases people's democratic perception which will eventually raise people's turnout rate in regard to other political behaviors. We get a consistent result that not only voting but also attending a campaign or rally fulfills this mechanism, and we even find that because the variance in attending a campaign or rally is higher than voting behavior, the estimation seems more suitable to the case of attending a campaign.

Compared to former studies, the method applied in this study is original; we connect education, democratic perception and political behaviors, and then consider it as a system and allow them to affect each other. We think it is a better way to analyze political behaviors because people's decision will not be affect by a single reason, as what we know and how we really acts are two things; that is why we decompose people's behavior into thoughts and real acts, and estimate them separately. However, as an experimental research, there is still room to improve for future studies; one might extend the ideas to other political behaviors and test the hypotheses in other countries; also, the explanatory variables are worth exploring.[49] Otherwise, if a dataset can measure the democratic perception better, and ask the respondents more specific questions about democracy, we believe that the empirical results could be more successful.

[49] Limited to the sample, we are not able to solve the endogenous problem; however, we have tried our best to control all the possible explanatory variables. For future researches, the endogenous problem are worth concerning.

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Appendices

A Corruption and Its Determinants

Table 1: The Cultural Groups

Group	Definition and Descriptions
English law origin	Common law based countries : Australia, Bangladesh, Barbados, Belize, Canada, Cyprus, Dominica, Ghana, Grenada, Hong Kong, India, Ireland, Jamaica, Kenya, Kiribati, Malawi, Malaysia, New Zealand, Nigeria, Papua, New Guinea, Samoa, Sierra Leone, Singapore, Solomon Islands, South Africa, St. Lucia, St. Vincent and the Grenadines, Tanzania, Trinidad and Tobago, Uganda, United Kingdom, United States, Zambia.
OECD	19 old OECD countries of West European : Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Luxembourg, The Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, United States.
Latin American	20 Latin American countries: Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Paraguay, Panama, Peru, Suriname, Uruguay, Venezuela.
Oriental	Countries which is effected by "Chinese" cultural : China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam.
Communist	Former/current Communist countries: Albania, Armenia, Azerbaijan, Belarus, Benin, Bulgaria, Croatia, Czech Rep, Estonia, Ethiopia, Georgia, Hungary, Kazakhstan, Kyrgiz Rep, Latvia, Lithuania, Macedonia, Moldavia, Mongolia, Nepal, Poland, Romania, Russia, Slovak Rep, Slovenia, Tajikistan, Ukraine, Uzbekistan, Venezuela, Yemen.
Africa	42 countries from Africa: Algeria, Angola, Benin, Bosnia and Herzegovina, Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, ,Comoros, Congo, Dem. Rep., Congo, Rep., Cote d'Ivoire, Djibouti, Egypt, Arab Rep., Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya,Lesotho, Liberia, Libya, Madagascar, Malawi, Mozambique, Mali, Mauritania, Mauritius, Morocco, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, St. Vincent and the Grenadines, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe

We followed Paldam (2002) to set up these group dummies, and since we have more countries than his sample, the other definitions, we referenced from CIA World Factbook.

Table 2: Summary of Data Resources

Data	Resource
CPI score	Transparency International
PPP GDP per capita	International Monetary Foundation (IMF)
Ex.& Im. of GDP (%)	World Development Indicators (WDI online)
Consumer Price Index	World Development Indicators (WDI online)
Economic Freedom Index	The Heritage Foundation
Political Freedom Index	The Freedom House
Population (million)	International Monetary Fund (IMF)
English Law origin	CIA World Factbook
Christian	CIA World Factbook
Communist	CIA World Factbook
Gross male secondary education enrollment	World Bank EdStats Query

Where English Law origin, Christian and Communist are dummy variables basically referenced from CIA World Factbook 2009. All data are avaiable from 1995 to 2008.

Table 3: Summary Statistics of Data

Variable	Obs.	Mean	Standard Deviation	Min	Max
CPI score	1883	5.543	2.348	0	10
GDP Per capita	2398	9.825	11.719	0.189	85.868
GDPpc^2	3194	200.799	503.071	0.036	7373.238
ln GDPpc	2398	8.456	1.314	5.239	11.361
(ln GDPpc)^2	2398	73.225	22.067	27.453	129.062
Average freedom	2060	59.208	11.105	15.6	90.5
Business freedom	2060	64.129	14.448	20	100
Government size	2025	67.583	22.337	0.1	99.3
Monetary freedom	1994	73.826	13.376	10	95.4
Investment freedom	2060	53.636	18.846	10	90
Financial freedom	2060	51.379	20.095	10	90
Fiscal freedom	2060	69.764	15.323	10	99.9
Property rights	2060	50.782	23.407	10	90
Civil liberty	2463	4.487	1.793	1	7
Political rights	2466	4.589	2.146	1	7
Political rights^2	2466	25.659	18.478	1	49
Inflation rate	2178	27.191	535.494	-13.850	24411.030
Population	2382	35.632	131.177	0.072	1327.660
$\frac{Ex.+Im.}{GDP}$	2252	87.829	49.921	0.308	456.646
Gross male secondary education enrollment	1748	70.678	30.570	5.641	161.672

Note that Ex. represents export and Im. represents import. So $\frac{Ex.+Im.}{GDP}$ is export and import percentage of GDP, which is used to measure the degree of international integration.

