ESSAYS IN POLITICAL ECONOMY

by

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ABSTRACT

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This dissertation analyzes various issues in Political Economy. In the first chapter, I revisit the issue that has been popularly debated, namely whether corporations affiliated in business groups build stronger ties to the government. With the focus on the Japanese political economy, this chapter theoretically and empirically investigates how a firm's incentive to build political connections is affected by its ownership structure. I first show that intercorporate stockholding encourages the equity issuer to build political network if the equity holder exercises non-trivial controlling power over the equity issuer, but discourages it otherwise. Next, I analyze a large data set of Japanese corporations publicly traded from 1991 to 2003. The empirical analysis confirms the theoretical predictions: the number of retired elite bureaucrats in a private firm's board of directors, which is a measure of political connection of the firm, increases as the share of equity held by non-financial firms (friendly shareholders) decreases or as that by financial institutions (controlling shareholders) increases. These findings suggest that companies affiliated to business groups, in contrast to popular belief, might build relatively weaker political connections.

By reinterpreting Jean-Jacques Rousseau who considered self-government and self-regulation of people as the fundamental problem of politics, the second chapter explores several fundamental issues of political economy including how to allocate resources to achieve efficient self-regulation, how the agency problems in different parts of a society interact each other, and why the governments of poor societies work so poorly. The analysis shows that once a society is sufficiently developed in economic and political spheres, the agency problem on the citizens' side becomes negligible, in which case citizens (and researchers) can entirely focus on the issue of government accountability. When a political community is economically and politically poorly developed, however, the agency problem on the citizens' side exacerbates agency problems of other parts of

the society. Therefore, in such a case one should explicitly take the problem of self-regulation of the citizens as an integrated part of the entire political economic system.

In the last chapter, I develop a spatial voting model in which political elites play an active role in increasing or decreasing polarization. Key assumptions are: (i) voters respond to changes in policy positions of parties only if they pay attention to politics; (ii) political elites can disinterest a specific group of voters away by making the voters believe that implemented policies will be less preferable to them. Under intermediate range of parameters, the model generates multiple equilibria, i.e. political elites can choose whether to polarize their policy platforms or not. Either when economic inequality sufficiently grows or when media tend to mobilize partisans sufficiently more than they do centrists, polarization becomes the unique equilibrium.

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CHAPTER 1

OWNERSHIP STRUCTURE AND POLITICAL CONNECTION: THE CASE OF JAPAN

1.1   Introduction

Recent empirical works have shown that business groups are pervasive in modern economies. La Porta et al. (1999), Claessens et al. (2000) and Faccio and Lang (2002) provide evidence on the ubiquity of business groups in various countries across the world. The relationship that business groups have with other parts of society considerably varies depending on historical, political and societal context. But in most economies where business groups play an important role, critics and the public have suspected and raised concerns about the possibility that the economic giants, utilizing their vast resources, might build strong connections with politically powerful groups, and unlevel the playing field. Despite such widespread concern and interest, academic investigation on political behavior of financially interlinked firms has been scarce until recently. Recent works by some financial economists have discovered a series of interesting aspects of political economy of pyramidal business groups in developing countries. They show that most large business groups are formed with government support, and enjoy close ties to the government for long periods of time.
[1] These findings, together with the occasional news about marital ties and personal networks between political and economic elites, seem to justify the above mentioned concern. Other scholars, however, have found that in some advanced economies, companies affiliated in business groups have weaker ties to the government in contrast to the public's belief. For instance, Colignon and Usui (2003) and Raj and Yamada (2009) report that group affiliation of a Japanese company is correlated negatively with the strength of its political connection which is measured by the number of former high-ranked government officials hired as board members. Once this inconsistency is taken seriously, a couple of new questions arise: why are the government-business relationships

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[1]   Khanna and Yafeh (2007) and Morck, Wolfenzon and Yeung (2005) provide excellent surveys on this subject.

in different countries dissimilar? Why do group affiliated firms build weaker or stronger political connections? What is the underlying mechanism which generates the discrepancy? These are questions that are difficult to answer in a satisfactory manner, but addressing them properly is undeniably essential in understanding the political economy of business groups. This paper, as a first step, examines whether intercorporate stock ownership, the defining characteristic of business groups, indeed encourages private firms to build stronger political networks, and explores the conditions under which financially interlinked corporations have relatively weaker political connections. The focus of this paper is on the Japanese political economy which is an ideal laboratory for this investigation particularly due to its extensive reciprocal shareholding practice. In the first part of the paper, I develop a simple theoretical framework in which financially and politically related firms simultaneously decide how much resources to spend in building political connections. Key assumption used throughout the analysis is that the political network built by a company generates positive externality to other financially connected firms. In other words, when a group affiliated firm builds political network and spends resources in pursuing political goals, the benefits are shared among the member firms. [2] At least since Olson (1965), it has been well understood that political action imposes certain externalities on other political players and that outcomes of political games are often socially inefficient due to the absence of internalization mechanism. The problem considered here departs in a significant way from the situations that Olson described. Because intercorporate holding of stocks works as a financial contract that enables corporations to at least partially internalize such externalities, the firms holding each other's stocks are expected to enjoy greater political benefits at lower costs. However, this does not immediately imply that financial ties among corporations encourage them to build stronger connections to the government. The analysis presented in this paper shows that financial ties between corporations can strengthen or weaken the incentive for political network building, depending on the type of the relationship between the equity holder and the equity issuer. The intuition can be clearly demonstrated by considering the simplest case with two firms, an equity issuer, call it firm 1, and an equity holder,

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[2] Justifications for this assumption are presented in Section 1.2.

firm 2. [3] Suppose first that prearranged institutional barriers or conventional corporate governance practice, which will be discussed at length below, keep firm 2 from intervening in the other corporation's decision making process. In this case, as the share held by firm 2 increases, firm 1's incentive for building political connection will be weakened for the following reason. Whenever firm 2 increases its holding of the other firm's equity, it will increase its political expenditure as well, because it can absorb back a larger amount of political benefit through the strengthened financial linkage. And, when firm 2 participates more enthusiastically in government-related activities, firm 1 would be more tempted to free-ride on the other's effort, and consequently will reduce the resources assigned to political activities. By contrast, if firm 2 can bypass the institutional barriers and exercise controlling power over firm 1's business, firm 1 will increase activities that benefit firm 2 and reduce those which harm it. And more importantly, such tendency will become stronger as the share held by firm 2 grows up. In this situation, the company owned largely by the other firm tends to build a stronger connection with the government, than do firms of which equity is diffusely held. In the context of Japanese political economy, this theoretical result can be easily transformed into empirically testable hypotheses. Since 1980's, economists who study Japanese companies have consistently reported that ownership of a corporation is often concentrated to a small number of large shareholders (or block holders), and that such large shareholders are mostly two distinct types of corporations: trade partners and financial institutions. According to previous studies, companies in trade partnership refrain themselves from participating in other firms' governance, and furthermore, protect each other from the risk of hostile takeovers by outsiders. Financial institutions holding both debt and equity, on the other hand, act as outside monitors who discipline the managers, and often actively intervene in the firm's corporate governance. Combining these narratives with the theoretical result of this paper generates the following hypotheses: non-financial firms' shareholding would have a negative impact on the firm's political connection, while financial institutions' would have a positive impact. The second half of the paper is devoted to testing these hypotheses, by analyzing roughly 2,300 corporations publicly traded from 1991

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[3] In the analysis below, I consider a more general case of cross-shareholding, i.e. firm 1 can hold firm 2's equity.

to 2003. Following the previous studies mentioned above, I employ the number of retired elite bureaucrats in a private firm's board of directors, called amakudari, as the measure of political connection of the company. The amakudari practice is not merely idiosyncratic reemployment arranged by individuals. It is systematically (sometimes officially and often not) arranged by ministries and government agencies, and the size of such arrangement is non-trivial by any criteria. In the sample period, nearly 40 percent of the companies have had at least one former bureaucrat as their board member. These ex-bureaucrats are known to provide channels of information and negotiations between the public and the private sector. The empirical strategy is built on the economy-wide financial deregulation, so called the "financial big bang" which was initiated and in progress during the sample period. Fuelled largely by the reform, the ownership structure of most Japanese corporations has undergone rapid change. During the sample period, the share held by financial institutions has dropped from 34 percent to 25 percent, and non-financial firms' share from 33.5 to 29.8 percent. If the change in financial structure is largely exogenous to individual firms' effort for better political connection, as the financial deregulation story suggests, then the empirical correlation between the change in the ownership structure variables and the change in the number of amakudari would reveal how the degree of the political connection is affected by the ownership structure. Regression analysis with fixed-effects shows that the number of amakudari is negatively correlated with the share of equities held by non-financial firms and positively with financial firms' shareholdings. Even if the changes of the ownership structure were largely driven by the exogenous shock, the estimates are likely to be biased, unless a firm's political connection does not affect its ownership structure at all. Thus, I further explore the causal relationship by exploiting the information of firms which have never hired any ex-bureaucrat for the entire sample period. The results of instrumental variable regression also confirm the theoretical predictions. The effects of changes in the ownership structure are not only statistically but also economically significant: a ten percent point increase of non-financial firms' share induces firms to hire about 0.5 less ex-bureaucrat. The same change in financial firms' shareholding encourages the firm to hire 0.7 additional amakudari. This paper offers an intuitive explanation for the puzzling finding documented

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in the previous studies. Some scholars, motivated by the observations from developing countries, have suspected that Japanese business groups, often called keiretsu, and their member firms have better connections with the government. For instance, in a historical review on Japanese business groups, Morck and Nakamura (2005) conjecture that "[s]ince the great keiretsu firms included the most attractive amakudari landing spots and were the most enthusiastic about amakudari, these groups may have enjoyed advantage, in the short term at least, due to their better connections with government." [4] Thus, the negative correlation between group affiliation and the number of amakudari reported by Colignon and Usui (2003) and Raj and Yamada (2009) appeared at first as a puzzle. Whereas Colignon-Usui and Raj-Yamada analyze only the cross-sectional distribution of retired bureaucrats, the present paper explores the deeper mechanism by asking a more articulated question and by adopting more sophisticated empirical strategies. Group affiliated firms might enjoy larger political benefits at lower costs because they can partially internalize political externality through the financial linkages. At the same time, however, this internalization mechanism might encourage the financially interlinked firms to free-ride on others' political effort, which might lead to lower levels of political expenditure by the member firms. The current work also provides a framework to understand the cross-country difference. The theory says that financially interlinked firms tend to assign relatively more resources to political activities if the equity holder (or parent company) exercises significant control over the equity issuer firms (or subsidiaries). Studies of pyramidal groups convincingly show that this is indeed the case. So, even though it may not be directly comparable, the evidence found in this paper is consistent with the empirical patterns observed in developing economies. This work is related to a burgeoning literature on politically connected firms. Analyzing data of manufacturing firms in the U.S., Agrawal and Knoeber (2001) show that politically experienced directors are more prevalent in firms where sales to government, exports and lobbying are greater. Goldman et al. (2008) find positive abnormal stock return fol-

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[4] See also Okimoto (1989) who shows that group affiliated firms and banks were "generously subsidized" after the World War II. Similarly, Beason and Weinstein (1996) find that in the post-war Japanese economy, keiretsu affiliated firms were granted more favorable industrial subsidies in mining business.

lowing the announcement of the nomination of a politically connected individual to the board. For the case of Japan, Miwa and Ramseyer (2005) report that more ex-bureaucrats are found in firms doing business with the government. Studies exploring politically connected companies in developing countries are more abundant. For example, see Fisman (2001) for Indonesia, Classens et al. (2008) for Brazil, and Khwaja and Mian (2005) for the case of Pakistan. By analyzing politically connected firms in 47 countries, Faccio (2006) finds that firm values increase when officers or large shareholders of the firms are entering politics. The remainder of the paper is organized as follows. Section 1.2 analyzes political-network-building incentives of profit-seeking firms under changing financial environments. In Section 1.3, I provide a description of the data, and present the empirical strategy. Empirical findings are in Section 1.4. Finally, I discuss a few limitations of this work and directions for future work in Section 1.5.

1.2 Theory

1.2.1 Model

Consider two firms ($i, j = 1, 2$) which hold each other's equity, and which simultaneously and independently decide how much effort and resources to spend in building political network. The political connection of a firm imposes a certain externality on the other which might be positive or negative.[5] Let $\pi_i(l_i, l_j)$ denote the total revenue of firm i as a function of its own political connection l_i and the other's l_j. For expositional simplicity, assume

$$\pi_i(l_i, l_j) = \pi_i(l_i + \delta l_j)$$

and $\pi_i(\cdot)$ is increasing and strictly concave. Under this simplifying assumption, the sign and the size of the externality are determined by a single parameter δ.

The political externality prevailing between financially interlinked firms is expected to be positive on average (i.e. they share political benefits) for at least two reasons. In a detailed analysis

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[5] For political externalities that arise in various context, see Olson (1963).

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of the ownership structure of large Japanese corporations, Miwa (1996) documents that the largest shareholders are mostly corporations, especially financial institutions and business partners. When two firms are in business partnership, any good news to one firm which does not drastically alter the distribution of bargaining power is good to the other as well. For example, suppose a company assembling components into complete products succeeds in influencing the government to implement a more favorable policy, and consequently decides to increase its production. The growth in the demand by the assembler will benefit the component suppliers as well. The benefit potentially spills over into up and down of the entire supply chain. Of course, political success that improves the firm's general performance will benefit its creditor-shareholders, too.

Information sharing is another good reason to expect positive political externality to prevail among financially connected firms. Arguably, one of the main goals of building political connection is to get information related to the public policies and regulations. Once a firm successfully obtain policy related information, such information can be transmitted to other firms without any direct cost (due to non-rivalry). If the managers of the firm expect losses from information sharing, then they can freely keep the information inside. Therefore, the externality generated by information sharing is highly likely to be positive in its nature. Studies on keiretsu document that the group affiliated firms share information through various channels, which allows them to better utilize political connections. Motivated by this observation, I make a key assumption, namely that a firm's political network building effort generates positive externality to other financially connected firms.[6] To ensure the existence of stable Nash equilibrium, I further assume the size of the externality is sufficiently small, i.e. $0 < \delta \ll 1$.

To introduce the objective of the companies, let us define the value of firm i as

$$V_i(l_i, l_j) = \left[\pi_i \left(l_i + \delta l_j \right) - c_i l_i \right] + q_{ji} \left[\pi_j (l_j + \delta l_i) - c_j l_j \right]$$

where q_{ji} denotes the share of equity of firm j held by firm i, and c_i is the constant marginal cost

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[6] Of course, we cannot preclude the possibility that some financially interlinked firms suffer a conflict of political interests. However, since my focus is on the average behavior, exceptions would not change the main message of the paper. At the end of this subsection, I briefly discuss what theory predicts when negative externality prevails.

of the network building. The terms in the first square bracket is the profit generated within firm i, and the second by firm j. Because firm i holds q_{ji} of firm j's equity, it is entitled to receive the corresponding proportion of the cash generated by firm j.

Maximizing the value V_i would be the objective of firm i if firm j does not participate in i's decision making process.[7] If, however, firm j is active in the corporate governance of firm i, its objective must at least partially reflect shareholder j's interest, and firm j's influence should grow larger as it holds more equity of firm i. In sum, firm i maximizes a weighted average of V_i and V_j:

$$\max_{l_i} V_i(l_i, l_j) + \phi_{ij} q_{ij} V_j(l_j, l_i) \tag{1.1}$$

where q_{ij} is the share of equity of firm i held by firm j. The formula shows that as q_{ij} gets larger, firm j is more able to enforce firm i to make decisions on behalf of firm j. $\phi_{ij} \geq 0$ is a parameter introduced to capture pre-arranged implicit contract, conventions and institutional features that are not explicitly modeled in this simple framework. In particular, if firm j is a *friendly shareholder* (e.g. trading partners) which does not actively participate in firm i's decision making, the managers of firm i will not take much of firm j's interest into account, i.e. they let ϕ_{ij} small . On the other hand, if j is a *controlling shareholder* (e.g. financial firms) that has a substantial influence on firm i's corporate governance, firm i's decisions will reflect largely firm j's interest, which can be parsimoniously captured by a large ϕ_{ij}.[8]

It is noteworthy that when either the externality is negligible ($\delta = 0$) or the firms do not hold the other firms' equity ($q_{12} = q_{21} = 0$), the objective of the firms boils down to maximizing their own profit, $[\pi_i(l_i) - c_i l_i]$. Hence, in the textbook environment where markets are perfectly competitive, and the ownership of firms is dispersed among small individual shareholders, the assumption that firms maximize (1) is identical to the standard assumption such as profit or shareholder wealth maximization.[9]

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[7] In the context of cross-shareholding, the assumption of firm-value maximization is previously employed in Farrell and Shapiro (1990) and Clayton and Jorgensen (2005).

[8] In the next subsection, I discuss at length the corporate governance practice in Japan with an emphasis on the difference between friendly and controlling shareholders.

