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Abstract

This paper develops a general equilibrium model to consider the effects of corruption on economic welfare, the network size of division of labor and productivity. A Walrasian equilibrium in a market economy is firstly computed in which each person can choose his/her occupation freely. We then consider the effects on welfare when a privileged group is chosen to work as high-level administrators. Finally, we allow for explicit collusion between administrators through introducing an administrator's agent who acts in the interests of all the administrators by introducing an entrance fee, amounting to a bribe; while the price of the administrators' services is still determined by the supply and demand of a Walrasian market. The model shows that corruption increases the economic welfare of a privileged group in China consisting of high ranking officials and those closely connected to them at the expense of the general populace. While the model is developed in order to explain corruption in China, it is also potentially relevant to other countries with entrenched privileged groups.

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Keywords: Division of Labor, Specialization, Exogenous Corruption, Endogenous Corruption, Privileged Groups

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1. Introduction

A significant literature has emerged which analyzes the problem of corruption in China. Most of this literature is written from a political or sociological perspective (e.g., Lee 1990, Root 1996, Lu 2000). While there have been a few attempts to explicitly model different aspects of corruption in China (see eg Liew 1993, Manion 1996, Yao 1997) generally there is a dearth of formal economic models of the Chinese corruption problem. There is a sizeable theoretical literature on corruption using game-theoretic, imperfect information and principal-agent models (e.g. Buscaglia 2001, Fisman 2001, Klitgaard 1988, Murphy *et al* 1991, Mauro 1995, Rauch 2001, Sloof 2000).

This literature defines corruption as an illegal payment to a public agent to obtain a benefit that may or may not be deserved, or the abuse of public office for private gains (Rose-Ackerman 1978, 1996, Klitgaard, 1988, Shleifer and Vishny, 1993). Lui (1985) shows how bribes minimize the waiting costs associated with queuing, therefore reducing inefficiency in public administration in a Nash equilibrium. Corrupt officials may intentionally delay the queuing process to extract more bribes (Myrdal, 1968), perhaps in part because corruption contracts are not enforceable in courts (Shleifer and Vishny, 1993). The empirical literature on corruption that emerged in the 1990s also suggests a negative relationship between corruption and economic growth. For example, Mauro (1995), who was the first to look at how corruption

affects growth in a cross-country sample, concludes that corruption causes slower growth.

Most existing theoretical models of corruption, following Becker and Stigler (1974) use a partial equilibrium framework (e.g., Banfield 1975, Rose-Ackerman 1975, Laffont and N'Guessan 1999). This paper aims to make two contributions to the literature on corruption. The first is to endogenize corruption as a rational choice problem using a Walrasian general equilibrium model with division of labor and economies of specialization. This extends the general consumer-producer framework developed in Yang and Ng (1993) for modeling specialization to consider the effects of corruption on economic welfare, the network size of division of labor and productivity.[1] The second objective is to use the model to illustrate the effect of institutionalized privilege and corruption on resulting income differences in China.

The model, which we develop, shows that corruption increases the economic welfare of a privileged group in China consisting of high ranking officials and their relatives at the expense of the rest of society. This issue is important because high level profiteering is a major cause of disaffection amongst the working class in China and was one of the main causes of the Tiananmen Square demonstrations in 1989 (e.g., Ostergaard and Peterson 1991, Levy 1994, pp. 7-9). The next section

[1] See Yang and Ng (1998) for an extensive survey of the consumer-producer approach for modeling the division of labor and specialization.

contains a brief discussion of the relationship between corruption and privilege in China. A model of corruption and privilege is then developed in section three. First, we compute a Walrasian equilibrium in a market economy in which every individual can choose his/her occupation freely. We then consider the effects on welfare when a privileged group is chosen to work as high-level administrators, while the prices of other goods and services are determined by the supply and demand of a Walrasian market. Finally, we allow for explicit collusion between high level administrators through introducing an administrator's agent who acts in the interests of all the administrators by introducing an entrance fee, amounting to a bribe, which people outside the privileged group must pay in order to do business; while the price of the administrators' services is still determined by the supply and demand of a Walrasian market.

