The Matching of Heterogeneous Firms and Politicians*

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Abstract

We use a unique Chinese firm-director panel dataset and a simple assignment model to examine the matching mechanism of heterogeneous firms and politicians. Based on 36,308 detailed biographies, we identify directors that previously held bureaucratic positions and classify the rank of each position in the Chinese political hierarchy. We address three questions using this direct measure of political capital: First, how do firms with heterogeneous productivity match with politicians with different political ability? Second, what determines the price of political capital? Finally, is there significant short-term return from political investment? Our results indicate that more productive firms are more likely to hire politically endowed individuals. The incentive increases in the dependence on external financing and decreases in the extent of foreign ownership. Conditional on the probability of being hired, individuals with greater political ability receive more compensation than their co-workers. One-step increase in political ladder from municipal to provincial level is equivalent to an annual pay increase of US$17,359. Education attainment, on the other hand, has little effect. The estimated return of political investment is sensitive to the control of matching, stressing the importance of taking into account the endogeneity of politician recruitment.

Key words: firm heterogeneity, politician, political hierarchy, matching

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1 Introduction

The proliferation of globalization in China has drawn increasing attention to its political economy. In contrast to its unprecedented economic growth, China's political liberalization is far from prospering. The highly closed political regime continues to rule while the country embraces economic integration. This discrepancy grants new economic values to political capital as rent-seeking activities expand from autarky to a fast-growing open economy.

A number of studies have shown that political connections play an important role in firms' economic performance.[1] They help firms secure favorable regulatory conditions, gain access to resources, and receive preferential treatment in legal system. These "benefits" are not exclusive to one nation; they have been identified in both developed and developing countries, including US, Brazil, India, Indonesia, Pakistan, and China. However, most of the existing analyses treat firms' political connections as an exogenous endowment and do not consider the endogenous decision to invest in political capital. This can lead to ambiguity in the established causality and biased estimates on the effect of political connections. We investigate in this paper the differential decisions of heterogeneous firms to engage in political investment, and how these decisions lead to the differential market values of politicians. We also evaluate how taking into account the endogenous matching can affect the estimated short-term return of political investment.

We use a unique Chinese firm-director level panel dataset to undertake the empirical tasks. The data includes the population of Chinese publicly listed companies in the period of 2004-2007 with the exclusion of enterprises whose corporate governance is subject to direct government intervention.[2] More than 35 percent of these non-state controlled companies have politicians on board. The politicians differ considerably in the rank of political positions. As of 2007, 73 percent of them were former officials of local city governments whereas 19 percent held the positions of provincial governor or equivalent. The participation rate also varies over time: while the number of politicians engaged in businesses fell between 2004 and 2005, the number steadily increased afterwards, from 660 in 2005 to 793 in 2007. This is especially true at the relatively top level: The number of provincial-tier politicians was nearly doubled between 2005 and 2007, rising from 77 to 146. There is also a large variation in the level of compensation received by these politicians. The average annual compensation is around 198,966.7 yuan (ap-

[1] We discuss this literature in greater detail below.

[2] Section 2.1 provides more detail on these firms and the rationale to exclude them from analysis.

proximately US $29,259.8) while the maximum reached 6,906,600 yuan (approximately US $1,015,676.5). These phenomena portray a dynamic interaction between firms and politicians that has been largely ignored in the literature. The main goal of this paper is to examine the underlying determinants of this interaction, specifically, how firms with heterogenous productivity are matched with heterogeneous politicians and what affects the price of political capital in the matched pairs.

The scope and depth of this data provide several distinct advantages compared to the existing studies. First, we construct direct measures of political endowment for each individual and each company rather than relying on subjective proxies (such as communist party membership) as in previous studies. Specifically, we identify the political positions held by each director and the rank of these positions in the Chinese political hierarchy. Unlike other democracy economies where campaign contributions serve as a main channel to invest in political capital, business entities in China rely on building personal connections (known as *"guanxi"*) with governments. Hiring politicians with attractive political capital is an approach that has often been adopted (Li, 1998).

Second, we take into account the hierarchy of Chinese political system when we construct the political capital measures. We differentiate the power of politicians by considering the highest rank (as well as the average) of their government positions. We also control for the scope of their political connections using the number of previously held political jobs. In contrast to the dummy indicator variables traditionally used in the literature, these two measures allow us to estimate the marginal value of political ability, for example, the value of a one-step increase in political ladder, in both individual income and firm performance.

Third, we control for each individual's education and professional credential. This is important for addressing a long standing issue that arose in the literature, that is, the correlation between political accomplishment and education attainment. Controlling for the latter helps us disentangle the effect of political capital from the effect of conventional human capital. It also permits us to compare the value of political endowment with the value of education and professional training, at both individual and firm level.

Finally, the panel nature of the data enables us to establish the causality between firm productivity and political investment. Specifically, it allows us to identify the new hires of each company every year and their associated characteristics. Based on this information, we examine how firms' productivity and performance in a lagged period affect their future decision to invest in political capital and, conversely, how their political investment decision influences their future performance. The firm-director structure of

data also permits us to evaluate the price of political capital within each firm with the use of firm-year fixed effect and isolate the effect of unobserved factors.

We find both analytically and empirically that more productive firms are more likely to hire politically endowed individuals than their less efficient competitors. The incentive increases in firms' dependence on external financing and decreases in the extent of foreign ownership. This suggests that firms with greater liquidity constraint have a greater propensity to engage in political investment. The incentive to recruit politicians also varies with governance quality. Firms located in cities that have lower government efficiency and poorer contractual enforcement exhibit significantly stronger motive to build political connections. Conditional on the probability of being hired, individuals with greater political ability receive significantly more compensation than their co-workers. The marginal effect of one-step increase in the political ladder is equivalent to an annual pay increase of US$17,359. In stark contrast to the value of political capital, we observe little correlation between conventional human capital and the level of compensation. Raising education attainment from, for example, high school to college and from college to graduate degree does not lead to any significant increase in the pay rate. Finally, we find the estimated return of political investment is sensitive to the control of selection bias. Without correcting for the endogeneity of political capital investment, we find a positive correlation between the stock of political capital and the level of net earning and between the inflow of political capital and immediate earning growth. This relationship vanishes once we address the endogenous decision to hire politicians through either a two-stage instrumental variable (IV) approach or a matching technique.

This paper is related to two strands of literature. First, it builds on the rapidly growing literature that examines the effect of political connections on firm performance. Empirical evidence in this literature shows that political connections help firms secure favorable regulatory conditions (Agrawal and Knoeber, 2001) and obtain preferential access to resources such as bank loans (Khwaja and Mian, 2005). It also suggests that political connections can help raise the market value of firms (Roberts, 1990; Fisman, 2001; Rmalho, 2007) and improve their economic performance (Johnson and Mitton, 2003). These results are not exclusive to one nation; they have been identified in both industrial and emerging economies including US (Snyder, 1990; Agrawal and Knoeber, 2001), Brazil (Ramalho, 2007), Indonesia (Fisman, 2001), Malaysia (Johnson and Mitton, 2003) and Pakistan (Khwaja and Mian, 2005). Faccio (2005) presents a cross-country comparison of politically connected firms. Several studies provide related evidence based on Chinese

firm-level data.[3] Li et al. (2008), for example, investigate the relationship between communist party membership and profitability of Chinese private firms. They find that being affiliated to the communist party has a positive effect on firms' access to bank loans and confidence in the legal system. Bai et al. (2005) also find a similar effect on private entrepreneurs' ability to access bank loans.[4]

Our study complements the above contributions in three ways. First, instead of treating each firm's political capital as an exogenous and constant stock, we examine the differential decisions of heterogeneous firms to invest in political capital.[5] Using direct measures of human political capital, we establish the matching mechanism between firms and politicians. Second, we estimate the market values of politicians. Based on the compensation data, we examine how the price of human political capital varies with its ability and employer productivity and, furthermore, how the price of political capital compares to the price of traditional human capital. Finally, we evaluate the return of political investment, the primary focus of the existing literature, taking into account the endogenous matching between firms and politicians. We examine how controlling for selection may affect the estimated payoff of politician recruitment.

This paper is also related to the recently developed firm heterogeneity literature in international trade. This literature is marked by a series of important firm-level empirical studies led by, for example, Bernard and Jensen (1995, 1999, 2003) and Eaton *et al.* (2008) and major theoretical breakthroughs represented by Melitz (2003), Helpman *et al.* (2004), and Bernard *et al.* (2003), among others. We complement this literature by introducing heterogeneity in human capital and investigating the interaction between firm productivity and labor ability — with labor specifically defined in the context of politicians. The consideration of the latter helps us identify potential sources of firm heterogeneity in emerging economies.

