Corruption during the Economic Transition in China

Wei Li[1]
Darden School of Business
University of Virginia
Box 6650
Charlottesville, VA 22906-6650
Email: weili@virginia.edu
Tel: (434) 243-7691
Fax: (434) 243-7681

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1. Introduction

In the spring of 1989, university students, joined later by workers, civil servants and journalists, held massive demonstrations in the Tiananmen Square in Beijing. The demonstrators had two prominent demands—democratic reforms and an end to corruption.[2] Despite the apparent success of the economic reform in rapidly raising the standards of living for the vast majority of Chinese, by the late 1980's, there was a growing public perception that corruption had gotten worse. In particular, the dual-track system, the hallmark of the Chinese reform, was widely believed to have fueled a particular form of corruption—diversion of under-priced in-plan goods to the market by officials (Yang & Li, 1993). On August 15, 1989, two months after the suppression of the demonstrations, the Chinese government launched a nationwide anti-corruption campaign, apparently aimed at soothing public outrage over corruption.

The dual-track system was a hybrid economic system under which traditional central planning (the plan track) and the emerging product market (the market track) coexisted as means of resource allocation. Before its introduction in 1985, resource allocation in China was done mostly under the plan via the planning bureaucracy. In the early 1980s, the Chinese government relaxed bureaucratic control over resource allocation by allowing state owned firms to produce and sell outside-plan output directly to buyers at "floating prices." The outside-plan prices were initially regulated by the government and not allowed to exceed plan prices by more than 20 percent. On January 1, 1985, the government lifted the control on outside-plan pricing. Markets for outside-plan products then developed rapidly in China in parallel to the existing plan.

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[2] See Adi Ignatius, "Summit Fails to Deter Students from Mounting Criticism of Deng," the *Wall Street Journal*, May 17, 1989.

Under the dual-track system, an identical good would often be allocated on both the plan track and the market track. But the good would typically be sold at a substantially higher price in the market than in the plan. Officials who had discretion over the allocation of in-plan resources could and allegedly did divert in-plan resources to the market and pocket the profits. This type of corruption was widely known in China as "guandao" or official diversion.

Corruption has been pervasive not only in China but in many other countries. In dozens of countries, public outrage over corruption has forced discredited governments out of office. Despite its importance, research on corruption has been hampered by the lack of reliable data. Given their illicit nature, corrupt exchanges were seldom, if ever, done in the open. To uncover corruption and to measure its economic impact using publicly available data, researchers must often rely on indirect approaches.

In this paper, I document one such attempt. The data I use come from a survey of 769 Chinese state-owned enterprises conducted in 1990, supplemented by Chinese input-output tables. The survey was never intended to support a study of corruption in China. Its main objective was to study the impact of economic reform on enterprise behavior and performance in the 1980s. But the survey did produce a panel dataset containing detailed information on each sample firm's participation in the dual-track system, in which official diversion of under-priced in-plan goods was considered pervasive. Using the data, I am able to make indirect inference about corruption by analyzing sample firms' participation in both the plan track and the market track.

The logic of the analysis goes as follows. If corruption plays a role in an economy, it must leave its imprints on the economy, even when corrupters have attempted to cover their tracks. These imprints, if positively identified in the data, can be taken as indirect evidence of corruption. In this paper, I document the identification of two types of imprints.

The first is the distortions that corruption imposes on the economy. The under-pricing of in-plan goods and the ensuing shortage mean that corrupt officials who control the allocation of in-plan goods can elicit bribes from buyers willing to pay higher prices. An increase in the gap between the market price or the implicit market price and the plan price, caused by, for example, a decrease in the plan price, would lead to an increase in corruption. Since corrupt officials must first procure the shortage goods from state-owned producers, an increase in the gap between plan and (black) market prices would in turn lead to an increase in in-plan quotas that state-owned producers face. Indeed, the data offer strong statistical support that a decrease in the plan price raises the procurement of output quota. The data also show that increases in wage rate and input prices, which may be passed on to buyers as increased (black) market price of output, also tend to raise the procurement of output quota. There is thus strong evidence of the distortions caused by corruption.

There is also evidence that corruption-induced distortions were present throughout the sample period from 1980 to 1989. During this period, planning or bureaucratic control over resource allocation was ever present, while product markets were only introduced after January 1985. The finding here has an important implication. Official diversion,

the type of corruption documented here, was pervasive enough to have left its marks on resource allocation even before the introduction of product markets in 1985. The introduction of product markets could not have been the primary cause of official diversion. The root cause of official diversion here was the plan which gave bureaucrats control over resource allocation. But the introduction of product markets in parallel to the plan would surely have observable impact on official diversion. I will argue in Section 2 that the dual-track system helped monetize official diversion and hence reduced the transaction costs of conducting official diversion. The result should be an increase in the pervasiveness of official diversion in the late 1980s. To test this conjecture, I turn to the analysis of the second type of corruption imprints and propose indirect approaches to measuring the pervasiveness of official diversion.

The second type of corruption imprints that I identify in the Chinese data is the imbalance in resource allocation in the plan and in the market under the dual-track system after 1985. In the absence of official diversion, resource should flow separately on the plan track and the market track. Goods procured into the plan should be distributed to in-plan uses; while goods produced outside of the plan should be distributed through the market track. Corruption destroys the balance. As corrupt officials divert goods from the plan to the market, they increase the allocation of resources to market uses at the expense of in-plan uses, for any given level of in-plan procurement. Official diversion therefore represents a "sink" in the plan, but a "source" in the market. It drives a wedge between in-plan procurement and in-plan uses, and between market production and market uses. This wedge measures the volume of official diversion. Corruption is detected if plan procurement exceeds in-plan uses, that is, if there is a leakage in the plan. Similarly, corruption is detected if the volume of market transactions exceeds the market supply from producers. Indeed, the Chinese firm-level data, supplemented by aggregate data, offer strong evidence of imbalance. Estimation also shows more than one-third of China's in-plan goods were diverted in the late 1980s.

The indirect evidence presented in the paper documents the imprints on the economy left by official diversion in the 1980s. It suggests that corruption existed and was pervasive both before and after the introduction of the dual-track system in China. But the statistical evidence cannot identify a specific corrupt exchange, a task perhaps best left to the detective.

The rest of the paper is organized as follows. In Section 2, I give a brief description of the changes in Chinese institutions and in corruption. In Section 3, I first describe the empirical model and the data for estimating and testing the impact of corruption on resource allocation, and then present and discuss the empirical results. In Section 4, I present the method for estimating the volume of diversion, the data, and the estimates. Section 5 offers some concluding remarks.

2. The Economic Environment and Corruption

2.1. The Dual-Track System

The pre-reform economy in China was a planned economy. Markets did not exist. The government allocated resources through its planning bureaucracy. Shortage was pervasive and chronic. The government started the reforms first by relaxing the plan. It gradually allowed state-owned firms to sell their outside-plan output at higher "floating prices." The "floating prices" were regulated and typically not allowed to exceed plan prices by more than 20 percent. On January 1, 1985, the government lifted the limit on market pricing and officially ushered in the dual-track system.

