The Achilles' heels of growth: factor price distortions and wealth transfer in China

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The Achilles' Heels of Growth: Factor Price Distortions and Wealth Transfer in China

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Abstract: As critical piece of China's gradualist economic transition, domestic price reform still faces major challenges. In particular, factor price, which is still tightly-controlled and not market-based, is lower than market equilibrium price. Factor price distortion not only reduces market efficiency but also affects wealth distribution. Subsequent wealth transfer has, over the past ten to fifteen years, created a powerful vested interests and spawned social resentment, both of which may constitute major hazards in China's future reform and development. Keeping in mind that China will have to address factor price distortion in its next step of reform, this paper takes stock of China's journey toward price reform; examines the relationship among factor price distortion, previous economic growth, and policy; and estimates the size of resulting wealth transfer.

Key words: factor price, economic growth, wealth transfer
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I. Introduction

Gradualist reform is one of the hallmarks of China's economic transition. As stated by Young (2000), while this reform strategy has achieved great successes, it has also failed to solve many continuing problems due to dependence on previous policy. Price reform is a good example. After thirty years of reform, although the prices of most final commodities have become market-based, prices of many production factors such as land, natural gas, and electricity are still under government control. Despite criticism from Chinese academia on price controls[1], reform of production factor pricing has been slow.

Aside from institutional inertia, control of production factor prices is largely an outcome of China's economic policies, which revolve around ensuring growth and stability. On the one hand, under-pricing of production factors has increased revenue for producers and is thus conducive to stimulating investment. Cheap factors are still a main reason behind the competitiveness of Chinese products in the international market. In addition, controlling production factor price is a powerful tool that can contain economic overheating and slow the increase of overall price levels caused by Balassa-Samuelson effect. Thus, price reform affects not only the macroeconomic environment but is tied into China's social stability as well. Due to these considerations, China's central government has treaded carefully on the issue..

Economic theories tell us that price distortion reduces the efficiency of resource allocation. If such distortion appears in the factors at the bottom of production chain, the negative impacts

[1] For such discussion, see Gong Min (2009).

would be even more serious. For China, a country in the process of economic transition, price distortion of production factors has another significant consequence that is in income distribution. Control of production factor prices leads directly to the transfer of wealth from factor owners to other users

Consequences of price distortion in China have already been discussed by some scholars. Xu (1993) estimated the degree of price distortion in various economic sectors using a computable general equilibrium model. Garbaccio (1994) estimated the effects of relaxed and enhanced price control of various sectors on profits, output, and employment. This paper will pay greater attention to the analysis of factor pricing from the perspective of political economy, i.e. the effects of price distortion on various interests. We aim to identify reasons why this system may be slow to reform, as well as its social and economic consequences. As Qin et al. (2009) found, inequalities in income distribution could have a significant effect on China's macroeconomic stability and growth. This paper also considers the relationship between rent-seeking from natural resources and economic growth. Additionally, as indicated by Tornell (1992), Tornell and Lane (1999) and Torvik (2002), vested interests' struggle for resource rents will threaten long-term economic growth. Our concern, in turn, is that the enormous vested interests generated by price distortion in China's production factors are highly likely to contribute to such instability.

This paper is structured as follows: Part II is a brief overview and discussion of China's price reform; Part III discusses the relationship between the control of production factor prices and export-oriented economic policies through modeling; Part IV provides an empirical analysis that estimates the size of domestic and international wealth transfer caused by factor prices; and Part V offers conclusions.

II. China's price reform: overview and discussion

Price adjustment began at the inception of China's economic reform. At that time, China's price reform followed a strategy of prioritization, differentiation, and double-tracking. Reform of commodity prices and the development of a commodities market outpaced those of factor prices and factor markets. Prices of agricultural products and industrial consumables were the first to be deregulated, followed by prices of intermediate inputs. At present, except for a few types of products, China has deregulated all commodity prices[2]. In this respect, China has established a basic market economy. Reform of factor prices and opening of a factor market, on the other hand, have been much slower; government regulation is still visible..

With the implementation of the household contract responsibility system in the early period of reform and opening, raising grain prices became the main thrust of policies aimed at stimulating economic growth. Between 1979 and 1984, the purchasing prices of 18 categories of agricultural and sideline products increased by 22.1 per cent. Later, China began to reduce fixed quotas for purchasing and marketing, increase negotiated purchase and marketing, and deregulate the prices of agricultural and sideline products. Given the great success of rural reform, price reform began to be carried out in cities in 1984. At the beginning, regulatory price re-adjustment still held sway.

[2] According to the *Pricing Catalogue of the NDRC and the State Council* released on July 4, 2001, there are 13 categories of commodities under regulatory pricing, which include central reserve materials, state-run industries producing or providing tobacco, salt, civil ammunition, certain chemical fertilizers, certain major medicines, textbooks, natural gas, central and cross-provincial water conservancy and water supplies, electric power, military goods, key transportation, basic postal services, basic telecom services, and important special services.

In an attempt to restore macroeconomic balance, China launched a thorough price reform effort involving interlocked pricing, tax, and fiscal changes. The result was serious inflation and skyrocketing demand, which led to social dislocation and the political turmoil of 1989. As a result, price reform was shelved, and reform in all areas came to a halt until Deng Xiaoping's speeches on economic reform during his tour of southern China in 1992.

Before the re-initiation of reform, China maintained regulatory power over the size of loans, interest rates, and access to the financial industry. In 1993, China began to undertake financial reform, marked by the enactment of *Decisions on Matters Concerning the Establishment of A Socialist Market Economy* and *Decisions of the State Council on the Reform of the Financial System*. China canceled its restrictions on the size of loans in 1998, deregulated interest rates in inter-bank markets and implemented and expanded the floating scope of loan interest rates in 1996, and relaxed control on the upper limit of loan interest rates for commercial banks in 2004 (Monetary Policy Analysis Panel, the People's Bank of China, 2005). Officially, the central bank still regulates the lower limit of loan interest rates and the upper limit of savings interest rates, although there is often a large discrepancy between the official interest rate and private interest rates (see Figure 1).