The rest of the paper is organized as follows. In section 2, we discuss China's economic and bureaucratic reforms during the transition period and how they affect the interaction between economy and bureaucracy. We then describe in Section 3 the structure of the

[3] Haggard and Huang (2008) provide an excellent survey on the political economy of private-sector development in China.

[4] While most existing studies find political connections have a positive effect on firm performance, there is also evidence of negative influence. Fan et al. (2007), for example, show that politically connected CEOs can have an adverse impact on the post-IPO performance of newly privatized Chinese state-owned enterprises. The rationale there is that during the early privatization process political connections represent government intervention whose interests often differ from asset value and profit maximization.

[5] An equally interesting question is the decision of individuals to enter politics. This has been examined in several studies including Dickson (2003), Liu (2003) and Li et al. (2006).

political hierarchy in China. In section 4, we build a simple assignment model to examine the matching of firms and politicians and derive three testable hypotheses. We describe the data and variable constructions in Section 5. In Section 6, we begin the empirical analysis by first estimating the decision to engage in political investment and how the decision varies across heterogeneous firms. We then examine in Section 7 the price of political capital in comparison to conventional human capital and present in Section 8 the estimated return of political investment. The paper concludes in section 9.

2 The interaction of economy and bureaucracy in China

In the past three decades, China undertook a drastic transition from a planned economy to a market-oriented economy. This transition has led to unprecedented economic growth and fundamental changes in every aspect of the Chinese society. At the same time as this transition, China adopted several reforms in its bureaucratic system. While these reforms were far from conventional political liberalization, they transformed the political and economic incentives of Chinese politicians. In this section, we provide a brief overview of these economic and bureaucratic transitions.

2.1 The economic transformation

At the outset of China's reforms in 1978, the state controlled virtually all aspects of the economy. Since that time, China initiated a long sequence of economic restructuring granting market forces a central role in determining the prices of goods, services and factors. This process is marked by two interrelated phenomena: the sharp decline of state-owned enterprises (SOEs) and the bloom of privately-controlled industrial activities.

As China started introducing market reforms, SOEs that were historically dependent on government protection and subsidy faced the dual challenge of increasing market competition and decreasing fiscal support. Enterprises that had been idle before the reforms were quickly crowded out of the market. According to the Industry Census data, the output share of state-owned enterprises plunged from 81 percent in 1980 to 15 percent in 2005. The number of SOEs dropped by more than 90%. The remaining enterprises were forced to undertake drastic restructuring to enhance their competitiveness and survive rationalization. They also began a partial privatization process when the Company Law was adopted in 1993. This process was aimed to diversify the corporate ownership of

SOEs and reorganize them to corporations. During the process, the role of government was transformed to the role of a shareholder in the remaining state controlled enterprises. This transformation was facilitated by the establishment of State-owned Assets Supervision and Administration Commission (SASAC) in 2003, whose primary mission is to carry out the government's functions as investor and owner of state assets. As of April 2009, SASAC of the State Council oversees 138 centrally controlled state enterprises, including China's large petroleum, petrochemical, electricity, automobile, and telecom enterprises. This number steadily decreased compared to 2003 as a result fo a state-pushed drive to restructure and streamline the group (China Daily, July 21 2007).[6] Provincial and municipal State-owned Assets Management Authorities, the local SASAC entities, perform similar functions at lower levels and oversee local state-owned enterprises.

The main responsibilities of SASAC include approving mergers and acquisitions, authorizing sale of stocks and assets, and appointing top executives. The latter means that enterprises supervised by SASAC remains to have distinctive corporate governance from their counterparts. The hiring decision of top executives in these firms is not an outcome of market selection but a decision partially or even completely interfered by the government.[7] Given the primary interest of this paper is to examine the endogenous decision of firms to engage in political investment, we exclude enterprises whose shareholders include government entities such as SASAC. We focus instead on companies that are under little direct government influence and enjoy autonomy in their corporate governance. These include largely privatized former SOEs and privately owned businesses, a group that experienced a remarkable growth in the economic transition and became a main actor of the Chinese economy.

The 2005 Census data shows that 85 percent of industrial output came from non-state-owned firms and firms with partial or full foreign ownership. This figure, compared to 1980 when non-state-controlled activities constituted 20 percent of the entire economy, represents a substantial increase in the weight of private sectors. As of 2003, more than 60 percent of fixed-asset investment was undertaken by private businesses (Haggard and Huang, 2008). This group also plays an increasingly important role in China's international trade, contributing to the country's rapid growth in exports and

[6]It is also noted that the SASAC plans to cut the number of major enterprises to between 80 and 100 by 2010.

[7]Despite the expected government intervention, survey data, such as the Shanghai Stock Exchange poll, shows a growing tendency of state-owned enterprises to pursue commercial interests and greater autonomy given to enterprise managers. This is attributed partly to the profit-seeking focus of SASAC and the continuing offering of public shares.

imports. However, all these transitions started in an environment where most important elements characterizing a sound institutional infrastructure, e.g., well-structured legal system, rigorous law enforcement, well-functioning financial markets, were still missing. The institutional constraints pose a direct impact on individual companies' performance and, consequently, corporate decisions targeted to improve firms' relative competitiveness. For example, while many studies including Perkins and Rawski (2008) point out that the private sector in China is under no more official intervention than its counterpart in leading market economies, the sector is noted to face severe challenges in the financing of capital formation. Bank loans, share offerings, and bond issues continue to flow mainly to state-controlled entities. This offers a strong incentive for firms to form coalition with government. As described in the introduction, political connections can help firms secure access to bank loans and foreign exchange.[8] One channel to form coalition is to recruit politicians. We discuss next how the bureaucratic reforms in the past thirty years provided an opportunity for the interaction between businesses and government bureaucrats.

2.2 The bureaucratic reforms

Despite the lack of political liberalization, China went through a major transformation of its bureaucratic system. This transformation started in 1980 and consisted of three major reforms: the initiation of a mandatory retirement program, the granting of permissions to bureaucrats to quit government positions and join businesses, and the decentralization of administrative responsibilities (Li, 1998).

The first reform addressed the promotion and retirement policy of bureaucrats. It was initiated by Deng Xiaoping in 1980 and aimed to "abolish the de facto lifetime tenure system of government officials". The reform introduced strict retirement ages for government officials and initiated a massive mandatory retirement program. It also offered a one-time buyout strategy to compensate outgoing officials both economically and politically.[9] The buyout program provided generous economic incentives, including

[8] Among all the benefits of having political connections in China, improved access to bank loans has been most emphasized in the existing literature. This is driven by the fact that private sectors in China are among the most constrained in the world in terms of their access to capital. According to the cross-country survey collected by Batra et al. (2002), the subjective perceptions of Chinese entrepreneurs of the financial constraints they face are similar to those prevailing in other transitional economies such as Croatia, Czech Republic and Romania and in poor economies such as Ghana and Ethiopia. In Section 6.2, we examine how dependence on external finance offers firms distinct incentives to invest in political capital.

[9] Li (1998) notes that the buyout program was a special arrangement for revolutionary veterans who

an extra month of salary each year, additional housing and continual availability of official services. It also granted political privileges such as the position of special counselors. Expectedly, this reform significantly decreased the average retirement age and tenure of bureaucrats. According to the Chronicles of Contemporary Chinese Politics (1996), the average retirement age fell from 62 to 55 for provincial governors, from 64 to 58 for ministers, and from 58 to 50 for city mayors.[10] The average tenure per position decreased from 6.43 to 3.84 at the provincial governor level and from 6.56 to 4.44 at the minister level.

The second major reform is closely related to the first and was introduced in the mid-1980s when bureaucrats were allowed to quit their government positions and join businesses, a phenomenon later known as *xiahai* ("leaping into the sea"). This was accompanied by the government's substantial efforts to downsize its agencies. Both of these measures, along with the mandatory retirement and buyout program, led to a large supply of former government officials who are motivated to join the business community to pursue the higher economic returns. This was documented in a 1995 survey of local government officials (State Commission of System Reform, 1996): Close to 20 percent of interviewed officials were planning on *xiahai*. Of those, 35 percent were looking for joint-venture enterprises, 21 percent for private enterprises, and 15 percent for SOEs. A large number of bureaucrats also sought to found their own businesses and become private entrepreneurs.