The dual-track system was a hybrid system of resource allocation where the plan and the market co-existed. Under the system, a state-owned enterprise must still fulfill its compulsory output quota, and deliver it to a relevant branch of the Material Supply Bureau (MSB) at the plan price. In return, the enterprise may receive in-plan allocation of some of its needed material inputs (*i.e.*, input quotas) at plan prices. Once it fulfills its plan obligations, the enterprise is allowed to produce outside-plan output and sell it in the emerging product market, typically at a higher "floating" price before January 1985 or the market price. But it must buy any additional material inputs in the product market. The plan prices of both output and inputs, however, continue to be set centrally by the State Price Bureau and are often substantially lower than would-be market clearing prices (*i.e.*, in-plan goods are often in short supply).

The allocation of in-plan resources is handled by officials in the MSB. As the economy becomes more decentralized, an increasing amount of in-plan resources is allocated by officials in local branches of the MSB. These officials have the government mandate and often superior ranks in the bureaucracy than managers of firms under their supervision. In most cases, they have discretion over the allocation of in-plan goods (Byrd, 1992).

Table 1: Average ex-factory plan and market prices of four industrial commodities, 1987-1989. Source: Yang and Li (1993, p. 58-59).

Commodity	*Price*	*1987*	*1988*	*1989*
Steel	Plan	859.80	964.80	1078.00
(yuan/ton)	Market	1432.60	1514.60	1870.80
	Market/Plan	1.67	1.57	1.74
Aluminum	Plan	4367.00	4922.00	5261.00
(yuan/ton)	Market	6093.00	8444.00	10430.00
	Market/Plan	1.40	1.72	1.98
Coal	Plan	35.89	39.54	42.25
(yuan/ton)	Market	80.00	110.00	153.40
	Market/Plan	2.23	2.78	3.63
Timber	Plan	150.00	158.15	160.62
(yuan/m^3)	Market	368.87	435.38	481.40
	Market/Plan	2.46	2.75	3.00

To see how the dual-track system worked in practice, I present some aggregate statistics on the pricing and allocation of a few key industrial goods. Table 1 shows the plan and the market prices of four industrial goods between 1987 and 1989. Because of inflation, both prices were rising during the period. But market prices were rising much faster than plan prices. In the late 1980s, the government, in an effort to curb inflation, limited the increase in plan prices. As a result, the gaps between market and plan prices, which were quite sizable in 1987, widened further during the three year period.

Table 2 shows that in 1989 the emerging product market allocated a substantial proportion of the listed industrial commodities. On the supply side, producers of the listed commodities reported that they sold between 32% and 63% of their output at market prices. On the demand side, users of these commodities reported that they paid market prices for between 52% and 85% of their inputs. An interesting observation to note is that for each commodity with available data, the proportion of market transactions reported by buyers was always substantially more than that reported by purchasers.

Table 2: Comparing the proportion of market transactions reported by users and by producers in 1989.

	Proportion of output sold by producers on market track[1]	Proportion of input bought by users on market track[2]
Steel	32%	55%
Coal	22%	59%
Cement	63%	85%
Caustic soda	40%	52%

[1] China Statistical Yearbook, 1990, Table 11-27.
[2] Huang Wei-ding, *China's Invisible Economy*, 1996, p. 179.

These aggregate statistics are consistent with data obtained from a survey of state-owned enterprises covering the period between 1980 and 1989. In Li (2001b), the firm-level data are tabulated and analyzed. Below I list a summary of the findings.

1. Consistent with price control between 1980 and 1989, "floating" prices for outside-plan (quasi-market) transactions were only slightly higher than plan prices. Removal of the price control in January 1, 1985 was followed by significant and accelerating increases in market prices. In contrast, plan prices rose at a a much slower rate, thanks to tightened price control in the plan as the government tried to contain accelerating inflation in the late 1980s. As a result, the gap between market and plan prices widened substantially in the late 1980s.

2. The inflation in market prices of material inputs, which were traditionally kept low relative to those of processed goods, was substantially higher than the inflation in market

prices of output between 1985-89, suggesting that the price liberalization was effective in undoing price distortions imposed by decades of central planning.

3. The proportion of output that sample firms sold to the plan or the market remained roughly unchanged between 1981 and 1989. Since total output grew in real terms during the sample period (Li, 1997), the in-plan procurement of output (or output quota) grew on average by about 4 percent per annum. On the input side, sample firms purchased a decreasing proportion of their inputs from the plan. The quantity of inputs purchased from the market grew at a faster rate than input usage.

4. The firm-level data thus reveal that more in-plan resources were taken from sample firms than were allocated to them as intermediate inputs. Measured in 1989 market prices, the net material contribution to the plan increased from 16.2 to 30.1 million Yuan per firm between 1981 and 1989, with most of the increases realized after 1985.

The observation that market prices exceeded plan prices by a large margin implies that rents were embodied in in-plan goods. The rents are simply the potential profits from buying all in-plan goods at plan prices and selling them at market prices. The widening price gap and the increase in in-plan procurement in the late 1980s imply that the rents rose substantially. Corrupt officials could and many allegedly did capture the rents by buying in-plan goods that they controlled at the plan prices and then diverting them for sale on the market.

The corrupt practices would leave distortionary imprints on the economy. There is evidence that the allocation of in-plan resource is consistent with official diversion. In detailed case studies of the Anshan Steel Company and the Second Motor Vehicle Manufacturing Plant, Byrd (1992, pp. 323 and 392) finds that the MSB would raise procurement quotas for steel and trucks when demand for them was strong and force the firms to direct market on their own when the demand was weak. Byrd (p. 392) concluded that

"[s]upervisory authorities acted largely as self-interested entities promoting their own benefits and protecting their own interests, with little regard for [the producers]. MSB in particular seems to have acted primarily to protect itself from losses that might result from its inability to sell the output it procured. Not surprisingly, when market conditions firmed up…, MSB became an advocate of a high share of mandatory planning."

By the late 1980s, economists and policy makers, increasingly concerned about corruption, estimated the size of the rents. Published estimates for 1988 varied from 10 percent to 20 percent of GDP.[3] How much of the rents were actually captured by corrupt officials was subject to much debate and speculation. But the existence of this debate suggests that the Chinese media, despite strict censorship, became more open in the late 1980s than ever before in reporting and discussing official corruption.

[3] A summary of the estimates is reported in Huang and Li (1991) (p. 225). According to Hu (1989), the rents embodied in in-plan goods in 1988 were worth at least 150 billion Yuan.