[9] According to recent empirical studies on corporate ownership structure, such an environment

Because the goal of this section is to derive simple and intuitive predictions, I add restricts on the ownership structure to focus on the empirically relevant situation. For most pairs of firms in reality, share held by another firm is non-negative but far less than one, so assume in what follows that $q_{ji} \ll 1$ for $i, j = 1, 2$. I further assume

$$\phi_{ij} < \left(1 - 2q_{ij}q_{ji}\right)/q_{ij}^2,$$

which ensures that firm i weighs the direct benefit given to its own profit more than the external effect. It is easy to show that under these assumptions, there is unique stable equilibrium of the game of political network building.

The following proposition describes how firm i's equilibrium political expenditure would respond to a change in its ownership structure when firm j is a friendly shareholder, i.e. when ϕ_{ij} is small.

Proposition 1 *For sufficiently small ϕ_{ij}, firm i lowers its political expenditure in response to an increase in the share held by firm j, i.e. $\partial l_i^* / \partial q_{ij} < 0$.*

Proof. Suppose first $\phi_{ij} = 0$ so that firm i maximizes its value V_i. In this case, firm j's share q_{ij} does not appear in firm i's objective function, which means q_{ij} affects the equilibrium political expenditure l_i^* only through an indirect channel, the change in l_j. The first-order condition for program (1) is

$$\pi_i' - c_i + q_{ji}\delta\pi_j' = 0.$$

Differentiating this first-order condition with respect to q_{ji} and rearranging the terms, one can derive the following.

$$\frac{\partial l_i(l_j|q_{ji})}{\partial q_{ji}} = \frac{-\delta\pi_j'}{SOC} \tag{1.2}$$

is rather exceptional. For example, La Porta et al. (1999) found that corporate ownership is concentrated to a small number of shareholders in most countries other than the U.S. and the U.K.

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where $l_i(l_j|q_{ji})$ is the best response function of firm i. And, the slope of the best response function is obtained by differentiating the first-ordier condition with respect to l_j:

$$\frac{\partial l_i(l_j)}{\partial l_j} = -\delta \frac{\pi_i'' + q_{ji}\pi_j''}{\pi_i'' + q_{ji}\delta^2\pi_j''} \tag{1.3}$$

which is negative, i.e. strategic substitute. Combining (2) and (3) yields

$$\frac{\partial l_i^*}{\partial q_{ij}} = \frac{\partial l_i(l_j)}{\partial l_j}\frac{\partial l_j(l_i|q_{ij})}{\partial q_{ij}} = \left[-\delta \frac{\pi_i'' + q_{ji}\pi_j''}{\pi_i'' + q_{ji}\delta^2\pi_j''}\right] \times \left[\frac{-\delta\pi_i'}{SOC}\right]$$

which is negative given the assumptions. Because the objective function is continuous in ϕ_{ij}, for ϕ_{ij} in a small neighborhood of zero, $\partial l_i^*/\partial q_{ij}$ is negative. ∎

The logic behind this proposition is quite straightforward. As q_{ij} increases, firm j's incentive to hire former government officials also increases because a larger part of the political benefit appropriated by firm i can be absorbed back through the strengthened financial connection. Knowing this change in firm j's incentive, firm i has an incentive to reduce its political expenditure and free-ride on firm j's political effort. Consequently, the equilibrium political connection l_i^* becomes lower as firm i gets more financially integrated to firm j.

A few remarks are worth mentioning. First note that this proposition is obtained by restricting our attention to the case where q_{ij} is small. If $\phi_{ij} > 0$ and firm j is the dominant shareholder of firm i, the above proposition would fail to remain relevant. Second, the above proposition does not predict that financially interlinked or group affiliated firms will enjoy smaller political benefits. Even if each member firm builds a weaker connection, they might enjoy greater political benefits than stand-alone firms do, by internalizing the externalities. For instance, suppose the positive externality is mainly originated from information sharing among financially connected companies, so the political benefits stand-alone corporations enjoy are solely from its own expenditure. Assume, for simplicity, $\phi_{ij} = \phi_{ji} = 0$. In this case, a stand-alone firm k's first-order condition is

$$\pi_k'\left(l_k^S\right) - c_k = 0,$$

whereas that of a group affiliated firm is

$$\pi_i'\left(l_i^G + \delta l_j^G\right) - c_i + q_{ji}\delta\pi_j'\left(l_j^G + \delta l_i^G\right) = 0$$

where the last term in the equation is positive. Hence, $\pi_i' \left(l_i^G + \delta l_j^G \right) < \pi_k' \left(l_k^S \right)$ so long as c_k is much smaller than c_i, that is, even if l_i^G may be smaller than l_k^S, the total benefit $\left(l_i^G + \delta l_j^G \right)$ must be greater than l_k^S.

The first proposition highlights the incentives to free-ride on other financially connected firms. Not surprisingly, this incentive is sufficiently mitigated when a shareholder firm actively participates in the corporate governance of the equity issuer firm, i.e. when ϕ_{ij} is large.

Proposition 2 *For sufficiently large ϕ_{ij}, firm i increases its political expenditure in response to an increase in the share held by firm j, i.e. $\partial l_i^* / \partial q_{ij} > 0$.*

Proof. The first-order condition for program (1) is

$$\left(1 + \phi_{ij} q_{ij}^2 \right) \left(\pi_i' - c_i \right) + \left(q_{ji} + \phi_{ij} q_{ij} \right) \delta \pi_j' = 0.$$

As firm i increases its holding of firm j's equity, the best-response $l_i(l_j)$ will move outward, i.e.

$$\frac{\partial l_i(l_j | q_{ji}, q_{ij})}{\partial q_{ji}} = - \frac{\delta \pi_j'}{\left(1 + \phi_{ij} q_{ij}^2 \right) \pi_i'' + \left(q_{ji} + \phi_{ij} q_{ij} \right) \delta^2 \pi_j''} > 0.$$

However, its size shrinks as ϕ_{ij} increases. Therefore, for a sufficiently large ϕ_j, firm i does not increase its political spending much in response to an increase in q_{ji}, which implies that the incentive analyzed in the previous proposition is sufficiently mitigated. On the contrary, the direct effect of a change in ownership structure does not shrink. The direct effect of a change in ownership structure on the best response function of firm i is

$$\frac{\partial l_i(l_j | q_{ji}, q_{ij})}{\partial q_{ij}} = - \frac{2 \phi_{ij} q_{ij} \left(\pi_i' - c_i \right) + \phi_{ij} \delta \pi_j'}{\left(1 + \phi_{ij} q_{ij}^2 \right) \pi_i'' + \left(q_{ji} + \phi_{ij} q_{ij} \right) \delta^2 \pi_j''}$$

$$= - \frac{\phi_{ij} \delta \pi_j' \left[1 - 2 q_{ij} \frac{q_{ji} + \phi_{ij} q_{ij}}{1 + \phi_{ij} q_{ij}^2} \right]}{\left(1 + \phi_{ij} q_{ij}^2 \right) \pi_i'' + \left(q_{ji} + \phi_{ij} q_{ij} \right) \delta^2 \pi_j''}$$

which is positive since $\phi_{ij} < \left(1 - 2 q_{ij} q_{ji} \right) / q_{ij}^2$ by assumption. And, it does not shrink as ϕ_j increases. Therefore, for a sufficiently large ϕ_j, the direct effect dominates and the equilibrium political expenditure increases as the other firm's share increases. ∎

The intuition is the same with the standard logic of internalization via integration: as a firm (or subsidiary) gets financially more integrated to another company (or parent company), the subsidiary's goal will become more aligned with that of the parent firm, and they will behave more cooperatively. This effect is particularly strong when firm j is able and willing to exercise considerable power on the managers of firm i.

The contrast between the two propositions is striking. The free-ride effect highlighted in Proposition 1 has not been widely recognized in the literature probably because most previous studies has focused on pyramidal business groups within which there are a controller and the controlled. Within groups of trade partners which cross-hold each other's stocks, however, the free-ride effect may dominate the cooperation effect which is emphasized in Proposition 2. Given that the two effects push the firm toward the opposite directions, crucial in empirical analysis is to discern the friendly and the controlling shareholders. In the next subsection, I selectively survey the literature on corporate governance of the Japanese firm so as to identify shareholders which tend to exercise controlling power and those which do not.

Lastly, I discuss briefly the case where the positive externality assumption is violated. If negative political externality prevails between financially interlinked firms i and j, intercorporate shareholding would have negative impacts on their political connections regardless of whether the shareholder is controlling or friendly. To see why, suppose firm j is a friendly shareholder. As firm j holds more of firm i's equity, firm j will lower its political expenditure, because a larger negative externality will flow back through the financial linkage. In turn, this change leads to a decrease in firm i's political expenditure, since with negative externality, the political network building game is of strategic complement, i.e. $l_i(l_j)/l_j > 0$. Next, suppose firm j is a controlling shareholder. As the share held by firm j increases, it is more able to force firm i to lower activities that do harm to firm j'. Thus, firm i will become less enthusiastic in political network building.

1.2.2 Prediction

Since at least 1980s', researchers have reported that some of the stylized facts observed in the U.S. financial market are absent in the Japanese counterpart. Allen and Zhao (2007) describe the Japanese system simply as "shareholders are not rulers." Economists have identified a couple of reasons why the influence of individual shareholders is particularly limited in the Japanese corporation. First, the boards of directors which typically are dominated by insiders (senior employees) do not guide and discipline the managers to work for shareholders' best interests. Instead, both directors and managers are expected to make decisions for the sake of broader stakeholders, especially creditors and employees.[10] Another significant difference between the U.S. and Japanese financial markets is that hostile takeovers which are quite common in the U.S. financial market are extremely rare in the Japanese market. The primary reason for this is that cross-shareholdings were put in place by many Japanese corporations to prevent hostile takeovers. It means that market discipline which enables the U.S. shareholders to control large corporations plays only a limited role in the Japanese economy.

Despite all these institutional barriers and implicit contracts, however, one should not jump to the conclusion that every shareholder is powerless. While friendly shareholders (also called as *antei-kabunushi*, meaning stable shareholders), mostly the corporations in business partnership, stay away from others' corporate governance unless there is a risk of hostile takeover, financial institutions holding both debt and equity, on the other hand, act as outside monitors with significant influence, guiding and sometimes replacing the managers (see Aoki and Patrick, 1994). Kaplan and Minton (1994), Kang and Shivdasani (1995) and Yafeh and Yosha (2003) provide evidence of active intervention by financial institutions. Shleifer and Vishny (1997) note that "their power comes in part because of a variety of control rights they receive when firms default or violate debt covenants (Smith and Warner, 1979) and in part because they typically lend short term, so

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[10] For more details, see Aoki (1990) and Miwa (1996) for instance. Berglof and Perotti (1994) assess the issue from more theoretical perspective, but they do not distinguish controlling and friendly shareholders.

borrowers have to come back at regular, short intervals for more funds."[11]

This observation suggests that when a corporation appears as a shareholder, it is likely to be a friendly shareholder if it is a non-financial firm, and a controlling one if a financial company. Combining this additional information with the theoretical results obtained in the previous subsection, the following predictions are immediate.

1. As the share of equity held by non-financial firms increases, a measure of political connection of the firm decreases.

2. As the share of equity held by financial institutions increases, a measure of political connection of the firm increases.

It is noteworthy that these predictions depart from the hypothesis tested in previous empirical studies in a few important ways. Previous studies have mainly explored the cross-sectional variation asking whether group affiliated firms have relatively stronger ties to the government. One of the problems the previous studies suffered is the ambiguity in the definition of business groups, namely it is often controversial whether a given firm is affiliated in a business group or not. And as Miwa and Ramseyer (2002) convincingly show, this ambiguity in group affiliation can make the empirical findings non-robust. More importantly, even if researchers overcome the problem and get a robust test result, it is still unclear why or why not business groups have stronger political connections. By contrast, the hypotheses derived here do not suffer the ambiguity problem in defining group affiliations. Moreover, since they are derived from explicit considerations about the incentives of financially interlinked firms, a test of the hypotheses can provide suggestive answers to the why-questions, too.

To investigate the causal relationship between a firm's ownership structure and its political expenditure, a data set in panel structure and a proper empirical strategy are needed. In the following section, I introduce the data used in the analysis and my empirical strategy.

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[11] A related, fundamental question is why countries have different financial systems. Perotti and von Thadden (2006) and Roe (2003) provide political-economic theories explaining how different corporate governance systems come to exist.

1.3 Data and Empirical Strategy

1.3.1 Data

The source of the data is *Nikkei: Annual Corporation Reports* issued from 1992 to 2004 which contains summary information about every corporation publicly traded from 1991 to 2003. In each year, about 2,500 to 2,900 companies have been listed in the market, but non-negligible fraction of them failed to register the requested information properly. Dropping out the observations with missing variables, the number of corporations analyzed here is about 2,300 per year. The panel structure is naturally unbalanced since every year some firms enter and others exit the financial market. The report provides the list of directors and managers and the name of the former employer of each board member. It also shows a rough picture of ownership structure of each firm. In the report, owners of a firm are categorized into six groups: the government, non-financial firms, financial institutions, securities companies, foreigners, and the rest.[12] Each of the shares held by non-financial firms, financial institutions, and the rest accounts for roughly 30% of all stockholdings (so altogether 90%), and the shares held by the government, securities companies, and foreigners altogether account for 10%.

To explore the government-business relationship, students of Japanese political economy have utilized data of retired high-ranked bureaucrats hired by private firms, called *amakudari* literally meaning "descent from heaven", as a measure of political connection or a proxy for political expenditure of private companies.[13] This measure is expected to serve the purposes well particularly because the role of bureaucrats in Japanese politics is predominant. They "actually initiate and draft virtually all important legislation." (Johnson, 1975) A remark made by Sahashi, former vice-minister of the Ministry of International Trade and Industry (MITI), shows clearly the extent and importance of their role: the Diet (Japanese parliament) is merely an "extension of the bureaucracy."

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[12] Here, the majority of "the rest" are known to be individual investors.

[13] The information on private firms' direct expenditure on political activities is not available to researchers since lobbying activity is not legalized in Japan.

In more general term, amakudari practice refers to the reemployment system of elite bureaucrats. It shares some common features with the "revolving door" practice in the United States, but differs in many ways.[14] Most notable discrepancy is in the supply side. Because the bureaucratic hierarchy is pyramidal, a bureaucrat is pressured to depart the public sector after she becomes a section director, if she does not continue to rise in the administrative hierarchy. By the time that a member of her cohort becomes a vice-minister, all but the most successful must leave the bureaucracy to give the vice-minister absolute seniority. So, the supply of ex-bureaucrats has been sizable and stable. These retired bureaucrats start their second career in national or local politics, in private and public corporations, or in other institutions in need of their consultation. Those who are hired in private firms are known to provide channels of information and negotiations between the public and the private sector. According to Colignon and Usui (2003), "[a]rranged by the ministry, not the individual, it in effect provides private corporations with lobbyists" and "ministries with windows to private corporations."[15]

Following the previous studies, I utilize the number of ex-bureaucrats in a firm's board room as the measure of its political connection. More specifically, exploiting the information of the former employer of board members, I measure the degree of political connection in two ways. First, *narrowly defined amakudari* includes only the apparent ones, the listed board members whose former employer is a ministry or a government agency. The problem of the narrow definition is that it might underestimate true political connection, because some retired bureaucrats go to the private sector in multiple steps: first to a public company, then to a private one. This practice is also quite popular, and is even given a name, *yokosuberi* meaning "sideslip." So, in addition to the directors from ministries and government agencies, ones who were previously hired in public

[14] See for instance Che (1995) for an economic analysis of the "revolving door" practice.
[15] A few systematic investigations on the effect of hiring amakudari, focusing on the financial industry, are available in the literature. Horiuchi and Shimizu (2001) show that those banks accepting amakudari have reduced capital adequacy levels and increased non-performing loans. Similarly, Van Rixtel and Hassink (2002) find that amakudari appointments have a positive impact on future profitability and lending to risky industries.

Table 1.1: Summary Statistics

	Mean	Std. dev	Minimum	Maximum
Narrowly defined amakudari	0.27401	0.74889	0	13
Broadly defined amakudari	0.38239	1.02232	0	13
Share held by non-financial firms	31.6676	18.6569	0	100
Share held by financial institutions	29.8896	15.8656	0	100
Number of directors	17.4372	7.32593	4	77
Number of employees	2365.75	5286.23	6	97474
Sales	223116	896680	10.33	2.13e+07

companies are counted as *broadly defined amakudari*.[16] Table 1.1 shows the summary statistics of the variables that I use in the analysis. The fraction of the firms which have at least one (broadly defined) amakudari is 38.19%. This number is significantly greater than that in the U.S. where less than 10% of the firms have directors with political background.[17] Given that the average number of amakudari is 0.38239 as shown in the table, it means that most firms hire one or zero retired bureaucrats. The share held by other corporations also make a sharp contrast with ownership structure of the typical U.S. firm. At its highest, about 70% of the entire equity was once held by other corporations, while most large firms are diffusely owned in the U.S.

As briefly mentioned in the previous section, the structure and the role of board of directors of Japanese companies differ quite significantly from those of American firms. In Japan, the distinction between board members and executive directors is rather vague, and the vast majority of directors are selected from among employees. An employee is elected to be a director in his or her early fifties, and stays on the board for six to seven years. Unless they resign, these new directors are promoted four years later to a higher position, such as managing director, executive managing director, vice-president or president. This is a reason why the number of directors appears much larger than in the U.S. firm. See Miwa (1996) and Miwa and Ramseyer (2005) for more detailed description.