2. Corruption and Privilege in China

At the start of the 1990s bureaucrats were given permission to set up businesses in China. As early as 1993, there were 900,000 administrative enterprises engaged in commercial activities (Pan 1993). These were profit-making enterprises set up by government institutions. The decision to let government institutions set up businesses was aimed at reducing the size of the bureaucracy and boosting private enterprise. To limit the potential for corruption, Chinese Communist Party (CCP) officials were expected to give up their official salaries and benefits and live on the profits of their newly established businesses. However, few officials have

cut their ties with their parent departments, preferring instead to utilize them to increase profits. Root (1996 p. 748) points out that in some cases "cadre-entrepreneurs operate as government officials in the morning and private business people in the afternoon". In these cases "officials manage economic enterprises without resigning their government positions". It is more common, though, for officials to resign their positions as government bureaucrats, but still use their connections within departments to circumvent regulations. As Gong notes:

> "These administrative enterprises were not formally affiliated with government institutions; nor were they run by incumbent government officials. However, many of the chief executives running these enterprises were former government officials who continued to maintain close financial, administrative and personal ties with their former government institutions. These entrepreneurs, though without former cadre titles, relied on their cadre background and networks to navigate the business sea and earn big profit" (Gong 1997, p. 285).

Cadre-entrepreneurs are better placed than ordinary business people to conduct their businesses. China's markets can be characterized as gray markets (Fan, 1988, Li 1996). "A gray market is one in which transactions may be blocked due to residual government regulations. However, a government bureaucrat, or government agency can properly work around the obstacles and make the transaction possible" (Li 1996, p. 3). This places cadre-entrepreneurs in a better position than ordinary business

people to obtain inputs through administrative channels. In the early 1990s the head of a large joint venture company in Shenzhen, who was a former high-ranked CCP official from Guangdong, told the first author that in carrying on his business he could take advantage of both China's socialist political system and the capitalist market mechanism. He explained that he was in a fortunate position. The socialist political structure of China allowed him to choose his profession as the head of a high joint venture company in the Special Economic Zone (SEZ) and to obtain all necessary support through utilizing his political connections as a former high ranked official. The capitalist market mechanism enabled him to earn large sums of money through doing domestic and foreign business.

The group in Chinese society that has perhaps benefited the most from China's socialist market economy is the *taizi* or "princelings", who are the children of China's political leaders and high-ranking officials. Many sons and daughters of China's political leaders now hold top positions in the CCP. According to one media report, by the beginning of the 1990s, 3100 princelings held top positions in the CCP (Barnathan 1992 p. 18). Other princelings are major figures in business, using their political connections to further their business interests. For example, Deng Xiaoping's son, Deng Pufang, publicly flaunts his entitlement to 5% of the profits of any transaction he brokers on the grounds that he is acting no differently to the Chief Executive of a Western capitalist firm (Root 1996, p. 749). In 1992, Bo Xicheng, the son of a revolutionary veteran, Bo Yibo, and head of the tourism department in Beijing, was one of the first

prominent princelings to leave government service to go into business. Other prominent princelings who have well publicized business interests include Chen Yun's son, Chen Yuan, and Deng Xiaoping's other children, Deng Lin, Deng Nin and Deng Zhifang.

From time to time there have been corruption scandals, which have been linked to the children of prominent Chinese political leaders. For example, in 1992 Shenzhen Fountain, a property company controlled by Deng Xiaoping's niece, Ding Peng, became embroiled in a corruption scandal following the firm's takeover by the Shenzhen government. In the mid-1990s the Shougang Concord Grand Group, controlled by Deng Zhifang, was linked to a corruption probe. At about the same time, there were reports that He Ping, Deng Xiaoping's son-in-law, was forced to step aside at a Chinese military firm he controlled, after it was implicated in a gun-running racket in the United States (Gilley 1996). In none of these cases were the individuals formally sanctioned. There have been some examples where high-ranking officials such as Chen Xitong and Wang Baosheng, who were respectively former Mayor and Deputy Mayor of Beijing, have been charged with corruption. However, usually corrupt officials have been punished less harshly than ordinary citizens who commit similar crimes (Manion 1998).