Table 4: List of Countries

Afghanistan	Costa Rica	Iran, Islamic Rep.	Mozambique	Spain
Albania	Cote d'Ivoire	Iraq	Myanmar	Sri Lanka
Algeria	Croatia	Ireland	Namibia	St. Lucia
Angola	Cyprus	Israel	Nepal	St. Vincent & Grenadines
Argentina	Czech Rep.	Italy	Netherlands	Sudan
Armenia	Denmark	Jamaica	New Zealand	Suriname
Australia	Djibouti	Japan	Nicaragua	Swaziland
Austria	Dominica	Jordan	Niger	Sweden
Azerbaijan	Dominican Rep.	Kazakhstan	Nigeria	Switzerland
Bahrain	Ecuador	Kenya	Norway	Syrian Arab Rep.
Bangladesh	Egypt, Arab Rep.	Kiribati	Oman	Taiwan
Barbados	El Salvador	Korea, Rep.	Pakistan	Tajikistan
Belarus	Equatorial Guinea	Kuwait	Palau	Tanzania
Belgium	Eritrea	Kyrgyz Rep.	Panama	Thailand
Belize	Estonia	Lao PDR	Papua New Guinea	Timor-Leste
Benin	Ethiopia	Latvia	Paraguay	Togo
Bhutan	Finland	Lebanon	Peru	Tonga
Bolivia	France	Lesotho	Philippines	Trinidad & Tobago
Bosnia & Herzegovina	Gabon	Liberia	Poland	Tunisia
Botswana	Gambia, The	Libya	Portugal	Turkey
Brazil	Georgia	Lithuania	Qatar	Turkmenistan
Bulgaria	Germany	Luxembourg	Romania	Uganda
Burkina Faso	Ghana	Macedonia, FYR	Russian Fed.	Ukraine
Burundi	Greece	Madagascar	Rwanda	United Arab Emirates
Cambodia	Grenada	Malawi	Samoa	United Kingdom
Cameroon	Guatemala	Malaysia	Sao Tome & Principe	United States
Canada	Guinea	Maldives	Saudi Arabia	Uruguay
Cape Verde	Guinea-Bissau	Mali	Senegal	Uzbekistan
Central African Rep.	Guyana	Malta	Serbia	Vanuatu
Chad	Haiti	Mauritania	Seychelles	Venezuela, RB
Chile	Honduras	Mauritius	Sierra Leone	Vietnam
China	Hong Kong, China	Mexico	Singapore	Yemen, Rep.
Colombia	Hungary	Moldova	Slovak Rep.	Zambia
Comoros	Iceland	Mongolia	Slovenia	Zimbabwe
Congo, Dem. Rep.	India	Montenegro	Solomon Islands	
Congo, Rep.	Indonesia	Morocco	South Africa	

The countries listed here are not necessary available every year, according to the Corruption Perception Index we have all these countries in 2008 and the earlier years the less data we have.

Table 5: Relationship between Corruption and GDPpc

	Without Cubic			With Cubic		
VARIABLES	(1) score	(2) score	(3) score	(4) score	(5) score	(6) score
GDPPc	-0.197***	-0.200***	-0.0807***	-0.250***	-0.247***	-0.0994***
	(0.00694)	(0.00809)	(0.00909)	(0.0125)	(0.0141)	(0.0169)
$GDPPc^2$	0.0019***	0.0021***	0.0007***	0.0044***	0.0045***	0.0015**
	(0.0001)	(0.000138)	(0.0001)	(0.0005)	(0.0005)	(0.0006)
Int'l trade	-	-0.0036***	1.02e-05	-	-0.0038***	-8.89e-06
		(0.0006)	(0.0006)		(0.0006)	(0.0006)
Inflation	-	0.0023**	-0.0054***	-	0.0022**	-0.0054***
		(0.0009)	(0.00158)		(0.0010)	(0.0015)
Avg. Freedom	-	-	-0.0934***	-	-	-0.0929***
			(0.0054)			(0.0054)
Gov. Spending	-	-	0.0165***	-	-	0.0161***
			(0.00221)			(0.0021)
Civil liberty	-	-	-0.0571	-	-	-0.0565
			(0.0471)			(0.0472)
Political right	-	-	0.462***	-	-	0.448***
			(0.0982)			(0.0993)
Political $right^2$	-	-	-0.0536***	-	-	-0.0518***
			(0.0110)			(0.0111)
Education	-	-	-0.0060***	-	-	-0.0053***
			(0.00173)			(0.0018)
$GDPPc^3$	-	-	-	-2.42e-05***	-2.43e-05***	-7.60e-06
				(4.81e-06)	(5.71e-06)	(5.93e-06)
Constant	7.938***	8.230***	11.50***	8.150***	8.435***	11.55***
	(0.0622)	(0.0879)	(0.389)	(0.0707)	(0.101)	(0.389)
Observations	1516	1299	984	1516	1299	984
R^2	0.791	0.797	0.870	0.795	0.800	0.870

Culture group Latin America, Africa, Oriental and OECD are controlled. Also, population is controlled. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Relationship between Corruption and ln(GDPpc)

	OLS			Random Effects	Fixed Effects
VARIABLES	(1) score	(2) score	(3) score	(4) score	(5) score
ln GDPpc	2.917***	3.242***	2.272***	2.272***	2.469***
	(0.346)	(0.419)	(0.404)	(0.392)	(0.396)
(ln GDPpc)^2	-0.233***	-0.250***	-0.158***	-0.158***	-0.171***
	(0.0211)	(0.0255)	(0.0237)	(0.0228)	(0.0231)
Int'l trade	-	-0.00255***	0.000362	0.000362	-0.000157
		(0.000731)	(0.000661)	(0.000636)	(0.000646)
Inflation	-	0.00336***	-0.00448**	-0.00448***	-0.00360***
		(0.00102)	(0.00175)	(0.00138)	(0.00139)
Avg. Freedom	-	-	-0.0950***	-0.0950***	-0.0900***
			(0.00526)	(0.00508)	(0.00520)
Gov. spending	-	-	0.0169***	0.0169***	0.0151***
			(0.00214)	(0.00201)	(0.00204)
Civil liberty	-	-	-0.0604	-0.0604	-0.109**
			(0.0465)	(0.0464)	(0.0481)
Political right	-	-	0.460***	0.460***	0.478***
			(0.0981)	(0.0984)	(0.0983)
Political right^2	-	-	-0.0532***	-0.0532***	-0.0512***
			(0.0110)	(0.0108)	(0.0108)
Education	-	-	-0.00675***	-0.00675***	-0.00727***
			(0.00198)	(0.00201)	(0.00201)
Constant	-1.051	-2.403	3.287*	3.287*	2.581
	(1.410)	(1.717)	(1.679)	(1.680)	(1.693)
Observations	1516	1299	984	984	984
R^2	0.788	0.792	0.871		0.868
Number of year				14	14

Culture group Latin America, Africa, Oriental and OECD are controlled; also, population is controlled. Column (1) to (3) are estimated by Robust-OLS; Column (4) and (5) are separately estimated by GLS random and fixed effect. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Relationship between Corruption and Explanatory Variables