It is well-known that the number of employees and sales, which are used as control variables in

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[16]   These definitions are originally suggested by Rhyu (2008).
[17]   See Agrawal amd Knoeber (2001).

the regression analysis, follow considerably right-skewed distributions. Because in their original form, they poorly "explain" the dependent variable, in the analysis I take log on these variables to make them follow more bell-shaped distributions.

1.3.2 Empirical strategy

In this subsection, I explain the empirical methods used in the analysis, which exploit the exogenous changes in the ownership structure prompted by the economy-wide financial reform. In the late 1980s and the early 1990s, the Japanese economy experienced a series of significant collapses of asset price bubble, and entered into a long period of economic recession, often referred to as "lost decade." Beginning in the 1990s, the Japanese government introduced short-term stimulation policies and economy-wide structural reform for economic recovery. Substantive deregulation of the financial sector, known as the "financial big bang" program was initiated in 1996, as a major part of this effort. The aim of the deregulation was to transform a highly regulated and bank-oriented financial system into a transparent, market-based one. It eliminated regulations related to banks' payoff ratio, additional stock issuance, and a large part of the controls on foreign exchange transactions. Largely fuelled by this institutional reform, the ownership structure of Japanese corporations has changed substantially during the sample period. Figure 1.1 shows the trends of the shares held by non-financial companies and those held by financial institutions.

This observation suggests that taking the change of the ownership structure variables as "exogenous" to its political connection is a reasonable starting point. In this subsection, let us just focus on a single ownership variable denoted by q_{it} for expositional simplicity. The relationship of our interest is captured by β_1 in the following equation:

$$l_{it} = \alpha_{1i} + \beta_1 q_{it} + W_{it}\gamma_1 + e_t + v_{it} \tag{1.4}$$

where l_{it} is the political expenditure of firm i at period t, α_{1i} is the unobserved individual heterogeneity (firm fixed-effect), W_{it} is vector of exogenous variables, and e_t is time trend shared by all firms. If the change in the ownership structure variable is largely exogenous to the degree of

Figure 1.1: Trends of economy-wide financial firms' shareholding and non-financial firms'

Financial institutions' share ——■—— Non-financial firms' share
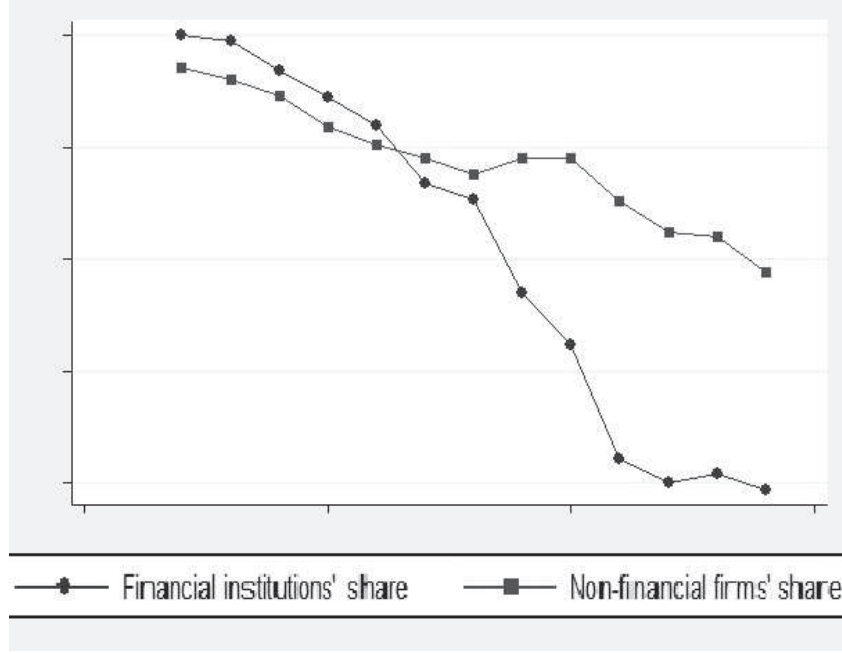
political connection, i.e. $E(v_{it}|\alpha_{1i}, q_{it}, W_{it}, e_t)$ is close to zero, a simple least-square estimation of (4) would be enough to reveal how intercorporate stockholding affects the degree of political connection. Thus, I first regress the number of amakudari on the ownership structure variables and the other controls including firm and time fixed-effects.

Even if the changes of q_{it} are largely driven by the exogenous factor, however, it might not be completely exogenous for the following reason. If political benefits are shared only within financially connected companies, and if the sharing makes the member firms better off, firms without financial connections have incentives to join the club so long as the cost does not exceed the benefit. In other words, a strong political connection might attract investments from other corporations which seek for better and more diverse political connections, which means q_{it} may also be a function of l_{it}:

$$q_{it} = \alpha_{2i} + \beta_2 l_{it} + X_{it}\gamma_2 + d_t + f_{It} + \varepsilon_{it} \tag{1.5}$$

where α_{2i} is firm fixed-effect, X_{it} is vector of exogenous variables, d_t is time trend, and f_{It} is

industry-specific effect of financial reform. I denotes the industry to which firm i belongs.[18] The error terms ε_{it} is assumed to be mean zero and orthogonal to the other variables. If this simultaneity problem is not properly controlled for, the method suggested above may generate significantly biased estimates unless β_2 is close to zero.

Alternative strategy is to estimate (4) with an instrument for q_{it}. If the error term v_{it} is orthogonal to q_{jt} for all $j \neq i$, the industry-year average of q_{jt} can be used as an instrument for q_{it}. Unfortunately, that is not the case. Because financially interlinked corporations strategically decide how much to expend in building political connections, the set of unobserved variables must include l_{jt} where j is a firm that can impose political externality on firm i, i.e.

$$ v_{it} = \sum_{j \in P_i} \delta_j l_{jt} + \eta_{it} $$

where P_i is the set of firms whose political expenditure affects firm i's performance, and η_{it} is the unobservable that is orthogonal to l_{jt} for all j. Thus when β_2 is not zero, for any firm j in P_i, q_{jt} is not orthogonal to v_{it}.

Because P_i is not observable to the researcher, one cannot build an instrument precisely based on P_i. Instead, I propose an instrument based on a similar idea. Notice that the mean of v_{it} can be safely assumed to be zero thanks to α_{1i}. It implies firm j can be included in P_i only if l_{jt} changes at least once. Therefore, any set of firms which hire a constant number of amakudari can be used in constructing an instrument. In the main analysis, I instrument q_{it} with $\overline{q}_{J_it} = \frac{1}{\#J} \sum_{j \in J_i} q_{jt}$ where J_i is the set of firm j such that i) $l_{jt} = 0$ for all t, and ii) firm j and i are in the same industry. Note that the intersection of J_i and P_i is an empty set. Since for $j \in J_i$, q_{jt} is orthogonal to v_{it}, so is its average $\overline{q}_{J_it}$.

Validity of the the instruments relies on the assumption that hiring amakudari is the dominant form of political network building. If hiring ex-bureaucrats is an inferior way to build connections to the government, this instrument would not help to mute the strategic interaction between l_i and l_j, and might not be valid. However, no other significant political channel between the government

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[18] Corporations are categorized into 29 industries by the *Nikkei Reports*, and no firm has moved from one industry to another.

Table 1.2: First Stage Regression on the Instruments

	Non-fin. share	Fin. share
Industry-year average	0.27679	
of non-financial firms' shareholding	(4.87)	
Industry-year average		0.39204
of financial firms' shareholding		(8.20)
All other control variables	Yes	Yes
Time FE	Yes	Yes
Firm FE	Yes	Yes

Note: The industry-year average variables are calculated only with firms that have never hired retired bureaucrats. The numbers in parenthesis are t-statistics based on the standard errors clustered by individual firms.

and private firms has been reported in the literature thus far. An alternative assumption that can support the validity is that total political expenditure of a firm is proportional to the number of amakudari in its board room. This is the case if the total political benefit that the firm enjoys is the multiplication of its spendings in various political channels (e.g. in Cobb-Douglas form).

The instruments should be highly correlated with the instrumented variables, which can be satisfied if f_{It} varies considerably across time and industry. Table 1.2 shows that the industry-year average $\bar{q}_{J_i t}$ is strongly correlated with individual firms' ownership structure q_{it}, even after all the other variables are controlled for.

1.4 Empirical Results

1.4.1 Estimation with fixed-effects

As a preliminary analysis, I first estimate (4) without instrumenting the ownership variables. Table 1.3 shows the regression coefficients and t-statistics (in parenthesis) in various specifications. For panel A, I use the narrow definition of amakudari, and the broad one for panel B. The total number of observations ($N \times T$) is 30,126, and the panel is unbalanced. t-statistics which are calculated using the standard errors clustered by individual firms. Firm and time fixed-effects are included in

Table 1.3: FE Estimates

A. Narrowly defined amakudari				
	(1)	(2)	(3)	(4)
Shareholding of non-financial firms	-0.00254		-0.00234	-0.00331
	(-2.75)		(-2.43)	(-2.96)
Share held by financial institutions		0.00147	0.00063	-0.00025
		(1.49)	(0.62)	(-0.21)
Number of directors				0.01136
				(4.71)
Log of number of employees				-0.05510
				(-1.76)
Log of sales				0.00424
				(0.41)
B. Broadly defined amakudari				
	(1)	(2)	(3)	(4)
Shreholding of non-financial firms	-0.00283		-0.00219	-0.00342
	(-2.53)		(-1.95)	(-2.56)
Share held by financial institutions		0.00278	0.00199	0.00121
		(2.16)	(1.52)	(0.79)
Number of directors				0.01571
				(5.05)
Log of number of employees				-0.11131
				(-2.47)
Log of sales				-0.01989
				(-1.42)

Note: The dependent variable is the number of ex-bureaucrats in the boardroom. The numbers in parenthesis are t-statistics based on the standard errors clustered by individual firms. Firm fixed effect and time fixed effect are included in all regressions.

all regressions.

Even in this simple regression, one can identify some interesting patterns. Notice first that the share held by non-financial firms appears to be negative and statistically very significant. The coefficient for financial institutions' shareholding appear positive in most specifications, but it is statistically different from zero only in the second column of panel B. Not surprisingly, the total number of directors appears to be positively correlated with the number of amakudari. The number of employees, a measure of firm size, shows negative correlation with the level of political effort. No statistically significant pattern is found with regard to the sales of a firm, a measure of the firm's

performance.

A few implications can be derived from the findings. First of all, they clearly show that ownership structure of a firm does matter in determining its political connections, which suggests political behavior of group affiliated firms is indeed different from that of stand-alone companies. But the observed pattern says group affiliated firms would not necessarily build stronger connections to the government. This finding echoes those of Colignon and Usui (2003) and Raj and Yamada (2009) who report negative correlation between the number of amakudari and business group affiliation. However, the results presented here show more than the previously explored cross-sectional distribution of amakudari. Because the cross-sectional correlation between the ownership structure variables and the number of ex-bureaucrats is already captured by individual firm fixed-effect, the remaining effect of the ownership structure variables must come from their changes over time dimension. Also note that they are largely consistent with the theoretical predictions.

A. Narrowly defined amakudari	(1)	(2)	(3)	(4)
Share held by non-financial firms	-0.05138		-0.02799	-0.03028
	(-3.85)		(-2.87)	(-2.88)
Share held by financial institutions		0.02467	0.02255	0.01584
		(3.83)	(3.25)	(1.96)
Number of directors				0.00912
				(4.29)
Log of number of employees				-0.09117
				(-2.15)
Log of sales				-0.03034
				(-1.84)
Fraction of variance due to α_{1i}	0.79721	0.64812	0.75566	0.73631
B. Broadly defined amakudari	(1)	(2)	(3)	(4)
Share held by non-financial firms	-0.1228		-0.04773	-0.04937
	(-5.45)		(-3.40)	(-3.27)
Share held by financial institutions		0.07601	0.07237	0.07035
		(7.83)	(6.64)	(5.47)
Number of directors				0.00669
				(1.93)
Log of number of employees				-0.35242
				(-4.97)
Log of sales				-0.13437
				(-4.47)
Fraction of variance due to α_{1i}	0.86793	0.76473	0.83603	0.81809

Note: The dependent variable is the number of ex-bureaucrats in boardroom. The numbers in parenthesis are t-statistics based on the standard errors generated by bootstrap. Firm and time fixed effects are included in all regressions.

1.4.2 Estimation with the instruments

In this subsection, I present the main result obtained by instrumenting the ownership variables. Table 1.4 reports the estimated coefficients and t-statistics (in parenthesis). The t-statistics are calculated based on standard errors generated by bootstrap method. As before, firm and year fixed-effects are included in all regressions. First notice that the patterns found in table 1.3 are repeated here. The share of equities held by non-financial firms has a negative effect on the firm's political connection, whereas the share held by financial firms has a positive, which confirms the theory. Also note that statistical significance of financial firms' shareholding is dramatically improved in this analysis. Both variables are statistically significant in all specifications.

The effects of changes in ownership structure are economically significant as well. A ten percent point increase of non-financial firms' shareholding decreases the number of narrowly defined amakudari by 0.3, and the number of broadly defined ones by 0.5. The same change in financial firms' shareholding induces firm to hire 0.2 additional narrowly defined amakudari and 0.7 broadly defined one. Both the number of employees and sales are negatively correlated with the number of ex-bureaucrats.

1.4.3 Delayed responses

So far I have implicitly assumed that the adjustment of the board composition is immediate. However, one might legitimately suspect that assumption. If it takes time for firms to adjust their board composition in response to a change in their ownership structure, lagged variables must be introduced and appear statistically significant. Hence, in this subsection I explore how the dependent variable responds to a change in lagged explanatory variables. Table 1.5 shows the estimates of regressions with contemporaneous and one-year lagged variables. As before, firm and year fixed-effects are included in all regression, and the endogenous variables are instrumented. First, panel A shows that an increase in non-financial firms' shareholding at period $t-1$ reduces the number of ex-bureaucrats at period t. The size of coefficients of the lagged variable appears larger than that of the contemporaneous variable in all specifications, and the statistical significance of the

Table 1.5: Delayed Responses

A. Non-financial firms' share

	Narrowly defined amakudari		Broadly defined amakudari	
Contemporaneous	-0.05138	-0.01079	-0.1228	-0.04520
	(-3.85)	(-0.54)	(-5.45)	(-1.42)
Lagged	-0.05567	-0.04601	-0.12990	-0.08962
	(-3.58)	(-2.00)	(-4.75)	(-2.28)

B. Financial firms' share

	Narrowly defined amakudari		Broadly defined amakudari	
Contemporaneous	0.02467	-0.02174	0.07601	-0.01283
	(3.83)	(-1.29)	(7.83)	(-0.50)
Lagged	0.02891	0.04685	0.07882	0.08934
	(4.04)	(2.70)	(7.31)	(3.36)

Note: The dependent variable is the number of amakudari. The numbers in parenthesis are t-statistics based on the standard errors generated by bootstrap. Firm and time fixed effects are included in all regressions.

contemporaneous variable is lost when the lagged variable is included.

Similar pattern is found in panel B. An increase in financial institutions' shareholding at period $t-1$ tends to increase the number of ex-bureaucrats at period t. When the lagged variable is included, the explanatory power of the contemporaneous variable completely disappears. These findings are consistent with the expectation that for the composition of boards to fully be adjusted would take time. It should not be missed that the directions of response of political connection remain consistent with the theoretical predictions.

1.4.4 Subsample analysis

In this subsection, I check the robustness of the main result by focusing on two subsamples. It has been pointed out by many researchers that there are two forces sustaining amakudari practice: push and pull factors.[19] Push factors refer to the incentives for the government to send former bureaucrats to private firms mainly for regulatory purposes. On the other hand, pull factors are the incentives for private firms to recruit retired bureaucrats for the purpose of network building.

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[19] See for example Aoki (1988) and Colignon and Usui (2003).

Table 1.6: Subsample Analysis

A. Highly Regulated Industries Excluded

	Narrowly defined amakudari		Broadly defined amakudari	
Non-financial firms	-0.05665	-0.03121	-0.14196	-0.07167
	(-4.20)	(-3.31)	(-5.70)	(-4.54)
Financial institutions	0.03212	0.02716	0.08645	0.07508
	(4.36)	(3.54)	(7.59)	(5.76)
# of observation	27473		27473	

B. Horizontal Keiretsu (Share held by non-financial firms < 30%)

	Narrowly defined amakudari		Broadly defined amakudari	
Non-financial firms	-0.05138	-0.10544	-0.47524	-0.14467
	(-3.85)	(-2.00)	(-2.90)	(-1.94)
Financial institutions	0.02787	0.02771	0.09007	0.08984
	(3.30)	(2.76)	(6.54)	(5.61)
# of observation	16119		16119	

Note: The dependent variable is the number of amakudari. The numbers in parenthesis are t-statistics based on the standard errors generated by bootstrap. Firm and time fixed effects are included in all regressions.