3. The Model

A. The Basic Model

Consider a large economy E with two consumer goods: good x and good y. Assume that there is a continuum of M individual consumer-producers, which may be represented by all the points in the closed interval [0, M].[2] Moreover, assume that all of the individuals are *ex ante* identical and that each has identical, non-satiated, continuous and rational preferences represented by the following utility function:

$$u = f(x^c, y^c) \tag{1}$$

Here $x^c \equiv (x + x^d)$ and $y^c \equiv (y + y^d)$ are the amounts of the two final goods that are consumed, x and y are the amounts of the two goods that are self-provided, x^d and y^d are the amounts of the two goods that are purchased from the market and $f(.)$ is continuously increasing and quasi-concave. For simplicity, it is assumed that $f(.) = (x^c) \cdot (y^c)$. Assume that to produce these two consumer goods, in addition to labor, an intermediate good, good z, is also required. In this model good z refers to an administrative service, such as the provision of licenses or permits for setting up business or major financial assistance. Assume that each individual has the same Cobb-Douglas production function for the production of good x and good y:

$$x^p = x + x^s = (z + z^d)^\beta \cdot (l_x - b), \tag{2}$$

[2] This assumption implies that the population size is very large. It avoids an integer problem which arises where there are a number of different specialists, which may lead to non-existence of equilibrium with the division of labour (see Sun *et al* 1998).

$y^p = y + y^s = (z + z^d)^\beta \cdot (l_y - b)$,

$z^p = z + z^s = \text{Max}\{0, l_z\text{-}c\}$.

Here, x^p and y^p are the amounts of the two final goods produced, z^p is the amount of the intermediate good produced, z^d is the amount of the intermediate good purchased from the market and x^s, y^s and z^s are the amounts of the three goods sold. The values b and c are fixed learning costs, which are incurred in producing goods x, y and z, where $b \in (0, 1)$, and $c \in (0, 1)$. The parameter β represents the elasticity of output for good x and y with respect to the input level of the intermediate good z. $\beta + 1 > 1$ implies that there are increasing returns in producing the final consumer goods x and y. From equation (2) the production function of any consumer good is weakly convex in the labor input and is strictly concave in the input of the administrative service.

The endowment constraint for each individual endowed with one unit of labor is:

$$l_x + l_y + l_z = 1 \qquad (3)$$

Here l_i is the amount of labor allocated to the production of good i. This system of production implies that each individual's labor productivity increases as he/she narrows his/her range of production activities. As shown by Yang (2001, chapter 2), the aggregate production schedule for three individuals discontinuously jumps from a low profile to a high profile as each person jumps from producing three goods to a production pattern in which at least one person produces only one good (specialization). The difference between the two aggregate production

profiles is considered as positive network effects of the division of labor on aggregate productivity. The network effect implies that each person's decision as to his/her level of specialization depends on the number of participants in a large network of division of labor, which is determined by all individuals in choosing their levels of specialization. This is the Young (1928) theorem. Since economies of specialization is individual specific (learning by doing must be achieved through individual specific practice and cannot be transferred between individuals), the labor endowment constraint is specified for each individual so that increasing returns are localized.

The budget constraint for an individual can be represented as follows:

$$k_x p_x x^s + k_y p_y y^s + k_z p_z z^s = p_x x^d + p_y y^d + p_z z^d, \text{ and } k_i \in (0,1) \qquad (4)$$

Here p_i is the price of good i and k_i is a trading efficiency coefficient which represents transportation conditions and the general institutional environment that affects trading efficiency.[3] To simplify the analysis we assume that $k_x = k_y = k$, and that the transaction efficiency coefficient for the administrative service is equal to 1, i.e. $k_z = 1$.