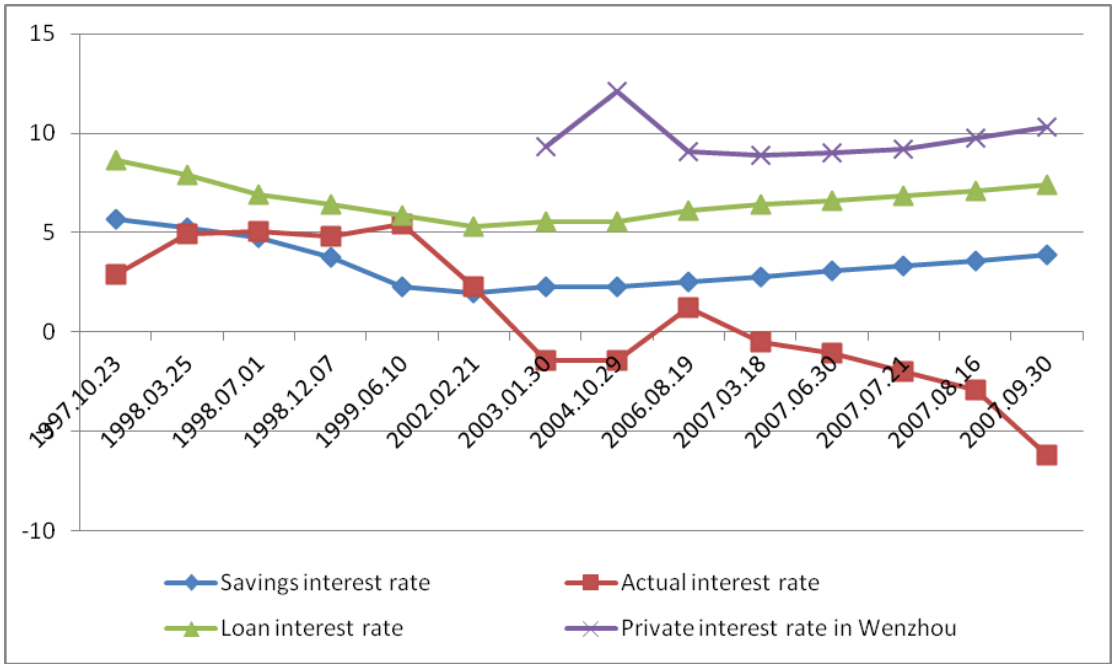

Figure 1: Savings and loan interest rates, actual interest rates, and private loan interest rates in Wenzhou, Zhejiang province (%)

Source: *China Statistical Yearbook* (2007). Monthly statistics on private loan interest rates in Wenzhou are the result of monitoring conducted by the Wenzhou Branch of the People's Bank of China (central bank) from three hundred monitoring points.

Prior to and during the initial stages of reform, China adopted strict foreign exchange controls and a fixed exchange rate system, with the foreign exchange rate highly over-valued. As the exchange rate depreciated and China began to implement foreign exchange reserve holdings, and foreign exchange quota transaction systems, a system developed under which the official exchange rate, the black market exchange rate, and the foreign exchange quota transaction

exchange rate existed side by side. In 1994, exchange rate reform helped achieve exchange rate integration, which occurred in sync with rapid exchange rate depreciation. After excessive depreciation, the renminbi exchange rate began a slow process of appreciation. In 1996, China acceded to GATT and began to phase in free convertibility under current accounts. In 1998, with the eruption of the Asian Financial Crisis, the Chinese government declared it would not devalue the renminbi and decided to re-adopt a fixed exchange rate system. Afterwards, the short-lived expectation of depreciation was replaced by the expectation of long-term appreciation beginning in 2002. The reform of the foreign exchange system on July 21, 2005 phased in the managed floating exchange rate system and gradually relaxed some capital account restrictions. Since then, the renminbi has appreciated slightly. Due to foreign exchange controls and a weakening U.S. dollar, the renminbi had appreciated by a cumulative 10.89 per cent against the US dollar as of November 23, 2007, while having depreciated by 9.59 per cent against the euro. According to a report by the World Bank, China's PPP-based exchange rate was 3.4 in 2004[3]. On the whole, it is clear that the renminbi exchange rate is undervalued.

In China, land resources and the land market are controlled mainly by local governments. The current land system in China is a hybrid system in which collective land and state-owned land and farmland and construction land are administered according to different systems. In rural areas, the primary distribution and redistribution of land-use rights are conducted by village-level organizations. In many parts of rural China, land contract rights cannot be freely transferred or traded: the conversion of agricultural land into non-agricultural land requires both government approval and land acquisition by the government as an intermediary step before the land is used for non-agricultural construction. In the process of land acquisition, compensation awarded to the original user is based on the value of losses rather than on the market price. This has led to a huge discrepancy between land acquisition cost and land transfer price (see Figure 2) and has constituted a major source of government revenue.

As with land, the acquisition and revenue distribution of other natural resources in China such as petroleum, natural gas, and coal are not determined by the market. Resource royalties are tantamount to an administrative fee, and amounts are much lower than average resource prices in the market. Valuable intangible resources such as television, broadcasting, and wireless communication channels, among others, are also offered for industry use at exceedingly low prices (Zhang, 2006). Due to free access to and symbolic pricing of resources, the pricing mechanism of resource goods is distorted by incomplete price composition, an excessively low price level, and unreasonable price parity relations. Despite multiple price increases, resource royalties have always been tightly regulated. Although China has attempted to address several unreasonable price parity relations, such as coal and electricity prices within China and between domestic and international oil prices, these measures have failed to be properly implemented and achieve expected results.

[3] Quoted from *China Economic Quarterly*, the World Bank, China office, February 2008.