Since the focus of the analysis has been on the pull factors, the result must become clearer if we exclude from the sample the industries where push factors are presumably very strong: Finance, Air transportation, Communications, and Electronic power and gas industries. These industries are regarded as psuedo-public sectors, and the government thoroughly monitors and regulates them. Consequently, the average number of amakudari in these industries is almost twice as large as the economy average. So in this subsample, the absolute value of the coefficients are likely to appear smaller than before. Panel A of Table 1.6 shows the same pattern observed in the Table 1.3, 1.4 and 1.5.

Next, I try to take into account heterogeneity of business groups. Aoki (1990) argues that there are two types of "business groups", one of which is "financial keiretsu," and the other is "capital keiretsu". Financial keiretsu groups are characterized by loose cross-shareholdings and identified by Presidents' Clubs whose main function is information sharing. On the other hand, capital keiretsu groups are characterized by strong vertical relationships where a dominant parent company holds the majority of stock. Morck and Nakamura (2005) categorize modern business groups into

"horizontal and vertical keiretsu" each of which can be loosely matched to financial and capital keiretsu, respectively. According to Morck and Nakamura, the key feature of vertical keiretsu is that a dominant non-financial firm exercise controlling power over its subsidiaries, which differs from the intercorporate ownership discussed in Section 2. So, once vertical keiretsu groups are excluded from the sample, the main result is expected to be a bit clearer.

Panel B of Table 1.6 shows the results from the sample of firms less than 30% of which stocks are owned by non-financial corporations. As expected, the main result turns out to be robust in this analysis as well. Other than the fact that, as expected the numbers are a bit inflated, the results are very similar to the ones in Table 1.4.

1.5 Conclusion

Analyzing the reemployment system of retired bureaucrats in Japan, this paper shows that share-holding by non-financial firms (friendly shareholders) has a negative impact on profit-motivated firms' political participation, and that by financial institutions (controlling shareholders) a positive impact. It provides a framework to understand the puzzling finding reported by Colignon and Usui (2003) and Raj and Yamada (2009), that business group affiliated corporations have weaker connections to the government. I argue that it can be explained by the fact that when financially inter-linked firms share political benefits with each other, the incentives to free-ride on others' political effort might be significantly high, so the member firms end up with weaker political connections.

By focusing on a simple decision problem faced by a corporation, whether to hire directors with a bureaucratic background, this paper derives a broad implication for corporate governance under high degree of intercorporate stock ownership. For many years, researchers have tried to understand the operation of different financial systems. For the Japanese case, the major role that financial institutions play in corporate governance has long been cited as the key mechanism solving agency problem in the Japanese financial market. The empirical specification employed in this paper is formulated to indirectly test these claims, and my findings support the "main bank" narratives.

There are a few limitations in the analysis, which invite future works on this topic. I analyzed firms' political activities focusing on a specific political channel, namely retired bureaucrats hired by private firms. If there are other less observable political channels, the present analysis might be showing only an imperfect and biased picture of the entire political-economic system. I believe that studies utilize other information and data would add valuable insights to the literature. For example, to see if business group affiliated firms are actually better treated by the government, one may want to check whether implemented policies have indeed been in favor of group affiliated firms by directly analyzing the government expenditure. Further work taking into account heterogeneity of business groups is also called for. If business groups are heterogenous, as argued by Aoki (1990) and Morck and Nakamura (2005), one can expect that their political behavior might also be heterogenous. Such heterogeneity is likely to turn out even greater if a researcher compares business groups in different countries. Granovetter (2005) and Khanna and Yafeh (2007) have suggested frames to categorize various types of business groups.

Lack of welfare implications is another limitation of this study. The theoretical model suggests that the firms cross-holding each other's equity would make more efficient use of each unit of political connection. However, until the welfare impact of the reemployment system is fully understood, it would hardly be possible to properly evaluate the political consequences of intercorporate stock ownership.

CHAPTER 2

ON THE OPTIMAL SOCIAL CONTRACT

2.1 Introduction

It has been well noted in the literature of development and democracy that the structure and quality of governments in poor countries are markedly different from those of rich countries. Evidence shows that on the contrary to the widespread belief, poor democracies do not perform better than non-democracies with comparable income level, and in many dimension do worse. Also, the policy discrepancy between poor and rich democracies often appears greater than that between poor democracies and non-democracies.[1] If these patterns appear puzzling in the currently dominant framework of political economy studies, it might be because the framework has been proposed and developed in already developed countries such as the United States and western European countries, so lack perspectives of less developed societies. Thus, to better understand the relationship between political system and economic development, an alternative conceptual framework may have to be adopted, desirably one that contains the perspective of poor economies.

This paper proposes such a framework, being motivated by the following two facts: (i) now rich countries in Europe and the other parts of the globe were poor countries some 200 or 300 years ago; (ii) scholarly works directly and indirectly reflect the most prominent problems at the time when they were written. Provided that problems that poor countries face are largely assimilar across time and region, this observation suggests that the classics in political theory, which were written 200 or 300 years ago, would help us develop an alternative framework with developing countries' perspective. As a preliminary attempt, this article proposes a modern economic interpretation for one of the classics in political theory, On the Social Contract by Jean-Jacques Rousseau. In particular, adopting Rousseau's key ideas on Sovereign, government and subjects, I characterize

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[1] See for example Keefer (2007).

the *optimal* social contract, and examine its properties using modern contract theory.

Principal-agent framework has been applied to political problems in numerous studies, but in most occasions, the relationship among political bodies has been assumed to be *linear* and *uni-directional*. A typical study in political science considers citizens as the principal and government as the agent. In public finance, on the other hand, government mostly appears as the principal, whereas citizens play the role of agents. In the social contract à la Rousseau, individuals appear twice in completely different positions, once in the position of the ultimate principal (Sovereign) and then in that of the ultimate agent (subjects).

> "What then is government? An intermediate body set up between the subjects and the Sovereign, to secure their mutual correspondence, charged with the execution of the laws and the maintenance of liberty, both civil and political." Jean-Jacque Rousseau, *On the Social Contract*, Book III, Chapter 1.

Thus, the relationship between the citizens and the government looks like a "hierarchy", a chain of principal-agent relationships, but differs from usual hierarchies in that the top and the bottom of the chain are the same people. In this sense, the relationship is *circular* and *bi-directional* in Rousseau's framework. Following his predecessors, most notably Thomas Hobbes, Rousseau considered the problem of self-regulation of people as the fundamental problem of political theory. Because the current main stream political economy has exclusively focused on the one side of the agency problems, namely government accountability, the construction of this circular framework would add valuable insights to the literature of democracy and development.[2]

Explicit consideration of this bi-directional agency problem helps highlight a few important aspects of citizen-government relationship, particularly in relation with economic and political

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[2] This framework can be alternatively motivated by James Madison who said "[i]f men were angels, no government would be necessary. If angels were to govern men, neither external nor internal controls on government would be necessary. In framing a government which is to be administered by men over men, the great difficulty lies in this: you must first enable the government to control the governed; and in the next place oblige it to control itself." Alexander Hamilton, John Jay and James Madison, *The Federalist Papers*, No. 51.

fundamentals. In this article, I show that richer societies tend to require their government to spend more resources in monitoring the executive (i.e. checks-and-balances), that they can provide a disproportionately greater amount of public goods, and that when the members' prospective income level is greater, the polities are more resilient to negative economic shocks. Well-institutionalized political system has similar positive effects on the performance of polities by reducing the cost of disciplining misbehaving politicians. The bottom-line is that as the value generated by the social contract becomes greater, the self-regulation problem (i.e. the agency problem on the citizens' side) becomes less severe. And, the government can be constructed to deliver more desirable outcomes when the society is required to spend less resources in mitigating individual citizens' agency problem. I also show that the imperfect self-regulation can generate a poverty trap in which the citizens refuse to invest into public good project because the marginal utility of private consumption is too high, which in turn results in low public good provision, low productivity and low level of income.

The predictions of the model are largely consistent with the empirical patterns documented in the literature. Keefer (2007) summarizes the findings as "poorer countries make significantly different choices along these policy dimensions than richer countries; theses are not easily explained by regime type. However, ... the policy choices of poor democracies differ little from those of poor non-democracies!" In Section 4, I discuss the possibility that non-democracies might be able to perform better than democracies by punishing misbehavior more severely. La Porta et al. (1999), in similar vein, find that richer countries show higher public sector efficiency, better public good provision, larger government, and higher level of political freedom. Przeworski et al. (2000) provide a comprehensive assessment on the dynamic relationship between political regime and economic development. They do not find any evidence that higher economic wealth causes transition to democracy, but do find that economic prosperity stabilizes the political regime.

A few previous studies have explicitly considered the bi-directional agency problem. In a model in which a self-serving politician provides public goods and citizens can partially evade taxes, Acemoglu (2005) show that both too weak and too strong states might impede economic

development. The underlying logic is very similar to that of hold-up problem that a seller, who are requested to build buyer-specific product, has: if one party has too much (bargaining) power, the counterpart has little incentive to invest in projects which enlarge the total surplus. Whereas he analyzes the relationship between the "power" of government and its performance, I focus on how economic development and free, fair and regular elections affect the performance of government. Acemoglu et al. (2010) studies dynamic Mirrlees taxation under the assumption that political elites have self-serving motivation. They allow the citizens to discipline politicians by the threat of replacement. The agency problem on the citizens' side in their paper is originated from asymmetric information with regard to the type of agents. In my model, the source of the agency problem is imperfect enforceability of the social contract. These studies do not endogenize the structure of government. Acemoglu et al. (2011) is very closely related to the current study in terms of model in the sense that they assume the government's ability to collect taxes depends upon the size of the government (bureaucracy) and that they allow the ruler(s) to decide the size.

To my best knowledge, none of the previous studies has investigated the optimal social contract problem, namely how to optimally assign resources to minimize the overall costs generated by the bi-directional agency problem, the problem that I explore in this work. Another notable feature of this study is rich comparative statics with respect to empirically observable characteristics. The above mentioned studies provide a very clear picture of a specific mechanism (for example how inefficient states can emerge and persist via the corruption between economic elites and bureaucrats), while show little attempts of comparative statics. In contrast, staying at a more abstract level, I draw broad boundaries for feasible, incentive-compatible political associations, and examine how the boundaries respond to changes of economic fundamentals and political institutionalization.

In a very different set up, Lagunoff (2001) consider the self-regulation problem of citizens. In his model, the citizens have heterogenous preference, and democratically, so along the preference of the median voter, establish the law which everybody has to obey. Because the law enforcement is subject to errors, the median voter has an incentive to establish more tolerant legal system even when she has no intrinsic preference for "civil liberty." Unlike the studies mentioned above and

the current study, Lagunoff does not explicitly consider the incentives of the government and the bureaucrats. Lagunoff's work is rather complementary to the other papers in the sense that it provides a plausible reason for citizens to choose tolerance over most severe punishment.

This work is also related to the studies of self-enforcing political regimes. Przeworski (2005) and Fearon (2011) investigate why and when fair and regular elections are preferred by political elites, and how a democratic regime can be sustained as an equilibrium. Key idea is that since the political elites cannot credibly make a commitment to give up their power, a democratic regime can be sustained only when giving up power is more beneficial for themselves.[3] Because the social contract is the contract that provides the basis of law and order, a body politic can be built and persist only when "civil freedom" is preferred over "natural freedom" by its members. In this sense, the social contract must be self-enforcing.

The rest of the paper is organized as follows. In the next section, I lay down the basic set up and the equilibrium concept. Section 3 provides the main analysis of the model. In that, I characterize the optimal social contract, and conduct a few comparative statics so as to examine the structure, quality and stability of the social contract. I formally and informally discuss other related issues in Section 4. Finally, I conclude in Section 5, briefly discussing the usefulness of the framework developed in this paper.

2.2 Model

2.2.1 Environment

Consider a society with a continuum of infinitely lived individuals $i \in [0,1]$, and $t = 1, 2, ... \infty$. In each period, a person is endowed with one or zero unit of stochastic "taxable" income:

$$y_{it} = \begin{cases} 1 & \text{with prob. } y_t \\ 0 & \text{with prob. } 1 - y_t \end{cases}$$

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[3] Similar idea is examined by Acemoglu (2003).

The aggregate level of taxable income is stochastic and independently and identically distributed, i.e. $y_t = \int y_{it} di \overset{iid}{\sim} F(y_t)$. The mean of y_t is μ, and its distribution is common knowledge. Because y_{it} is observable only to person i, y_t is not directly observable. The person with $y_{it} = 1$ decides whether to privately consume it or to submit it for public good production. Denote $x_{it} \in \{0,1\}$ the consumption decision: $x_{it} = 0$ if invest to the public good production, and 1 if consume it privately.

The public good production succeeds with probability p. More precisely, from z unit of the input (collected private good), γz unit of public good is produced with probability p, and zero unit with probability $1 - p$. Once the public good is produced, everybody in the polity equally enjoy its benefit. Assume the "tax revenue" $z_t = y_t - x_t = \int (y_{it} - x_{it}) di$ is observable, but neither y_t nor x_t is. The amount of input for public good production, denoted by $\widehat{z}_t \leq z_t$, is not observable to the citizens, but when the project succeeds, $\gamma \widehat{z}_t$ is publicly observable. In other words, $\widehat{z}_t$ is not observable when the public project is launched, but becomes a public knowledge after the project generates its outcome. In general, $\widehat{z}_t$ is strictly smaller than z_t due to the politician's private appropriation, legitimate or illegitimate. Such an appropriation must be legitimate in equilibrium, and is denoted as $w_t = z_t - \widehat{z}_t$, the wage for the politician.

An individual's instantaneous utility in each period is $u(\underline{x}_{it} + x_{it}) + \gamma \widehat{z}_t$ if the project succeeds, and $u(\underline{x}_{it} + x_{it})$ otherwise, where $\underline{x}_{it}$ is the baseline income (or the wealth of the citizen) and $u(\cdot)$ is increasing and strictly concave. To focus on the bi-directional agency problem, I abstract from heterogeneity of citizens, i.e. $\underline{x}_{it} = \underline{x}_t$ for all i. For a moment, I assume $\underline{x}_t = \underline{x}$, but relax this assumption in later sections.

In most part of the paper, I use the public finance terminology such as taxable income, tax revenue and so on. However, the model can also be understood in more Hobbesian manner. For instance, y_{it} can be interpreted as an opportunity to steal others' belongings. In this interpretation, the choice x_{it} is whether to respect the law and order, and the public good is the secure property rights.

2.2.2 Government

Following Rousseau, I introduce a government as an intermediary agent which helps solve the self-regulation problem more efficiently. Specifically speaking, because individuals cannot monitor each other or punish misbehavior of others, they delegate the tasks to the government. Two roles given to the government in this model is to monitor the individuals and to produce the public good. The head of the executive can divert the collected resources for personal use if she is willing to take the risk of being replaced by the citizens. However, because the true investment $\widehat{z}_t$ is not observable and the success of the project is uncertain, the government's misbehavior is hard to detect, which aggravates the moral hazard problem. So if possible, the citizens would want to force politicians to build a separate agency which monitors the use of the public fund.

I assume the government consists of two agencies: Internal Monitoring Agency (IMA) and External Monitoring Agency (EMA). The role of EMA is, like a IRS in the U.S., to monitor the citizens whether to pay taxes when they have to. Specifically, this government agency can randomly monitor $\phi(n_E)$ fraction of the citizens where n_E is the number of civil servants working in EMA. And, IMA check the works of the executive. Since neither the organization of bureaucracy nor the mechanism of checks-and-balances is the focus of this paper, I simply assume that if more resources are invested in the monitoring activity, misbehavior is more likely to be detected and punished. More precisely, when the politician diverts the public resource, such misbehavior is detected, and the fund is impounded with probability $\psi(n_I)$ where n_I is the number of civil servants working in IMA. It is assumed that even if she gets caught, zero public good is provided in that period, since the opportunity to produce the public good is lost. Both $\phi(\cdot)$ and $\psi(\cdot)$ are increasing and concave. Let $n_P = 1 - n_I - n_E$ be the number of citizens working in the private sector. I assume that the citizens who work in the public sector lose the opportunity to get the additional income (i.e. $y_{it} = 0$ if i works in the public sector), but the baseline income $\underline{x}$ is preserved.

The above description of the government does not need to be understood literally. Because for the citizens working in the public sector, $y_{it} = 0$, the more are hired in the public sector, the less resources the society has for the public good production. It implies that $n_E + n_I$ is a real

cost from the society's perspective, which would have been avoidable if the information were complete. Therefore, the number of government employees can, and probably should, be more broadly interpreted as all the resources spent so as to solve or mitigate the agency problems.

2.2.3 Timing of the events

In each period, the people as subjects (the agents in the principal-agent relationship) decides whether to submit the taxable income when it is given, and as the Sovereign (the principal) whether to replace the politician. The politician in the office maximizes the discounted utility by choosing how much to divert the public fund. Specifically, the events take place in the following order.

1. The politician in the office announces the composition of the government (n_I, n_E).

2. The public sector is filled in. The individuals hired in the public sector must give up the opportunity obtain the taxable income.