2.2. Official Diversion

Browsing the Chinese printed media in the late 1980, one cannot help but notice a perception of the growing pervasiveness of official diversion. Journalists even coined a special phrase, *Guandao* or official diversion/profiteering, to describe this form of corruption. Readers proficient in Chinese may sample articles published in policy journals in China; see, for example, Li Maoshen, "Ten Policy Recommendations to Solve the Current Economic Problems," *Financial and Trade Economics*, 1989, No. 7; and Zhi Muxing and Gai Shi, "To Where is the Dual-Track System Leading China?" *Economics Weekly*, March 26, 1989. Published corruption cases in the 1980s are too numerous to cite. Below I mention only a few reports. Yang and Li (1993, p. 117) reported that local MSB officials in Shijiazhuang city diverted 276 tons of steel and 135 cubic meters of lumber from the plan to the market in 1984. According to the *Sichuan Daily* (January 10, 1988), fifteen MSB officials in Sichuan province were convicted of corruption for diverting 261 cars. Even low income peasants who were entitled to receive subsidized agricultural inputs did not escape the wrath of corruption. On December 21, 1988, the *Hunan Daily* reported that local officials pocketed a profit of 160,000 Yuan by illegally selling peasants 1,293 tons of in-plan chemical fertilizers at the market price.

Concerned that corruption could undermine its legitimacy, the government resorted to a mass campaign and harsher punishment of convicted corrupters. On August 15, 1989, it formally launched yet another anti-corruption campaign.[4] By August 30, 1989, 1022 officials turned themselves in in exchange for leniency; two corrupt deputy governors in the provinces were removed from their posts; and five notorious trading companies suspected of official diversion were shut down (Jian and Jian, 2001). The impact of the anti-corruption campaign proved short-lived. According to Transparency International (2001) that compiles the corruption perception index, corruption in China took a sharp turn for the worse from the late 1980s to 1996.

Publicized corruption cases were likely only the tip of the iceberg. For every convicted corrupt official, there were surely many more who went unscathed. For one, corruption by high-ranking officials was rarely investigated. More importantly, illicit corrupt exchanges were hidden. Nicholas D. Kristof, a former *New York Times* correspondent Beijing, described an official's lifestyle—a membership to sports club frequented by expatriates and an imported motorcycle—that was totally incompatible with his merger salary. Kristof then commented that in China "[t]he odds of being caught [in corruption] are not much worse than those of being struck by lightning. The potential profits are so huge, and so many people seem to be indulging, that very few officials are deterred" (Kristof & WuDunn, 1994, p. 197).

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[4] The PRC government that came to power in 1949 waged three major campaigns before 1989: the "three-anti movement" (anti-corruption, anti-waste and anti-bureaucracy) in 1951-52, the "five-anti movement" (anti-corruption, anti-diversion, anti-waste, anti-decentralism and anti-bureaucracy) in the cities in 1963-65 and the "four-inspection movement" (inspection of (material) accounts, warehouses, financial accounts, and work points) in the countryside in 1963-65.

As the Chinese economy underwent significant changes in transition from the plan towards the market, corruption also evolved as the corrupters exploited opportunities opened up by the reforms. Before the introduction of the dual-track system in 1985, corruption was often conducted via under-the-table, in-kind exchanges. Under central planning, most consumer and producer goods were under-priced and in chronic shortage. Consumers needed ration coupons and producers needed allocation quotas to purchase shortage goods. There were, therefore, gains from trade between officials who controlled the allocation of ration coupons and quotas and buyers willing to pay higher prices—often not in cash but in in-kind payoffs. Common in-kind bribes included a gift of other shortage goods, a free product sample, and an offer for a desirable job or a promotion.

There are two main reasons why in-kind bribes were preferred to money bribes. First, the utility of money as a medium of exchange and a store of value was limited in a shortage economy. "Guanxi" or connection to those in power was a more valuable currency of exchange than money. While guanxi could open "the back door" access to shortage goods and services, money alone had little purchasing power. Chang (1991, p. 456) gives an example of "the back door," through which the author, the daughter of a former local official, gained admission to Sichuan University in 1973. No money changed hands in that transaction. Second, while accepting a cash bribe was *per se* illegal, accepting an in-kind gift or favor discreetly was common and often not considered a corrupt practice. In pre-reform China, some official posts were considered more desirable than others not because they paid higher salaries or contributed more to society but because they came with the right to allocate resources in shortage.[5] Since "back doors" and guanxi were considered acceptable privileges of the officialdom, it is no wonder that corruption wasn't perceived as pervasive in pre-reform China.[6]

But in-kind barter exchanges are costly to arrange. If the officials could conduct these exchanges in a market setting using money as a universal medium of exchange, they would save much transaction costs. The dual-track system introduced in 1985 provided them with just the right kind of economic environment. In this new environment, money became more useful as price liberalization eliminated shortage in the newly emerged product market. Another institutional factor that facilitated the monetization of corruption is that Chinese state-owned banks allowed anonymous bank accounts. And finally the officials devised an innovative diversion scheme that would monetize corruption by stealth.

Described by Chinese journalists (e.g. Huang & Li, 1991), this scheme involves the use of a network of trading companies, otherwise known as *pibao gongshi* or "briefcase companies" whose tangible assets (*e.g.*, business cards and company seals) could easily fit into a briefcase. This was possible because the dual-track reform encouraged entry into

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[5] This represents a distortion as talents are attracted to rent-seeking activities rather than productive ones. See Murphy et al. (1991).

[6] Some of the workers who joined the demonstration in 1989 were nostalgic for the pre-reform days when the government was perceived as "clean" (see for example, *Wall Street Journal*, May 19, 1989, "People's Republic: Chinese Communism Faces a Crossroads as the Masses Speak"). Even by the early 1980s, China was still perceived as less corrupt than Portugal, South Korea, Greece, Turkey, Italy, Thailand, and all Latin American countries (Transparency International, 2001).

the distribution sector and permitted new entrants to resell in-plan goods in order to mitigate misallocation in the plan. Created and controlled by a close-knit group of corrupt officials, these companies were often licensed to resell in-plan goods for a small, government-regulated markup to cover “administrative and marketing expenses.” Through repeated reselling among a network of briefcase companies—a practice akin to repeated self-dealing, a group of corrupt officials could capture the diversion rents in the form of administrative fee on each transaction. With a sufficiently long chain of transactions, the officials can raise the price of the in-plan good to its market clearing level before offloading it to users at the market price. In essence, this scheme “launders” in-plan goods into market goods via a series of apparently legal transactions.