The third reform is the administrative decentralization. During the decentralization, considerable power and autonomy, including the authority to appoint subordinate government officials and to set economic regulations, was granted to local governments. According to Naughton (2008), local authorities in China today enjoy more autonomy than their counterparts in some former socialist countries (for example, the Soviet Union) or even democracies (for instance, India). This gave businesses increasing incentives to form coalitions with local politicians. These politicians contribute their institutional knowledge, political background and connections. In return, they become shareholders and managers. This type of interaction differs from bribery and is legitimate under the rule of law.

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were the first and biggest potential opponents of the reform. He argues that the program was intended to facilitate the future implementation of economic reforms.

[10] The mandatory retirement age is 65 for provincial governors and ministers, 60 for city mayors or department chiefs, and 55 for county sheriffs and division chiefs.

3 An overview of the political hierarchy

Before presenting our theoretical and econometric analysis, we discuss in this section the political hierarchy in China. This provides a useful background for our empirical analysis, especially the construction of our primary variable *political ability*. China's political hierarchy consists of multiple levels of government and can be roughly divided to the central government and local governments. As described in Section ???, China undertook significant decentralization in the past few decades granting considerable autonomy to local governments. Prominent examples include Guangdong and Zhejiang, two coastal provinces where local officials have a large scope of discretion in setting economic policies. We review below the structure of central and local governments.

Central government

The central government at the national level is composed of the National People's Congress (NPC), President, the Central Military Commission, and the State Council. The National People's Congress is the highest state legislative body under the Constitution of the People's Republic of China. At the annual plenary sessions (which is also known as "Two Meetings" together with the Chinese People's Political Consultative Conference (CPPCC)), delegates review and approve new policies, laws and other important legislative and personnel changes that are proposed by the Communist Party of China (CPC) or the State Council. Delegates of the NPC are elected from military and provincial People's Congresses, which are in turn elected from lower level congresses. A delegate to any level of People's Congress has a term of five years; after this term, the delegate can be reelected and remain in the People's Congress.[11] Between annual plenary sessions of the NPC, the NPC Standing Committee (which has about 160 members as of year 2008) can modify legislations under the Constitution and within the confines of the NPC. Chairman of the NPC Standing Committee is the top legislator in China and conventionally ranked third among top leaders, after the General Party Secretary and President.

President of China is elected by the NPC and subordinate to the NPC. Based upon the decisions made by the NPC and its standing committee, President announces new laws, personnel changes and other important political decisions. President serves a term

[11] Although the compositions of People's Congress at all levels are still effectively controlled by the ruling Communist Party of China, the delegates to People's Congress are not limited to members of the CPC. Instead, a third of the seats are conventionally reserved for non-party people and people from parties other than the CPC. The rules of the NPC also set minimum proportional requirements for those from minority ethnics other than Han ethnic.

of five years and can be reelected once consecutively.

The Central Military Commission leads the entire armed force in China. It comprises Chairman, Vice-Chairmen and several members (two Vice-Chairmen and eight members as of year 2008). The Chairman is elected by the NPC and responsible to the NPC. The other members are nominated by the Chairman and approved by the NPC and its standing committee. Each member is elected for a term of five years and can be reelected.

The State Council is the highest executive body of state power and highest administrative body of state. The State Council includes Premier, vice-Premiers, State Councilors, and ministers of ministries and commissions. Premier is nominated by President and approved by the NPC. The other members of the State Council are nominated by Premier and reviewed by the NPC or its standing committee. The term of appointment is five years for each member of the State Council and cannot be renewed after two successive terms. There are 27 ministries and commissions in the State Council (e.g. Ministry of Foreign Affairs), 17 institutions (e.g. Xinhua News Agency), 16 organizations (e.g. General Administration of Customs) and 4 administrative offices (e.g. Hong Kong and Macao Affairs Office of the State Council). Under the ministries and commissions, there are 22 administrations and bureaus such as National Bureau of Energy and State Food and Drug Administration.

Local governments

Local governments in China can be ranked at four levels. They include, from high to low, province, prefecture or municipality, county and township.[12] The higher-level government has administrative responsibilities on the lower-level governments. There are two top officials at each local level government. One is the Party Secretary who represents the Communist Party of China and is in charge of policy making. This figure is appointed by the superiors. The other is the head of the local government (governor, mayor or magistrate for different levels) who engages in policy making and is, in theory, elected by the people. The governments in China have a dual position system, which means that any higher level government has corresponding positions for the lower level government. Hence, a provincial government is composed of several departments and each of these departments is ranked the same as the lower level government, i.e. the municipal government.

[12] There are four municipalities that are treated and ranked the same as other provinces, that is, Beijing, Tianjin, Shanghai and Chongqing. Twenty-two provinces, five autonomous regions (Inner Mongolia, Guangxi, Tibet, Ningxia and Xinjiang) and two special administrative regions (Hong Kong and Macao) are ranked the same as the ministries and commissions in the State Council.

Provinces are the highest level of local governments. As of today, excluding Taiwan, Hong Kong and Macau, China has 31 provincial units — 4 centrally administrated cities (Beijing, Shanghai, Tianjing and Chongqing), 22 provinces and 5 autonomous regions. A province ranks at the same level as a ministry in the central government. There are three level of cities in China, namely municipalities, prefecture-level cities, and county-level cities. Sub-provincial cities are prefecture-level, and sub-prefecture-level cities are county-level. By the end of 2005, China had more than 660 cities. The largest cities are the four centrally administered municipalities, which include Chongqing, Shanghai, Beijing and Tianjin. Counties are found in the third level of the local governments, whose number is more than 1400. Township is the lowest level of central government and exists in smaller rural areas.

The hierarchy of Chinese politicians

Following the hierarchy of central and local governments, government officials are ranked at four levels in China. Generally speaking, officials of a higher-level government are ranked higher in the political hierarchy and thus have more political power than their lower-level counterparts.

Except the central party and state leaders at the national level, i.e., President, Premier and other top leaders, the highest ranked political position is "Bu". Provincial leaders (i.e., the provincial party secretary and governor) and ministers of State Council ministries and commissions are ranked at this level.[13] The next rank is "Ting", which includes municipal-level positions (such as mayors) and department heads of government bureaus. The third rank is "Chu" and includes county-level positions and directors of government divisions. The lowest rank is "Ke"; government officials at township level and section chiefs of government bureaus are at this level. In the Chinese political system, officials at the rank of "Bu" or "Ting" are considered as high-level officials. Table A.1 summarizes the structure of the hierarchy.

In 1984, China replaced the two-rank down system with a one-rank down system as part of the decentralization. This means that, for example, the Central Committee only managed directly leaders at ministerial and provincial level. The decentralization greatly reduced the number of cadres directly managed by the Central Committee and enabled provincial leaders to gain almost complete control over appointments and dismissals of officials within their territorial jurisdiction. The change increased the possibility that

[13] In some highly ranked municipalities, e.g., Nanjing, mayor tends to be ranked half a rank above his/her counterparts of other municipalities and the same as deputy minister.

provinces become increasingly in-grown. According to Lieberthal (1995), there was a general increase in the percentage of provincial appointments below the top level in which the appointee's previous position was in the same province. As a result of the 1984 reform, local governments, especially at the provincial level, revolved from an agent of the center to governments with their own resources and interests.

4 The model

In this section, we use an assignment model, built on Jovanovic (1998) to examine the mapping of heterogeneous firms and politicians.

4.1 Consumers

The economy consists of two sectors, one of which produces a homogeneous product and the other differentiated products. Consumers have a CES sub-utility function for the differentiated good given by

$$U = \left[\int_{i \in \Omega} q(i)^{\alpha} di \right]^{\frac{1}{\alpha}}, \tag{1}$$

where $q(i)$ represents the consumption of variety i and Ω is the set of varieties available. The constant elasticity of substitution across varieties is given by $\varepsilon = 1/(1-\alpha) > 1$ with $0 < \alpha < 1$. Given this utility function, the demand for each variety is

$$q(i) = Ap(i)^{-\varepsilon}, \tag{2}$$

where

$$A \equiv E / \int_{i \in \Omega} p(i)^{1-\varepsilon} di,$$

$p(i)$ is the price of the variety i, and E is the country's total spending on the differentiated product.