3. EMA secretly and randomly chooses citizens who will be investigated.

4. y_{it} is realized and observed only by i. Individual i chooses x_{it} which is observable only to i, unless investigated by EMA.

5. z_t is collected and publicly observed. The politician secretly decide how much to divert the public fund in addition to the given wage.

6. The outcome of the public project is realized.

7. Observing the outcome, the citizens collectively decide whether to replace the head of the executive.

8. IMA and EMA inspect their monitoring objects, and pre-determined sanctions are imposed if any misbehavior is detected.

9. All agents consume what is given to them.

Before proceeding further, a few comments may clarify the setup. First, in any equilibrium where the citizens working in the private sector submit their taxable income for the public good production (i.e. $x_{it} = 0$ for all i and t), the individuals are indifferent between working in the private and in the public sector. Thus, conditional on that the public investment takes place, the number of the government employees and the composition of it are completely determined by the head of the executive. Second, the assumption that EMA inspects randomly chosen citizens is innocuous because the citizens are ex-ante homogenous. EMA can use a different inspection strategy by making an artificial distinction among the citizens. Analyzing equilibria based on such a strategy is beyond the scope of this paper.[4] Third, note that since the number of the citizens is infinite, there exists the coordination problem in deciding whether to replace the politician. However, the citizens who share the common goal of disciplining the politicians can easily sidestep the problem by conditioning their action on the observable outcome. So in what follows, I focus on the equilibria where the citizens jointly make a decision whether to replace the office holder. Lastly, the role of IMA is to investigate the person who was in charge after the project fails in order to reduce the incentive to divert the public fund.

2.2.4 Equilibrium

Citizen i as an ultimate agent maximizes her discounted utility

$$\max_{x_{it}} \sum_{t=1}^{\infty} E_t \beta^{t-1} \left[u(\underline{x} + x_{it}) + Z_t - R_t - s_{it} \right]$$

subject to

$$x_{it} \leq y_{it} \text{ for all } t$$

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[4]   Also, one may raise a question on the way EMA is working. Instead of randomly monitoring every citizen, it can focus on the ones who do not pay taxes. One justification could be that the government agency might not able to adopt this apparently more efficient strategy due to administrative lags, i.e. EMA does not know who did not pay taxes when they monitor.

If we relax the assumption that EMA randomly samples over every citizen, we will observe more efficient workings of the government. But the main comparative results of the paper would still hold.

where s_{it} is the sanction imposed on the citizen, and

$$Z_t = \begin{cases} \gamma \widehat{z}_t & \text{if the project succeeds} \\ 0 & \text{otherwise} \end{cases}$$

$$R_t = \begin{cases} R & \text{if replace the politician} \\ 0 & \text{if keep the politician} \end{cases}.$$

The replacement cost R is zero if the polity is well institutionalized (i.e. free, fair and regular elections are held), and $\lambda > 0$ if poorly institutionalized (e.g. the cost of revolution). Throughout the paper, I maintain the assumption that the fundamental political institution (free, fair and regular election), therefore R, is exogenously given. For the analysis, it is very useful to rescale the utility for the citizens as follows.

$$\max \sum_{t=1}^{\infty} E_t \beta^{t-1} \left[x_{it} + \frac{Z_t - R_t - s_{it}}{u(\underline{x}+1) - u(\underline{x})} \right]. \tag{2.1}$$

And define

$$\widehat{\gamma} = \frac{\gamma}{u(\underline{x}+1) - u(\underline{x})}$$
$$\widehat{R} = \frac{R}{u(\underline{x}+1) - u(\underline{x})}$$

Note that $\widehat{\gamma}$ is the "marginal rate of substitution" between the private and the public goods, and is increasing as the baseline income $\underline{x}$ grows larger. Similarly, the "effective" cost of revolution $\lambda / [u(\underline{x}+1) - u(\underline{x})]$ becomes larger as $\underline{x}$ increases.[5]

Before discussing the punishment schemes, let us consider anarchy, as a benchmark, where nobody invests to the public good production nor works in the public sector. In anarchy equilibrium, $Z_t - R_t - s_{it} = 0$ for all i and t. From (1), the value of anarchy can be easily calculated as

$$V_A = \frac{\mu}{1-\beta}.$$

Throughout the paper, I make an assumption that the government cannot make any citizens' utility lower than V_A. The basic idea is that for a social contract to be *legitimate*, the participation of its

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[5] Przeworski (2005) formally argues that the higher cost of social conflicts in richer society can be a source of the observed relationship between the economic development and democracy.

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members must be based on their free-will, and they must be able to freely opt out. If that is the case, the citizens cannot be worse off than the utility that they get in the anarchy. This assumption might appear restrictive and unrealistic at first glance, particularly because in reality, no polity grants opt-out option to its members. But in fact, it does not impose much restriction. So long as the disutility from the sanction is finite (and independent of key parameters such as $\underline{x}$, γ, λ and etc.), all the qualitative results of this paper does not change.[6] Section 4 provides a brief discussion of the situation in which the legitimacy constraint is violated, i.e. the government is allowed to make the citizens' utility lower than that in anarchy. I also assume that it is costless for the government to punish individual citizens.

On the other hand, the politician maximizes

$$\max_{T_t} \sum_{t=1}^{\infty} E_t \beta^{t-1} O_t \left[w(z_t) + (1 - \psi) T_t \right] \tag{2.2}$$

where $w(z_t) = z_t - \widehat{z}(z_t)$ is the wage for the politician as a function of the tax revenue z_t, $T_t \leq z_t - w(z_t)$ is the misuse of the public fund (T for theft), and

$$O_t = \begin{cases} 1 & \text{if being in the office at } t \\ 0 & \text{otherwise} \end{cases}$$

As in most other repeated games, multiple social contracts can be sustained as subgame perfect equilibrium. Especially, for any parameter values, there always exists the anarchy equilibrium which is the unique equilibrium of the static game. This implies that (i) inefficient political system can persist over a long period of time and (ii) the structure and quality of governments are not completely shaped by the underlying economic environment. The latter has been a significant obstacle when exploring the relationship between economic environment and political system.

In the following sections, I consider Markov Perfect Equilibrium in which the strategies are mappings from the current state variables to actions. In particular, I focus on the optimal social

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[6]   One may ask why the government cannot make the misbehaving citizens infinitely miserable. Kantian principle or the arguments relying on human rights can be provided as an answer. More practically, human imperfection can also be a reason for such restriction. That is, when law enforcements are subject to errors, citizens collectively decide to tolerate such misbehavior. See Lagunoff (2001) for a discussion of related issues.

contract which can be interpreted in two ways. First, it is an upper bound for efficient public good provision. Thus, the analysis provides a suggestive answer to the question why some countries showing poor performance could not do better. Second, it can be understood as the "social demand" for a certain form of government. Just as Marshallian demand for a private good is derived from consumers' maximization problem, the "social demand" for a better political system would be derived as the solution of the social contract problem. This latter interpretation provides a perspective for understanding the empirical relationship between economic development and political system. Thus, in what follows I interpret the optimal social contract mainly as the social demand, but with caution.

The optimal social contract is the strategies of the citizens and the politician(s) such that

- Given the state variables $(y_{it}, n_I, n_E, z_t, Z_t)$, the citizens maximize (1), and decide to replace the politician if

  (i) the government composition (n_I, n_E) does not maximize the citizens' utility

  (ii) the politician fails to produce the expected amount of the public good, i.e. $Z_t < \hat{\gamma}\hat{z}(z_t)$.

- Given the state variables (O_t, z_t), the politician chooses T_t to maximize (2).

- The individuals working in the private sector find it optimal to obey the law ($x_{it} = 0$). The government jobs are filled in as planned.

- The government maximally punish the citizens who are detected as keeping taxable income for personal consumption, subject to the legitimacy constraint.

To focus on "working" social contracts, I restrict our attention to a limited range of parameter values. Specifically, assume βp is large enough for the politician(s) not to find that $n_I = 0$ serves her best interest. Also assume $\hat{\gamma} p > 1$ so that the public good project is worthwhile to invest into.

2.3 Analysis

In this section, I first characterize the optimal social contract, and then conduct comparative statics with respect to the wealth level $\underline{x}$ and the political institution R. Let us first consider the problem of a citizen as an agent. When keeping the contract, the expected value of the social contract is:

$$V_C = \sum_{t=1}^{\infty} E_t \beta^{t-1} \left[\frac{Z_t - R_t}{u(\underline{x}+1) - u(\underline{x})} \right] = \frac{\widehat{\gamma} p E\left[\widehat{z}(z_t)\right] - (1-p)\widehat{R}}{1 - \beta} \tag{2.3}$$

For the social contract to be sustained as an equilibrium, the individuals must find it optimal to obey the rule. So, the incentive compatibility constraint for individual i with $y_{it} = 1$ is

$$\widehat{\gamma} p E\left[\widehat{z}(z_t) | y_{it} = 1\right] - (1-p)\widehat{R} + \beta V_C$$

$$\geq \quad 1 + \widehat{\gamma} p E\left[\widehat{z}(z_t) | y_{it} = 1\right] - (1-p)\widehat{R} + \beta\left[\phi V_A + (1-\phi)V_C\right]$$

where $\widehat{\gamma} p E\left[\widehat{z}(z_t) | y_{it} = 1\right]$ is the expectation for the public good provision conditional on that the citizen is given the taxable income. This is in general different from $\widehat{\gamma} p E\left[\widehat{z}(z_t)\right]$ because $E\left[y_t | y_{it} = 1\right]$ is greater than the unconditional expectation $E\left[y_t\right] = \mu$. The LHS of the inequality is the expected utility for the citizen when she pays the tax (i.e. $x_{it} = 0$), while the RHS is when she, instead, uses the endowment for personal pleasure (i.e. $x_{it} = 1$). The public benefit and cost $\widehat{\gamma} p E\left[\widehat{z}(z_t) | y_{it} = 1\right] - (1-p)\widehat{R}$ are given to the citizen regardless of what she does. If she evades the tax, she immediately enjoys the benefit (1 on the RHS), and such misbehavior is detected with probability ϕ, in which case the continuation value drops to V_A, because the government would maximally punish the citizen. The IC constraint can be simplified into

$$\frac{1}{\beta \phi(n_E)} \leq V_C - V_A. \tag{2.4}$$

For the politician, the value of being in the office is

$$V_O = E\left[w(z_t)\right] + \beta p V_O = \frac{E\left[w(z_t)\right]}{1 - \beta p}$$

where $w(z) = z - \widehat{z}(z)$ is the wage schedule for the politician. Utilizing this notation, the incentive compatibility constraint for the politician can be written as

$$w(z_t) + \beta p V_O \geq w(z_t) + (1 - \psi)\widehat{z}(z_t).$$

The RHS is the expected value when the politician appropriates the entire public fund for private use, the value with "maximal theft." Given z_t publicly observed, accordingly, the politician is supposed to invest $\widehat{z}(z_t)$ to the public project, otherwise she would be removed from the office at the end of the period. Put it differently, even if she diverts the public fund just a little bit, she is surely replaced by the citizens. Thus, it is optimal for her to divert the entire fund (i.e. $T_t = \widehat{z}(z_t)$), once she decides to use the fund for private benefit. However, the politician can enjoy the fruits of the "theft" only when IMA fails to detect it, thus with probability $(1 - \psi)$. The IC constraint for the politician can be simplified into

$$\widehat{z}(z_t) \leq \min \left\{ z_t, \frac{\beta p V_O}{1 - \psi(n_I)} \right\} = \min \left\{ z_t, \frac{\beta p E\left[z_t - \widehat{z}(z_t)\right]}{\left[1 - \psi(n_I)\right](1 - \beta p)} \right\} \tag{2.5}$$

There are many social contracts that satisfy the two incentive compatibility constraints. Here, I only consider the optimal social contract which maximizes the expected utility for the participants of the contract. This contract must be "self-enforcing": the participants must find it optimal to keep the contract. Thus, the optimal social contract solves

$$\max_{n_I, n_E, \widehat{z}} V_C$$

subject to the IC constraints (4) and (5).

To find the solution of the program, first note that constraint (4) must be binding. Otherwise, one can slightly reduce n_E, keeping (4) held, and increase the number of citizens working in the private sector. This modification increases the tax revenue, and also the expected amount of public good provided. Similarly, (5) must be binding, too, otherwise by decreasing w, one can increase the public good provision $\widehat{z}$ at least for some z_t.

From (3), it is apparent that maximizing V_C is equivalent with maximizing $E\left[\widehat{z}(z_t)\right]$. From (3) and (4), one can derive the following formula:

$$E\left[\widehat{z}(z_t)\right] = \frac{1}{\widehat{\gamma}p} \left(\frac{1 - \beta}{\beta\phi} + (1 - p)\widehat{R} + \mu \right) \tag{2.6}$$

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Using (5), (6) and the fact that in equilibrium $z_t = n_P y_t$, one can rewrite $E\left[\widehat{z}(z_t)\right]$ as

$$
\begin{aligned}
E\left[\widehat{z}(z_t)\right] &= E\left[\min\{n_P y_t, \Gamma\}\right] \\
&= \int_0^{\Gamma/n_P} n_P y_t \, dF(y_t) + \left[1 - F\left(\frac{\Gamma}{n_P}\right)\right]\Gamma
\end{aligned}
\tag{2.7}
$$

where

$$
\Gamma = \frac{\beta p \left[n_P \mu - \frac{1}{\widehat{\gamma} p}\left(\frac{1-\beta}{\beta \phi} + (1-p)\widehat{R} + \mu\right)\right]}{(1-\psi)(1-\beta p)}
$$

Note that (7) is strictly increasing in Γ, i.e. V_C is a monotone transformation of Γ. Therefore, an alternative representation of the optimization problem is:

$$
\max_{n_E, n_I} \Gamma
$$

subject to

$$
\frac{1}{\widehat{\gamma} p}\left(\frac{1-\beta}{\beta \phi} + (1-p)\widehat{R} + \mu\right) = \int_0^{\Gamma/n_P} n_P y_t \, dF(y_t) + \left[1 - F\left(\frac{\Gamma}{n_P}\right)\right]\Gamma.
$$

The equality constraint is obtained by combining (6), the IC for the citizens and (7), the IC for the politician. Under the assumption that the program has a proper interior solution, the following proposition characterizes the optimal social contract.

Proposition 3 *Suppose there exists an interior solution for the social contract problem. Then, the composition of the government (n_E, n_I) is characterized by*

$$
\frac{1-\psi}{\psi'}\mu = n_P \mu - \frac{1}{\widehat{\gamma} p}\left[\frac{1-\beta}{\beta \phi} + (1-p)\widehat{R} + \mu\right]
\tag{2.8}
$$

$$
\frac{1}{\widehat{\gamma} p}\left[\frac{1-\beta}{\beta \phi} + (1-p)\widehat{R} + \mu\right] = \int_0^{\Upsilon/n_P} n_P y_t \, dF + \left[1 - F\left(\frac{\Upsilon}{n_P}\right)\right]\Upsilon
\tag{2.9}
$$

where $\Upsilon = \frac{\beta p}{1-\beta p}\frac{\mu}{\psi'}$. And, the optimal compensation scheme for the politician is

$$
\widehat{z}(z_t) = \min\left\{z_t, \frac{\beta p \left[n_P \mu - \frac{1}{\widehat{\gamma} p}\left(\frac{1-\beta}{\beta \phi(n_E)} + (1-p)\widehat{R} + \mu\right)\right]}{[1 - \psi(n_I)](1-\beta p)}\right\}
$$

In the following subsection, I investigate how the structure of the government responds to changes in the society's wealth and the degree of political institutionalization. Modifying the basic model slightly, in the next subsection I analyze the quality and the stability of the social contract.

2.3.1 Structure of the government

To understand the results more intuitively, let us introduce a measure of checks-and-balances.

$$CB = n_I/n_E$$

Greater n_I/n_E ratio means the polity spends greater amount of resources in disciplining the person(s) in power than in monitoring the citizens. When CB is low, too much resources have to be given to the political elites in the form of "wages", otherwise they would divert the entire public fund. Thus, a government with higher CB can be thought of as a better device for self-government. High CB could also be counted as a desirable feature for political systems in that the government is more accountable, and more civil rights and liberty are given to its members.[7]

The following two propositions state how the structure of the government responds to changes in the society's wealth and political institutionalization. The basic message is that the optimal social contract yields more "democratic" government structure when the total value generated by the contract is larger. The total value of the social contract is larger when the society's baseline income is greater, and when the cost of replacing the incompetent politician is smaller.