VARIABLES	(1) score	(2) score	(3) score	(4) score
ln GDPpc	3.390***	3.679***	2.636***	2.986***
	(0.328)	(0.386)	(0.303)	(0.363)
$(ln$ GDPpc$)^2$	-0.263***	-0.278***	-0.185***	-0.218***
	(0.0194)	(0.0229)	(0.0180)	(0.0212)
Business freedom	-	-	-0.0202***	-
			(0.00261)	
Trade freedom	-	-	-0.0061**	-
			(0.00248)	
Fiscal freedom	-	-	0.0009	-
			(0.00237)	
Government spending	-	-	0.0048***	-
			(0.00164)	
Monetary freedom	-	-	-0.0110***	-
			(0.00249)	
Investment freedom	-	-	-0.0048**	-
			(0.00192)	
Financial freedom	-	-	0.0018	-
			(0.00177)	
Property rights	-	-	-0.03010***	-
			(0.00206)	
Int'l trade	-	-0.0036***	-	-
		(0.000628)		
Inflation	-	0.0049***	-	-
		(0.00127)		
Civil liberty	-	-	-	-0.2770***
				(0.0444)
Political right	-	-	-	0.4340***
				(0.0967)
Political right^2	-	-	-	-0.0485***
				(0.0106)
Education	-	-	-	-0.0067***
				(0.00194)
protestant	-	-	-	-1.3090***
				(0.141)
communist	-	-	-	0.5330***
				(0.0856)
protestant	-	-	-	-1.3010***
				(0.138)
English Law origin	-	-	-	0.0640
				(0.0782)
Constant	-2.904**	-4.046**	1.280	-2.079
	(1.380)	(1.629)	(1.315)	(1.522)
Observations	1516	1299	1395	1110
R^2	0.790	0.796	0.863	0.846
Number of year	14	14	14	14

Culture group Latin America, Africa, Oriental and OECD are controlled; also, population is controlled. All regressions are estimated by GLS fixed effect. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Full Model

VARIABLES	CPI Score
ln GDPPc	2.3700***
	(0.3870)
(ln GDPpc)^2	-0.158***
	(0.0227)
Business freedom	-0.0173***
	(0.0033)
Trade freedom	-0.0034
	(0.0029)
Fiscal freedom	0.0011
	(0.0029)
Government spending	0.0008
	(0.0020)
Monetary freedom	-0.0077**
	(0.0034)
Investment freedom	0.0024
	(0.0022)
Financial freedom	0.0024
	(0.0022)
Property rights	-0.0278***
	(0.0027)
Int'l trade	-0.0029***
	(0.0007)
Inflation	-0.0014
	(0.0015)
Civil liberty	-0.1540***
	(0.0471)
Political right	0.5050***
	(0.0994)
Political right^2	-0.0528***
	(0.0110)
Education	-0.0099***
	(0.0019)
Communist	0.3970***
	(0.0876)
Protestant	-1.0310***
	(0.1430)
English Law origin	0.143*
	(0.0829)
Constant	1.5650
	(2.4730)
Population	Yes
Latin America	Yes
Africa	Yes
Oriental	Yes
OECD	Yes
Observations	956
Number of year	14
R^2	0.883

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

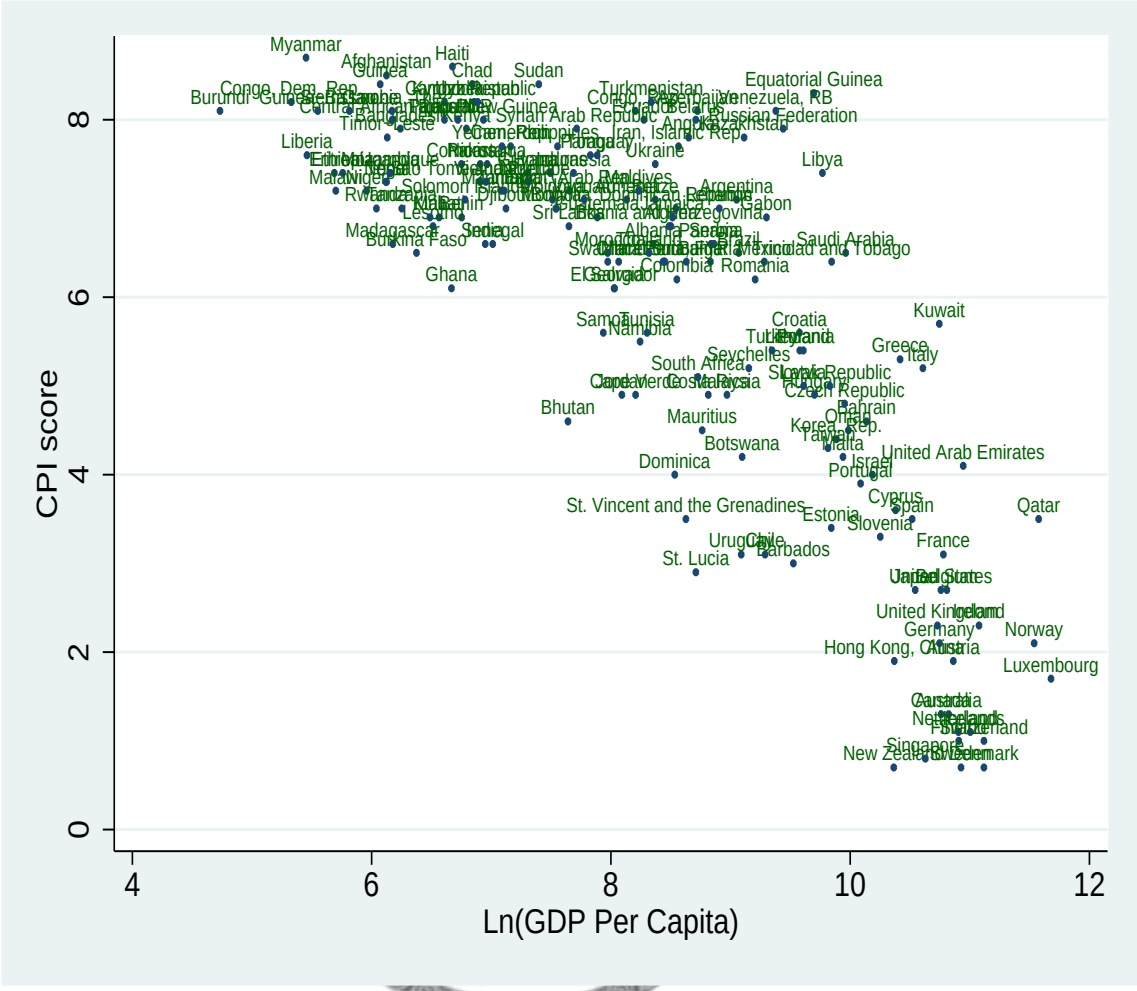

Figure 1: Plot of ln GDP Per capita and Corruption: Labeled Country (2008)