A Walrasian regime prevails in this model, given the assumption of a continuum of individuals and localized increasing returns in a large economy. The specification of the model generates a trade-off between economies of division of labor and transaction costs. The decision

[3] The specification of an iceberg transaction cost is a common practice in equilibrium models with a trade-off between increasing returns and transaction costs (see Krugman 1995). This specification avoids notoriously formidable index sets of destinations and origins of trade flows.

problem for an individual involves deciding on what, and how much, to produce for self-consumption and to sell and purchase from the market. This means the individual has to choose nine variables x, x^s, x^d, y, y^s, y^d, z, z^s, $z^d \geq 0$. Hence, there are 2^9 =512 possible corner and interior solutions.

We assume the fixed learning costs b and c have the following relationship:

$$b + c \geq 1 \tag{5}$$

The implication of the relationship in equation (5) is that any individual who offers administrative services specializes in their provision and that people cannot self-provide administrative services and one of the two consumer goods simultaneously.

In order to narrow down the set of possible corner and interior decisions governing each individual's optimum decision, in previous research Yang and Ng (1993) and Wen (1998) use the Kuhn-Tucker condition to establish the following condition:

Lemma 1: Each individual sells at most one good, but does not buy and sell the same good, nor buys and self-provides the same good at the same time.

We define a configuration as a combination of zero and positive variables which are compatible with Lemma 1. A combination of configurations for all individuals that is compatible with the market

clearing condition constitutes a market structure or structure for short. We now examine all structures that might occur in equilibrium.

B. The Market Economy

We first consider a market economy in which every individual can choose his/her occupation freely and compute a Walrasian general equilibrium for the above mentioned economy, E. Because of symmetry between good x and good y, we expect an equilibrium price vector of $(1,1,p)$ which can clear all of the markets within E, where p represents the equilibrium price of the administrative service, z.

According to Lemma 1, we can divide all of the producers in E into two groups, where each of the groups is characterized by a single consumer good that all of its members are selling. In equilibrium the number of sellers of good x, M_x, will be the same as the number of sellers of good y, M_y, i.e. $M_x = M_y = m$. Hence, it follows that the total amount of professional administrators in E will be M-$2m$, where M is the total population of the economy E and the value of m has to be determined.

To examine the decision of any individual, we have to compute his/her maximum utility in each and every possible configuration. Because administrative services are a necessary input in any production process, in autarky an individual's utility will be zero. Hence, we need to consider two market structures, which are depicted in figure 1. These are: (a) structure PD, where the individual purchases good z, produces both consumer goods, and sells one consumer good; and (2) structure CD:

where the individual purchases good z and one consumer good, while producing and selling the other consumer good. First we examine structure PD. In structure PD, the decision problem for an individual choosing configuration (xy/z) is depicted as follows:

Max: $u_x = x \cdot y$ (6)

Subject to the following constraints:

$x + x^s = (z^d)^\beta \cdot (l_x - b)$ (7)

$y = (z^d)^\beta \cdot (l_y - b)$,

$l_x + l_y = 1$,

$kp_x x^s = p_z z^d$.

An individual choosing configuration (yx/z) has the following decision problem:

Max: $u_y = x \cdot y$ (8)

Subject to the following constraints:

$y + y^s = (z^d)^\beta \cdot (l_y - b)$ (9)

$x = (z^d)^\beta \cdot (l_x - b)$,

$l_x + l_y = 1$,

$kp_y y^s = p_z z^d$.