Proposition 4 *For a polity with well-institutionalized system (i.e. $R = 0$) the social demand for higher CB becomes stronger as the society's wealth increases.*

Proof. Assuming $R = 0$, differentiating (8) and (9) with respect to $\widehat{\gamma}$ gives

$$-\frac{(1-\psi)\psi''\mu}{(\psi')^2}\frac{\partial n_I}{\partial \widehat{\gamma}} + \left(\mu - \frac{1-\beta}{\widehat{\gamma}p\beta}\frac{\phi'}{\phi^2}\right)\frac{\partial n_E}{\partial \widehat{\gamma}} = \frac{1}{\widehat{\gamma}^2 p}\left(\frac{1-\beta}{\beta\phi} + \mu\right)$$

$$-\frac{(1-F)\psi''}{(\psi')^2}\frac{\beta p\mu}{1-\beta p}\frac{\partial n_I}{\partial \widehat{\gamma}} + \frac{1-\beta}{\widehat{\gamma}p\beta}\frac{\phi'}{\phi^2}\frac{\partial n_E}{\partial \widehat{\gamma}} = -\frac{1}{\widehat{\gamma}^2 p}\left(\frac{1-\beta}{\beta\phi} + \mu\right)$$

Note first that the coefficients of $\partial n_I/\partial \widehat{\gamma}$ in the both equations are positive, and the RHS of the first equation is positive while that of the second one is negative. Adding up these two equations,

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[7] Although it is not incorporated in this model, one can think of the possibility that higher n_E results in more suppressive states, as frequently observed in authoritarian political systems. I discuss this issue in the next section.

we have

$$-\frac{\psi''\mu}{(\psi')^2}\left[1-\psi+\frac{(1-F)\beta p}{1-\beta p}\right]\frac{\partial n_I}{\partial\widehat{\gamma}}+\mu\frac{\partial n_E}{\partial\widehat{\gamma}}=0,$$

which shows that n_I and n_E move to the opposite directions in response to a change of $\widehat{\gamma}$. In the rest of the proof, I show that $\partial n_I/\partial\widehat{\gamma}>0$ and $\partial n_E/\partial\widehat{\gamma}<0$. First, notice that the coefficient of $\partial n_E/\partial\widehat{\gamma}$ in the first equation is

$$\mu-\frac{1-\beta}{\widehat{\gamma}p\beta}\frac{\phi'}{\phi^2}=-\frac{\beta p}{(1-\psi)(1-\beta p)}\frac{\partial\Gamma}{\partial n_E}$$

If $\partial\Gamma/\partial n_E$ is negative, that means too much resources are spent in monitoring the citizens. So in the social optimum, $\partial\Gamma/\partial n_E$ must be positive. That means the coefficient of $\partial n_E/\partial\widehat{\gamma}$ must be negative. If $\partial n_I/\partial\widehat{\gamma}<0$ and $\partial n_E/\partial\widehat{\gamma}>0$, the LHS of the first equation cannot be positive. Thus, $\partial n_I/\partial\widehat{\gamma}>0$ and $\partial n_E/\partial\widehat{\gamma}<0$, which in turn implies $\partial(n_I/n_E)/\partial\widehat{\gamma}>0$. Because $\widehat{\gamma}=\gamma/[u(\underline{x}+1)-u(\underline{x})]$ increases as $\underline{x}$ increases, $\partial(n_I/n_E)/\partial\underline{x}>0$, which completes the proof. ∎

In the optimal social contract, the resources spent in monitoring the citizens n_E decreases as the wealth $\underline{x}$ increases for the following reason. As the level of baseline income is enhanced, the marginal utility of private consumption becomes smaller, which means the agency problem on the individuals' side becomes less significant, thus less amount of resources are required to incentivize the citizens. By reducing the resources spent in the private sector monitoring, the utility given to the citizens can be improved either by generating more taxable endowment (i.e. increasing n_P) or by monitoring the politician more tightly (i.e. increasing n_I). At the optimum, it turns out that the citizens want to discipline the politician and to reduce the share given to her by enhancing the probability of detecting potential misuse of the public fund.

Note, however, that this proposition does not mean that poor countries prefer a government structure with lower *CB*. Let us for a moment take ψ as an exogenously given parameter while keeping n_E as endogenous. It is easy to show that the optimal level of n_E decreases as ψ increases. In other words, as the government becomes more accountable, the agency problem on the citizens' side is also mitigated. As mentioned at the beginning of this section, V_C is a monotone

transformation of $E\left[\widehat{z}(z_t)\right]$ whereas

$$E\left[\widehat{z}(z_t)\right] = \frac{1}{\widehat{\gamma} p}\left[\frac{1-\beta}{\beta \phi(n_E)} + (1-p)\widehat{R} + \mu\right].$$

This clearly shows that lower n_E indicates greater utility for the citizens. So, one can claim that in general, the citizens prefer more accountable government regardless of the level of their wealth. What the proposition really means is that richer societies are willing to spend greater amount of time, resources and efforts in monitoring and disciplining the political elites.

Whereas the above proposition describes the relationship between the economic fundamental and the structure of government, the following shows how the fundamental institution of democracy (free, fair and regular elections) shapes other derivative political institutions.

Proposition 5 *Institutionalization of free, fair and regular elections promotes to build a government with higher CB.*

Proof. This proposition can be proved by conducting comparative statics with respect to R. The proof is almost identical with the above proof, thus omitted. ∎

As the cost of replacing the politician goes down, the expected utility from keeping the contract becomes larger. It means IC constraint for the citizens is loosened, so the cost of monitoring the private sector n_E can be reduced. The citizens can and will reassign the resources saved in EMA into IMA, i.e. n_I goes up. Since the social welfare can be improved by reducing n_E and increasing n_I, the citizens are likely to demand more accountably structured government.

The discussion thus far clearly shows that the agency problems on the two sides aggravate each other. When a country is economically less developed, the citizens are more seriously tempted to violate the law and order, if by sacrificing the public good they can become privately a little bit better off. To incentivize the citizens, more resources should be spent in keeping the law and order, and consequently relatively less resources are spent in disciplining the political elites. This implies the government provides public goods in a less efficient manner, and less efficient government reduces the citizens' willingness to keep the law and order. In this way, the agency problems

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becomes disproportionately more severe in less developed countries, and thus their governments are likely to perform poorly.

2.3.2 State capacity and stability

So far I have assumed that the amount of taxable endowment y_{it} is given as 1 or nil. The basic model can be easily generalized into the case where y_{it} is h with probability y_t/h, and 0 with the complementary probability. As before, define the marginal rate of substitution as

$$\widetilde{\gamma} = \frac{\gamma h}{u(\underline{x}+h) - u(\underline{x})}$$

and the effective cost of replacement as

$$\widetilde{R} = \frac{Rh}{u(\underline{x}+h) - u(\underline{x})}.$$

Then, the optimal social contract is chracterized by (8) and (9) with a few modifications: $\widehat{\gamma}$ and $\widehat{R}$ are substituted by $\widetilde{\gamma}$ and $\widetilde{R}$, respectively, and μ is scaled up (or down) into $h\mu$. It is apparent from these definitions and the proofs of the propositions that Proposition 2 and 3 stay true insofar as the optimal social contract problem has the interior solution.

To investigate the relationship between the size of government spending and the economic development, suppose that at period $t = 0$, the citizens jointly decide whether to construct a polity which produces h unit of taxable endowment per period at the initial setup cost of $H(h)$ where H is an increasing function. The individuals construct the polity if and only if

$$V_C - H > V_A.$$

If the initial construction cost H is high, then the polity cannot exist unless the value generated by the social constract $(V_C - V_A)$ is large enough. Recall that according to the above propositions, when the society is economically developed, and the fundamental political institution is well established, the value of the social contract $(V_C - V_A)$ is large. In such a case, it can successfully provide a greater amount of public goods, i.e. it can sustain higher h. For simplicity, let us assume for a moment that the society has a well institutionalized political system, i.e. $R = 0$.

Proposition 6 *If a society with wealth level $\underline{x}^1$ is able to sustain a certain level of government spending h, so is a society with greater wealth $\underline{x}^2 (> \underline{x}^1)$.*

Proof. By envelope theorem, the expected value generated by the social contract

$$V_C = \frac{\widetilde{\gamma} p E\left[\widetilde{z}(z_t)\right]}{1 - \beta}$$

is increasing in $\widetilde{\gamma}$. The proposition is immediate from the observation that the marginal rate of substitution $\widetilde{\gamma}$ is increasing in $\underline{x}$. ∎

This proposition is closely related to an empirical regularity often referred to as Wagner's law. The law says the development of an industrial economy will be accompanied by an increased share of public expenditure in gross national product. A potential source of the observed pattern is the agency costs of the citizens and the political elites. As an economy grows, the both agency costs decreases as shown in Proposition 2, which in turn allows the economy to sustain a disproportionately large public sector.

The same logic sheds light on the stability of political regimes, too. Now, let us assume the baseline income $\underline{x}_t$ is subject to a negative shock. Specifically, suppose $\underline{x}_t$ drops by Δ at period s, is recovered to $\underline{x}$ at the next period and on, i.e. $\underline{x}_s = \underline{x} - \Delta$, and $\underline{x}_{s+1} = \underline{x}_{s+2} = ... = \underline{x}$. The polity is dismantled if the citizens refuse to comply with the rule when the shock hits the economy. When the private consumption falls down to $\underline{x} - \Delta$, the citizens would be more likely to keep the social contract when the continuation value of the social contract is greater.

Proposition 7 *The polity becomes more stable as the prospective wealth level $\underline{x}$ is greater, or as the political system gets more institutionalized.*

Proof. The IC constraint for the citizens with $y_{is} = 1$ is

$$
\begin{aligned}
&\widetilde{\gamma} p E\left[\widetilde{z}(z_s)|y_{is} = 1\right] - (1-p)\widetilde{R} + \beta V_C \\
\geq\; &\frac{u(\underline{x} - \Delta + h) - u(\underline{x} - \Delta)}{u(\underline{x} + h) - u(\underline{x})} + \widetilde{\gamma} p E\left[\widetilde{z}(z_s)|y_{is} = 1\right] - (1-p)\widetilde{R} + \beta\left[\phi V_A + (1 - \phi)V_C\right]
\end{aligned}
$$

which can be simplified into

$$\frac{1}{\beta\phi}\frac{u(\underline{x}-\Delta+h)-u(\underline{x}-\Delta)}{u(\underline{x}+h)-u(\underline{x})} \leq V_C - V_A.$$

As shown in the proof of Proposition 4, V_C becomes larger as $\underline{x}$ increases whereas by the assumption, where as the LHS of the inequality (weakly) decreases because $u(\cdot)$ is concave. It means the IC constraint is easier to be satisfied when the society's wealth is greater. ∎

Przeworski (2005) and others have argued that economic development enhances the stability of political regimes. The previously suggested argument focuses on the incentive of political losers to conform the democratic rules. Because revolution destroys economic assets and institutions, it becomes more costly as the society is more economically developed. The above proposition provides a different perspective for the same phenomenon. In this model, a polity becomes more resilient as the economic wealth in the future is expected to be larger, because the citizens' incentive to behave more selfishly in hard times is weakened.

The results derived so far are summarized as the following. When the expected value generated by the optimal social contract is larger, (i) the government tends to be more accountable, (ii) the society can provide a greater amount of public goods, and (iii) the polity becomes more resilient to negative economic shocks. And, the value of the social contract is larger when the society's baseline income is greater, and when the cost of replacing the misbehaving politician is smaller. Although the basic model highlights some of the important underlying mechanisms, there still exist notable gaps between the basic model and the reality. In the next section, I try to narrow the gap by addressing a few issues including endogenous change of the wealth and direct monitoring by the citizens.

2.4 Other Issues

2.4.1 Illegitimate government

The analysis thus far shows that the legitimacy constraint, namely the government cannot punish more harshly than the Nature does in anarchy, increases the burden of self-government by increas-

ing the agency costs. From this, it is rather apparent that if the government is allowed to punish its citizens more severely, the overall efficiency can be improved. Does this mean that governments that watch over citizens and suppress their liberty would perform better? If the government works are not subject to errors, it seems that it would perform better at least in theory. However, it is not necessarily the case if the government does not try to maximize the citizens' welfare. If the government maximizes a certain objective function other than V_C, for example the benefit of political elites, it is very probable that the citizens are worse off. Even though it is likely that the government equips itself with some self-regulating device, i.e. $n_I > 0$, the level of it would be less than the socially optimal level.[8] The severe agency problem on the government side would exacerbate that on the citizens side, and in order to incentivize the citizens, the society should invest a great amount of resources in monitoring the citizens (i.e. high n_E).

In reality, more often than not, oppressive governments tend to serve the interests of political and economic elites over those of the public. Such government are imposed upon rather than constructed by the public. This observation may suggest that if a polity is constructed by the public, they would not want to have oppressive state apparatus. If so, the legitimacy constraint adopted in this paper would be not only of theoretical interest, but also empirically relevant in working democracies.

Extending model, one can think of the possibility that higher n_E results in more suppressive states, as frequently observed in authoritarian political systems. In such a situation, the results of this paper would be strengthened because the government with more suppressive state apparatus would be able to increase the cost of revolution, λ. As shown above, when the cost of replacing politicians becomes larger, the total value generated by the social contract becomes smaller, which in turn exacerbate the agency problem of the citizens.

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[8] McGuire and Olson (1996) convincingly argues that even if rulers have only self-serving incentives, it is better for them to abstain from fully extracting surplus, otherwise the ruled will refute to produce surplus at all.

2.4.2 Poverty trap

For clear exposition, I have assumed that the wealth level is exogenously given. However, there is ample evidence that economic prosperity heavily relies on the efficiency of public sector and the quality of public infrastructure. In this subsection, I address this issue by assuming that the productivity of the economy depends upon the level of public good provided to the citizens.[9]

For analytical simplicity, let us assume that the politician is perfectly monitored and disciplined ($\psi = 1$), every citizen is given one unit of taxable endowment in each period ($y_{it} = 1$ for all i and t), the probability of success of the public project is one ($p = 1$), and the probability that a misbehaving citizen gets caught and penalized ϕ is exogenously given and time-invariant. For detected tax evasion, a punishment is given once, and the size of sanction is finite ($S < \infty$). The production technology of private goods is given as

$$\underline{y}_{it} = z_t k_{it}^{\alpha}$$

and the productivity z_t is determined by the public investment in the previous period:

$$z_{t+1} = \int (y_{it} - x_{it}) \, di + \underline{z} = 1 - \int x_{it} \, di + \underline{z}$$

where k_{it} is capital stock at period t, α is smaller than 1, and $\underline{z}$ is the minimum productivity.

Citizen i solves the following optimization problem:

$$V(k_{it}, z_t) = \max_{x_{it}, k_{it+1}} \{ u(\underline{x}_{it} + x_{it}) - \phi S x_{it} + \beta V(k_{it+1}, z_{t+1}) \}$$

subject to

$$\underline{x}_{it} + k_{it+1} \leq \underline{y}_{it} + (1 - \delta) k_{it}$$

$$x_{it} \in \{0, 1\}$$

where δ is the depreciation rate of capital. I assume that the initial productivity z_1 is $\underline{z}$, and the citizens are ex-ante identical, i.e. $k_{i1} = k_1$ for all i. It is obvious that if the expected cost of

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[9] Many previous studies including Acemoglu (2005) have adopted a similar assumption. To my best knowledge, the poverty trap generated by the agency problems has not been analyzed before.

disobeying the rule ϕS is large enough, everybody will choose to invest to the public project, regardless of the level of capital. To focus on non-trivial case, let us assume ϕS is not too large. More specifically, I assume the following.

$$\lim_{k_1 \to 0} \left[u(\underline{z}k_1^\alpha + 1) - u(\underline{z}k_1^\alpha) \right] > \phi S$$

Under the assumptions made above, the following proposition is immediate.

Proposition 8 *For sufficiently small $\underline{z}$, there exists $\underline{k}$ such that for $k_1 \leq \underline{k}$, nobody invests in the public project in any time, i.e. $x_{it} = 1$ for all i and t.*

Proof. The value for citizen i when $x_{it} = 0$ is

$$u\left[\underline{z}k_t^\alpha + (1-\delta)k_t - \widehat{k}_{t+1}(k_t) \right] + \beta V\left(\widehat{k}_{t+1}, z_{t+1} \right)$$

and that when $x_{it} = 1$ is

$$u\left[\underline{z}k_t^\alpha + (1-\delta)k_t - \widetilde{k}_{t+1}(k_t) + 1 \right] - \phi S + \beta V\left(\widetilde{k}_{t+1}, z_{t+1} \right).$$

where $\widetilde{k}_{t+1}(\cdot)$ and $\widehat{k}_{t+1}(\cdot)$ are the solutions for the optimization problem, given x_{it}. As $k_t \to 0$, so do $\widetilde{k}_{t+1}$ and $\widehat{k}_{t+1}$. Thus, as $k_t \to 0$, $\left| V\left(\widehat{k}_{t+1}, z_{t+1} \right) - V\left(\widetilde{k}_{t+1}, z_{t+1} \right) \right| \to 0$. Therefore, according to the assumption, refusing public investment ($x_{it} = 1$) is preferred for a very small k_t. Next, let us denote the steady state level of capital by k^* when $x_{it} = 1$ for all i:

$$k^* = \arg\max_k \left\{ u\left[\underline{z}k^* + (1-\delta)k^* - k + 1 \right] - \phi S + \beta V(k, \underline{z}) \right\}.$$

It is easy to show that as $\underline{z}$ goes to zero, k^* also converges to zero. It implies for a sufficiently small $\underline{z}$, there exists a steady state level of capital k^* with which the citizens prefer not to invest in the public project. ∎

This proposition shows the intuition developed in the previous section can be applied to a more dynamic situation. When the level of income (wealth) is endogenously determined, the following negative-feedback mechanism might hinder a country to be economically and socially developed. If a society is given a low level of initial capital, its production capacity is low, so is its income

(wealth) level. As we have seen in the previous section, the agency problem is particularly serious when the level of income is low. Consequently, the government's ability to provide public goods such as social infrastructure, public education and health care would be seriously limited. This bounds the economy's expected productivity in the next period. Since the expected return from private investment is low, they invest little, which results in a low level of capital stock in the next period. Thus again, low level of income would be given to the citizens.