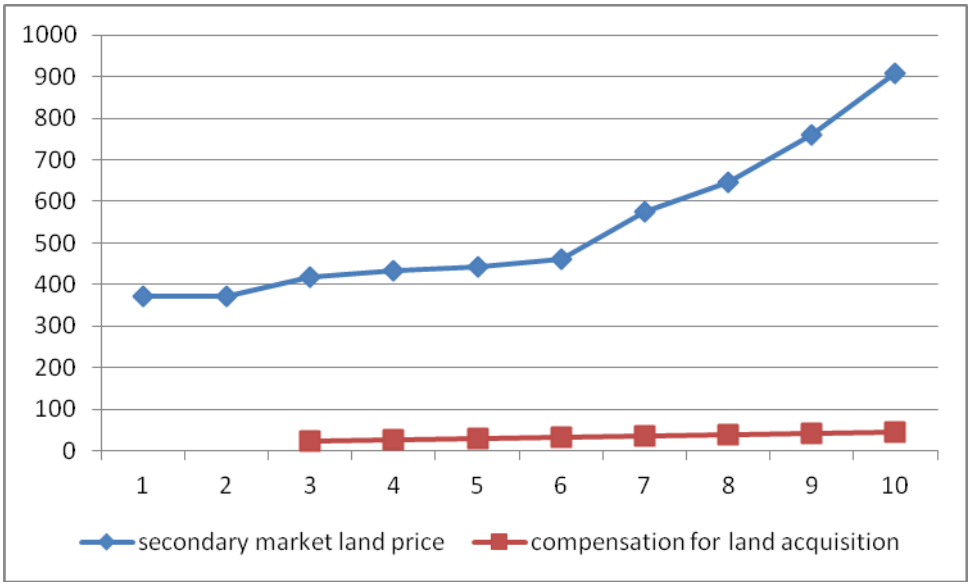

Figure 2: Compensation for land acquisition versus secondary market land price (yuan/m^2)

Source: *China Statistical Yearbook* (2007)

Since reform and opening-up in 1978, as food supply became less of a problem and control over residence registration loosened, China began to witness a massive migration of rural dwellers to cities, which has continued to the present day. Although this inflow of labor was responsible for the development of an informal labor market in urban areas, institutional barriers between China's urban and rural areas have remained high. Local governments and industries are preoccupied with economic performance, neglecting safety, hygiene, and working conditions. In urban formal labor markets, on the other hand, employers and employees are given freedom of choice and the right to termination, enabled by multiple reforms in organization, dismissal, early retirement, and lump-sum severance pay. General labor prices are also deregulated. Salaries of entrepreneurs, intellectuals, and skilled workers, however, are still under regulatory control.

In a word, the market-oriented reforms of capital, land, and labor are far from complete, and prices are still largely under regulatory control. Factor prices are seriously undervalued and price parity relations between factors and products are artificially distorted. In short, government control of and dominance in the market for production factors has been a hallmark of the modern Chinese economy (Zhang Shuguang, 2007).

III. Factor price distortion: causes and effects

(I) Export-led growth strategy, inflation, and factor under-pricing

Consider an open economy that adopts a fixed exchange rate system and includes two sectors of tradable goods and non-tradable goods. Nominal total demand in this economy can be expressed as:

$$P_Y \cdot Y^D = P_C \cdot C^D + P_I \cdot I^D + P_G \cdot G^D + P_X \cdot X^D \qquad (1)$$

where Y^D, C^D, I^D, G^D, and X^D are actual total demand, actual consumption, investment, government spending, and net export demand, respectively, and P_Y, P_C, P_I, P_G, and P_X are the price levels of corresponding demands. Nominal consumer demand is determined in the following way:

$$P_C \cdot C^D = \begin{cases} (1-\tau) \cdot P_Y \cdot Y^D & (1-\tau) \cdot P_Y \cdot Y^D < P_C \cdot C_F \\ P_C \cdot C_F & \lambda_C \cdot (1-\tau) \cdot P_Y \cdot Y^D < P_C \cdot C_F \le (1-\tau) \cdot P_Y \cdot Y^D \\ \lambda_C \cdot (1-\tau) \cdot P_Y \cdot Y^D & \lambda_C \cdot (1-\tau) \cdot P_Y \cdot Y^D \ge P_C \cdot C_F \end{cases}$$

Where τ is the government tax rate and C_F is basic consumer demand. Consumer demand as it is expressed in the above formula means that households must first use their disposable income to satisfy certain basic consumer needs. Then, consumption and savings are divided, using λ_c proportion of income to represent consumption and the remainder to indicate savings. The realistic background of this assumption is that major uncertainties during an economic transition make it difficult for people to properly assess future income, spending, and investment returns. In this case, they can only adopt a simple set of income distribution rules. Psychological aversion to risk also lessens the share of consumption in income λ_C and raises the savings rate.

Economically desirable nominal investment demand is a linear function of nominal total demand. It can only be fulfilled after consumer demand. Hence:

$$P_I \cdot I^D = \begin{cases} 0 & (1-\tau) \cdot P_Y \cdot Y^D < P_C \cdot C_F \\ (1-\tau) \cdot P_Y \cdot Y^D - P_C \cdot C_F & P_C \cdot C_F \le (1-\tau) \cdot P_Y \cdot Y^D < \left[\lambda_C \cdot (1-\tau) + \lambda_I \right] \cdot P_Y \cdot Y^D \\ \lambda_I \cdot P_Y \cdot Y^D & (1-\tau) \cdot P_Y \cdot Y^D \ge \left[\lambda_C \cdot (1-\tau) + \lambda_I \right] \cdot P_Y \cdot Y^D \text{ 且 } \lambda_C \cdot (1-\tau) \cdot P_Y \cdot Y^D > P_C \cdot C_F \end{cases}$$

We assume $\lambda_C + \lambda_I < 1$; i.e. savings exceed investment.

The Chinese government practices operating on a balanced budget, thus:

$$P_G \cdot G^D = \tau \cdot P_Y \cdot Y^D$$

As we have configured the current model, if government spending and current account surpluses do not exist—i.e., $\tau = 0$ and $X^D = 0$ –we have the following constant equation:

$$P_Y \cdot Y^D = P_C \cdot C_F$$

This means that under conditions where output capacity exceeds basic consumer demand, the economy cannot achieve a sufficient utilization of resources.

We choose to focus, however, on another situation, i.e. one in which the government promotes economic expansion through spending and export in order to avoid the problem of insufficient consumption. Thus,

$$P_C \cdot C^D = \lambda_C \cdot (1-\tau) \cdot P_Y \cdot Y^D$$

$$P_I \cdot I^D = \lambda_I \cdot P_Y \cdot Y^D$$

Equation (1) gives us:

$$\left[1-\lambda_C \cdot (1-\tau) - \lambda_I - \tau\right] \cdot P_Y \cdot Y^D = P_X \cdot X^D \qquad (2)$$

Subsequently, the above demand is decomposed into tradable and non-tradable goods sectors. The Cobb-Douglas utility function applies to households:

$$u(y_T, y_N) = y_T^a \cdot y_N^b$$

where y_T and y_N are acquired tradable and non-tradable goods, respectively. We then use a first-order condition of maximal utility:

$$P_T \cdot C_T = \frac{a}{a+b} \cdot P_C \cdot C^D$$

$$P_N \cdot C_N = \frac{b}{a+b} \cdot P_C \cdot C^D$$

where P_T and P_N are the prices of tradable and non-tradable goods, respectively, and C_T and C_N represent consumer demand for tradable and non-tradable goods, respectively.