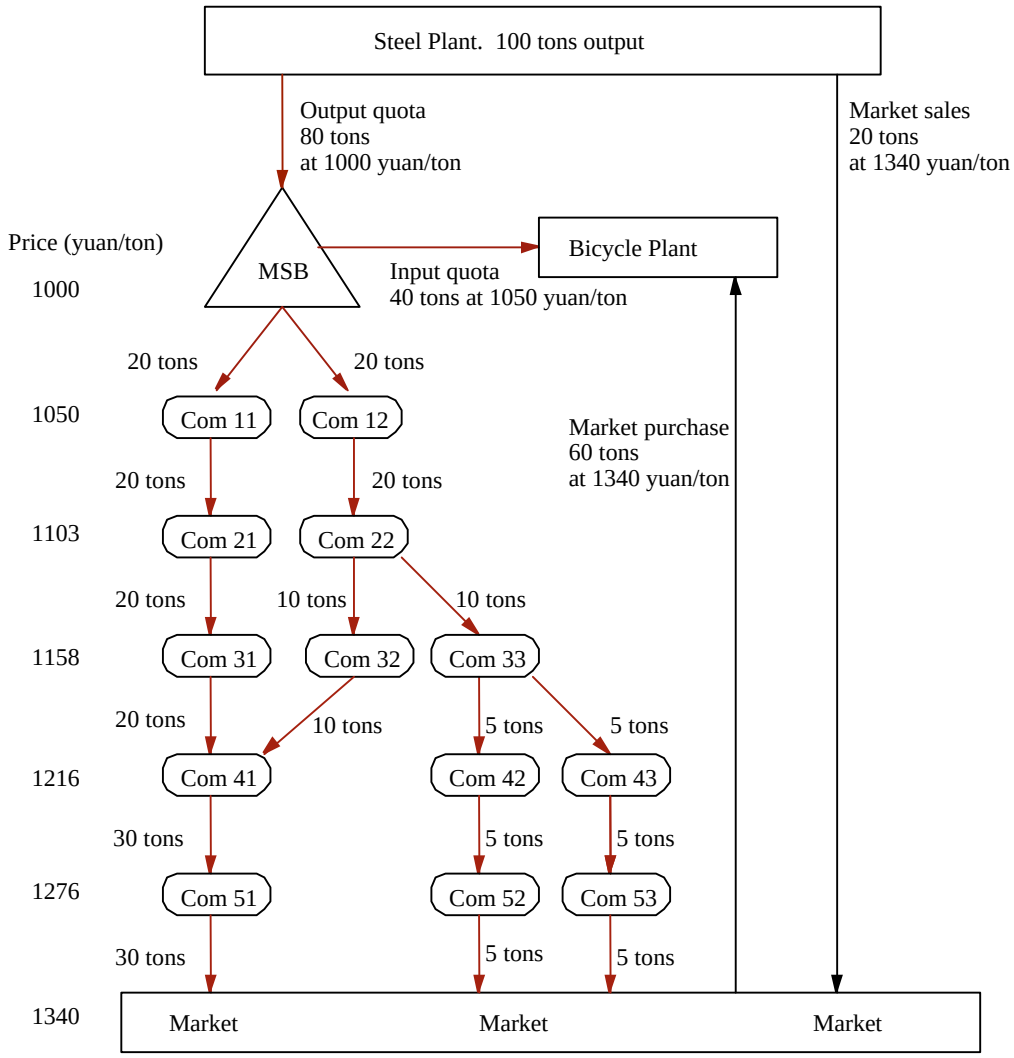

Figure 1: Briefcase companies and official diversion. A state-owned steel plant produces an annual output of 100 tons, and delivers 80 tons of its output to the MSB at the plan price of 1000 yuan/ton. It then sells the remaining 20 tons in the market. The MSB resells, at the plan price plus a small markup (say 5%) approved by the government, 40 tons of in-plan steel to a state-owned bicycle company, and 20 tons each to two authorized resellers (briefcase companies Com 11 and Com 12). The resellers then sells the steel for a small markup to other resellers (Com 21 and Com 22), which in turn sell the steel for a small markup to another layer of resellers (Com 31, Com 32 and Com 33), and so on. As the reselling is repeated, the price of this load of steel rises quickly. At the end of the chain, the repeated markups eventually bring the price to the market clearing level (1340 yuan/ton), and the steel is then sold at the market price.

For concreteness, I illustrate in Figure 1 an example that traces the diversion of 40 tons of in-plan steel via a network of briefcase companies, with each charging a small markup of 5 percent for its services. Focus first on the MSB's sources and uses of in-plan steel on its material balance account. It procures 80 tons of steel from the steel plant (sources of in-plan steel), and then distributes 40 tons to the bicycle plant and 20 tons each to two in-plan resellers (uses of in-plan steel). By recording the sales to the two briefcase resellers as in-plan, the MSB keeps its in-plan material balance account in balance. Auditing the MSB's account alone is unlikely to detect official diversion because of the convoluted reselling scheme. This observation is general and is consistent with the published aggregate MSB in-plan material balance accounts for key industrial commodities. As an example, the aggregate MSB balance sheet of in-plan steel in Table 3, constructed using data published by the State Statistical Bureau, shows no sign of official diversion.

Table 3: Aggregate material balance sheet of in-plan steel as reported by the material supply bureaus (State Statistical Bureau, various years). In-plan procurement includes imports, while in-plan sales include exports. Wastes and statistical errors are calculated by the author. Source: Li, 2001a.

	1986	1987	1988	1989	1990
Sources (million metric ton)					
In-plan procurement	30.04	34.31	38.85	34.85	35.73
Uses					
In-plan sales	28.88	34.22	39.80	33.79	35.16
Changes in in-plan inventory	1.33	0.21	-1.95	2.15	0.81
Wastes and statistical errors	-0.17	-0.12	0.99	-1.08	-0.24
Total	30.04	34.31	38.85	34.85	35.73

But a joint analysis of the accounts of the steel plant (the producer) and the bicycle plant (the user) in Figure 1 is more revealing. While the steel plant delivers 80 tons of steel into the plan, the bicycle plant is able to buy only 40 tons of it at the plan price and has to pay the market price for the remaining 40 tons. Data from industrial firms (as opposed to the MSBs), therefore, reveal a leakage of 40 tons of steel in the plan, which is the volume of diversion. This observation is general. The briefcase companies together with the MSBs form a circuitous distribution network linking producers of in-plan goods with users of the goods on the market track. One way to gauge the diversion traffic in the network is to examine the flow of goods through the network's terminals—the producers and the users.

Widespread usage of the reselling scheme under the dual-track system significantly altered the form of corruption in China. As officials deployed briefcase companies to conceal corrupt exchanges, official diversion became increasingly monetized and marketized in the second half of the 1980s. Since this change reduced the transaction costs of official diversion, it should not be surprising that official diversion became more pervasive under the dual-track system.

This change also had an unexpected side-effect: it made official diversion more transparent and hence estimable. Straddling both the plan track and the market track, an official corrupter was no longer a bribe elicitor as in Shleifer and Vishny (1993) but an arbitrageur who buys low from the plan and sells high on the market. The implied bribe per unit of a diverted good—the difference between market and plan prices—was observable under the dual-track system. More importantly, the discussion above implies that aggregate measures of the volume of in-plan resources diverted or the leakage in the plan can be estimated by examining producers' and users' accounts.