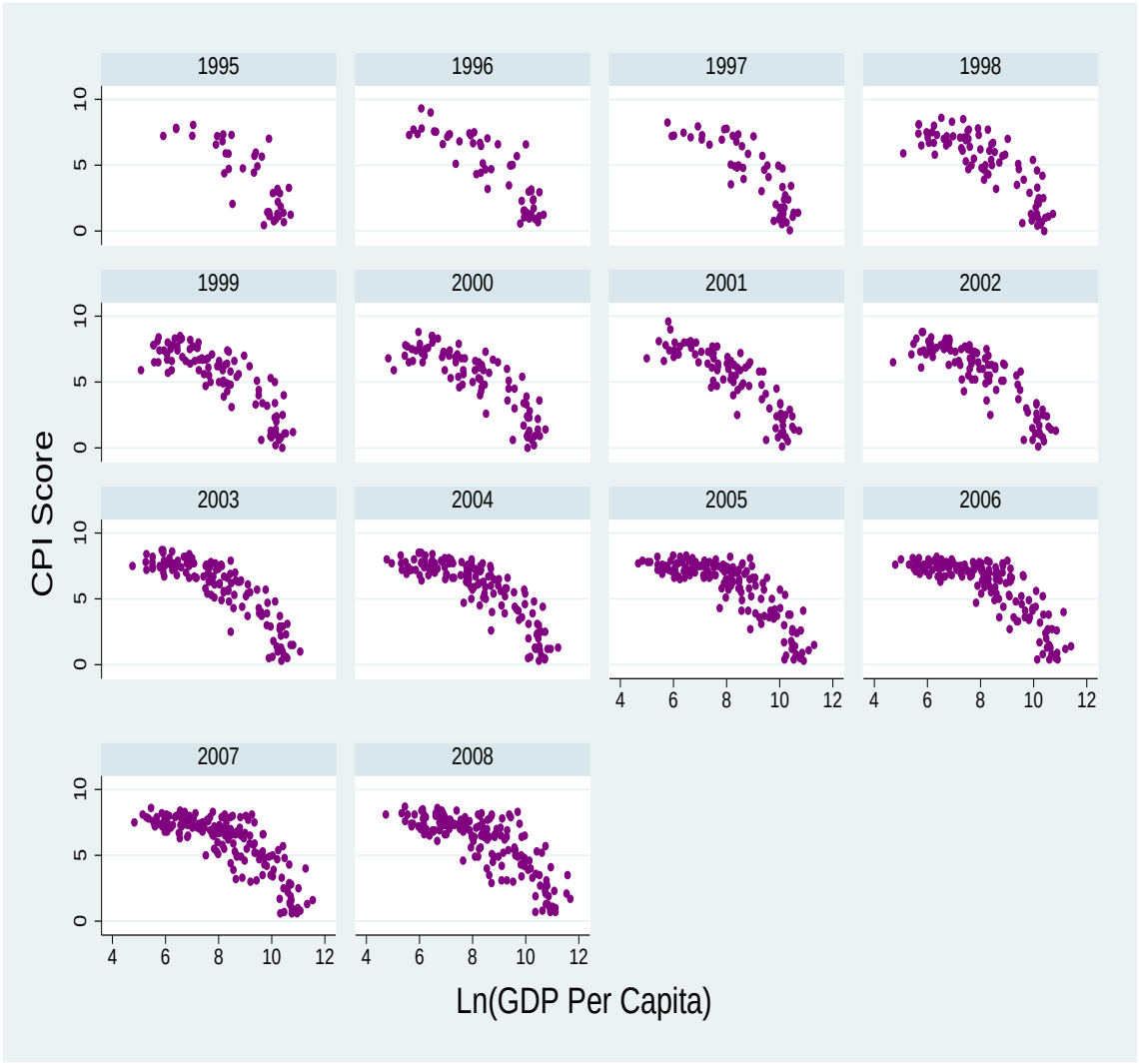

Figure 2: Plot of ln GDP Per Capita and Corruption by Year

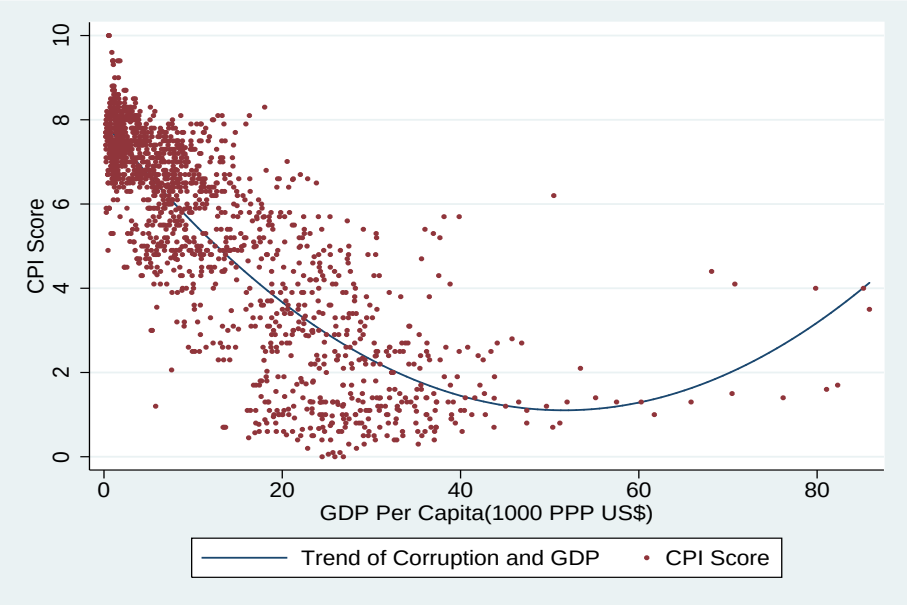

Figure 3: Relation between GDP and Corruption (Quadratic Prediction Plot)

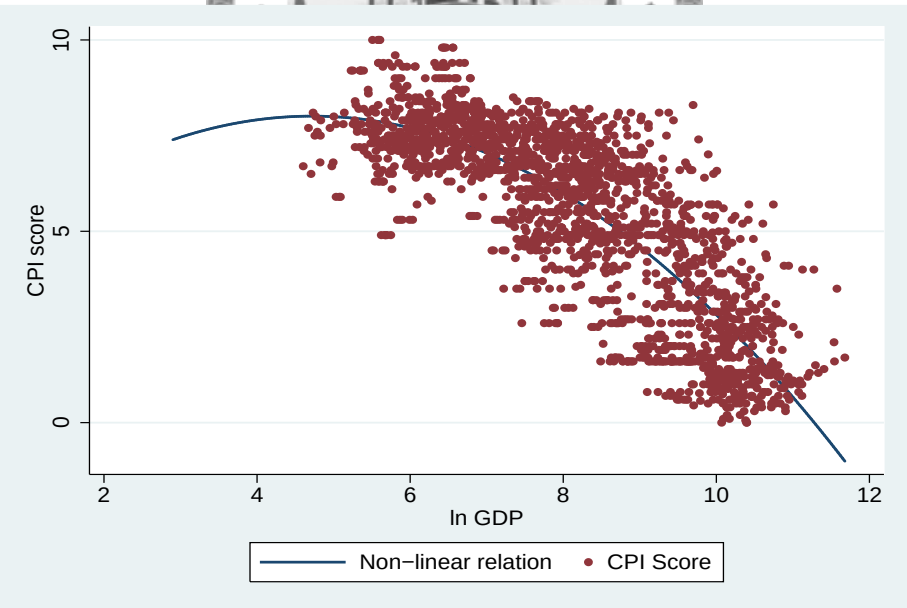

Figure 4: Relation between ln GDP and Corruption (OLS)