Investment formation takes the following form:

$$I = A_I \cdot I_T^c \cdot I_N^d$$

where I_T and I_N are tradable goods and non-tradable goods for investment, and A_I is the productivity coefficient. Given its Cobb-Douglas form, this gives us:

$$P_T \cdot I_T = \frac{c}{c+d} \cdot P_I \cdot I^D$$

$$P_N \cdot I_N = \frac{d}{c+d} \cdot P_I \cdot I^D$$

Government spending is complex, as it includes both consumption and investment. For purposes of this paper, we assume that the proportions of and investments in tradable goods and non-tradable goods are equal, i.e.:

$$P_T \cdot G_T = \frac{c}{c+d} \cdot P_G \cdot G^D$$

$$P_N \cdot G_N = \frac{d}{c+d} \cdot P_G \cdot G^D$$

Obviously, net export is equivalent to all tradable goods, hence:

$$P_X = P_T$$

Summarizing the above expressions and replacing nominal total demand with $P_Y \cdot Y^D = P_T \cdot Y_T + P_N \cdot Y_N$ give us the relationship between tradable goods and non-tradable goods:

$$\left[\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)+\frac{d}{c+d}\cdot(\lambda_I+\tau)\right]\cdot P_T\cdot Y_T = \left[1-\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)-\frac{d}{c+d}\cdot(\lambda_I+\tau)\right]\cdot P_N\cdot Y_N$$

Thus:

$$\frac{P_T\cdot Y_T}{P_N\cdot Y_N}=\frac{1-\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)-\frac{d}{c+d}\cdot(\lambda_I+\tau)}{\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)+\frac{d}{c+d}\cdot(\lambda_I+\tau)} \qquad (3)$$

Regarding the supply side, we calculate the production function of tradable goods and non-tradable goods:

$$Y_T = A_T\cdot K_T^{\alpha}\cdot L_T^{\beta}\cdot Z_T^{\gamma} \qquad \alpha+\beta+\gamma=1$$

$$Y_N = A_N\cdot K_N^{\theta}\cdot L_N^{\varphi}\cdot Z_N^{\omega} \qquad \theta+\varphi+\omega=1$$

where K_i, L_i, and Z_i are capital, labor, and resource (such as energy, land, and ores) inputs for the two sectors. A_T and A_N are the production coefficients of both sectors. We assume $\alpha>\theta$, $\beta<\varphi$ and $\gamma<\omega$, i.e. that the production of tradable goods is relatively capital-intensive, while the production of non-tradable goods requires more labor and resources. We reason that most tradable goods are industrial goods, while the greater part of non-tradable goods is closely related to non-tradable factor inputs, such as land, both in the service and consumption phases. Capital, labor, and total resource inputs in the economy are K, L, and Z respectively, hence:

$$K_T + K_N = K$$

$$L_T + L_N = L$$

$$Z_T + Z_N = Z$$

Minimization of production cost gives the following first-order conditions:

$$P_T\cdot\alpha\cdot A_T\cdot K_T^{\alpha-1}\cdot L_T^{\beta}\cdot Z_T^{\gamma} = r \qquad (4)$$

$$P_T\cdot\beta\cdot A_T\cdot K_T^{\alpha}\cdot L_T^{\beta-1}\cdot Z_T^{\gamma} = w \qquad (5)$$

$$P_T\cdot\gamma\cdot A_T\cdot K_T^{\alpha}\cdot L_T^{\beta}\cdot Z_T^{\gamma-1} = h \qquad (6)$$

$$P_N \cdot \theta \cdot A_N \cdot K_N^{\theta-1} \cdot L_N^{\varphi} \cdot Z_N^{\omega} = r \qquad (7)$$

$$P_N \cdot \varphi \cdot A_N \cdot K_N^{\theta} \cdot L_N^{\varphi-1} \cdot Z_N^{\omega} = w \qquad (8)$$

$$P_N \cdot \omega \cdot A_N \cdot K_N^{\theta} \cdot L_N^{\varphi} \cdot Z_N^{\omega-1} = h \qquad (9)$$

where r, w, and h represent interest rates, wage rates, and resource prices, respectively.

Combining the production functions of both sectors using equations (4) and (7) gives us:

$$\frac{P_T \cdot Y_T}{P_N \cdot Y_N} = \frac{\theta}{\alpha} \cdot \frac{K_T}{K_N} \qquad (10)$$

Substituting equation (3) gives us:

$$\frac{K_T}{K_N} = \frac{\alpha \cdot \left[1 - \frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) - \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}{\theta \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}$$

Thus,

$$K_T = \frac{\alpha \cdot \left[1 - \frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) - \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}{\alpha + (\theta - \alpha) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]} \cdot K$$

$$K_N = \frac{\theta \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}{\alpha + (\theta - \alpha) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]} \cdot K$$

By the same token, the distribution of labor and resources in both sectors can be represented as follows:

$$L_T = \frac{\beta \cdot \left[1 - \frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) - \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}{\beta + (\varphi - \beta) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]} \cdot L$$

$$L_N = \frac{\varphi \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}{\beta + (\varphi - \beta) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]} \cdot L$$

$$Z_T = \frac{\gamma \cdot \left[1 - \frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) - \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}{\gamma + (\omega - \gamma) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]} \cdot Z$$

$$Z_N = \frac{\omega \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]}{\gamma + (\omega - \gamma) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]} \cdot Z$$