An individual choosing configuration (z/xy) and providing the administrative service has the following decision problem:

Max: $u_z = x^d \cdot y^d$ (10)

Subject to the following constraints:

$z^s = l_z - c$, $l_z = 1$ (11)

$p_z z^s = p_x x^d + p_y y^d$

The two conditions for utility equalization across three configurations yield the corner equilibrium prices for goods x and y relative to z:

$$p=\frac{p_z}{p_x}=\frac{p_z}{p_y}=(1-2b)\cdot(k\cdot\beta)^{\beta}\cdot\left(\frac{1-\beta}{1-c}\right)^{1-\beta} \tag{12}$$

The two independent market-clearing conditions for goods x and z (the other market clearing condition is not independent due to Walras' law) give the corner equilibrium for the number of specialists, which are producing goods x, y, and z.

$$m=\frac{M_x}{M_z}=\frac{M_y}{M_z}=\frac{M\cdot(1-\beta)}{2(1-\beta+k\beta)} \tag{13}$$

Here M_x is the number of x specialist choosing (xy/z), M_y is the number of specialist producers choosing (yx/z) and M_z is the number of individuals choosing (z/xy). The relative number of specialists, together with the population size identity $M_x+M_z+M_y=M$, give the corner equilibrium number of specialists, producing goods x, y and z. Inserting relative prices into an indirect utility function for any of the three configurations in structure PD gives the per capita real income in this structure:

$$u_{PD}=\left[\frac{(1-2b)\cdot(1-c)^{\beta}\cdot(k\cdot\beta)^{\beta}\cdot(1-\beta)^{1-\beta}}{2}\right]^2 \tag{14}$$

We now examine structure CD in which an individual produces one final good, while purchasing the other consumer good and intermediate good z from the market. The decision problem for an individual choosing configuration (x/yz) is as follows:

Max: $u_x=x\cdot y^d$ (15)

Subject to the following constraints:

$$x+x^s=(z^d)^{\beta}\cdot(l_x-b),\qquad l_x=1 \tag{16}$$

$$kp_x x^s=p_z z^d+p_y y^d\ .$$

An individual choosing configuration (y/xz) has the following decision problem,

$$\text{Max: } u_y = x^d \cdot y \tag{17}$$

Subject to the following constraints:

$$y + y^s = (z^d)^\beta \cdot (l_y - b), \qquad l_x = 1 \tag{18}$$

$$kp_y y^s = p_z z^d + p_x x^d .$$

An individual choosing configuration (z/xy) and providing the administrative service has the following decision problem:

$$\text{Max: } u_z = x^d \cdot y^d \tag{19}$$

Subject to the following constraints:

$$z^s = l_z - c \ , \quad l_z = 1 \tag{20}$$

$$p_z z^s = p_x x^d + p_y y^d .$$

The two conditions for utility equalization across three configurations yield the corner equilibrium prices of goods x and y relative to z:

$$p = \frac{p_z}{p_x} = \frac{p_z}{p_y} = (1-b) \cdot k^{\frac{1-\beta}{2}} \cdot \beta^\beta \cdot \left(\frac{1-\beta}{1-c}\right)^{1-\beta} \tag{21}$$

The corner equilibrium relative number of specialists producing goods x, y, and z is:

$$m = \frac{M_x}{M_z} = \frac{M_y}{M_z} = \frac{M \cdot (1-\beta)}{2\left(1 - \beta + \beta \cdot k^{\frac{1+\beta}{2(1-\beta)}}\right)} \tag{22}$$

Inserting relative prices into an indirect utility function of any of these three configurations in structure CD yields the per capita real income in this structure:

$$u_{CD} = \left[\frac{(1-b) \cdot (1-c)^\beta \cdot k^{\frac{1-\beta}{2}} \cdot \beta^\beta \cdot (1-\beta)^{1-\beta}}{2}\right]^2 \tag{23}$$

According to the Yao Theorem (Yang, 2001, Chapter 6), the general equilibrium in this model is the corner equilibrium that yields the highest per capita real income and in which no-one has an incentive to unilaterally deviate from it. Other corner equilibria are not general equilibrium. Thus, we need to compare per capita real incomes among corner equilibria in both structures to check if individuals have incentives to deviate from them. In order to do this, we partition the parameter space (k,β,b,c) into several sub-spaces within each of which a specific corner equilibrium generates the highest per capita real income and therefore is the general equilibrium.