4.2 Producers

There is a continuum of N producers in the economy. Each producer draws a "physical" productivity θ from a cumulative distribution function $G(\theta)$. This productivity is determined by the efficiency of physical capital (e.g., machinery) and production workers. The producer also employs a director from a continuum of L units of labor whose ability

is given by the cumulative distribution function $F(a)$. Note the ability considered here is broadly defined and can be interpreted as either conventional or political ability. Given θ and a, the producer incurs a constant marginal cost $c/(\theta_i a_i)$, where c represents the cost of a cost-minimizing bundle of inputs. The marginal cost is assumed to decrease in both "physical" productivity θ_i and director ability a_i.[14]

The objective of the firm is to maximize the following profit function:

$$\pi(\theta_i) = \max_{p_i, a_i} \left\{ \left(p_i - \frac{c}{\theta_i a_i} \right) q_i - w(a_i) \right\}, \tag{3}$$

where $w(.)$ is a price function of labor ability that the firm takes as given. Given the demand function in (2), the firm sets its profit-maximizing price at

$$p_i = \frac{c}{\alpha \theta_i a_i}, \tag{4}$$

which is a constant mark-up of the marginal cost. The firm also chooses the director ability $a_i = \phi(\theta_i)$ that satisfies:

$$(\varepsilon - 1) \left[\frac{\theta_i \phi(\theta_i)}{c} \right]^{\varepsilon - 1} \frac{B}{\phi(\theta i)} - w'(\phi(\theta i)) = 0, \tag{5}$$

where $B \equiv (1-\alpha)\alpha^{\varepsilon-1} A$. Given p_i and a_i, the profit the firm receives is

$$\pi(\theta_i) = \left[\frac{\theta_i \phi(\theta i)}{c} \right]^{\varepsilon - 1} B - w(\phi(\theta i)). \tag{6}$$

4.3 Entry decision

There is free entry of firms. The free entry condition determines the wage of the lowest-ability workers that are employed by the producers. Let $\underline{a}$ denote the minimum ability; it solves the following problem:

$$\pi(\underline{\theta}) = 0 \quad \Longrightarrow \quad \left[\frac{\underline{\theta} \cdot \underline{a}}{c} \right]^{\varepsilon - 1} B = w(\underline{a}), \tag{7}$$

where $\underline{a} = \phi(\underline{\theta})$.

[14] We assume here "physical" productivity and director ability are two separable components of total factor productivity. In the data, we observe only total factor productivity and director ability. To examine the causal effect between the two, we estimate in Section 6 how the lagged total factor productivity affects the firm's decision to recruit new directors.

4.4 Labor market clearing

For the labor market to clear at each ability level a, we need, for any θ, that the number of firms exceeding θ equal the labor allocated to these firms:

$$N \cdot \int_{\theta}^{\infty} dG(v) = L \cdot \int_{\phi(\theta)}^{\infty} dF(v) \quad \text{for all } \theta. \tag{8}$$

The above equation defines $\phi(.)$ uniquely in terms of $G(.)$ and $F(.)$ and allows us to recover the equilibrium wage function. Assume both θ and a follow a pareto distribution with $G(\theta) = 1 - (b/\theta)^{k_1}$, where b is the minimum productivity and k_1 is the shape parameter, and $F(a) = 1 - (z/a)^{k_2}$, where z is the minimum ability and k_2 is the shape parameter. Equation (8) can then be simplified to

$$a = \phi(\theta) = \left(\frac{\theta}{b}\right)^{\frac{k_1}{k_2}} \left(\frac{L}{N}\right)^{\frac{1}{k_2}} z \tag{9}$$

or

$$\ln a = \frac{k_1}{k_2} \ln \theta + \frac{1}{k_2} \left[\ln L - \ln N - k_1 \ln b + k_2 \ln z\right]. \tag{10}$$

It is clear that $\phi'(\theta) > 0$, i.e., the assignment is positive so that the more productive firms match with the more capable individuals.

Since $w(a) = w(\underline{a}) + \int_{\underline{a}}^{a} w'(v)dv$, equations (5) and (7) imply that the wage function is

$$w(a) = r(\underline{\theta}, \underline{a}) + \int_{\underline{a}}^{a} r_2(\phi^{-1}(v), v)dv \tag{11}$$

for $a \in [\underline{a}, \infty]$, where $r(\theta, a) \equiv (\theta a/c)^{\varepsilon - 1} B$. This can be further simplified to

$$\begin{aligned} w(a) &= \frac{k_1}{k_1 + k_2} r(\phi^{-1}(a), a) - \frac{k_2}{k_1 + k_2} r(\underline{\theta}, \underline{a}) \\ &= \frac{1}{k_1 + k_2} \frac{B}{c^{\varepsilon - 1}} \left[k_1 \left(\phi^{-1}(a) \cdot a\right)^{\varepsilon - 1} - k_2 \left(\phi^{-1}(\underline{a}) \cdot \underline{a}\right)^{\varepsilon - 1}\right]. \end{aligned} \tag{12}$$

Taking natural log of both sides of equation (12), we obtain

$$\begin{aligned} \ln w(a) &= \ln \left[\frac{k_1}{k_2} \left(\frac{\phi^{-1}(a) \cdot a}{\phi^{-1}(\underline{a}) \cdot \underline{a}}\right)^{\varepsilon - 1} - 1\right] + \ln B - (\varepsilon - 1) \ln c \\ &\quad + \ln \frac{k_2}{k_1 + k_2} + (\varepsilon - 1) \ln \left[\phi^{-1}(\underline{a}) \cdot \underline{a}\right]. \end{aligned} \tag{13}$$

Now consider the profit received by each firm. It is given by

$$\pi(\theta_i) = \frac{k_2}{k_1 + k_2} \frac{B}{c^{\varepsilon-1}} \left[(\theta_i \phi(\theta_i))^{\varepsilon-1} - (\underline{\theta}\phi(\underline{\theta}))^{\varepsilon-1} \right], \tag{14}$$

which is equivalent to

$$\ln \pi(\theta_i) = \ln \left[\left(\frac{\theta_i \phi(\theta_i)}{\underline{\theta}\phi(\underline{\theta})} \right)^{\varepsilon-1} - 1 \right] + \ln B - (\varepsilon - 1) \ln c + \ln \frac{k_2}{k_1 + k_2} + (\varepsilon - 1) \ln \underline{\theta}\phi(\underline{\theta}) \tag{15}$$

by taking natural logs of equation (14).

In the empirical analysis, we examine the characteristics of equilibrium which consists of an assignment function $\phi(\theta)$ (equation (9)), a wage function $w(a)$ (equation (12)), and a profit function $\pi(\theta_i)$ (equation (14)). All combinations of (θ, a) other than $(\theta, \phi(\theta))$ are predicted to yield negative profits.

5 Data

We use a unique Chinese firm-director level panel dataset to undertake the empirical tasks. The data includes all the public companies incorporated in the People's Republic of China. Because state- and privately-controlled companies are still distinctive in corporate governance and the extent of government intervention (Section 2.1), we focus on firms whose shareholders do not include government entities such as SASAC. This helps us examine the hiring decision in a profit-seeking environment and ensure the estimated relationship between firm productivity and director political ability reflects an outcome jointly determined by the producer and political labor market, rather than a selection by the government. There are over 1200 firms in the data during the period of 2004-2007.

The dataset consists of two parts. First, it includes the financial, location and ownership information of firms. The financial section of the data is obtained from the COMPUSTAT and company annual reports and covers the period of 2003-2007.[15] It includes information such as sales, employment, investment, capital stock, and profit.[16] We use these data and the methodology outlined in Olley and Pakes (1996) to estimate each firm's total factor productivity.[17] The location and ownership information is supplied by

[15] COMPUSTAT is a global database of financial and market information on publicly listed companies. It covers approximately 98% of the world's market capitalization.

[16] Empolyment data in the COMPUSTAT is largely missing for Chinese firms. We manually collected these data from published annal reports.

[17] We also considered alternative measures such as labor productivity and market share. As to be

China Stock Market & Accounting Research (CSMAR). Based on the ownership data, we identify the ownership structure of each firm, e.g., the share of foreign ownership. This is valuable for differentiating the incentive of political investment between domestic and foreign-owned companies.

The second part of the dataset is structured at firm-director-year level.[18] The data reports the name, detailed biography, education, starting date and compensation of all the executives and board members associated with the publicly listed companies between 2004 and 2007. The filing of these information is required by China Securities Regulatory Commission (CSRC) and is supplied by CSMAR. There are in total 36,308 individuals and 89,608 observations in the data. For each individual, the data reports a detailed biography. The biography is organized in the format required by the CSRC and describes each individual's education (including school of education), previous work experience, and previous government positions (including the time period in each position). We carefully examined each biography and identified all the political positions previously held by the individual.[19] For each identified position, we match the rank of the positions to the Chinese political hierarchy described in Table A.1. A position is ranked as 3 if it is at the level of "Bu".[20] This includes provincial Party Secretaries, governors as well as ministers of State Council ministries and commissions. We rank a position as 2 if it is at the level of "Ting", which includes municipal-level positions (such as mayors) and department heads of government bureaus. The lowest rank that is taken into account is "Chu" and takes the value of 1. It includes county-level positions and directors of government divisions.[21]

As described in Section 1, the number and composition of participating politicians varies over time. Table A.2 shows that the number of politicians engaged in private sectors was 878 in 2004. The figure decreased to 660 in 2005 but increased to 793 in 2007. Within the pool of politicians, there is an increasing trend in the political power. 13 percent of participating politicians in 2004 was at the level of "Bu" (the top tier of

shown, the results were qualitatively similar.