Substituting into the production functions of both sectors gives us:

$$\begin{aligned} Y_T = A_T &\cdot \left[1 - \frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) - \frac{d}{c+d} \cdot (\lambda_I + \tau)\right] \cdot \alpha^\alpha \cdot \beta^\beta \cdot \gamma^\gamma \\ &\cdot \left\{\alpha + (\theta - \alpha) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]\right\}^{-\alpha} \\ &\cdot \left\{\beta + (\varphi - \beta) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]\right\}^{-\beta} \\ &\cdot \left\{\gamma + (\omega - \gamma) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]\right\}^{-\gamma} \cdot K^\alpha \cdot L^\beta \cdot Z^\gamma \end{aligned}$$

$$\begin{aligned} Y_N = A_N &\cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right] \cdot \theta^\theta \cdot \varphi^\varphi \cdot \omega^\omega \\ &\cdot \left\{\alpha + (\theta - \alpha) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]\right\}^{-\theta} \\ &\cdot \left\{\beta + (\varphi - \beta) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]\right\}^{-\varphi} \\ &\cdot \left\{\gamma + (\omega - \gamma) \cdot \left[\frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) + \frac{d}{c+d} \cdot (\lambda_I + \tau)\right]\right\}^{-\omega} \cdot K^\theta \cdot L^\varphi \cdot Z^\omega \end{aligned}$$

According to equation (3), the nominal total output value of the economy can be expressed as:

$$P_Y \cdot Y = P_T \cdot Y_T + P_N \cdot Y_N = \frac{1}{1 - \frac{b}{a+b} \cdot \lambda_C \cdot (1-\tau) - \frac{d}{c+d} \cdot (\lambda_I + \tau)} \cdot P_T \cdot Y_T$$

Assuming that the tax rate, marginal consumption, and investment tendency remain constant, the nominal GDP growth rate can be expressed as follows:

$$g_{NGDP} = \frac{\dot{P}_T}{P_T} + \frac{\dot{Y}_T}{Y_T} = \frac{\dot{P}_T}{P_T} + \frac{\dot{A}_T}{A_T} + \alpha \cdot \frac{\dot{K}}{K} + \beta \cdot \frac{\dot{L}}{L} + \gamma \cdot \frac{\dot{Z}}{Z} \qquad (11)$$

Because of the fixed exchange rate system, prices of tradable goods are determined exogenously. We assume that international prices of tradable goods remain constant, i.e. $\dot{P}_T = 0$, and that the economic growth rate is subject to technological progress plus factor inputs. At the

same time, equation (10) gives us the relative price ratio between non-tradable goods and tradable goods.

$$\frac{P_N}{P_T}=\frac{Y_T}{Y_N}\cdot\frac{\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)+\frac{d}{c+d}\cdot(\lambda_I+\tau)}{1-\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)-\frac{d}{c+d}\cdot(\lambda_I+\tau)}$$
$$=A_T\cdot A_N^{-1}\cdot\alpha^{\alpha}\cdot\beta^{\beta}\cdot\gamma^{\gamma}\cdot\theta^{-\theta}\cdot\varphi^{-\varphi}\cdot\omega^{-\omega}$$
$$\cdot\left\{\alpha+(\theta-\alpha)\cdot\left[\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)+\frac{d}{c+d}\cdot(\lambda_I+\tau)\right]\right\}^{\theta-\alpha}$$
$$\cdot\left\{\beta+(\varphi-\beta)\cdot\left[\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)+\frac{d}{c+d}\cdot(\lambda_I+\tau)\right]\right\}^{\varphi-\beta}$$
$$\cdot\left\{\gamma+(\omega-\gamma)\cdot\left[\frac{b}{a+b}\cdot\lambda_C\cdot(1-\tau)+\frac{d}{c+d}\cdot(\lambda_I+\tau)\right]\right\}^{\omega-\gamma}\cdot K^{\alpha-\theta}\cdot L^{\beta-\varphi}\cdot Z^{\gamma-\omega}$$

Taking the differential of both sides gives us:

$$\frac{\dot{P}_N}{P_N}-\frac{\dot{P}_T}{P_T}=\frac{\dot{A}_T}{A_T}-\frac{\dot{A}_N}{A_N}+(\alpha-\theta)\cdot\frac{\dot{K}}{K}+(\beta-\varphi)\cdot\frac{\dot{L}}{L}+(\gamma-\omega)\cdot\frac{\dot{Z}}{Z} \qquad (12)$$

We assume $\frac{\dot{A}_T}{A_T}>\frac{\dot{A}_N}{A_N}$; i.e., technological progress in the tradable goods sector outpaces that of the non-tradable goods sector. This implies that its effect on the prices of non-tradable goods is positive, which is consistent with the Balassa-Samuelson effect. Given $\alpha>\theta$, $\beta<\varphi$, and $\gamma<\omega$, the effect of capital accumulation on the prices of non-tradable goods is also positive, while the effect of increased labor and resources is negative.

Consumer price index in the economy is represented as:

$$CPI=\frac{a\cdot\frac{P_T}{P_{T0}}+b\cdot\frac{P_N}{P_{N0}}}{a+b}$$

where P_{T0} and P_{N0} are the prices of tradable and non-tradable goods for the base period and the inflation rate is:

$$\pi=\frac{a\cdot\frac{\dot{P}_T}{P_{T0}}+b\cdot\frac{\dot{P}_N}{P_{N0}}}{a\cdot\frac{P_T}{P_{T0}}+b\cdot\frac{P_N}{P_{N0}}}$$

Given the constant prices of tradable commodities, we calculate:

$$\pi = \frac{b}{a + b \cdot \dfrac{P_N}{P_{N0}}} \cdot \frac{\dot{P}_N}{P_{N0}}$$
$$= \frac{b}{a + b \cdot \dfrac{P_N}{P_{N0}}} \cdot \left[\frac{\dot{A}_T}{A_T} - \frac{\dot{A}_N}{A_N} + (\alpha - \theta) \cdot \frac{\dot{K}}{K} + (\beta - \varphi) \cdot \frac{\dot{L}}{L} + (\gamma - \omega) \cdot \frac{\dot{Z}}{Z} \right] \tag{13}$$

Comparing equation (13) with equation (11) and with our analysis on equation (12), we can see that under the fixed exchange rate system, economic growth driven primarily by technological progress and capital accumulation will inevitably be accompanied by a certain degree of inflation. If the government wishes to keep inflation low during periods of high growth, price controls to expand the supply of labor and resources are a necessary tool.