Comparing the per capita real incomes in structures PD and CD, it can be seen that $u_{CD} > u_{PD}$ when the transaction efficiency coefficient is sufficiently large:

$$k \geq \left(\frac{1-2b}{1-b}\right)^{\frac{2}{1-3\beta}} \tag{24}$$

Proposition 1: When the transaction efficiency k is sufficiently large, $u_{CD} > u_{PD}$.

Proposition 1 implies that each individual will specialize in producing one good as the transaction efficiency becomes sufficiently large. The division of labor in China has increased over the last two decades due to improvement in transaction efficiency associated with a much clearer delineation of property rights. Empirical evidence of this phenomenon tends to be anecdotal. However, in one econometric study that directly

examines this issue, Yang *et al* (1992) show that per capita real income and the level of division of labor increased as efficiency in specifying and enforcing property rights improved in rural China over the period 1979-1987. Their conclusion was that the contribution of property rights reform in rural China during this period to growth via its effect on transaction efficiency accounted for 48 per cent of economic growth (Yang *et al* 1992, p. 29). The division of labor in rural China prior to 1978 was extremely low. Yang *et al* (1992) suggest that the degree of commercialization, which relates to the level of division of labor, in Mao's China was 0.3. The division of labor in urban areas was coming off a much higher base (see Yang 1994). Thus while the value of k is difficult to measure, it is clear that in China k has increased over time. Hence, for the sake of simplicity, and without compromising the generality of the conclusions, in the subsequent analysis we assume that k is sufficiently close to 1 such that proposition 1 holds. Therefore we concentrate on structure CD and do not discuss structure PD.[4]

C. Market Economy with Privilege and Corruption

In this subsection we model two forms of corruption, which we term Exogenous and Endogenous Corruption. We use the term Exogenous Corruption to refer to the situation where select individuals constituting a privileged group are chosen to work as high-level administrators, while all other individuals are only allowed to produce consumer goods. In these circumstances, it is arguable that inequality in wealth distribution

[4] The results below do not rest on proposition 1 being true. While, in the subsequent analysis, we use

between *ex ante* identical individuals is directly generated by the nature of the economic system itself, which allows, and sometimes encourages, the systemic institutionalization of privilege. We use the term Endogenous Corruption to refer to the situation where officials, their relatives and those who have influence with them achieve additional benefits through utilizing connections, bribery and collusion.

We start through modelling the welfare effects of Exogenous Corruption. As discussed in section two, in China not every person is free to choose his/her occupation. In most cases China still has the characteristics of a hierarchical structure, where high-level administrative positions are often held by members of a privileged group who are either high-ranking party members or their relatives. The top leaders of the CCP intentionally restrict the number of these high level positions to both secure and to strengthen their economic and political influence. To model such an economy, where a few select individuals possess such privileges, assume that a small portion of the population t is chosen by the party leaders to become high level administrators, while all the other individuals are only permitted to produce consumer goods. Given this restriction, even in equilibrium, utility equalization will not necessarily hold across the entire population. The decision problems for individual specialists will still be the same. However the market-clearing condition for Structure CD becomes:

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structure CD to illustrate our results, the conclusions also hold for structure PD.

$$t \cdot M \cdot (1-c) = (1-t) \cdot M \cdot \left[\frac{(1-b) \cdot k \cdot \beta}{p_t} \right]^{\frac{1}{1-\beta}} . \qquad (25)$$

The price for administrative services in such an economy can be depicted as follows:

$$\frac{p_t}{p} = \left[\left(\frac{1-t}{t} \right) \cdot \left(\frac{\beta \cdot k^{\frac{1+\beta}{2(1-\beta)}}}{1-\beta} \right) \right]^{1-\beta} \qquad (26)$$