3. Detecting the Allocative Impact of Corruption

I have documented the under-pricing of in-plan goods in the 1980s in China. This under-pricing creates gains from trade between officials who control the allocation of in-plan goods and buyers who are willing to pay higher prices. A corrupt official can realize the gains by acquiring in-plan goods at the plan prices and reselling them to buyers at market or implicit market prices. His profit margin will be higher if the difference between market and plan prices are larger. As a result, one expects that an increase in the gap between the market price or the implicit market price and the plan price would corrupt more officials and induce each corrupt official to divert more from the plan. To increase diversion, each corrupt official would in turn raise the in-plan procurement or the output quotas that state-owned producers face. I therefore hypothesize that *a state-owned enterprise's output quota increases with the gap between the (implicit) market price and the plan price of its output*.[7]

But the corrupt official has an incentive not to ratchet up the output quota even when price gap remains large. To ratchet up the output quota, the official must take into account how the producer will respond. As discussed, the producer is allowed to sell its outside-plan output in the market after it has fulfilled its output quota. Given the price gap between the plan and the market, the producer has a financial incentive to produce outside-plan output. In general, an increase in output quota will force the producer to work harder by producing more output to ensure a sufficient quantity of outside-plan output is available. The increase in production, under the assumption of imperfectly competitive output market, means that the market price will have to fall. The corrupt official, who anticipates the reaction of the producer, will take into account the effect of the producer's reaction in setting the output quota. Since he anticipates the market price to fall as he increases the output quota, he will have little incentive to ratchet up the quota beyond a certain level—the optimal quota that maximizes corruption proceeds.

The above discussion suggests that the market price or the implicit market price before the price liberalization is endogenous, determined by the producer's and the corrupt official's actions. Li (2001a) shows that the equilibrium market price is a function that is

[7] A more rigorous discussion is in Li (2001a). Shleifer & Vishny (1993) give a general discussion on the distortionary effect of corruption.

increasing with the marginal cost of production—the market price of material inputs and wage rates—and decreasing with the output quota.

Combining the determination of output quota and the market price of output, one obtains the following testable implications: *If the output quota is determined by corruption, it should increase with the market price of material inputs, wage rate, and decrease with the plan price*.

This prediction, if true, implies that corruption makes some unusual imprints on the setting of output quota. According to standard theories of socialist planning (e.g. Kornai, 1992), the plan price is set for accounting purposes and plays little allocative role. Planning is done in physical terms. If the planner wants to produce 100 trucks, it will set the plan target on steel, rubber and other industrial commodities to ensure that there are sufficient inputs for the production of 100 trucks. An increase in the plan price of steel should not have any impact on size of the output quota on steel mills. The prediction that the output quota increases with the market price of material input and wage rate is even more unusual. If the role of the planning official is to try to balance the supply and demand in the plan, then holding everything else constant, an increase in the marginal cost of production should not lead to an increase in the output quota. Given the sharp differences in the predicted responses with or without corruption, statistical tests on whether corruption existed should be very powerful.

To test the prediction, I run a regression with the output quota as the dependent variable and the following variables with explanatory variables: the plan price of output, the plan price of input, the market price of input and the wage rate, all in logarithms. The results of the regressions are reported in Table 4. Technical discussions of the econometric framework and the data preparation are available in Li (2001a).

Table 4: Estimating the determinants of the output quota using Honoré's semi-parametric fixed-effects Tobit. The dependent variable is the output quota measured in 1989 market prices in 10 million Yuan. The numbers reported in parentheses are *t*-statistics. Source: Li, 2001b.

	1980-89	*1980-84*	*1985-89*
Log plan output price	-0.534	-0.730	-0.566
	(-4.821)	(-6.968)	(-5.087)
Log market input price	0.419	0.374	0.420
	(3.676)	(3.103)	(3.740)
Log plan input price	-0.175	-0.053	-0.157
	(-1.686)	(-0.466)	(-1.376)
Log base wage rate	0.395	0.115	0.655
	(4.986)	(1.390)	(4.702)
Observations [% censored]		7086 [22%]	

Inspection of the signs of the estimated coefficients on included explanatory variables reveals that all variables operate as predicted. “Log plan output price” increases corrupt officials’ marginal cost of diversion. It should reduce the amount of output quota that the official procures and diverts. The estimated negative coefficients on this variable in Table 4 empirically confirm the presence of the negative effect of the official price on corruption. “Log market input price” and “log base wage rate” both increase the marginal cost of production that the firm faces. In an imperfectly competitive market, they raise the market price of output for any given output quota. If the resulting upward shift in the market price increases the marginal revenue in diverting output quota, it would raise the procurement and the diversion of output quota. It is therefore not surprising to find that the estimated coefficients on both variables are positive and statistically significant. There is a negative but (statistically) insignificant effect of the plan price of input on output quota. The data, therefore, offer strong evidence that corruption had measurable effects on the allocation of in-plan goods.

To what extent did the effects of corruption on resource allocation change as a result of market price liberalization in 1985? Inspection of the estimates before and after the liberalization as reported in Columns 2 and 3 in Table 4 shows that there is little qualitative change in how the output quota responds to changes in the included variables. This finding reveals strikingly that even before the full implementation of the dual-track system, the allocation of in-plan resources is consistent with the hypothesis of corruption. They suggest that official diversion thrived even in the absence of a functioning product market, and that corrupt officials could have relied on implicit or black-market prices in making allocation decisions before prices were liberalized.

In sum, the empirical analysis has shown that the allocation of in-plan resources between 1980 and 1989 in China exhibits strong empirical patterns, and that these patterns strongly support the hypothesis of official corruption. The analysis has also shown that there is little qualitative change in the patterns of in-plan resource allocation before and after the full implementation of the dual-track system in 1985. This finding suggests that the diversion of in-plan resources was a not a new phenomenon, rather it thrived even before the formal introduction of the dual-track system.

4. Estimating Corruption

The discussion in Section 2.2 suggests that the diversion traffic is estimable using data collected from producers and users. In this section I offer a more formal discussion of the empirical method and then present some strong evidence of diversion.

Conceptually, resource should flow separately on the plan track and the market track in the absence of diversion. Goods procured into the plan should be distributed only to in-plan uses, while goods produced for the market should be distributed to market uses.

Official diversion, however, destroys the balance in both the plan and the market. As corrupt officials divert goods from the plan to the market, they reduce the flow of in-plan resource to in-plan uses for any given in-plan procurement and at the same time increase

the flow of resource to market uses. Official diversion therefore represents a "sink" in the plan, but a "source" in the market. It drives a wedge between in-plan procurement and in-plan uses. An indirect approach to measuring the volume of diversion is to estimate either the leakage in the plan or the extra, unaccounted sources of market supply.

Since the leakage in the plan will show up in the market as a source of market supply not attributable to producers, the plan-based and the market-based approaches are conceptually identical: they are the two sides of the same coin. But the market-based approach is more demanding on the data. While in-plan procurement is levied on state-owned firms only, sources of market supply include non-state firms, for which there is no survey comparable in coverage to the survey of state owned enterprises used here. But for commodities produced primarily by state owned firms, such as steel, it is possible to estimate the amount of diversion using market-based approach and aggregate data. Below I first present some evidence using aggregate data on market sales reported by producers and on market purchases reported by user firms.