[18] We use the term director loosely in the paper and refer to both executives and board members. We considered distinguishing the two by taking into account only executives or board members. The results were qualitatively similar. In Section 7 where we examine the compensation, we focus exclusively on executives.

[19] The descriptive format in which the original information was presented made the process extremely challenging. We verified each record after constructing the data to ensure the accuracy.

[20] We also considered alternative weighting schemes, such as treating each rank equally, including only the highest rank, and allowing for an exponential effect, and found the results largely similar.

[21] Note we focus on bureaucratic ranks at or above "Chu" and do not take into account officials ranked at "Ke" (i.e., section chief of government bureau, township party secretary and magistrate). "Ke" is the lowest level of political hierarchy and considered to have the minimum power. Classifying this rank requires considerable judgement.

hierarchy); this group increased to 19 percent in 2007.

In addition to the level of political positions, we identified the number of political positions held by each individual and computed the average rank of the positions. We use these two as alternative measures of political endowment. As shown in Table A.3, there is a large positive correlation between the level of political rank and the number of previous positions. Individuals with a higher political rank tend to have held a larger number of positions. This is consistent with the political system in China, where officials generally start at lower levels and are gradually promoted based on their political performance.

We also take into account each individual's education and professional credential. We measure education based on the highest degree earned. This variable ranges from 0 to 5, with the values corresponding to, from low to high, no high school degree, high school, college, master's and doctoral degree.[22] Noteworthily, the data shows a negative correlation between education and measures of political capital (Table A.3). Among all the employed directors, people that have more political capital appear to have received less education.[23] We also observe in the data whether each person has a professional credential such as Certified Public Accountant (CPA). We capture this information with a dummy variable and use it, together with education, to disentangle the correlation between political accomplishment and education attainment.

Finally, we take advantage of the panel nature of the data and identify the new hires by each company in each year. This information permits us to establish the causal effect of firms' performance in a lagged period on their hiring decision. The data records significant turnovers. The average number of newly hired directors is around 6.75. More than 20 percent of the companies have recruited at least one politician between 2004 and 2007. Tables 1 and 2 summarize the descriptive statistics of all the firm- and director-level variables, respectively. To control for the effect of geographic factors such as population and regional policies, we include a city-year fixed effect throughout the empirical analysis. We also employ a set of SIC 3-digit industry dummies to capture all industry specific characteristics.[24]

[22] There are some missing values in the education variable. This leads to a smaller number of observations when education is included in the estimation.

[23] A possible explanation is the poor provision of education service prior to the early eighties.

[24] In Section 6.2, we examine how some industry and geographic specific attributes such as dependence on external financing and governance quality may lead to differential incentives to invest in political capital. In Section 7 when we examine individual compensation, we include a firm-year fixed effect to control for all time-variant firm characteristics. We rely on only within-firm variation to explain the effect of political ability on director pay. Ideally, we would also like to adopt a firm fixed effect (instead of industry dummies) in Section 6. However, given the relatively short panel and the small variation in productivity, firm dummies would substantially reduce the degrees of freedom.

6 The matching of heterogeneous firms and politicians

6.1 Firm productivity and political capital investment

We begin our empirical analysis by first investigating the assignment function $\phi(\theta)$ represented in equation (10). As shown in Table 3, we find a positive and statistically significant relationship between TFP and the probability of having politicians on board as expected. Column (1) indicates that a 100-percent increase in productivity is associated with 4 percentage point increase in the likelihood of employing a politician. More productive firms also tend to have more, as shown by column (2), especially those with a higher political rank and a larger number of positions, as suggested by columns (3)-(5). Specifically, firms with 100-percent greater productivity have on average 0.8 more former official. The average political rank of their directors is also 0.8 higher. Finally, we observe an insignificant relationship between firm productivity and director education and a positive and significant correlation with director credential.

[Table 3 about here]

While the above results indicate a positive correlation between firm efficiency and the level of human politician capital, they are not suggestive of the causality between the two variables. As described in Section 4, director ability is is one of the components of total factor productivity. To establish the causal effect of firm productivity on political investment decision, we examine next firms' decision to hire politicians. We proceed by first identifying the new hires of each company in each year. Then we estimate how firms with heterogeneous lagged productivity vary in their hiring preferences. The results are reported in Table 4.[25] We find that more productive firms are significantly more likely to recruit politically endowed individuals than their less efficient counterparts. They also prefer to hire politicians from the higher level of hierarchy and those that held a larger number of positions. The average political rank of new directors is 0.5 higher in firms whose productivity is 100-percent higher than average. This matching does not apply to conventional human capital investment, however. Firms with a greater productivity do not have a significantly stronger preference for educated individuals or individuals that hold professional credentials.

[25] Firms that did not have any new hires are not included in the analysis.

[Table 4 about here]

In Table 5, we consider an alternative proxy of efficiency. We follow Helpman et al. (2004) and note that the firm-heterogeneity model considered in Section 4 suggests a positive correlation between firm productivity and market share.[26] This correspondence motivates Helpman et al. (2004) to use each company's market share as a measure of total factor productivity. Here we consider the same strategy and examine the robustness of our results. As shown in Table 5, the findings are largely similar to Table 4. Firms with a larger market share exhibit a stronger motive to invest in political capital. Directors recruited by the larger companies are not only more powerful in terms of the bureaucratic rank but also more experienced in terms of the number of held positions. Similar to Table 4, there is little correlation between firm market share and new hires' average education level even though the parameter of professional credential became significant and positive. We also used profitability as another measure of firm efficiency. As shown in Table 6, the results are largely similar: More profitable businesses have a greater tendency to recruit politicians.

[Tables 5-6 about here]

6.2 The differential incentive of political capital investment

6.2.1 Liquidity constraint

According to a cross-country survey data reported by Batra et al. (2003), firms in China are among the most constrained in the world in terms of access to capital. The level of financial constraints reported by Chinese entrepreneurs is similar to those prevailing in other transitional economies, such as the Czech Republic and Romania, and in poor economies, such as Ghana and Ethiopia. The surveys organized by the Chinese government reach similar conclusions. A research report based on a private-sector survey conducted in 2002 concludes that financing continues to be a major challenge for many private firms. This finding is not surprising given the controlled financial system in China. Even with the entrance and growth of many domestic and foreign banks and financial institutions in recent years, China's banking system is still mainly dominated by the four largest state-owned banks, i.e., Bank of China, People's Construction Bank of China, Agricultural Bank of China, and Industrial and Commercial Bank of China.

[26] This is a feature of the model where price is a constant markup of the marginal cost of production.

According to Allen et al. (2008), around 30 percent of publicly listed companies' funding comes from bank loans; about 45 percent comes from self-fund raising, including internal financing and proceeds from equity and bond issuance. The lack of access to long-term capital and the resulting high dependence on self-fund raising constitutes a large impediment to business growth. An effective approach to overcome this impediment is to build political connections.

To test this hypothesis, we examine in this sub-section the differential incentives of firms to invest in political capital dependent on their dependence on external finance. We construct an industry specific measure of external capital dependence following the approach of Braun (2003). This variable is measured by the share of capital expenditure not financed with cash flow from operations for the median firm in each industry. It is constructed based on all publicly listed companies. We include this measure along with firm productivity and estimate how an industry's reliance on outside financing affects its firms' political investment decision. The results are reported in Table 7. The evidence is broadly consistent with the expectation. We find firms with a larger external capital dependence have a greater incentive to recruit politicians. They are also motivated to hire politicians from a higher tier of political hierarchy and with a larger number of previously held positions. These firms are however not significantly different from their counterparts in preferences for education and professional training. This suggests that raising firms' credit access is a value that is exclusive to political capital investment.