It is worth mentioning that the result would hold without the simplifying assumptions. If the agency problems are endogenized as in the analysis of the previous section, the agency cost of a low income country is greater than that of a high income country. Thus, endogenizing the structure of the government would do nothing but reinforce the feedback mechanism.

2.4.3   Civic virtue

Numerous studies have argued that "civic virtue" or "social capital" plays a important role in workings of democracy. There are many ways for civic virtue to enhance the quality of self-government. In this subsection, I demonstrate one way that civic virtue can help reduce the agency cost. Suppose there are informal social networks, so any citizens can be observed by at least one fellow citizen with probability q. If it is a social norm that misbehavior is reported to the government, the probability of detection is now $q + \phi - q\phi$ which is greater than ϕ. Accordingly, the agency cost incurred by the citizens can be reduced (lower n_E). As the previous analysis has shown, this allows the society to spend more resources into disciplining the political elites and to construct a more democratic government (increase n_I).

Note that the social norm could be ignoring what she observes, instead of reporting it. In such case, the probability of detection remains as ϕ even when q is positive. Thus, civic virtue should be sustained as an equilibrium of repeated interactions among the citizens, and can be broken or reinforced by historical events.[10] The ignoring equilibrium would be more likely to emerge when

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[10]   See Kandori (1995) for a game-theoretic model of social norm, and Putnam et al. (2001) for a study of social capital and civic virtue.

reporting to the government incurs a cost to the reporter.

2.5 Conclusion

This paper, using a simple theoretical framework, explores several fundamental issues of political economy including how to allocate resources to achieve efficient self-government, why the governments of poor economies work so poorly, and how the agency problems in different parts of a society interact each other. A novel feature of the current work is that it adopts the frameworks of the classical writers, particularly that of Jean-Jacques Rousseau. The perspective of the social contract encourages us to consider bi-directional agency problem of citizens and the government as a non-separable one. While the agency problem on each side is thoroughly examined in separate literatures, the joint analysis is rarely attempted.

The analysis of this paper shows that the two agency problems aggravate each other: poor quality of government lowers the citizens' willingness to follow the law and order, and at the same time when more resources are spent in monitoring and disciplining the citizens, less would be spent in improving the government accountability. It is also shown that the severity of the problem depends upon the level of economic development and that of political institutionalization of the society. When the economic performance of the society depends on the amount of public goods invested in the previous period, the agency problem might generate a poverty trap.

Although Rousseau's works have been constantly referred to in normative discussions, his legacy has seldom appeared in positive analyses. So, one may ask why his legacy has been only partly appreciated. I do not intend to provide here a comprehensive genealogy of the ideas, but just would like to point out the results of this article do suggest a plausible answer to the why-question. It says once a society is sufficiently developed in economic and political spheres, the agency problem on the citizens' side does not outstand any more, in which case, researchers can safely ignore it and focus on the problem on the other side, namely the problem of government accountability. The analysis suggests, however, this strategy might not be valid in analyzing the political economy of developing countries. When considering developing countries, one should

explicitly take the problem of self-regulation of the citizens as an integrated part of the entire political economic system.

Of course, more scholarly efforts are required for better understanding of the self-regulation issue. In particular, two important issues which are abstracted from this paper invite further investigations. First, wealth inequality generates a different set of political problems which might interact with the agency problem which has been the focus of this article. Second, the corruption of bureaucracy is also very notable feature in developing countries, and it is likely to exacerbate the agency problem on the other sides of the society.

CHAPTER 3

VOTER ATTENTION AND POLITICAL POLARIZATION

3.1 Introduction

The nature of the political polarization in the United States has been a subject of intense debates in a recent few years. Most scholars agree on the fact that the polarization at the elite level has increased over the last three decades (see e.g. Poole and Rosenthal 1997, Stonecash et al. 2003, and Theriault 2008). In contrast, there is much less agreement on the ideological landscape at the mass level. A group of scholars argues that there has been substantial changes in voters' political preferences (Abramowitz 2011, and Hetherington 2001), while others counter-argue that those changes are exaggerated or just a myth (Fiorina et al., 2006).[1] The former tends to support the idea that the polarization is a primarily bottom-up phenomenon, while from the latter's point of view, the polarization is best characterized as top-down or elite-driven. Whereas the evidence that has been submitted is not conclusive, the existing theories of political polarization seem to support the bottom-up side: in theory, ever since Downs (1957), political parties compete to win as many votes as possible, thus their policy positions are tightly bound to the fundamental preference of voters. In this theoretical framework, the top-down side scholars are requested to explain why politicians who seek for winning elections ever want to change their platforms when there is no major change in the fundamentals.

This paper provides a spatial voting model in which elite-driven political polarization can emerge as an equilibrium. Key assumptions are: (i) voters are responsive to changes in policy positions of parties only if they pay attention to politics; (ii) political elites can disinterest away some voters by making the voters believe that implemented policies will be less preferable to them. Under these assumptions, political parties do not have incentive to converge to median voters if

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[1] See also Abramowitz and Saunders (2008) and Fiorina and Abrams (2008) for the follow-ups.

the median voters believe that the parties' platforms will diverge away from the center, so do not even pay attention to politics. By the same logic, the traditional median-voter equilibrium can also emerge: when voters expect the parties converge to the center, and consequently the median voters remain attentive and responsive, the political parties are forced to compete for the votes of the median voters. In this manner, the policy platforms can be polarized even when there is no change in the fundamentals.[2]

Although the model provides a logical description of elite-driven polarization, it does not take a side in the above mentioned debate. Examining the conditions for the median-voter equilibrium to exist, I show that the centrifugal force grows larger either when economic inequality grows or when media tend to mobilize partisans more than they do centrists. If the economic inequality and media slant become considerably severe as many scholars and commentators argue that be the case in the U.S., platform polarization becomes the unique equilibrium.[3] Thus, this paper position is that it is not theoretically decidable whether the nature of the polarization at hand is top-down (i.e. without any change in the parameters) or bottom-up (i.e. caused by a change in the fundamentals).

It is widely recognized that in a large electorate rational voters have little incentive to gather information or to be attentive when it is costly. Downs (1957) pointed out this problem together with the problem of voters' turnout decision, namely rational voters who only consider the outcome of the election do not have incentives to turn out to the voting booth when the number of voters is sufficiently large. The latter problem has been thouroughly explored by economists and political scientists, but the former has been much less popular in academic discussion.[4] The present paper considers the two problems together: for the turnout problem, on one hand, adopting a widely used

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[2]   The nature of the polarization demonstrated in this paper is better-termed as "belief-driven". However, so long as such beliefs are formed by the political elites whose symbolic actions are visible to many citizens, we can also call it as "elite-driven", too.

[3]   Bartels (2007) and McCarty et al. (2008) argue that the current polarization has been mainly driven by the change in the structure of the economy, whereas Campante and Hojman (2010) and Prior (2007) emphasize the role of media in polarization of opinions

[4]   In the literature, voters' incentive to acquire information has been investigated exclusively in committee setting. See Gerling et al. (2005) for a survey of the incentive for information acquisition in committee setting. See Merlo (2006) for a survey on voters' turnout decision.

assumption which is that voting as a civic duty generates intrinsic utility by itself. For the attention problem, on the other, I assume that voters rationally evaluate the probability of their turnout, which depends on the expected utility of voting, which in turn is affected by the policy positions chosen by the political parties. Because attention is a limited cognitive resource, the voters decide to pay no attention to politics if they expect they will not show up in the voting booth after all. This assumption on the link of the two closely related problems helps highlight the role of voters' belief and politicians' symbolic actions in elections.

The model is a descendent of the spatial competition models of Downs (1957) and Hotelling (1929). Given that competing political parties in reality do not always take the same policy position, the famous median-voter result has been challenged by many theorists.[5] A recent paper by Glaeser et al. (2005) suggests a simple and realistic model of political polarization.[6] In their model, voters with different party affiliation have accesses to different information sources. Due to this discrepancy in observability, the political parties are better able to mobilize their own supporters, and in equilibrium, the parties compromise extensive margin (trying to cover as various ideological position as possible) with intensive margin (trying to mobilize its core supporters as much as possible), i.e. divergence from the center. The current paper is closely related to their work in the sense that the main source of platform polarization is voters' limited, selective exposure to political information. However, the attention decision considered in this paper is absent in their model, and consequently my model generates multiple equilibria which is rather new in the spatial competition literature.

This paper is also related to the growing literature of media and political competition.[7] Especially, some recent works shed lights on the relations between political polarization and media enviornment. Bernhardt et al. (2008) show that polarization can induce media censoring, which result in inefficient collective decision making. Campante and Hojman (2010) argue that enhacement in media variety might cause political polarization by changing the landscape of public opinion.

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[5] See Grofman (2004) and Roemer (2001) for surveys on platform polarization.
[6] Virag (2008) generalizes the model suggested by Glaeser et al.
[7]For a review, see Pratt and Stromberg (2011).

More encompassing picture is provided by Chan and Suen (2008) who consider political competition together with news market competition. In contrast to what has been observed in recent years, their model predicts that when more information is available in the market, parties' positions tend to become less polarized.

The remainder of paper is organized as follows. In the next section, I illustrate the main mechanism of the model with a few simplifying assumptions. Then, I present the extended model in which I allow voters' cognitive ability to be heterogenous and the candidates' valance to be stochastic. I discuss the limitations of this study and provide directions for future works in section 3.4.

3.2 Basic Model

Consider an election where two competing parties, L and R, choose their positions in a single-dimension policy space $[-1,1]$ to maximize their votes.[8] The election rule is simple majority, and when tied, the winner is determined randomly. There are infinitely many voters who can be partitioned into three groups, $g \in \{l,c,r\}$, left-wings, centrists, and right-wings. The citizens obtain intrinsic utility from voting itself, but also get disutility when the policy platform she votes for differs from her ideal point. The utility of abstention is normalized to zero. Specifically, the net utility of voting for a party whose platform is at $d \in [-1,1]$ is

$$u_i(d) = B - |d - x_i|$$

where B is the psychological benefit of fulfilling a civic duty, x_i is the voter i's ideal point in the ideology space, which can take one of three values:

$$x_i = \begin{cases} -1 & \text{if } i \in l \\ 0 & \text{if } i \in c \\ 1 & \text{if } i \in r \end{cases}$$

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[8]One can derive the qualitatively same result with the assumption of "winning probability maximization", but the calculation under the "vote maximization" is a bit more straightforward.

Denote the sizes of the groups of voters by α_l, α_c and α_r. To focus on symmetric equilibria, let us assume $\alpha_l = \alpha_r$, and normalize $\alpha_l + \alpha_c + \alpha_r = 1$. In this section, the cost of voting z_i^V and the cost of being attentive z_i^I are assumed to be the same for all voters, i.e. $z_i^V = z^V$ and $z_i^I = z^I$

The game consists of three stages: in the first stage, given the prior beliefs on the policy platforms $\overline{d}_L$ and $\overline{d}_R$, the voters decide whether to pay attention (or to gather information) to the politics or not. Next, observing the size of attentive voters in each group, the parties simultaneously decide their positions d_L and d_R. In the last stage, the voters decide whether to turnout and for whom to vote.

To keep the model simple, I assume an attentive voter can observe only one of the actual platforms chosen in the second stage: if a voter in group g decides to be attentive to politics, she observes d_L with probability δ_g and d_R with probability $1 - \delta_g$ (but not both) where the exogenously given probabilities $\delta_l > 1/2$ and $\delta_r < 1/2$, i.e. the left-wing voters observe and recognize the left-wing party's behavior with higher probability than they observe the right-wing party, and vice versa.[9] Hence, the set of the information held by a voter in the third stage is $I = \{(\overline{d}_L, d_R), (d_L, \overline{d}_R), (\overline{d}_L, \overline{d}_R)\}$. To make the environment symmetric, I suppose $\delta_l = 1 - \delta_r$, and $\delta_c = 1/2$. In the next section, I introduce stochastic quality (often called valance) of the candidates, in presence of which the voters have the incentives to pay attention and to gather information to make a better choice (or to minimize the regret of voting for a wrong candidate). In this section, as a short cut I simply assume that the benefit of voting is realized only if the voter is not in complete ignorance, i.e. only if the voter pay attention to politics. Thus in equilibrium, only the attentive and interested voters actually show up at the voting booth.

An equilibrium is a pair of belief $(\overline{d}_L, \overline{d}_R)$, the parties' actual platforms (d_L, d_R), and the voters' strategy such that

(i) given the prior beliefs, the voters decide to be attentive to politics if and only if the cost of

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[9] This assumption is very similar to the one suggested by Glaeser et al. (2005), and can be substituted by a more realistic assumption, e.g. some fraction of voters observe both d_L and d_R, and others observe only one of those. Key is that a non-trivial fraction of voters can observe only one of the actual platforms.

being attentive is smaller than the benefit of it;

(ii) given the sizes of the attentive voters, the parties select their platforms to maximize their own votes;

(iii) the voters rationally decide whether to turnout and for whom to vote to maximize their net utility;

(iv) the prior beliefs must be correct, i.e. $(\overline{d}_L, \overline{d}_R) = (d_L, d_R)$.

To focus on symmetric equilibria, let us restrict our attention to the case with $\overline{d}_L \in [-1, 0]$ and $\overline{d}_R \in [0, 1]$. It is rather obvious that if the benefit of voting B is large enough, everybody has an incentive to turn out, which means that everybody would decide to be attentive in the first stage. With such a large B, therefore, the political parties will always have incentive to move toward the center as the median-voter theorem predicts.[10] On the other hand, if B is very small, nobody would pay attention to politics, and consequently nobody would turn out. To make the illustration non-trivial, I assume the benefit B is in the intermediate range:

$$z^I + z^V < B < z^I + z^V + 1 \tag{A1}$$

This condition says that if the ideological difference between the voter and the party $|d - x_i|$ is zero, the voter always decides to be attentive and turns out, whereas if the ideological difference is expected to be greater than or equal to one, she abstains.

To characterize the polarization equilibrium, suppose first $(\overline{d}_L, \overline{d}_R) = (-1, 1)$. Then, the maximized expected utility for the centrists whose ideal point $x_i = 0$ is

$$\max \{u_i(-1), u_i(1)\} = B - 1,$$

which is smaller than the total cost $z^I + z^V$. Thus, the centrists decide to be inattentive to politics. On the other hand, the expected utility for the left-wing voters whose ideal point is $x_i = -1$ is

$$\max \{u_i(-1), u_i(1)\} = u_i(-1) = B,$$

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[10]   More precisely, with sufficiently large B, there does not exist an pure strategy equilibrium with polarized platforms. The median-voter equilibrium may not exist either.

and similarly that for the right-wing voters is also B which is greater than $z^I + z^V$ by assumption. Given the distribution of the attentive voters, the parties do not deviate from the presumed positions. First, the parties do not have the incentives to move to the center because the inattentive centrists would not respond to such a change in platforms. Next, party L does not have an incentive to crowd into party R's platform since such a move reduce the total votes for party L. This is because when the left-wing party abandons its supporters, δ_l fraction of the left-wing voters would observe the change in the position, and consequently abstain or cast their votes randomly. For simplicity, let us assume $B < 2$, so that they abstain. Hence, the left-wing party loses $\alpha_l \delta_l$ votes of the left-wings and in return additionally gain $\alpha_r \delta_r / 2$ votes from the right-wing voters. Recall that $\alpha_l = \alpha_r$ and $\delta_l > \delta_r$, which means the total votes for party L decline. Taking any position in $(-1, 1)$ is clearly a dominated strategy, because it reduces the support of the left-wings while cannot attract any vote from the right-wings. By the same logic, party R would not deviate from its presumed position. Therefore, the equilibrium pair of policy platforms is $(d_L, d_R) = (-1, 1) = (\overline{d}_L, \overline{d}_R)$.

In a similar way, we can also characterize the median-voter equilibrium. Suppose the prior beliefs are given as $(\overline{d}_L, \overline{d}_R) = (0, 0)$. Now, the voters in group c decide to pay attention, whereas the left-wings and the right-wings become disinterested. Because the attentive voters are concentrated at the center, any deviation from the center clearly reduces the total votes. Thus, the equilibrium positions are $(d_L, d_R) = (0, 0) = (\overline{d}_L, \overline{d}_R)$.

Proposition 9 *Under assumption A1, there exist multiple equilibria, in one of which the policy positions of the parties are polarized, whereas in the other the parties converge to the median voters.*

This simple illustration highlights the role of beliefs which are most likely to be formed by political parties' positions in the past and their symbolic actions. By constructing such beliefs, politicians in effect can "choose" whom to be pivotal and whom to be negligible in the election. As in previous voting models with a large electorate, the voters cannot solve the collective action problem, thus remain passive in selecting equilibrium.