4.1. Market-based approach

Since non-state firms had a negligible presence in China's steel industry in the 1980s, virtually all sources of supply in China's steel market were state-owned firms and imports. In Table 2, we see that on the supply side, state-owned steel producers reported that they sold 32% of their output at market prices, while on the demand side, users of steel reported that they paid market prices for 55% of their inputs. What could explain the discrepancy between quantities sold by producers to the market and quantities purchased by final users? Could it be the omission of other sources of market supply, say, imports and changes in steel inventories? To address this question, I use available data to compare the sell side and the buy side of market transactions in steel.

Table 5: Accounting for market sales and market purchases of steel in 1989 using the aggregate material-balance table.

Sources[1]		% to market[2]	Market sales
Domestic output	48.59	32%	15.55
Imports	9.48	=100%	=9.48
Total	58.18		=25.03
Use[2]		% from market[2]	Market purchases
Domestic consumption by users	53.60	55%	29.48
Exports	0.82	=0%	=0
Other[3]	3.76	=0%	=0
Total	58.18		=29.48

[1] Source: China Statistical Yearbook, 1991, p. 480.
[2] Source: Table 2.
[3] Other use includes additions to inventory, loss and wastage, and errors and omissions.

In Table 5, I first compute the sell side of market transactions, or the sources of market transaction, using data on sales by steel producers and imports. Total sales of steel by domestic producers in 1989 were 48.59 million tons (State Statistical Bureau, 1990). According to Table 2, 32% of the sales were transacted on the market track. Although there are no statistics on the proportion of market sales from imports, the maximum sales on the market track from imports should not exceed 9.48 million tons. Thus, *at most 25.03 million tons of steel were sold on the market track in 1989*. On the buy side, domestic users reported that they purchased 55% of the steel on the market track (Table 2). Given that the amount of domestic consumption was 53.60 million tons, this implies that 29.48 million tons of steel were purchased by domestic users on the market track. In 1989, China also exported 0.82 million tons of steel and added 3.76 million tons either to the stock piles or the waste piles. Since some of the exports and added inventory could have been obtained from the market, the total amount of steel purchased from the market should be at least 29.48 million tons.

The analysis thus reveals that the imputed market purchases exceeded the imputed market sales by *at least 4.45 million tons*. Since 48.59*(1-0.32) = 33.04 million tons of steel was procured into the plan, the estimate suggest that at least 13.47 percent of the in-plan steel was diverted to the market in 1989. Given the large price gap reported in Table 1, this diversion could generate at least 3.53 billion Yuan in profits in 1989, or .2 percent of GDP. The actual diversion was likely much higher. Official diversion is not confined to the steel industry. But as discussed, measuring it for a broad sample of industries using the market-based approach is in general more difficult than using the plan-based approach. Below I turn to the plan-based approach.

4.2. Plan-based approach

Material balance in the plan requires that sources of a particular in-plan good equal the uses of that good in the plan, as expressed in a balance sheet in Table 6. The output procured into the plan from a state owned firm in any given year should equal the sum of all in-plan purchases for that output from both industrial and non-industrial intermediate users and from final users. Official diversion, however, breaks the material balance. As corrupt officials siphon off in-plan goods from the plan track and sell them on the market at higher prices, they reduce the allocation of in-plan goods distributed to intermediate and final users. Official diversion thus drives a wedge between in-plan procurement and in-plan uses. As a result, official diversion is detected if there are leaks in the plan, that is, if more resources are procured into the plan than are allocated within the plan.

To estimate the leakage in the distribution of in-plan goods, the researcher needs data on to whom and how much an enterprise's in-plan output is distributed. Not all needed data are directly observed. Some have to be imputed using available aggregate information. As a result, it will not be possible to estimate the size of diversion from the in-plan output of a specific state owned enterprise. But an aggregate measure of the size of diversion from industrial state owned firms can be estimated. Since the material balance holds in the absence of diversion for every state owned enterprise, it should hold for an average

state owned industrial enterprise. The material balance sheet in Table 6 should thus hold for an average state owned industrial enterprise. An aggregate measure of official diversion can be estimated as the difference between the average in-plan procurement and the average in-plan distribution per state owned industrial firm.

Table 6: Material balance sheet for in-plan distribution

Sources	Uses
Procurement from a state-owned firm	In-plan industrial intermediate uses
	In-plan non-industrial intermediate uses
	In-plan final uses
	consumption
	investment
	net exports
	changes in inventory

The enterprise survey data that I have used in Section 3 give details on each sample firm's in-plan output and its intermediate uses of in-plan inputs. The survey sample consists of a diverse selection of state owned firms, representing 36 (out of a total of 40) two-digit industrial sectors located in the four provinces (Jiangsu, Jilin, Shanxi, and Sichuan). While large and medium sized firms are over-represented in the sample, by two important indicators—output growth rate and labor productivity—the sample averages are virtually identical to the published national averages. The sample appears quite representative of the master sample of state owned industrial firms used by the State Statistical Bureau.

Using the survey sample, one can therefore estimate the average procurement per firm directly as the average in-plan output per firm. Similarly, the average in-plan intermediate industrial uses per firm—the first entry on the right hand side of the balance sheet—can be estimated as the average input quota per firm. Estimates for the two averages in each year are listed in the first two columns of Table 7.

The average intermediate uses by non-industrial sectors and the average final uses per industrial firm cannot be estimated using the survey data since the survey did not provide information on how each firm's in-plan output is allocated to various uses. Fortunately, estimates of these unobserved variables can be constructed using China's input-output table, which describes the interdependence in the economy.

Ideally, I would like to use the input-output table of the plan-track economy to estimate how in-plan output from each industrial sector is allocated to final uses and to intermediate uses by non-industrial (unsampled) sectors. If such a table existed, I could compute two ratios: the proportions of each industrial sector's in-plan output distributed to non-industrial sectors for in-plan intermediate uses and to in-plan final uses. Assume that all firms in the same industry have identical distribution ratios. Then, by multiplying

the ratios and the average in-plan output per industrial state-owned firm, we would get the imputed values of the average in-plan distribution of industrial goods to non-industrial intermediate uses and to final uses.

Table 7: Estimation of the size of official diversion by the distribution approach using firm-level survey data and the 1997 input-output table. Output quota, input quota and the estimated size of diversion are all measured in current plan prices.