Substituting (26) into the decision problem facing professional administrators in (19), the equilibrium utility for administrative service professionals, u_t, will increase by

$$\frac{u_t}{u} = \left[\left(\frac{1-t}{t} \right) \cdot \left(\frac{\beta \cdot k^{\frac{1+\beta}{2(1-\beta)}}}{1-\beta} \right) \right]^{2(1-\beta)} \text{ and } \frac{du_t}{dt} < 0 . \qquad (27)$$

The equilibrium utility for any consumer good producer, U_t, will decrease by

$$\frac{U_t}{U} = \left[\left(\frac{t}{1-t} \right) \cdot \left(\frac{1-\beta}{\beta \cdot k^{\frac{1+\beta}{2(1-\beta)}}} \right) \right]^{2\beta} \text{ and } \frac{dU_t}{dt} > 0 \qquad (28)$$

Thus, when we allow for the existence of a privileged group, the utility of ordinary producers will decline, while the utility of members of the privileged group will increase due to their position. $\frac{du_t}{dt} < 0$ implies that the smaller the value of t, the more utility that accrues to the privileged group and $\frac{dU_t}{dt} > 0$ implies the smaller the value of t, the less utility that accrues to the general populace. Thus, the Exogenous Corruption problem is related to the degree of economic control exercised by the

privileged group over society. The more economic control that the privileged group exercises, the easier it will be for the privileged group to change the value of t at will.

We now model the problem of Endogenous Corruption. To model this sort of corruption, first we assume that although the administrators are chosen by the CCP leaders, the price of their services is determined by supply and demand in a Walrasian market. Hence, the price cannot be too high because of competition among administrators. Taking the decision problem for an individual choosing configuration (x/yz) for example, the new decision problem of any good x producer is:

Max: $u_x = x \cdot y^d$ (29)

Subject to the following constraints:

$x + x^s = (z^d)^\beta \cdot (l_x - b), \qquad l_x = 1$ (30)

$kx^s = (1+s) \cdot p \cdot z^d + y^d$.

The administrative service providers face the following decision problem:

Max: $u_z = x^d \cdot y^d$ (31)

Subject to the following constraints:

$z^s = l_z - c \ , \quad l_z = 1$ (32)

$(1+s) \cdot p \cdot z^s = x^d + y^d$.

Under these circumstances it is easy to verify that the price for the administrative service is just the same as that which was determined in the last sub-section. However, in practice, because of their political backgrounds, these high level administrators have built up very strong political and economic connections. Thus in China, these officials and

their relatives are not actually price-takers, but possess large amounts of market power. To allow for this, we now assume that there is an agent who acts in the interests of all the administrators who will utilize their monopoly power through introducing a two-part tariff. With the two-part tariff each individual outside the privileged group is required to pay an entrance fee, amounting to a bribe, to obtain the necessary administrative services to do business and we further assume that the entrance fee s can be paid in terms of the individual's product.

An entrance fee will change the equilibrium utility level of the administrative service provider and the ordinary producers. Comparing the utility level of officials with the consumer good producers, it can be seen that the agent of the privileged group can charge from each consumer good producer an entrance fee equal to $s\cdot(1-b)\cdot k^{\frac{1-\beta}{2}}\cdot\beta^{\beta}\cdot\left(\frac{1-\beta}{1-c}\right)^{1-\beta}$ units of his/her produce. Thus each member in the privileged group can increase his/her utility by $(1+s)^2$ times and $\frac{du}{ds}>0$. In contrast, the equilibrium utility of each consumer good producer will decline by $\left(\frac{1}{1+s}\right)^{\frac{2\beta}{1-\beta}}$ and $\frac{dU}{ds}<0$. This inequality in wealth distribution reflects Endogenous Corruption, which is generated by political and social monopoly power founded on connections and collusion. With the presence of Endogenous Corruption, the utility of any privileged group member is much larger than that of any ordinary

individual. Because $\frac{du}{ds} > 0$ and $\frac{dU}{ds} < 0$, the welfare inequality between the privileged group and the general populace will be exacerbated when the size of the entrance fee, or bribe, s, is increased. The foregoing analysis can be summarized in the following proposition:

Proposition 2: With both Exogenous Corruption and Endogenous Corruption, the privileged group members will achieve extra benefits at the expense of consumer good producers. The gap between the utility of members of the privileged group and the general populace will be a function of the degree of economic control exerted by members of the privileged group, which will, in turn, affect the values of s and t.