[Table 7 about here]

6.2.2 Foreign ownership

In this sub-section, we examine the incentive of foreign owned firms to invest in political capital. Companies with foreign ownership may differ from domestic firms in three aspects. First, they enjoy more favorable treatment from central and local governments. Haggard and Huang (2008) point out that since China became open to foreign direct investment, it has established a preferential regime for overseas investors. The preferential treatment includes moderate taxes and concessionary terms on land rental and utility rate. Second, firms with foreign ownership are less dependent on access to local bank loans. They instead rely more on funds from foreign investors as a main source of financing. Both of the above factors lower the marginal return of political investment and consequently the incentive to invest in political capital. However, foreign owned firms also tend to have less knowledge about government regulations and often experience a greater

difficulty in navigating the complex institutional environment. Survey evidence presented in Rosen (1999), for example, suggests that Western investors in China are challenged by administrative difficulties and operational inefficiencies. They are also deterred in some cases by the lack of transparency and oversight. These attributes predict a stronger incentive to build political connections. To estimate the net effect of foreign ownership on the decision to invest in political capital, we proceed next to include each firm's share of foreign ownership in the estimation.

As shown in Table 8, firms with a larger share of foreign ownership are found to have a lower probability to recruit politicians than their host-country domestic counterparts. The average probability of hiring politicians is 0.17 for firms with a positive foreign ownership but 0.21 for firms that are domestically owned. Firms with foreign ownership also exhibit weaker incentive to hire powerful government officials. The average political rank of new hires is 0.40 for foreign owned firms but 0.43 for the domestic. These results lend support to the first two hypotheses where foreign owned firms are predicted to derive less benefits from employing politicians given the level of preference they already receive and the level of dependence on host-country financing. We do not observe a significant difference in the level of education of new hires between foreign and domestically owned firms, but surprisingly we find firms with foreign ownership are less likely to recruit individuals with domestic professional credential than their domestic competitors.

[Table 8 about here]

6.2.3 Governance quality

As described in Section 2, local government officials in China retain a large degree of discretion after the administrative decentralization. For example, every investment contract has to be approved by some government level: Provinces and zones have the authority to approve projects valued at up to $30 million; county governments are able to approve projects below $10 million. Local governments are also responsible for enforcing national regulations such as the protection of intellectual property rights.

These decentralizations led to a large dispersion in governance quality across administrative units. A recent survey conducted by the World Bank (2006) in 120 Chinese cities find a significant geographic difference in institutional environment. Given the uniform rule of law, this difference was attributed to the variant governance quality across regions. For example, the statistics show that in the top 10th percentile cities, the average days of dealing with government are around 36 per year, whereas firms in the bottom

10th percentile cities spend on average 87 days. There is also a substantial difference in companies' expenditure on entertainment, a variable often considered as a measure of corruption. In cities of the top 10th percentile, entertainment expenditure constitutes 0.7 percent of revenue. Firms located in the bottom 10th percentile cities spend 1.7 times more. The survey also reports variation in firms' confidence on intellectual property protection and contract enforcement. Based on all the considerations, six cities, including Hangzhou, Qingdao, Shaoxing, Suzhou, Xiamen and Yantai, were evaluated to have superior institutional environment.

In this subsection, we investigate how geographic variation in governance quality affects firms' incentive to connect with politicians. We include two measures, the number of days dealing with governments and the level of confidence in contractual enforcement, and interact them with firm productivity. The results are reported in Table 9. We find both dimensions of governance quality exert a significant effect on firms' incentive to recruit politicians.[27] Firms located in cities with more inefficient governments exhibit a greater probability to hire directors with a political background. Similarly, firms in areas where there is less confidence in contractual enforcement are more likely to invest in politicians, especially those with a higher bureaucratic rank. In the meantime, we find governance has little effect on firms' preference for education.

[Table 9 about here]

7 The price of political capital

After examining the matching of firms and politicians, we ask in this section: How is the price of political capital determined by the matched pairs? Recall in Section 4 we predict in equation (12) that wage rate is an increasing function of individual ability and firm productivity, i.e., $w(\theta, a)$ where $a = \phi(\theta)$. To test this hypothesis, we investigate the level of compensation offered to new hires by each company controlling for the matching effect reflected in $\phi(\theta)$.[28] We start with firm-level data and then proceed to individual level.

[27] Note the "inefficiency" variable is measured by the average number of days dealing with governments and is negatively correlated with governance quality. The "contractual" variable is measured by the average confidence on IPR protection and contractual enforcement and is positively correlated with governance quality. The parameters of the two variables should therefore exhibit opposite signs.

[28] We focus here on the pay received by executives. Furthermore, we differentiate the different levels of executives by either including either a position fixed effect (e.g., separate dummy variables for CEO, senior managers and etc.) or restricting the data to a certain position such as top executive like CEO or general manager. Results obtained based on the former are reported here.

The firm-level estimation consists of two stages. First, we repeat the analysis in Section 6 and examine each firm's choice of human political capital. Based on the estimates, we predict each firm's preferred level of political capital and obtain the fitted level of average political rank held by new directors, i.e., $\widehat{a} = \widehat{\phi(\theta)}$. In the second stage, we estimate the effect of selected human political capital $\widehat{a}$ on the level of compensation taking into account the selection bias. To satisfy the exclusion condition required in this procedure, we adopt politician "turnover" among competitors as an instrumental variable. Specifically, we identify politicians that were previously employed in peer companies from the same industry and city. We restrict the pool to include only individuals that became unemployed in the same year and are below 65 years old.[29] Those that exited their previous employment more than a year ago were excluded because the probability that they are still available is relatively low. Individuals above 65 years old are also assumed to be less likely to be active in the labor market and were excluded as well. We obtain the simple and weighted count as well as the average rank of politicians in the turnover pool. The latter is used as an instrumental variable.

The choice of turnover quality as a potential instrument is motivated by two rationales. First, we expect that companies where there is a high-quality turnover among competitors to have a greater opportunity to hire politically endowed directors, especially those at a higher rank. They may also have a greater incentive to engage in political investment given the peer effect. But, on the other hand, the average quality of these politicians should not have a direct effect on the level of compensation given to the individual that is ultimately selected.[30]

[Table 10 about here]

Columns (1)-(3) of Table 10 confirm that there is a positive and significant relationship between the quantity and quality of turnover and the political rank of new hires. The political ability of a company's new hires is higher when competitors in the same city and industry experience a large turnover of higher level politicians. Based on column (3), we obtain the fitted political ability of new hires, which we will include in the second stage.

We also apply this procedure to examine firms' choice of conventional human capital. Specifically, we calculate the average education level and credential holding of the same

[29] We also considered different threshold ages such as 60 and found results largely similar.

[30] One may argue that the politician turnover among competitors can place downward pressure on the price of political capital because of the supply effect. We mitigate this concern by using the quality, instead of quantity, of the turnover as the instrument. Furthermore, the rational we provided above predicts a positive indirect effect on the price of political capital whereas the argument here would suggest a negative impact.

turnover pool and use these two variables as instruments. As shown in columns (4) and (5) of Table 10, the results are largely consistent with the expectation. While the education level of new director supply does not affect firms' choice of new hires, firms have a greater probability of recruiting individuals with professional credential when their competitors experience such a turnover.

With the fitted values of the three measures of human capital, we then estimate in the second stage the role of political and education in determining the level of compensation. As shown in the last column of Table 10, there is a significant and positive relationship between the strength of political capital and director pay. Companies whose new hires are more politically endowed tend to offer a larger amount of compensation. A one-step rise in the average rank leads to 40 percent increase in compensation. We also observe a positive relationship between firm productivity and director pay, as expected from the theory. Firms with 100 percent greater productivity offer 18 percent more pay.

In stark contrast to the price of political capital, we observe little correlation between conventional human capital and the level of compensation. An increase in new hires' education attainment from, for example, high school to college does not lead to any significant increase in the pay rate. A similar result applies to the effect of professional credential.

Next we re-examine the pricing function of human capital using firm-director level data. Analysis at this level allows us to control for all firm-year specific factors using firm-year fixed effect and estimate the effect of political capital based on within-firm variation. This mitigates the potential selection bias in the level of political and conventional human capital.[31] Table 11 reports the results. We find political capital is the only significant factor in determining the level of compensation. New hires with a greater political ability, measured by either the bureaucratic rank or the number of posts, receive more pay than their co-workers. A one-step increase in political rank leads to 5 percent increase in annual pay. Most of this effect is seen at the top tier: Individuals ranked at the "Bu" level receive 31 percent more compensation than those ranked at "Ting", an equivalence of US$17,359. Education and professional training, on the other hand, do not appear to affect labor value.

[Table 11 about here]

[31] The inclusion of firm-year fixed effect also means that firm productivity will drop out of estimation.