Year	In-plan value of output quota per firm	In-plan value of input quota per firm	Estimated intermediate in-plan use by unsampled industries per firm	Estimated in-plan final use per firm	Estimated size of diversion per firm	Percent of output quota diverted	Robust standard error
1980	1500.96	918.47	305.32	215.42	61.75	4.11%	0.062
1981	1489.90	861.25	298.94	207.48	122.23	8.20%	0.047
1982	1672.32	914.42	339.55	211.80	206.55	12.35%	0.055*
1983	2007.35	1169.12	435.63	224.47	178.13	8.87%	0.076
1984	2267.65	1253.48	476.85	244.21	293.10	12.93%	0.092
1985	2533.83	1312.70	522.27	270.62	428.24	16.90%	0.075*
1986	2734.65	1198.35	547.95	282.66	705.68	25.81%	0.056**
1987	3871.88	1336.83	717.28	445.46	1372.32	35.44%	0.081**
1988	4083.59	1360.79	793.66	417.91	1511.23	37.01%	0.059**
1989	4545.02	1719.79	880.86	457.96	1486.41	32.70%	0.063**

Input-output tables of the Chinese economy, constructed using the System of National Accounts (SNA), are available for the years 1987, 1992 and 1997. None of the tables describes the interdependence of the plan-track economy, however. The 1987 and 1992 tables are compiled using transactions data on both plan and market tracks, while the 1997 table describes the industry interdependence on the market since the plan track has ceased to exist by 1997.

In Li (2001b), I used the 1987 table to compute the proportions of output distributed to intermediate and final uses and to estimate the size of diversion. The distribution ratios are reproduced in Table 8. In Li (2001b), I also discussed how the size of diversion was likely underestimated.[8] To avoid the biases identified in Li (2001b), I use in this paper the 1997 input-output table to estimate the distribution ratios and the size of diversion.

[8] The underestimation of the size of diversion is the result of an overestimation of the distribution ratios computed using the 1987 input-output table. In the absence of diversion, the 1987 distribution ratios would be similar to the in-plan ratios. Since in the absence of diversion, the plan and the market should operate separately, any differences between the observed 1987 ratios and the unobserved in-plan ratios in 1987 will simply reflect the differences in how the plan and the market allocate resources. If misallocation of resource in the plan is arbitrary and tends to average out, there should not be any systematic bias in the 1987 observed ratios in the absence of diversion. But the 1987 ratios are expected to be biased upward—that is, greater than the in-plan ratios in the presence of official diversion. This is because official diversion reduces in-plan distributions while increases market distributions for any given in-plan output and market output.

Estimates of the size of diversion using the 1997 table should in general be free of the kind of bias that affects those obtained using the 1987 table. But estimates obtained using the 1997 table are likely biased in another dimension. The 1997 table should be different from the 1987 table due to technological and structural changes that occurred between 1987 and 1997 in the Chinese economy. The estimated 1987 and 1997 distribution ratios in Table 8 show that the intermediate and final uses of coal declined significantly between 1987 and 1997. While it is possible that the recorded change may be partly due to the upward biases in the 1987 ratios discussed in Li (2001b), a more important reason is the substitution of environmentally cleaner fuels for coal that occurred between 1987 and 1997. It is, however, difficult to ascertain the direction in which the bias will affect the estimate of the size of diversion.

Table 8: Distribution coefficients from the 1987 and 1997 Chinese input-output tables. Only the coefficients for the industries covered by the enterprise survey are listed here.

	Proportion of output distributed			
	For intermediate uses In unsampled industries		for final uses	
Industries covered in the survey sample	1987	1997	1987	1997
Coal mining	0.20	0.21	0.12	0.04
Metal ore mining	0.00	-0.07	0.01	-0.14
Other mining	0.63	0.00	0.28	0.01
Food and tobacco	0.16	0.64	0.21	0.63
Textiles	0.06	0.36	0.06	0.21
Wearing apparel	0.07	0.75	0.06	0.77
Sawmills and manufacture of furniture	0.46	0.20	0.32	0.33
Paper and educational articles	0.28	0.14	0.32	0.15
Eletricity, steam and hot water	0.22	0.09	0.25	0.07
Petroleum refineries	0.56	0.03	0.57	-0.08
Chemical and pharmaceutical products	0.33	0.16	0.26	0.04
Building materials	0.78	0.01	0.59	0.12
Primary metal manufacturing	0.32	-0.12	0.17	-0.10
Metal products	0.41	0.23	0.31	0.20
Machinery	0.16	0.44	0.19	0.32
Transport equipment	0.28	0.41	0.20	0.43
Electric machinery	0.19	0.41	0.29	0.34
Electronic equipment	0.07	0.48	0.18	0.29
Instruments	0.42	-0.06	0.39	0.21
Arithmetic average	0.29	0.23	0.25	0.21

With this caveat, I use the 1997 distribution ratios listed in Table 8 to construct an estimate of the size of diversion for each sample year. To do so, I multiply the 1997 ratios and the average in-plan output per industrial state-owned firm. The result is the imputed

values of the average in-plan distribution of industrial goods to non-industrial intermediate uses and to final uses. These estimates are reported in Columns 3 and 4 in Table 7. The sum of Columns 2, 3, and 4 represents an estimate of all in-plan uses in each year. The difference between Column 1 and the sum of Columns 2-4, which is reported in Column 5, is then an estimate of the leakage in the in-plan distribution in each year. Dividing Column 5 by Column 1 gives the test statistics—the size of diversion as a proportion of in-plan output, which is reported in Column 6. Column 7 reports the standard errors of the test statistics.

Under the null hypothesis of no diversion, the estimate of the size of diversion in each year as a proportion of in-plan output should be zero. This is contradicted by the estimates for years 1982 and 1985-1989, which are all positive and statistically significant. Although the estimates for other years are positive, they are not statistically significant. The estimates therefore reject the null hypothesis that official diversion did not exist between 1985 and 1989. But they fail to reject the null hypothesis for the first half of the 1980s. Compared to the estimates obtained using the 1987 distribution ratios in Li (2001b), the estimates in Table 7 are significantly larger. This is consistent with the discussion in Li (2001b) that the estimates obtained using the 1987 distribution ratios are likely biased downward.

The estimates in Table 7 show that the size of diversion rose substantially in 1985, the year when market prices were liberalized. Between 1985 and 1989, the estimated size of diversion continued to increase rapidly. The proportion of in-plan output diverted in 1988 more than doubled that in 1985. In the late 1980s, more than one-third of the in-plan output was estimated to have been diverted.

Given the finding in Section 3 that official diversion had a significant impact on resource allocation both before and after 1985; it is puzzling that the estimates of the size of diversion before 1985 are low and often insignificant. One explanation, discussed in Li (2001b), is that estimates of the size of diversion between 1980 and 1984 are biased towards zero. Recall that outside-plan prices were still under tight government control between 1980 and 1984. To capture the rent embodied in a diverted good, the corrupt official would often sell it nominally at the plan price in exchange for an under-the-table bribe. By recoding the transaction as in-plan, he left few traces of diversion. Since giving bribes was illegal, the briber-giver also had the incentive to conceal the bribe by recording the transaction as in-plan. If all diversion transactions were nominally recorded as in-plan between 1980 and 1984, the estimation procedure used here would fail to detect any leakage in the plan.