(II) Factor price control and income transfer

We examine the income transfer process produced by price controls using the resources sector in the above model as our example. If the resource sector contains *n* types of specific resources used as inputs for the whole of production, we get:

$$Z = \left(\sum_{i=1}^{n} z_i^{\sigma} \right)^{1/\sigma} \qquad (0 < \sigma < 1) \tag{14}$$

where z_i is type *i* of the specific resource of price p_i. For each type of specific resource, we assume an intermediary dealer who acquires resources from owners at purchasing price p_i^C and sells them to the market at price p_i^M to the market.

Substituting equation (14) into the production function of the tradable goods sector gives us:

$$Y_T = A_T \cdot K_T^{\alpha} \cdot L_T^{\beta} \cdot \left(\sum_{i=1}^{n} z_{Ti}^{\sigma} \right)^{\frac{\gamma}{\sigma}}$$

where z_{Ti} is the specific resource input for the tradable goods sector. The first-order condition of profit maximization on final products for producers is:

$$\gamma \cdot A_T \cdot K_T^{\alpha} \cdot L_T^{\beta} \cdot \left(\sum_{i=1}^{n} z_{Ti}^{\sigma} \right)^{\frac{\gamma}{\sigma} - 1} \cdot z_{Ti}^{\sigma - 1} = \frac{p_i}{P_T}$$

If we assume multiple types of resources, the market influence of individual resource intermediary dealers is negligible. Hence, we use $\gamma \cdot A_T \cdot K_T^{\alpha} \cdot L_T^{\beta} \cdot \left(\sum_{i=1}^{n} z_{Ti}^{\sigma} \right)^{\frac{\gamma}{\sigma} - 1}$ and P_T. Demand elasticity from final product manufacturers for each specific resource is $1/(\sigma - 1)$, which is subject to the composition of overall resources Z and does not take into account the parameters of the production function. Within the non-tradable goods sector, demand elasticity uses the same

expression, hence the elasticity of market demand for each specific resource may be written $1/(\sigma-1)$.

Intermediary dealers of each specific resource seek to maximize profits:

$$\pi_{Mi} = \left(p_i^M - p_i^C\right)\cdot z_i\left(p_i^M\right)$$

The corresponding first-order condition is:

$$p_i^M = \frac{p_i^C}{\frac{1}{\varepsilon}+1}$$

where ε is the demand elasticity of z_i. Thus,

$$p_i^M = \frac{p_i^C}{\sigma}$$

This means that for any decrease of purchasing price Δp_i^C, the market price of specific resources falls by $\frac{\Delta p_i^C}{\sigma} > \Delta p_i^C$, meaning that implementing controls on resource purchasing prices can effectively reduce the market price of resources. At the same time, we observe that for a small decrease in purchasing price Δp_i^C, the corresponding change to resource demand are:

$$\begin{aligned}\Delta z_i &= \frac{\frac{\Delta p_i^C}{\sigma}}{\frac{p_i^C}{\sigma}}\cdot\varepsilon\cdot z_i \\ &= \frac{\Delta p_i^C}{p_i^C}\cdot\frac{z_i}{\sigma-1}\end{aligned}$$

Assuming that resource owners have cost curve $c\left(z_i\right)$, determined by the rate of discount over time or by other factors, the change to the income of resource owners is:

$$\Delta\pi_{Ci} = \left[\left(p_i^C - \Delta p_i^C\right)\cdot\left(z_i + \frac{\Delta p_i^C}{p_i^C}\cdot\frac{z_i}{1-\sigma}\right) - c\left(z_i + \frac{\Delta p_i^C}{p_i^C}\cdot\frac{z_i}{1-\sigma}\right)\right] - \left[p_i^C\cdot z_i - c\left(z_i\right)\right]$$

Ignoring of the high order infinitesimal gives us the following approximation:

$$\Delta\pi_{Ci} = \frac{\sigma}{1-\sigma}\cdot\Delta p_i^C\cdot z_i - c'\left(z_i\right)\cdot\frac{\Delta p_i^C}{p_i^C}\cdot\frac{z_i}{1-\sigma}$$

Of course, depending on the size of cost change, the direction of income change can vary. Here, we examine primarily $\Delta\pi_{Ci} < 0$ and the existence of resource "oversupply" relative to optimal

time discount rate. Change to the income of intermediary dealers is:

$$\Delta\pi_{Mi} = \left[\left(\frac{p_i^C}{\sigma} - \frac{\Delta p_i^C}{\sigma}\right) - \left(p_i^C - \Delta p_i^C\right)\right] \cdot \left(z_i + \frac{\Delta p_i^C}{p_i^C} \cdot \frac{z_i}{1-\sigma}\right) - \left[\left(\frac{p_i^C}{\sigma} - p_i^C\right) \cdot z_i\right]$$

which we can approximate as:

$$\Delta\pi_{Mi} = \Delta p_i^C \cdot z_i$$

In contrast to resource owners, intermediary dealers' revenue after price adjustment is always positive and in direct proportion to the degree of price adjustment. In other words, one consequence of price adjustment is the transfer of income from resource owners to intermediary dealers.

The above model has many implications for policy and resource purchasing. First of all, despite the model's indication that income transfer is caused by the purchasing price of resources, it offers no clear indication of how income transfer affects social welfare overall. This is partially because we did not specifically define the social cost of inflation in our model. Another important reason lies in the market structure of resource supplies. The monopolistic position of intermediary dealers has caused (upward) distortion in the market prices of resources. This implies that government control of purchasing prices will compromise the interests of resource owners to some extent, but it will primarily help overcome the distortion caused by monopolistic pricing of intermediary dealers. Thus, the overall effect seems to be positive. On the other hand, however, any practice that aims to offset price distortion with another price distortion may wreak even greater havoc on the economy, giving rise to long-term effects that are difficult to predict. As a result, a question that arises is why the government has thus far refrained from directly controlling market prices set by intermediary dealers. While this kind of intervention has been implemented, it has only been minimally successful; this is due to the government's disadvantage vis-à-vis information access and negotiation capabilities[4]. Lastly, certain resources, such as petroleum and the wireless spectrum, play a far greater role in the economy than the model suggests. Suppliers of these resources also wield far more market power. In this respect, their behavior could be seen as more akin to oligarchic competition than to monopolistic competition in the market. This being said, the relationship between price distortion and income transfer , as well as its mechanism, are roughly consistent with our model.