8 The return of political investment

Last, we address the return of political capital investment. In particular, we examine equation (15) of Section 4 and estimate each firm's profit, $\ln \pi$, as a function of firm productivity θ_i and human (including political) capital $a = \phi(\theta_i)$. As described in Section 1, a large literature has been devoted to examining the effect of political connections on firms' economic performance without taking into account the endogeneity of political connections. We show here this can lead to significant bias in the estimated effect and misleading conclusion on the return of political capital.

We proceed by first estimating the profit function without correcting the selection bias. As shown in Table 12, we find a positive and significant correlation between a firm's stock of political capital and its level of profit. Firms that have politicians on board earn a greater level of profit than the others. Quantity of politicians also matters. One additional government officials leads to 16 percent increase in profit. As expected, the effect varies with the level of political ability. One step increase along the political hierarchy is associated with 8 percent more profit. There is also a positive correlation between the level of education and firm profitability. Companies that have more educated directors perform better than their counterparts.

[Tables 12-13 about here]

In columns (5)-(8), we take the first difference of profit and examine the effect of new hires on immediate profit growth. We find political investment becomes the only significant factor in these regressions. Firms that newly recruited government officials experience a greater immediate growth in profit. This effect also increases in the quantity of political new hires and the rank/number of positions. The conventional human capital does not appear to have a significant effect.

Now we take into account the selection bias embodied in the new hire variables. Specifically, we adopt a similar two-stage procedure as in Section 7 and first estimate the hiring decision as a function of firm productivity and within-industry-city politician turnover. We then obtain the fitted values of these new hire variables and examine their effect on firm performance. As shown in Table 13, political capital no longer exerts a significant effect on short-term profit growth after we correct for selection. Instead, industry and city factors appear to be the main determinants. This suggests that political investment does not yield immediate gain in profit.

[Table 14 about here]

We also consider an alternative strategy and restrict the evaluation to firms that share similar characteristics. Specifically, we perform a nearest-neighbor matching procedure and identify a control unit for each firm that newly recruited a government official, which we define as the treated. The control group is formed based on the propensity to hire politicians (obtained from Section 6.1) and consists of firms that exhibit similar probability but have not actually recruited any politician. We then compare the profit growth of the treated group with the matched control group and estimate the effect of hiring politicians (i.e., treatment). The matching procedure led to 578 pairs of firms. As shown in Table 14, we find the average treatment effect is around 0.19, significantly smaller than the estimate reported in column (1) of Table 13. But the effect is not statistically significant. The result remains similar when we consider a radius matching technique.

9 Conclusion

Politician recruiting is an increasingly prevailing phenomenon in China since the great economic transformation. It was exacerbated as the country undertook a sequence of bureaucratic reforms — raising the supply and value of local politicians — and a privatization process that led to growing demand for political connections.

We investigate in this paper the differential decisions of heterogeneous firms to engage in political investment, and how these decisions lead to the differential market values of politicians. We find that more productive firms are more likely to hire politically endowed individuals than their less efficient competitors. The incentive increases in firms' dependence on external financing and decreases in the extent of foreign ownership. It also varies with governance quality: Firms located in cities where there is lower government efficiency and poorer contractual enforcement exhibit significantly stronger motive to build political connections. Conditional on the probability of being hired, individuals with greater political asset receive significantly more compensation than their co-workers. The marginal effect of one-step increase in political ladder from "Ting" to "Bu" is equivalent to a pay increase of 31 percent or equivalently US$17,359. In stark contrast to the value of political capital, we observe little correlation between conventional human capital and the level of compensation. Raising education attainment from, for example, high school to college does not lead to any significant increase in the pay level.

We also examine the short-term return of political investment taking into account the endogenous matching of firms and politicians. We find the estimated return in immediate profit growth is sensitive to the control of selection bias. Without correcting

for the endogeneity of political investment, we find a positive correlation between the stock of political capital and the level of profit and between the inflow of political capital and profit growth. The relationship vanishes once we address the endogenous decision to hire politicians. This stresses the importance of taking into account the endogenous politician recruitment decision in the evaluation of political investment return.

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Table 1: Summary statistics of firm variables

variable	definition	mean	std.	min	max
total stock					
politician dummy	an indicator that equals 1 if there is at least one politician and 0 otherwise	0.37	0.48	0	1
politician count	the number of politicians on board	0.61	1.06	0	11
max rank	the average of the highest rank held by the politicians	0.76	1.02	0	3
num. of posts	the average number of political positions held by the politicians	0.42	0.59	0	4
ave. rank	the average rank of political positions held by the politicians	0.74	1.00	0	3
ave. education	the average education level of executives	3.16	0.37	1.57	5
ave. credential	the percentage of executives with professional credential	0.31	0.28	0	1
new hires					
politician dummy	an indicator that equals 1 if there is at least one politician and 0 otherwise	0.20	0.40	0	1
politician count	the number of politicians	0.31	0.76	0	9
max rank	the average of the highest rank held by the politicians	0.42	0.85	0	3
num. of posts	the average number of political positions held by the politicians	0.24	0.51	0	5
ave. rank	the average rank of political positions held by the politicians	0.07	0.23	0	3
ave. education	the average education level of executives	3.17	0.40	1	5
ave. credential	the percentage of executives with professional credential	0.31	0.34	0	1
financial attributes					
firm productivity	estimated firm total factor productivity (in log)	2.52	1.06	-4.37	7.40

Table 2: Summary statistics of director-level variables

variable	definition	mean	std.	min	max
politician dummy	an indicator that equals 1 if the executive held a political position and 0 otherwise	0.03	0.18	0	1
max rank	the highest political rank held by the executive	0.07	0.38	0	3
number of posts	the number of political positions held by the executive	0.04	0.22	0	6
ave. rank	the average political rank held by the executive	0.07	0.37	0	3
education	the level of education of the executive	3.12	0.71	1	5
credential	an indicator that equals 1 if the executive has a professional credential	0.32	0.46	0	1

Table 3: The assignment of firm productivity and political ability

Dependent variables:	political capital					education	
	(1) dummy	(2) count	(3) max rank	(4) posts	(5) ave. rank	(6) educ.	(7) cred.
productivity	0.04***	0.08***	0.08***	0.04***	0.08***	0.01	0.01***
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.00)
city-year fe	yes	yes	yes	yes	yes	yes	yes
ind. fe	yes	yes	yes	yes	yes	yes	yes
num. of obs.	3,920	3,920	3,920	3,920	3,920	3,510	3,920
R square	0.42	0.48	0.42	0.43	0.42	0.43	0.46
Root MSE	0.44	0.93	0.95	0.54	0.93	0.31	0.26

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 4: The assignment of firm productivity and political ability of new hires

Dependent variables:	political capital					education	
	(1) dummy	(2) count	(3) max rank	(4) posts	(5) ave. rank	(6) educ.	(7) cred.
productivity	0.02**	0.03	0.05***	0.02*	0.01	0.01	0.01
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
city-year fe	yes	yes	yes	yes	yes	yes	yes
ind. fe	yes	yes	yes	yes	yes	yes	yes
num. of obs.	2,840	2,840	2,840	2,840	2,840	2,023	2,840
R square	0.42	0.44	0.41	0.40	0.45	0.48	0.46
Root MSE	0.38	0.71	0.83	0.49	0.21	0.38	0.32

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 5: The assignment of firm productivity and political ability of new hires: market share

Dependent variables:	political capital					education	
	(1) dummy	(2) count	(3) max rank	(4) posts	(5) ave. rank	(6) educ.	(7) cred.
market share	0.01***	0.03**	0.04***	0.02**	0.01*	0.01	0.01***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
city-year fe	yes	yes	yes	yes	yes	yes	yes
ind. fe	yes	yes	yes	yes	yes	yes	yes
num. of obs.	3,293	3,293	3,293	3,293	3,293	2,337	3,293
R square	0.39	0.41	0.38	0.40	0.41	0.47	0.43
Root MSE	0.38	0.69	0.83	0.48	0.22	0.38	0.32

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 6: The assignment of firm productivity and political ability of new hires: profitability

Dependent variables:	political capital					education	
	(1) dummy	(2) count	(3) max rank	(4) posts	(5) ave. rank	(6) educ.	(7) cred.
profitability	0.01**	0.03**	0.03**	0.01	0.00	0.01	0.01***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
city-year fe	yes	yes	yes	yes	yes	yes	yes
ind. fe	yes	yes	yes	yes	yes	yes	yes
num. of obs.	2,404	2,404	2,404	2,404	2,404	1,688	2,404
R square	0.40	0.43	0.40	0.40	0.42	0.50	0.43
Root MSE	0.39	0.69	0.83	0.49	0.21	0.37	0.33