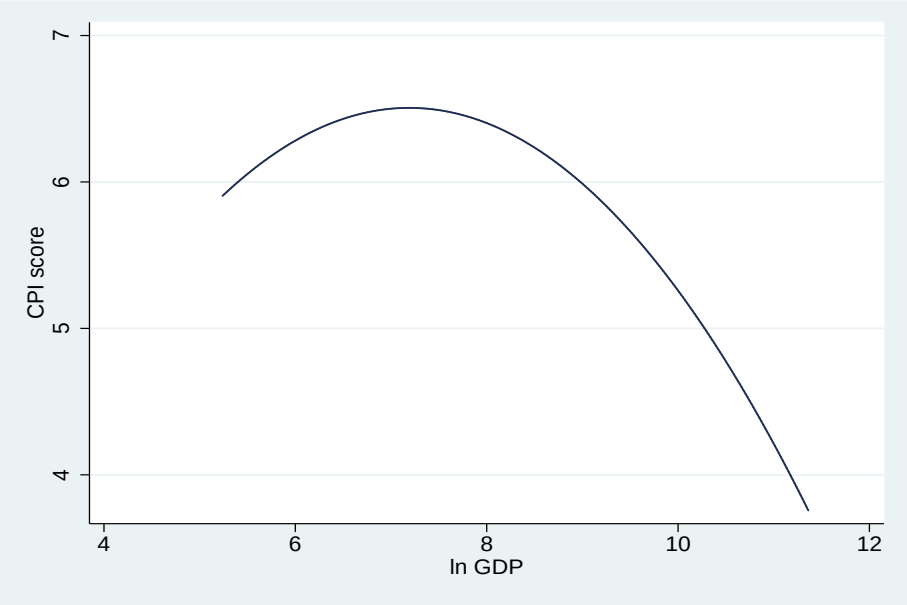

Figure 5: Relation between ln GDP and Corruption (GLS Random Effects)

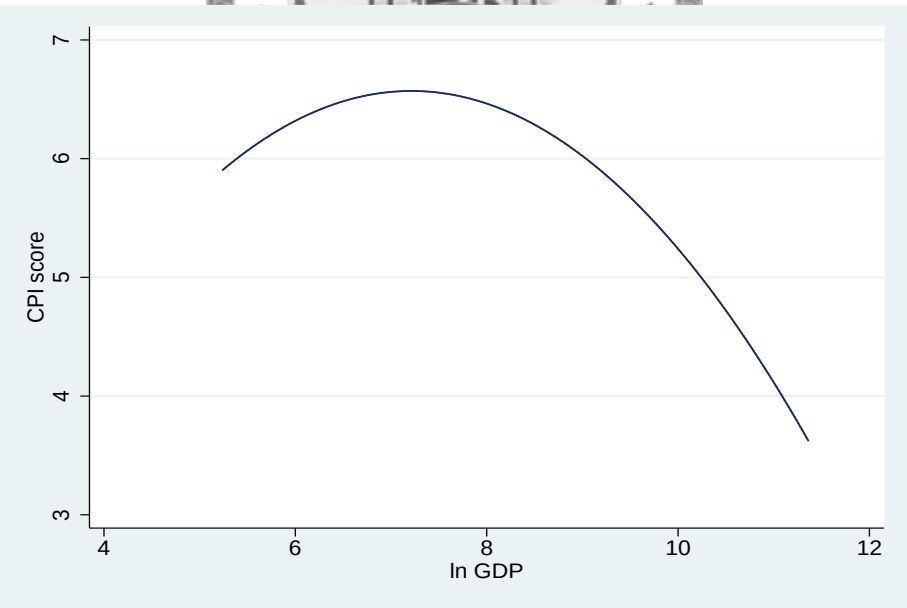

Figure 6: Relation between ln GDP and Corruption (GLS Fixed effects)

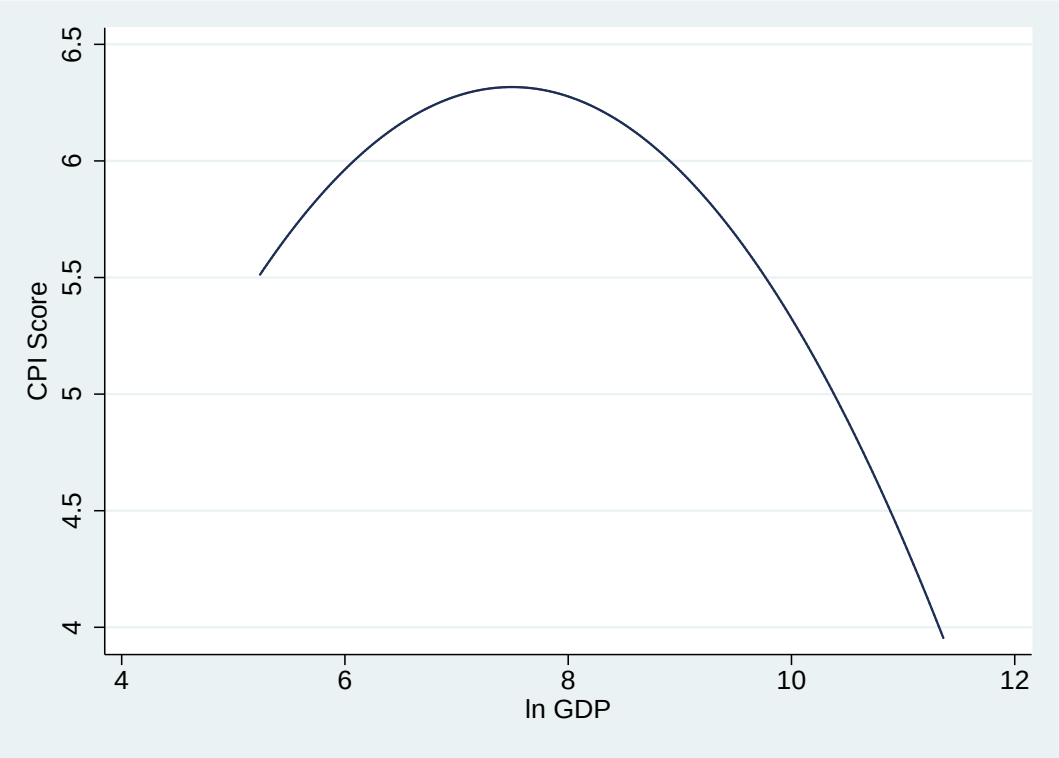

Figure 7: Relation between ln GDP and Corruption (Full model)