IV. Simple estimate of wealth transfer

(I) Domestic wealth transfer caused by factor price distortion

The effects of wealth transfer domestically caused by factor price undervaluation are threefold: first, wealth transfer from general sectors to administrative monopolistic sectors; second, wealth transfer from individuals to the government; and third, wealth transfer from workers to asset owners.

1. Wealth transfer to administrative monopolistic sectors

[4] Numerous links in the resource processing chain are controlled by powerful interests in the form of local governments and large, high-ranking state-owned enterprises. In contrast, it is easier to exert control over resource owners at the bottom of the production chain or through administrative channels.

China's administrative monopoly is concentrated in seven industries: tobacco, electricity, petroleum mining and processing, transportation, postal and telecom services, broadcasting and television, and finance and insurance[5]. Table 1 calculates relevant information from these 16 sectors in 2002.

Table 1: Shares of 16 monopolistic sectors in the national economy

	Labor wage (million yuan)	Net production tax (million yuan)	Depreciation (million yuan)	Operating surplus (million yuan)	Sum of value addition (million yuan)	Employment (thousand people)	Per capita wage (yuan)
Petroleum and natural gas mining	44,978.71	40,232.24	51,639.93	95,244.88	232,095.77	770	58,414
Tobacco industry	7,808.92	91,573.76	5,555.88	25,906.93	130,845.49	230	33,952
Petroleum and nuclear fuel processing	23,850.86	30,301.29	16,466.76	13,023.67	83,642.58	560	42,591
Electricity and heat production and supply	85,474.75	79,367.92	108,562.08	122,840.57	396,245.32	2,850	35,511
Gas production and supply	3,003.10	1,380.11	3,030.35	1.55	7,415.11	Included in the "Electricity and heat production and supply" column	Included in the "Electricity and heat production and supply" column
Water production and supply	12,728.21	3,877.79	12,008.74	264.02	28,350.72	Included in the "Electricity and heat production	Included in the "Electricity and heat production

[5] In an interview with Xinhua News Agency, Director of the State Asset Supervision and Administration Commission (SASAC) Li Rongrong said that state economy will maintain absolute control over these seven strategically important industries. In addition, Li mentioned a plan to develop 30 to 50 internationally competitive large corporate conglomerates in the following seven sectors: military and weapons manufacturing, power grids and electricity, petroleum and petrochemical production, telecom, coal, civil aviation, and shipping. The reason television, broadcasting, finance, and insurance were not mentioned is that these sectors do not fall under the purview of the SASAC.

						and supply" column	and supply" column
Railway passenger transport	35,490.18	4,105.14	18,779.56	3,758.07	62,132.96	1,160	66,470
Railway freight transport	41,614.84	5,015.75	24,422.65	10,839.99	81,893.23	Included in the "Railway passenger transport" column	Same as above
Air passenger transport	7,455.36	6,300.57	12,311.09	7,071.14	33,138.16	130	101,679
Air cargo transport	5,762.95	2,047.16	5,653.40	1,670.97	15,134.48	Included in the "Air passenger transport" column	Same as above
Pipeline transportation	779.75	288.85	1,591.42	1,819.79	4,479.80	20	38,988
Postal Industry	15,229.98	1,787.36	2,964.59	411.66	20,393.59	330	46,151
Information transmission services	49,766.93	13,456.51	106,789.57	100,110.74	270,123.74	610	81,585
Financial sector	121,918.09	5,038.62	49,144.87	244,142.92	420,244.50	2,870	47,941
Insurance	15,673.69	6,400.43	8,222.38	17,100.68	47,397.19	Included in "Financial sector" column	Same as above
Radio and Television Culture and Arts	32,738.79	5,442.52	3,795.25	11,430.13	53,406.68	860	38,291
Monopoly sector in total	504,275.13	296,616.01	430,938.52	655,109.66	1,886,939.32	10,390	48,558
Whole society	5,895,049.93	1,746,221.13	1,874,056.72	2,670,562.63	12,185,890.41	737,400	7,994
Deducting the sector of agriculture, forestry and	4,563,453.07	1,691,756.08	1,797,565.40	2,462,690.69	10,522,843.79	105,580	43,223

animal husbandry①							
Share of monopolistic sector I ②	0.0855	0.1699	0.23	0.2454	0.1548	0.0141	
Share of monopolistic sector II ③	0.1105	0.1753	0.2397	0.266	0.1793	0.0984	

Note: ① is total national economy, not including the agriculture, forestry, and animal husbandry sectors; ② is the share of monopolistic sectors in the national economy; and ③ is the share of monopolistic sectors in the national economy, not including the agriculture, forestry, and animal husbandry sectors.

Source: Calculated using input/output (producer price) sheets for 122 sectors for 2002 from the National Bureau of Statistics (NBS).

The above table indicates that these 16 monopolistic sectors show larger shares of depreciation and operating surplus than value added. Whether the agriculture, forestry, and animal husbandry are included or excluded, their share of operating surplus exceeds the share of their value added by roughly nine percentage points, or 50 per cent. It is likely, moreover, that their share of depreciation and operating surplus has been even higher in recent years. Before 2007, state-owned monopolistic enterprises had retained all their own profits. Measured against the share of value added, the transfer of social wealth to monopolistic sectors in 2002 may have been as high as 213.5 to 241.7 billion yuan. In other words, due to relative price distortion, the social wealth transferred to monopolistic sectors accounts for 32.6 per cent to 36.9 per cent of their total operating surplus.

Although the share of wages for monopolistic sectors is lower than value added, their share of employment takes an even smaller share. Excluding agriculture, forestry, and animal husbandry, wages in monopolistic sectors still show a higher share than that of their total employment by 1.21 percentage points, i.e. 12.3 per cent. In monopolistic sectors, moreover, per capita wages are higher than the national average by 5,335 yuan. If the excess wages are included in our calculations, wealth transferred to China's monopolistic sectors in 2002 amounts to between 268.9 and 297.1 billion yuan, which constitutes 18.5 to 20.4 per cent of national income in monopolistic sectors. If the depreciation rate in monopolistic sectors is equal to the national average, the wealth transfer to monopolistic sectors would still increase by between 108.6 and 140.9 billion yuan, reaching a total of more than 400 billion yuan and accounting for more than 21.5 per cent of value added in monopolistic sectors. In the past five years, China's GDP has shown an average annual growth rate of 10.6 per cent, and profits from industrial sectors have grown by 33.9 per cent, both figures higher than their 2002 levels (9.1 per cent and 22.2 per cent, respectively). Monopolistic sectors experienced even faster growth of profits, with some shares constituting an even higher proportion of the national economy. Hence, wealth transfer to monopolistic sectors in the past five years is faster and larger than ever.