Proposition 2 suggests that if corruption has been institutionalized, the consequences of corruption can be minimized only if the government has an effective anticorruption strategy and implements it impartially. From our model, the effectiveness of anticorruption measures depends on two factors: (1) the adequacy of the measures in terms of the comprehensiveness of their scope and powers; and (2) the level of commitment of political leaders to the goal of minimizing corruption. Thus, it is not surprising that anti-corruption strategies have been ineffective in some countries such as Indonesia and Bangladesh where corruption has been institutionalized and the commitment of the political leadership to minimize corruption is weak (see Kockanek 1993, Moran 1999). Effective strategies require that both adequate anti-corruption measures are put in place and that the political leadership is strongly

committed to eradicating corruption (Quah 1982, pp.174-75). Some examples of relatively effective strategies are the Prevention of Corruption Act and the Corrupt Practices Investigation Bureau in Singapore and the Prevention of Bribery Ordinance and the Independent Commission Against Corruption in Hong Kong (see Moran 1999, Quah 1999).

4. Concluding Remarks

This paper develops a Walrasian general equilibrium model with division of labor, economies of specialization and endogenous corruption. It extends the general consumer-producer framework to consider the effects of institutionalized corruption on economic welfare, the network size of the division of labor and productivity. To examine the effect of privilege and corruption, and resulting income differences in China, we first computed a Walrasian equilibrium in a market economy where each individual is free to choose his/her occupation. Following this, we considered the effects on welfare when a privileged group of officials are chosen to work as high-level administrators. In the model, a few select individuals possess such privileges, while all other individuals are only allowed to produce consumer goods. Finally, we allow for Endogenous Corruption among high-level administrators through introducing an administrator's agent who acts in the interests of all the administrators by introducing an entrance fee, which is in effect a bribe. People outside the privileged group must pay the bribe in order to do business, while the price of their services is still determined by the supply and demand of a Walrasian market. The model shows that the network size of division of

labor and aggregate productivity will increase when the institutional efficiency of enforcement of anti-corruption and property rights are improved.

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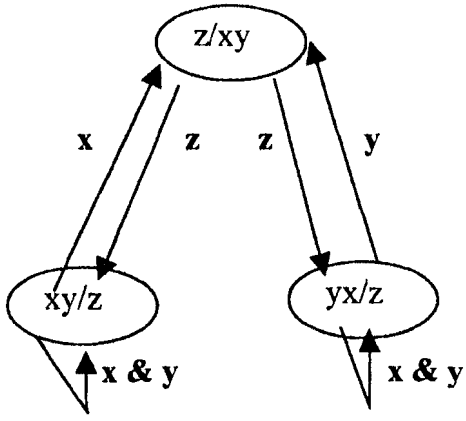
Figure 1: Configurations and Market Structures



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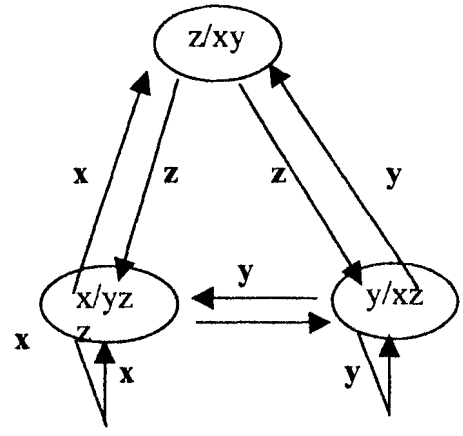

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