B Democratic Perception and Political Behaviors

Table 9: Percentage of Vote and Attend a Campaign

	Voted in the last election			Attend a campaign meeting or rally		
Country/%	No	Yes	Total	No	Yes	Total
Japan	297	1,052	1,349	1,177	209	1,386
	22.02	77.98	100.00	84.92	15.08	100.00
Taiwan	137	1,263	1400	1,225	181	1,406
	9.79	90.21	100.00	87.13	12.87	100.00

Data resource: *East Asia Barometer*. Survey of Japan is conducted in 2003 and 2001 for Taiwan.

Table 10: Distribution of Education Level

	Japan (2003)	Taiwan (2001)
Education Level	Percentage	Percentage
Post- and graduate degree	1.73%	3.25%
University/college degree	13.73%	11.31%
Some university education	16.98%	12.72%
Complete high school	45.23%	30.95%
Incomplete high school	2.53%	3.18%
Complete secondary school	-	10.88 %
Incomplete secondary school	-	1.34 %
Complete elementary school	14.45%	14.35%
Incomplete elementary school	5.35%	3.18%
No formal education	-	8.83%

Data resource: *East Asia Barometer*.

Table 11: Variable Names, Definitions, and Descriptive Statistics

		Japan (2003)		Taiwan (2001)	
Variable	Definition	Mean	Std. Dev.	Mean	Std. Dev.
Vote*	Voted in the last election	0.780	(0.415)	0.902	(0.297)
Rally*	Attend a campaign meeting or rally	0.151	(0.358)	0.129	(0.335)
perception	Democratic perception	17.752	(6.349)	16.652	(5.020)
post_g*	Graduated school degree	0.017	(0.129)	0.033	(0.177)
University*	Graduated from university	0.134	(0.341)	0.113	(0.317)
some_u*	Have some university education	0.166	(0.372)	0.127	(0.333)
high_s*	Graduated from high school	0.441	(0.497)	0.310	(0.462)
in_high_s*	Have some high school education	0.025	(0.155)	0.032	(0.176)
income*	Income quintile	2.925	(1.045)	2.234	(1.188)
male*	Respondent is male	0.453	(0.498)	0.486	(0.50)
age	Real age	50.974	(15.906)	43.500	(14.838)
urban*	Respondent lives in urban area	0.803	(0.398)	0.778	(0.416)
info	How often do you follow news about politics	4.590	(0.863)	3.645	(1.440)
Buddhism*	Respondent believe in Buddhism	0.351	(0.478)	0.245	(0.430)
RomanCath*	Respondent believe in Roman Catholic	-	-	0.025	(0.155)
Daoism*	Respondent believe in Daoism	-	-	0.111	(0.314)
SE017	Subjective social status	2.599	(0.918)	2.586	(0.889)
Q056	Interest in politics	2.782	(0.831)	2.133	(0.807)
Q019*	Member of any organization or formal groups	0.671	(0.470)	0.293	(0.455)
tradition	Variable to measure traditionalism or degree of conservative	10.836	(1.433)	10.529	(1.312)
Q024	Most people can be trusted	1.476	(1.010)	1.774	(1.007)
Q104	Satisfied or dissatisfied with the government	2.610	(1.307)	2.644	(1.279)
SE008	n of household members	3.464	(1.578)	4.629	(2.426)
Q001	How would you rate the overall economic condition of our country today?	1.431	(0.642)	1.882	(0.912)
Sample size		1418		1415	

Data resource: *East Asia Barometer*. Note that the minimum of perception is 7 and the maximum is 28. We denote the binary variables with "*".

Table 12: Single Equation Model: Vote

	Japan			Taiwan		
VARIABLES	(1) perception	(2) Vote	(3) -	(4) perception	(5) Vote	(6) -
perception	-	0.0206***	0.00551***	-	-0.00334	-0.000420
		(0.00777)	(0.00208)		(0.0163)	(0.00205)
post_g	2.537**	0.229	0.0554	2.339***	0.108	0.0125
	(1.280)	(0.324)	(0.0696)	(0.677)	(0.327)	(0.0352)
University	3.000***	0.325*	0.0780**	2.237***	0.0669	0.00809
	(0.620)	(0.182)	(0.0388)	(0.423)	(0.212)	(0.0246)
some_u	1.548***	0.212	0.0532	1.481***	-0.0592	-0.00768
	(0.585)	(0.166)	(0.0387)	(0.389)	(0.187)	(0.0251)
high_s	1.574***	-0.0217	-0.00582	1.441***	0.0954	0.0117
	(0.449)	(0.131)	(0.0352)	(0.303)	(0.155)	(0.0184)
in_high_s	0.700	-0.255	-0.0757	0.790	-0.0466	-0.00605
	(1.041)	(0.279)	(0.0902)	(0.630)	(0.299)	(0.0402)
income_f	0.177	0.0191	0.00511	-0.000819	0.0470	0.00591
	(0.161)	(0.0482)	(0.0129)	(0.106)	(0.0523)	(0.00656)
male	0.890***	-0.0592	-0.0159	0.871***	-0.282**	-0.0357**
	(0.328)	(0.0893)	(0.0241)	(0.222)	(0.110)	(0.0141)
age	-0.0672***	0.0268***	0.00719***	-0.0938***	0.0369***	0.00464***
	(0.0127)	(0.00355)	(0.000940)	(0.00896)	(0.00571)	(0.000653)
urban	1.003**	-0.279**	-0.0689***	1.175***	0.161	0.0217
	(0.392)	(0.116)	(0.0262)	(0.269)	(0.135)	(0.0195)
info	1.184***	0.109**	0.0291**	0.629***	0.0357	0.00448
	(0.210)	(0.0527)	(0.0142)	(0.0848)	(0.0405)	(0.00511)
Buddhism	-0.147	0.245**	0.0636***	0.00578	-0.170	-0.0229
	(0.335)	(0.0966)	(0.0242)	(0.258)	(0.128)	(0.0183)
Q019	0.563	0.192**	0.0533**	0.215	0.310**	0.0356**
	(0.352)	(0.0930)	(0.0265)	(0.243)	(0.132)	(0.0138)
SE017	0.193	0.0831*	0.0223*	0.746***	0.0604	0.00760
	(0.180)	(0.0501)	(0.0134)	(0.137)	(0.0733)	(0.00922)
Q104	-	0.0432	0.0116	-	0.0668	0.00840
		(0.0341)	(0.00913)		(0.0492)	(0.00614)
SE008	-	0.0573*	0.0154*	-	0.00728	0.000915
		(0.0310)	(0.00832)		(0.0217)	(0.00273)
Q001	-	0.0463	0.0124	-	0.0274	0.00345
		(0.0691)	(0.0185)		(0.0650)	(0.00816)
Vote	0.414	-	-	0.184	-	-
	(0.399)			(0.373)		
Q056	1.238***	-	-	0.441***	-	-
	(0.217)			(0.155)		
tradition	-0.0194	-	-	-0.0125	-	-
	(0.107)			(0.0831)		
Daoism	-	-	-	-0.314	-0.290*	-0.0431
				(0.351)	(0.159)	(0.0275)
RomanCath	-	-	-	0.490	-0.0768	-0.0102
				(0.699)	(0.350)	(0.0490)
Constant	8.361***	-2.063***	-	13.24***	-0.709	-
	(1.605)	(0.373)		(1.096)	(0.493)	
Observations	1344	1268	-	1382	1259	-
R^2	0.193	-	-	0.358	-	-