The liberalization of prices on the market track in January 1985 altered the economic environment that corrupt officials faced. In response, corrupt officials began to set up briefcase companies as their intermediaries between the plan and the market. Through repeated reselling, these briefcase companies could “launder” in-plan goods into market goods. As briefcase companies eventually sold the diverted goods to users at market prices, users would record their purchases as market transactions. As a result, statistics collected from state-owned firms, which were both producers and users of in-plan goods, could reveal the extent of leakage in the plan. The use of briefcase companies as intermediaries, therefore, helped make official diversion detectable using firm-level data.

Indeed the effect of price liberalization in 1985 was immediate. In 1985, the estimated size of diversion in Table 7 rose to a statistically significant 16.90 percent of the output quota on average. The estimated percentage rose sharply to 37.01 percent by 1988 and retracted slightly to 32.70 percent by 1989. All the estimates from 1985 on are statistically significant.

What explain the increase in the estimated size of diversion? Part of the answer may be that the downward biases fell gradually as the corrupt officials needed time to develop networks of briefcase companies. More importantly, however, the data may have captured the rapid increase in official diversion in the late 1980s. The monetization of diversion discussed earlier should have significantly reduced the transaction costs of diversion, thereby contributing to the increased pervasiveness of official diversion. Moreover, the widening of the gap between market and plan prices reported in Table 1 should have given corrupt officials stronger incentives to divert in-plan goods in the late 1980s.

5. Conclusion

Given its illicit nature, corruption is not directly observable. But if corruption plays a role in the economy, it must leave some imprints on the economy, even when corrupters have tried to cover their tracks. By identifying the imprints that corruption leaves behind, the researcher may be able to assemble indirect evidence that establishes statistically the existence and pervasiveness of corruption. This paper documents one such attempt. While the specific methods used may be unique to the Chinese setting, the general principle should be applicable to other settings as well. It should be noted that while it is possible to assemble indirect evidence of corruption, it remains difficult to identify a specific corrupt exchange, a task perhaps best left to the detective.

Exploiting a data set containing detailed transaction and price data from a panel of 769 Chinese state-owned enterprises, this study assembles two pieces of indirect evidence of a particular form of corruption in China in the 1980s—official diversion of in-plan resources to the market. The first piece of evidence is the imprints of corruption on the allocation of in-plan goods. We find that corrupt officials would increase procurement of in-plan goods when it was more profitable to divert in-plan goods—when the gap between market and plan prices widened. The second type of imprints of corruption that I identify in the Chinese data is the imbalance in resource allocation in the plan and in the market under the dual-track system after 1985. Since official diversion creates a wedge between in-plan procurement and in-plan uses and between market production and market uses, corruption is detected if plan procurement exceeds in-plan uses, that is, if there is a leakage in the plan. Similarly, corruption is detected if the volume of market transactions exceeds the market supply from producers. Indeed, the Chinese firm-level data, supplemented by aggregate data, offer strong evidence of official diversion. Estimation also shows a significant portion of China’s in-plan goods were diverted between 1985 and 1989.

The findings suggest that the introduction of the market-track *per se* did not cause corruption: Corruption was pervasive even before the full implementation of the dual-track system in 1985. The culprit was the continued reliance on the plan. By introducing the market track, the dual-track system represents a half-way move from the plan toward the market. Economic benefits of such a move have been studied in depth (see for example Byrd (1991), Li (1999), and Lau et al. (2000)). But the evidence here shows that this reform strategy has a serious downside: It maintained the status quo that was conducive to corruption. The evidence here also shows that it may have even helped spread corruption. Under tight price controls before 1985, corrupt officials would have to rely on costly barter exchanges to trade diverted goods. The introduction of the market track allowed official diversion to be monetized. The monetization of corruption reduced its transaction costs. The dual-track system therefore may have contributed to the increased pervasiveness and the heightened public awareness of corruption in China.

Corruption is much more than a redistribution of income from the government to corrupt officials. In general, the implied loss of government revenue may force the government to raise tax rates, thereby increasing the deadweight loss of taxation. Under China's dual-track system, corruption continued to exert an allocative role in the economy. The resulting allocation was distorted since corrupt officials would procure and divert more resources the larger the gaps between market and plan prices. Given the arbitrary under pricing of in-plan resources, some goods may be over-procured and hence over-produced while others under-produced.

Paradoxically, the distortions brought about by official diversion might have mitigated partially the existing distortions under the plan and resulted in an improvement in economic efficiency in China.[9] Since allocation under the plan was very distortionary, it is not surprising that diverting in-plan goods into the market may improve the allocation of resource in the economy. The dual-track system, even in the presence of official diversion, may have made invaluable contributions to China's transition from a highly distortionary planned economy to a market economy. Li (1997) found that a significant portion of the productivity growth in Chinese state-owned enterprises in the 1980s is attributable to improved allocation of resource.

But the economic gains were certainly not shared equitably. Corrupt officials reputedly captured most of the gains. Public outrage against corruption erupted in 1989. Massive demonstrations were held in Tiananmen Square from April 18 until June 4, 1989. The crackdown that followed has turned out to be a watershed event for China. The government immediately launched an anti-corruption campaign and tried to tighten the oversight of official behavior. After a short hiatus, economic reform resumed and planning was gradually phased out in the industrial sector.[10] On January 1, 1994, China also ended the dual-track system for foreign exchanges by abandoning the official exchange rate and allowing the currency swap markets and later the inter-bank currency

[9] This is consistent with the arguments in Li (1999) and Lau et al. (2000). Corruption does not negate the improvement in allocative efficiency in the Chinese economy.

[10] China listed price control on 593 items, according to the *Asian Wall Street Journal*, September 2, 1992.

markets to determine the exchange rate for current account purposes.[11] By the late-1990s, hardly any industrial goods were still allocated under the plan. However, the government has continued to impose centralized control over the financial sector. It has continued to impose stringent capital controls to block the outflow of domestic savings, to repress deposit and loan interest rates, and to restrict the listing of firms on China's stock exchanges (Gordon & Li, forthcoming). As a result of these changes, corruption in China has gradually shifted from the industrial and distribution sectors of the economy to other sectors, most notably the financial sector.[12] By most accounts,[13] China remains one of the most corrupt countries in the world.

[11] The central bank continues to intervene in the currency market and has so far managed to maintain a stable exchange rate. But under stringent capital control, the renminbi remains a non-convertible currency on the capital account.

[12] One particular corruption scheme involves diverting bank loans given to a state-owned organization into private investment accounts on the stock market or into private real estate investments; see Huang (1996, p. 259-260). Corrupt officials keep the upsides of these investments, but leave the banks to pick up the downside risks. Although no reliable statistics are available, it is believed (Huang, 1996) that a good portion of China's non-performing bank assets is linked to official corruption.

[13] Transparency International's (2001) "poll of polls" corruption perception index gives China a score of 3.5 (out of a perfect score of 10). China was tied with Namibia and ranked lower than El Salvador and Belarus.

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