3.3 Extension

In this section, I employ non-degenerated distributions for the cost of voting z_i^V and that of information gathering z_i^I. Also, I introduce an uncertainty as in probabilistic voting models; the (relative) quality or valance of candidates is unknown to the parties and the voters in the first two stages, and it is realized in the last stage before the voters make decisions.[11] Key departure from the standard probabilistic voting model is that the candidates' relative valance is observed only to the voters who pay attention to the politics. As smooth distributions are introduced, the outcome of the model becomes less stark, but the main idea remains the same.

Specifically, I assume z_i^V follows uniform distribution of $[0, 1/\psi]$, and z_i^I follows uniform of $[0, 1/\phi]$. Each cost is independent of each other and of the distribution of ideology. I assume that the cost of voting is unknown in the first stage, and is realized at the beginning of the third stage. The relative valance of the candidate of party R is denoted by y, is drawn from uniform distribution of $[-1/2\theta, 1/2\theta]$, and is observed by attentive voters in the third stage. All the distributions are common knowledge. Unlike in the previous section, a voter can go to the polling booth without knowing the actual position (d_L, d_R) and the true value of y. But she suffers disutility when she realizes that she made a "wrong" choice, the choice that differs from the one she would have made if she knew y. The disutility of regret is denoted by λ.

The utility for voter i when voting for party L is

$$u_i\left(\widetilde{d_L}\right) = B - \left|\widetilde{d_L} - x_i\right| - \frac{y}{2}$$

where $\widetilde{d_L} \in \{d_L, \overline{d}_L\}$ is the perceived position of party L, and similarly the utility when voting for party R is

$$u_i\left(\widetilde{d_R}\right) = B - \left|\widetilde{d_R} - x_i\right| + \frac{y}{2}.$$

In this enriched environment, equilibria similar to the ones analyzed in the previous section can emerge depending on the parameter range. Here, I focus on the situation where at least some voters

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[11] For early papers which develop and analyze probabilistic voting models, see Hinich et al. (1972) and Hinich (1977) among others.

in all groups decide to be attentive in the first stage. The relevant parameter range is

$$\min\left\{\lambda\left(\frac{1}{2}-2\theta\right),B-1-\frac{1}{2\psi}\right\} > 0, \tag{A2}$$

$$\min\left\{\lambda\left(\frac{1}{2}-2\theta\right),B-\frac{1}{2\psi}\right\} < \frac{1}{\phi}.$$

The first inequality says that the voter with zero attention cost decide to be attentive even if the ideological difference between herself and the party is as great as one ($B-1-1/2\psi$ is the net expected utility and $\lambda\left(1/2-2\theta\right)$ is the expected disutility of regret for the extremists). The second inequality, on the other hand, states that the voters with the highest attention cost $1/\phi$ pay no attention even if the ideological difference is zero. I assume $\theta < 1/4$, so that even the left-wing voters cast their votes to the right-wing party for some large y, and the right-wings do for the left-wing party when y is very small. I further assume that the disutility of regret λ is sufficiently large, so the regret is irrelevant when making the attention decision, specifically, suppose $\lambda\left(1/2-2\theta\right) > B-1/2\psi$.

In an equilibrium, inattentive voters might show up in the voting booth. However, because they cast their votes based on the prior beliefs $(\bar{d}_L,\bar{d}_R)$, the politicians take their votes for granted when choosing policy position. Hence, here I focus on the attentive voters. And, as before I focus on symmetric equilibria, thus assume $d_L \in [-1,0]$ and $d_R \in [0,1]$. Let us consider the left-wing party's position decision, and impose symmetry for d_R. Given $\bar{d}_R = d_R$, the expected votes from the centrists who respond to a change of d_L is

$$\pi_c^L\left(d_L|\bar{d}_R\right) = \alpha_c\delta_c\varepsilon_c\Pr\left(y+|d_L|\le|\bar{d}_R|\text{ and }B-|d_L|-\frac{y}{2}\ge z_i^Y\right)$$

$$= \alpha_c\delta_c\varepsilon_c\Pr\left(y+|d_L|\le|\bar{d}_R|\right)\Pr\left(B-|d_L|-\frac{y}{2}\ge z_i^Y\mid y+|d_L|\le|\bar{d}_R|\right) \tag{3.1}$$

where α_c is the measure of the voters in group c, δ_c is the fraction of the attentive centrists who observe party L's behavior, and ε_c denotes the fraction of attentive voters in group c, which is a function of the prior beliefs. Voter i turns out, and votes for the left-wing party if $y+|d_L|\le|\bar{d}_R|$ and $B-|d_L|-y/2\ge z_i^Y$. Using the distribution assumptions made above, (1) can be simplified into

$$\alpha_c\delta_c\varepsilon_c\left[\frac{1}{2}+\theta\left(d_L+\bar{d}_R\right)\right]\psi\left(B+d_L-\frac{d_L+\bar{d}_R}{4}+\frac{1}{8\theta}\right). \tag{3.2}$$

The marginal expected gain of moving toward the center is

$$\frac{\partial \pi_c^L \left(d_L | \bar{d}_R \right)}{\partial d_L} = \alpha_c \delta_c \varepsilon_c \psi \left[\frac{3}{8} + \frac{3}{4} \theta \left(d_L + \bar{d}_R \right) + \theta \left(B + d_L - \frac{d_L + \bar{d}_R}{4} + \frac{1}{8\theta} \right) \right]. \qquad (3.3)$$

Similarly, the expected votes from the responsive voters in group r is

$$\pi_r^L \left(d_L | \bar{d}_R \right) = \alpha_r \delta_r \varepsilon_r \left[\frac{1}{2} + \theta \left(d_L - \bar{d}_R \right) \right] \psi \left(B - 1 + d_L - \frac{d_L - \bar{d}_R}{4} + \frac{1}{8\theta} \right), \qquad (3.4)$$

of which derivative is

$$\frac{\partial \pi_r^L \left(d_L | \bar{d}_R \right)}{\partial d_L} = \alpha_r \delta_r \varepsilon_r \psi \left[\frac{3}{8} + \frac{3}{4} \theta \left(d_L - \bar{d}_R \right) + \theta \left(B - 1 + d_L - \frac{d_L - \bar{d}_R}{4} + \frac{1}{8\theta} \right) \right]. \qquad (3.5)$$

Lastly, the expected votes from the left-wings who are responsive to d_L is given by

$$\pi_l^L \left(d_L | \bar{d}_R \right) = \alpha_l \delta_l \varepsilon_l \left[\frac{1}{2} + \theta \left(\bar{d}_R - d_L \right) \right] \psi \left(B - 1 - d_L - \frac{\bar{d}_R - d_L}{4} + \frac{1}{8\theta} \right), \qquad (3.6)$$

and the marginal loss of moving toward the center is

$$\frac{\partial \pi_l^L \left(d_L | \bar{d}_R \right)}{\partial d_L} = -\alpha_l \delta_l \varepsilon_l \psi \left[\frac{3}{8} + \frac{3}{4} \theta \left(\bar{d}_R - d_L \right) + \theta \left(B - 1 - d_L - \frac{\bar{d}_R - d_L}{4} + \frac{1}{8\theta} \right) \right]. \qquad (3.7)$$

The total expected votes as a function of party L's position is the sum of (2), (4), and (6). Party L takes the extreme position if given party R's position, the marginal loss from moving toward the center is greater than the marginal gain.

In a symmetric equilibrium, $\bar{d}_L = -\bar{d}_R$, and the attention decisions are made based on these prior beliefs. Because with large enough λ a voter decide to pay attention if the net utility of voting is expected to be greater than the cost of being attentive, the fraction of attentive voters in group c can be written as

$$\begin{aligned} \varepsilon_c \left(\bar{d}_L, \bar{d}_R \right) &= \Pr \left[E \max \left\{ u_c \left(\bar{d}_L \right), u_c \left(\bar{d}_R \right) \right\} - \frac{1}{2\psi} \geq z_i^I \right] \\ &= \Pr \left[B + \bar{d}_L + \frac{1}{8\theta} - \frac{1}{2\psi} \geq z_i^I \right] \\ &= \phi \left(B + \bar{d}_L + \frac{1}{8\theta} - \frac{1}{2\psi} \right), \end{aligned}$$

that of group r is

$$\varepsilon_r \left(\bar{d}_L, \bar{d}_R \right) = \phi \left[B - 1 + \left(\frac{1}{2} + 2\theta \bar{d}_L \right) \left(\frac{1}{8\theta} + \frac{\bar{d}_L}{2} \right) + \left(\frac{1}{2} - 2\theta \bar{d}_L \right) \left(\frac{1}{8\theta} - \frac{\bar{d}_L}{2} \right) - \frac{1}{2\psi} \right],$$

and with the symmetric beliefs, the fraction of attentive voters among the left-wing voters ε_l is the same with ε_r.

To characterize the polarization equilibrium, first as in the previous section, suppose the voters expect that $(\bar{d}_L, \bar{d}_R) = (-1, 1)$. Then, ε_g fraction of voters in group g decide to pay attention to politics where

$$\varepsilon_c(-1, 1) = \phi \left(B - 1 + \frac{1}{8\theta} - \frac{1}{2\psi} \right)$$

and

$$\varepsilon_r(-1, 1) = \varepsilon_l(-1, 1) = \phi \left[B - 1 + \frac{1}{8\theta} + 2\theta - \frac{1}{2\psi} \right].$$

As in the baisc model analyzed in the previous section, when the voters expect the policy platforms to be polarized, the voters at the extreme ideological positions pay more attention to politics ($\varepsilon_r = \varepsilon_l > \varepsilon_c$).[12] In the second stage, party L sets its platform as $d_L = -1$ if the marginal expected gain of moving toward the center is negative:

$$\frac{\partial \pi_c^L \left(d_L | \bar{d}_R = 1 \right)}{\partial d_L} + \frac{\partial \pi_r^L \left(d_L | \bar{d}_R = 1 \right)}{\partial d_L} + \frac{\partial \pi_l^L \left(d_L | \bar{d}_R = 1 \right)}{\partial d_L} < 0$$

From (3), (5) and (7), it is apparent that the marginal expected gain is greatest when $d_L = 0$, so a sufficient condition for the polarization equilibrium to exist is

$$\alpha_c \delta_c \varepsilon_c \left[\frac{1}{2} + \frac{1}{2}\theta + B\theta \right] + \alpha_r \delta_r \varepsilon_r \left[\frac{1}{2} - \frac{3}{2}\theta + B\theta \right] < \alpha_l \delta_l \varepsilon_l \left[\frac{1}{2} - \frac{1}{2}\theta + B\theta \right]. \tag{3.8}$$

The median-voter equilibrium can be characterized in a similar way. Suppose the beliefs are given as $(\bar{d}_L, \bar{d}_R) = (0, 0)$. Then, ε_c, ε_r and ε_l are given by

$$\varepsilon_c(0, 0) = \phi \left(B + \frac{1}{8\theta} - \frac{1}{2\psi} \right),$$

and

$$\varepsilon_r(0, 0) = \varepsilon_l(0, 0) = \phi \left[B - 1 + \frac{1}{8\theta} - \frac{1}{2\psi} \right].$$

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[12] In the basic model, a group of voters are homogenously attentive or inattentive, i.e. $\varepsilon_g \in \{0, 1\}$.

The fraction of attentive voters among the centrists is now greater than those among the left-wings and right-wings. The left-wing party has an incentive to set its position at the center if the marginal expected gain is positive:

$$\frac{\partial \pi_c^L\left(d_L|\bar{d}_R=0\right)}{\partial d_L} + \frac{\partial \pi_r^L\left(d_L|\bar{d}_R=0\right)}{\partial d_L} + \frac{\partial \pi_l^L\left(d_L|\bar{d}_R=0\right)}{\partial d_L} > 0$$

which is minimized at $d_L = -1$. Therefore, a sufficient condition for the median-voter equilibrium to exist is

$$\alpha_c \delta_c \varepsilon_c \left[\frac{1}{2} - \frac{3}{2}\theta + B\theta\right] + \alpha_r \delta_r \varepsilon_r \left[\frac{1}{2} - 2\theta + B\theta\right] > \alpha_l \delta_l \varepsilon_l \left[\frac{1}{2} + \frac{1}{2}\theta + B\theta\right]. \qquad (3.9)$$

The analysis so far is summarized in the following proposition.

Proposition 10 *Under assumption A2, the polarization equilibrium exists if condition (8) holds. The median-voter equilibrium exists if condition (9) is satisfied.*

Note that as in the basic model, multiple equilibria exist for intermediate parameter range. To see it clearly, suppose the left-wing voters observe only the left-wing party, and the right-wing voters to the right-wing party, i.e. $\delta_r = 0$ and $\delta_l = 1$. And, as assumed from the beginning, the centrists observe either party with the same probability, $\delta_c = 1/2$. Then, the equilibrium conditions (8) and (9) can be rewritten as

$$\frac{1}{2}\alpha_c \varepsilon_c(-1,1) \times \left[\frac{1}{2} + \frac{1}{2}\theta + B\theta\right] < \alpha_l \varepsilon_l(-1,1) \times \left[\frac{1}{2} - \frac{1}{2}\theta + B\theta\right]$$

and

$$\frac{1}{2}\alpha_c \varepsilon_c(0,0) \times \left[\frac{1}{2} - \frac{3}{2}\theta + B\theta\right] > \alpha_l \varepsilon_l(0,0) \times \left[\frac{1}{2} + \frac{1}{2}\theta + B\theta\right].$$

Because $\varepsilon_l(-1,1) > \varepsilon_c(-1,1)$ and $\varepsilon_l(0,0) < \varepsilon_c(0,0)$, for a set of ideological distributions $(\alpha_l, \alpha_c, \alpha_r)$, both inequalities are satisfied, which means both the polarization and the median-voter equilibrium exist. The intuition is the same as before: when the voters expect the platforms are concentrated at the center, the centrists become more attentive to the politics, and the parties come to serve the attentive voters. When the policy positions are expected to be polarized, the voters at the extreme positions become more responsive, and the parties optimally decide to mobilize the extremists.

To consider the effect of the fundamentals, namely economic inequality and media slant, let us assume the voters' attention is affected by the news coverage of media and their attitude in delivering messages. Specifically, assume left-wing media deliver news in a way that suits the left-wing voters' taste, and right-wing media serve the right-wing voters. Consequently, as media slant becomes severe, the extremists become more attentive, while the centrists tend to lose their interests:

$$\frac{\partial \varepsilon_l(s)}{\partial s}, \frac{\partial \varepsilon_r(s)}{\partial s} > 0, \text{ and } \frac{\partial \varepsilon_c(s)}{\partial s} \leq 0$$

where s is the economy-wide media slant.

The ideological distribution would be mainly formed by underlying economic interests. So when the economic inequality increases the number of the centrists declines, and that of the extremists increases, i.e. as α_c goes down, $\alpha_l = \alpha_r = (1 - \alpha_c)/2$ goes up. Such changes strengthen the centrifugal force, and let the median voters be a small and unattractive group. In such a case, the median-voter equilibrium cannot exist any more.

Proposition 11 *For sufficiently large α_l and s, the platforms diverge from the center.*

Proof. For sufficiently large α_l and s, the marginal gain of moving toward the center is always negative as clearly shown in (3), (5) and (7). ∎

Bartels (2007) and McCarty et al. (2008) argue that the increased economic inequality over past thirty years might encourage the polarization in political arena. Campante and Hojman (2010) and Prior (2007), on the other hand, provide some evidence of the effect of changes in media environment. According to Prior, the media environment in 1950-70's in the U.S. was best characterized by dominance of broadcast TV which is a low-choice medium. The environment started changing around mid 70's when cable TV spreading out all over the country. Cable TV, satellite TV and the Internet are typical examples of high-choice media. Under this changed environment, the voters can freely filter and edit the messages delivered to them, so make the media experience more entertaining and enjoyable. These narratives are consistent with the above proposition.

3.4 Conclusion

In this paper, I develop a simple model in which political parties' policy positions are polarized or concentrated at the center depending on which group of voters are expected to actively participate in politics. When a voter expects that at least one of the chosen platforms is close enough to her ideal position, she tends to be more attentive to politics than when none of the parties serves her taste. Thus, by forming beliefs about the policy positions, the politicians play a major role in determining whom to be pivotal in the election. When the fundamentals such as economic inequality and media environment allow multiple equilibria, elites' role in political polarization is essential. On the other hand, the model also predicts that when the underlying distribution of voters' ideology is polarized enough, the parties would be forced to be polarized.

This study has a couple of limitations which invites future studies. First, I assumed many distributional assumptions to derive analytical conditions. Checking robustness of the main result in terms of distribution could be a subject of a future work. Second, the prior beliefs has been assumed to be given from outside of the model. A more comprehensive picture would appear when the formation of the beliefs are properly considered. Lastly, the mechanism that the extremists become more enthusiastic in the new media environment is only informally and briefly discussed.[13] An interesting future work would be to analyze the interaction between media market and political competition when voters have limited attention.

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[13] For an example of modeling such a mechanism, see Mullainathan and Shleifer (2005).

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