Note that column (1) and (4) are estimated by OLS, and column (2) and (5) are estimated by Probit; besides, column (3) and (6) are marginal effects of Probit estimation. Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Single Equation Model: Attend Rallies

	Japan			Taiwan		
VARIABLES	(1) perception	(2) Rally	(3) -	(4) perception	(5) Rally	(6) -
perception	-	0.00952	0.00208	-	0.0145	0.00287
		(0.00831)	(0.00182)		(0.0138)	(0.00274)
post_g	2.925**	0.0641	0.0145	2.472***	0.406	0.0990
	(1.289)	(0.376)	(0.0878)	(0.683)	(0.259)	(0.0749)
University	3.294***	0.0173	0.00382	2.260***	0.150	0.0319
	(0.620)	(0.170)	(0.0378)	(0.424)	(0.177)	(0.0400)
some_u	1.819***	-0.289	-0.0565*	1.486***	0.193	0.0417
	(0.585)	(0.177)	(0.0305)	(0.389)	(0.165)	(0.0383)
high_s	1.691***	0.00224	0.000490	1.478***	0.193	0.0400
	(0.449)	(0.125)	(0.0273)	(0.303)	(0.131)	(0.0282)
in_high_s	1.258	-0.0190	-0.00411	0.812	-0.387	-0.0613
	(1.023)	(0.302)	(0.0648)	(0.631)	(0.368)	(0.0445)
income_f	0.181	0.0352	0.00772	0.0280	0.0470	0.00933
	(0.161)	(0.0483)	(0.0106)	(0.106)	(0.0446)	(0.00884)
male	0.799**	0.0920	0.0203	0.876***	0.0533	0.0106
	(0.326)	(0.0930)	(0.0206)	(0.221)	(0.0961)	(0.0191)
age	-0.0597***	0.0138***	0.00303***	-0.0945***	0.0110***	0.00219***
	(0.0125)	(0.00377)	(0.000815)	(0.00881)	(0.00399)	(0.000790)
urban	0.892**	0.0849	0.0181	1.051***	0.240*	0.0440**
	(0.390)	(0.116)	(0.0240)	(0.269)	(0.130)	(0.0216)
info	1.145***	0.0421	0.00923	0.631***	0.166***	0.0329***
	(0.207)	(0.0673)	(0.0147)	(0.0850)	(0.0383)	(0.00744)
Buddhism	-0.115	0.144	0.0322	0.135	-0.116	-0.0223
	(0.335)	(0.0927)	(0.0212)	(0.259)	(0.114)	(0.0212)
Q019	0.689**	0.372***	0.0756***	0.214	0.276***	0.0585***
	(0.350)	(0.109)	(0.0202)	(0.248)	(0.0980)	(0.0220)
SE017	0.267	-0.00533	-0.00117	0.724***	-0.0128	-0.00255
	(0.180)	(0.0527)	(0.0115)	(0.137)	(0.0623)	(0.0124)
Q104	-	0.00343	0.000752	-	-0.00137	-0.000272
		(0.0349)	(0.00765)		(0.0400)	(0.00795)
SE008	-	0.0320	0.00701	-	0.0140	0.00278
		(0.0306)	(0.00669)		(0.0194)	(0.00385)
Q001	-	-0.0307	-0.00673	-	-0.0107	-0.00212
		(0.0716)	(0.0157)		(0.0553)	(0.0110)
Rally	-0.0256	-	-	0.266	-	-
	(0.438)			(0.330)		
Q056	1.322***	-	-	0.452***	-	-
	(0.217)			(0.156)		
tradition	0.0233	-	-	-0.0162	-	-
	(0.107)			(0.0834)		
Daoism	-	-	-	-0.236	0.232	0.0511
				(0.350)	(0.143)	(0.0345)
RomanCath	-	-	-	0.489	0.471*	0.119
				(0.701)	(0.265)	(0.0805)
Constant	7.360***	-2.715***	-	13.42***	-3.053***	-
	(1.600)	(0.428)		(1.073)	(0.433)	
Observations	1381	1304	-	1390	1262	-
R^2	0.192	-	-	0.364	-	-

Note that column (1) and (4) are estimated by OLS, and column (2) and (5) are estimated by Probit; besides, column (3) and (6) are marginal effects of Probit estimation. Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14: Simultaneous Equation Model: Vote