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 7: The assignment of firm productivity and political ability of new hires: external finance dependence

Dependent variables:	political capital					education	
	(1) dummy	(2) count	(3) max rank	(4) posts	(5) ave. rank	(6) educ.	(7) cred.
productivity	0.02**	0.04***	0.05***	0.02***	0.01**	0.01	0.01**
	(0.01)	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)	(0.00)
external dep.	0.001*	0.001	0.003*	0.003***	0.000	0.001	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
city-year fe	yes	yes	yes	yes	yes	yes	yes
num. of obs.	2,838	2,838	2,838	2,838	2,838	2,022	2,838
R square	0.33	0.34	0.32	0.33	0.33	0.39	0.35
Root MSE	0.40	0.74	0.86	0.51	0.23	0.40	0.34

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 8: The assignment of firm productivity and political ability of new hires: foreign ownership

Dependent variables:	political capital					education	
	(1) dummy	(2) count	(3) max rank	(4) posts	(5) ave. rank	(6) educ.	(7) cred.
productivity	0.02*	0.03	0.05***	0.02*	0.01	0.01	0.01
	(0.01)	(0.03)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
foreign	-0.25*	-0.32	-0.50*	-0.37	-0.06	-0.04	-0.34***
	(0.15)	(0.22)	(0.32)	(0.27)	(0.10)	(0.37)	(0.12)
city-year fe	yes	yes	yes	yes	yes	yes	yes
ind. fe	yes	yes	yes	yes	yes	yes	yes
num. of obs.	2,840	2,840	2,840	2,840	2,840	2,023	2,840
R square	0.42	0.44	0.41	0.40	0.45	0.49	0.46
Root MSE	0.39	0.71	0.83	0.49	0.21	0.38	0.32

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 9: The assignment of firm productivity and political ability of new hires: governance quality

Dependent variables:	political capital				education			
	(1) count	(2) max rank	(3) count	(4) max rank	(5) educ.	(6) cred.	(7) educ.	(8) cred.
productivity	-0.14	-0.04	0.25**	0.19**	0.07	0.01	-0.03	0.09***
	(0.10)	(0.08)	(0.12)	(0.09)	(0.05)	(0.03)	(0.05)	(0.03)
× inefficiency	3.64***	1.72			-1.11	-0.01		
	(2.13)	(1.68)			(1.01)	(0.71)		
× contractual			-0.36**	-0.24*			0.06	-0.13***
			(0.17)	(0.14)			(0.09)	(0.05)
city-year fe	yes	yes	yes	yes	yes	yes	yes	yes
ind. fe	yes	yes	yes	yes	yes	yes	yes	yes
num. of obs.	1,949	1,949	1,949	1,949	1,355	1,949	1,355	1,949
R square	0.17	0.26	0.32	0.17	0.23	0.23	0.23	0.19
Root MSE	0.87	0.85	0.70	0.87	0.39	0.39	0.39	0.34

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 10: The price of political capital: firm level

Dependent variables:	stage 1 (1) max rank	(2) max rank	(3) max rank	(4) educ.	(5) cred.	stage 2 (all) wage
productivity	0.04**	0.04**	0.04**	0.01	0.01	0.18**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.03)
max rank						0.40**
						(0.19)
education						-0.03
						(0.06)
credential						0.17
						(0.23)
IV: turnover within industry and city						
politician count	0.11***					
	(0.02)					
politician count		0.05***				
(weighted)		(0.01)				
politician ave. rank			0.16***			
			(0.03)			
ave. education				-0.00		
				(0.01)		
ave. credential					0.41***	
					(0.03)	
city-year fe	yes	yes	yes	yes	yes	yes
ind. fe	yes	yes	yes	yes	yes	yes
num. of obs.	2,840	2,840	2,840	2,023	2,840	1,742
R square	0.42	0.42	0.42	0.48	0.51	0.66
Root MSE	0.82	0.82	0.82	0.38	0.30	0.75

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 11: The price of political capital: firm-director level

Dependent variables:	(1) wage	(2) wage	(3) wage	(4) wage
pol. dummy	0.09***			
	(0.05)			
max rank		0.05**		
		(0.02)		
num of posts			0.06*	
			(0.03)	
ave rank				0.05***
				(0.02)
education	0.006	0.006	0.006	0.006
	(0.02)	(0.02)	(0.02)	(0.02)
credential	0.03	0.03	0.03	0.03
	(0.02)	(0.02)	(0.02)	(0.02)
co-year fe	yes	yes	yes	yes
position fe	yes	yes	yes	yes
num. of obs.	4,162	4,162	4,162	4,162
R square	0.89	0.89	0.89	0.89
Root MSE	0.45	0.45	0.45	0.45

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 12: The effect of political capital on performance: without correcting selection bias

Dependent	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
variables:	profit	profit	profit	profit	growth	growth	growth	growth
pol. dummy	0.18***				0.14**			
	(0.08)				(0.07)			
pol. count		0.16***				0.07**		
		(0.04)				(0.03)		
max rank			0.08**				0.07**	
			(0.04)				(0.03)	
ave posts				0.06				0.12***
				(0.07)				(0.05)
education	0.42***	0.42***	0.42***	0.41***	-0.08	-0.08	-0.08	-0.08
	(0.13)	(0.13)	(0.13)	(0.13)	(0.08)	(0.08)	(0.08)	(0.08)
credential	0.47***	0.45***	0.47***	0.49***	-0.12	-0.12	-0.12	-0.12
	(0.14)	(0.14)	(0.14)	(0.14)	(0.11)	(0.11)	(0.11)	(0.11)
productivity	0.89***	0.89***	0.89***	0.89***	-0.01	-0.01	-0.01	-0.01
	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
city-year fe	yes	yes	yes	yes	yes	yes	yes	yes
industry fe	yes	yes	yes	yes	yes	yes	yes	yes
num. of obs.	2,939	2,939	2,939	2,939	1,683	1,683	1,683	1,683
R square	0.62	0.62	0.62	0.62	0.50	0.50	0.50	0.50
Root MSE	1.42	1.42	1.42	1.41	1.26	1.26	1.26	1.26

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 13: The effect of political capital on performance: correcting selection bias

Dependent variables:	(1) growth	(2) growth	(3) growth	(4) growth
pol. dummy	0.38			
	(0.77)			
pol. count		0.16		
		(0.32)		
max rank			0.18	
			(0.37)	
ave posts				0.34
				(0.69)
education	-0.04	-0.04	-0.04	-0.04
	(0.09)	(0.09)	(0.09)	(0.09)
credential	-0.07	-0.07	-0.07	-0.07
	(0.34)	(0.34)	(0.34)	(0.34)
productivity	-0.04	-0.04	-0.04	-0.04
	(0.04)	(0.04)	(0.04)	(0.04)
city-year fe	yes	yes	yes	yes
industry fe	yes	yes	yes	yes
num. of obs.	1,683	1,683	1,683	1,683
R square	0.48	0.48	0.48	0.48
Root MSE	1.29	1.29	1.29	1.29

Notes: (i) robust standard errors are reported in the parentheses; (ii) ***, ** and * represent statistical significance at 1%, 5% and 10% respectively.

Table 14: The effect of political capital on performance: matching

Dependent variables:	(1) growth	(2) growth
politician dummy	0.19	0.17
	(0.67)	(0.60)
num of matched pairs	578	500

Table A.1: The political hierarchy in China

Rank	**Positions**
Bu	Minister
	Provincial party secretary
	Governor
Ting	Department head of government bureau
	Municipal party secretary
	Mayor
Chu	Division director of government bureau
	County party secretary
	County magistrate
Ke	Section chief of government bureau
	Township party secretary
	Township magistrate

Table A.2: The composition of participating politicians

Rank	**2004**		**2005**		**2006**		**2007**	
	count	share	count	share	count	share	count	share
Bu	114	0.13	77	0.12	113	0.16	146	0.19
Ting	689	0.78	531	0.80	531	0.75	581	0.73
Chu	75	0.08	52	0.08	63	0.09	66	0.08
Total	878	1.00	660	1.00	707	1.00	793	1.00

Table A.3: The correlation between political and conventional human capital

	max rank	num of pos.	ave. rank	education	credential
max rank	1.00				
num. of posts	0.91	1.00			
ave. rank	0.99	0.89	1.00		
education	-0.02	-0.03	-0.02	1.00	
credential	0.02	0.01	0.02	-0.16	1.00