	Japan		Taiwan	
VARIABLES	(1) perception	(2) Vote	(3) perception	(4) Vote
predict_perception	-	0.288***	-	0.307
		(0.072)		(0.253)
predict_Vote	-1.115	-	-0.849	-
	(1.091)		(0.841)	
post_g	2.805**	-0.539	1.909***	-0.486
	(1.275)	(0.511)	(0.681)	(0.595)
University	3.367***	-0.579*	1.611***	-0.423
	(0.668)	(0.339)	(0.437)	(0.426)
some_u	1.718**	-0.289	0.921**	-0.351
	(0.61)	(0.264)	(0.414)	(0.299)
high_s	1.551***	-0.469**	1.024***	-0.166
	(0.476)	(0.214)	(0.319)	(0.272)
in_high_s	1.783	-0.809*	0.664	-0.271
	(1.131)	(0.443)	(0.665)	(0.383)
income_f	0.336**	-0.120	0.087	0.022
	(0.171)	(0.077)	(0.113)	(0.062)
male	0.705**	-0.337**	0.668**	-0.589**
	(0.345)	(0.15)	(0.334)	(0.283)
age	-0.036	0.042***	-0.055*	0.064***
	(0.028)	(0.007)	(0.033)	(0.023)
urban	0.555	-0.455***	1.223***	-0.167
	(0.5)	(0.171)	(0.306)	(0.311)
info	1.065***	-0.278**	0.502***	-0.125
	(0.223)	(0.13)	(0.09)	(0.145)
Buddhism	0.124	0.264*	-0.073	-0.195
	(0.432)	(0.135)	(0.31)	(0.149)
SE017	0.126	0.049	0.658***	-0.112
	(0.21)	(0.073)	(0.157)	(0.172)
Q019	0.603	0.055	0.412	0.248
	(0.415)	(0.14)	(0.355)	(0.155)
Q024	-	-0.038	-	0.039
		(0.075)		(0.083)
Q104	-	0.208***	-	0.179
		(0.066)		(0.11)
SE008	-	0.166***	-	0.017
		(0.052)		(0.027)
Q001	-	0.204*	-	-0.025
		(0.107)		(0.084)
Daoism	-	-	-0.622	-0.219
			(0.434)	(0.203)
RomanCath	-	-	-0.134	-0.045
			(0.735)	(0.404)
Q056	1.677***	-	0.434**	-
	(0.442)		(0.188)	
tradition	0.059	-	-0.012	-
	(0.112)		(0.087)	
Constant	6.669**	-5.578	14.273***	-5.776
	(2.714)	(1.039)	(1.245)	(4.06)
Observations	1267	1267	1255	1255
R^2	0.185	-	0.304	-

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 15: Simultaneous Equation Model: Attend Rallies

	Japan		Taiwan	
VARIABLES	(1) perception	(2) Rally	(3) perception	(4) Rally
predict_perception	-	0.263***	-	0.620**
		(0.069)		(0.281)
predict_Rally	2.574**	-	2.658	-
	(1.012)		(2.573)	
post_g	3.136**	-0.795	1.237	-0.769
	(1.579)	(0.547)	(1.229)	(0.714)
University	3.691***	-0.93***	1.457**	-0.736
	(0.754)	(0.336)	(0.643)	(0.50)
some_u	2.884***	-0.828***	0.679	-0.325
	(0.836)	(0.271)	(0.667)	(0.363)
high_s	1.873***	-0.449**	0.597	-0.349
	(0.549)	(0.207)	(0.624)	(0.331)
in_high_s	2.85**	-0.745	1.745	-0.808
	(1.312)	(0.462)	(1.492)	(0.555)
income_f	0.171	-0.082	-0.006	0.002
	(0.201)	(0.073)	(0.173)	(0.078)
male	0.612	-0.169	0.836**	-0.571*
	(0.404)	(0.145)	(0.346)	(0.335)
age	-0.082***	0.026***	-0.119***	0.065**
	(0.019)	(0.006)	(0.033)	(0.026)
urban	0.609	-0.098	0.413	-0.351
	(0.497)	(0.165)	(0.734)	(0.338)
info	1.145***	-0.335**	0.175	-0.163
	(0.287)	(0.132)	(0.333)	(0.166)
Buddhism	-0.49	0.162	0.468	-0.182
	(0.430)	(0.128)	(0.468)	(0.191)
SE017	0.141	-0.07	0.569***	-0.333*
	(0.226)	(0.074)	(0.213)	(0.181)
Q019	-0.357	0.18	-0.47	0.161
	(0.565)	(0.150)	(0.689)	(0.176)
Q024	-	0.045	-	-0.071
		(0.071)		(0.096)
Q104	-	0.152**	-	0.217*
		(0.064)		(0.123)
SE008	-	0.104	-	0.04
		(0.047)		(0.035)
Q001	-	0.133	-	-0.117
		(0.106)		(0.105)
Daoism	-	-	-1.006	0.391
			(0.815)	(0.258)
RomanCath	-	-	-1.099	0.529
			(1.449)	(0.477)
Q056	0.442	-	-0.333	-
	(0.440)		(0.716)	
tradition	-0.005	-	0.195	-
	(0.134)		(0.235)	
Constant	15.549***	-5.765***	21.013***	-12.828***
	(3.620)	(0.969)	(6.210)	(4.537)
Observations	1303	1303	1255	1255
R^2	0.188	-	0.320	-

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 16: Chosen Question in Questionnaire

Participation in Elections(binary)	
(Vote)	Voted in the last election
(Rally)	Attend a campaign meeting or rally
Personal Background	
(SE002)	Gender
(SE003a)	Age
(SE005)	Education
(SE006)	Religion
(SE009)	Monthly household income
(SE012A)	Main Occupation
(level3)	Urban or rural
Personal characteristic	
(Q056)	Interest in politics
(Q057)	Follow news about politics and government
Social Capital	
(Q019)	Member of any organization or formal groups
(FGNUM)	Number of formal group
Trust in Institutions	
(Q008)	Trust in the national government
(Q104)	Satisfied or dissatisfied with the government
Globalization	
(QII66)	Frequency of use the the internet
Political Participation	
(QII88)	Attended a demonstration or protest march
(Q073)	Contacted government (administrative) official
(QII90)	You voted or not ever since you became eligible for voting

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Traditionalism

(Q064) Even if parents' demands are unreasonable, children still should do what they ask

(QII57) Being a student, one should not question the authority of their teacher

(Q069) For the sake of the family, the individual should put his personal interests second

(QII65) People should always support the decisions of their government even if they disagree with them

Authoritarian vs. Democratic Values

(Q132) People with little or no education should have as much say in politics as highly-educated people

(Q133) Government leaders are like the head of a family; we should all follow their decisions

(Q134) The government should decide whether certain ideas should be allowed to be discussed in society

(Q135) Harmony of the community will be disrupted if people organize lots of groups

(Q136) When judges decide important cases, they should accept the view of the executive branch

(Q137) If the government is constantly checked by the legislature, it cannot possibly accomplish great things

(Q138) If we have political leaders who are morally upright, we can let them decide everything

Citizen Empowerment and Political Support

(Q126) I think I have the ability to participate in politics

Note that all binary variable is converted into 1-0 form, for example, if the answer is yes the original code is 2, but it is not easy to understand when doing empirical work, so we convert 2 into 1 and 1 into 0.