2. Wealth transfer to the government

The Chinese government is the principle controller of resources, especially land resources.

Undervaluation of factor prices, therefore, has caused wealth to be transferred from individuals to the government. Figure 3 and Table 2 show this dimension of domestic wealth transfer in detail.

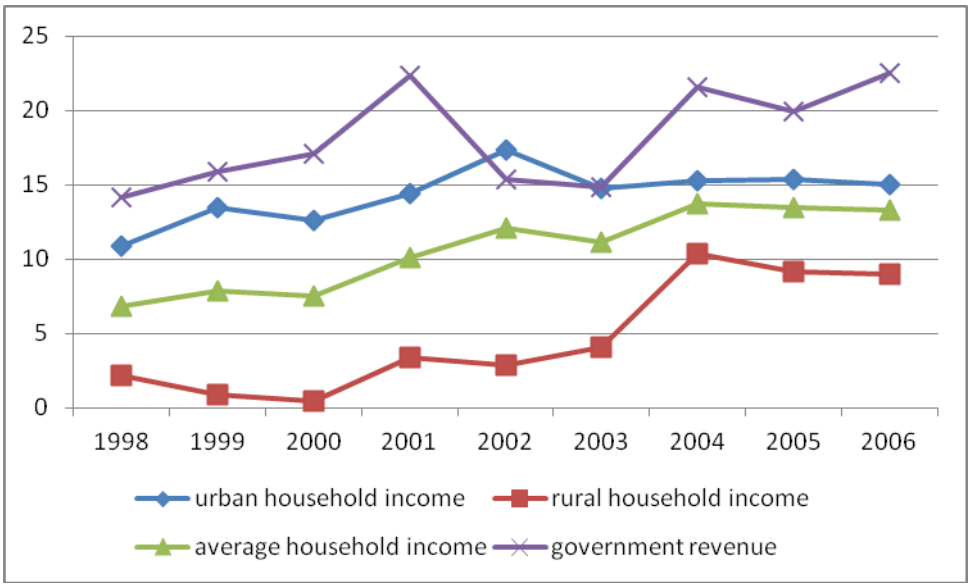

Figure 3: Household income and fiscal revenue growth, 1998 to 2006 (%)
Source: *China Statistical Yearbook*, 2007

Figure 3 calculates the growth of urban and rural household incomes using national census information and compares them with the growth of fiscal revenue. Except for 2002, when urban household income growth was slightly higher than fiscal revenue, and 2003, when urban and rural household income growth rates are relatively close, government revenue growth has been much higher than household income growth over the past decade. While urban and rural households' annual average revenue growth rates over the past ten years were18.1 per cent and 10.6 per cent, respectively, government revenue growth was 1.71 times higher than urban household revenue growth.

Table 2: Consumption, savings, and disposable income among government, household, and commercial sectors

	Disposable total income (billion yuan)	Household sector			
		Disposable income (billion yuan)	Share of disposable income (%)	Consumption rate (%)	Savings rate (%)
1995	5993.02	4029.16	67.23	47.34	19.89
1996	7032.04	4812.51	68.44	48.29	20.15
1995	5993.02	4029.16	67.23	47.34	19.89
1996	7032.04	4812.51	68.44	48.29	20.15
1997	7848.71	5384.22	68.60	47.04	21.56
1998	8337.90	5704.35	68.41	47.05	21.37
1999	8888.85	5973.31	67.20	47.16	20.04
2000	9852.29	6325.17	64.20	46.54	17.66

2001	10877.05	6743.75	62.00	45.24	16.75
2002	12017.18	7330.49	61.00	43.75	17.25
2003	13663.40	8170.70	59.80	41.60	18.20
2004	16148.32	9338.79	57.83	39.53	18.30

	Government sector				Commercial sector	
	Disposable income (billion yuan)	Share of disposable income (%)	Consumption rate (%)	Savings rate (%)	Savings (disposable income) (billion yuan)	Savings rate (%)
1995	991.61	16.55	13.98	2.57	972.25	16.22
1996	1257.03	17.88	14.17	3.71	962.49	13.69
1997	1436.31	18.30	14.29	4.01	1028.18	13.10
1998	1511.95	18.13	14.82	3.31	1121.60	13.45
1999	1608.88	18.10	15.43	2.67	1306.66	14.70
2000	1891.64	19.20	15.90	3.30	1635.48	16.60
2001	2229.77	20.50	16.24	4.26	1903.52	17.50
2002	2523.56	21.00	15.91	5.09	2163.14	18.00
2003	3005.99	22.00	15.09	6.91	2486.71	18.20
2004	3052.20	18.90	14.37	4.53	3757.33	23.27

Source: Cash flow statements (in-kind transactions), 1995 to 2004. *Historical Information on China's Cash Flow Statements: 1992 to 2004,* China Statistics Press, 2008.

Table 2 calculates the consumption, savings, disposable income, and the shares of disposable income among government, households, and the commercial sector according to adjusted cash flow statements (in-kind transactions) from *Historical Information on China's Cash Flow Statements:1992 to 2004*. Figures indicate that between 1995 and 2004, the savings and consumption rates rose for the government sector, while the share of its disposable income rose from 16.55 per cent to 18.90 per cent, reaching a peak of 22 per cent in 2003. On the other hand, saving and consumption rates for the household sector declined steadily; the share of household disposable incomes, in particular, dropped from 67.23 per cent to 57.83 per cent, down almost ten percentage points. Disposable income in the commercial sector increased dramatically after 2000.

The above tables provides a description of wealth transfer to the government in recent years using available information. This description, however, is insufficient. Fiscal revenue describes only government budgetary revenue, not all government revenue. This is illustrated by the relative share of disposable income to fiscal revenue. For instance, in 2004 the government's disposable income was 3,052.2 billion yuan; fiscal revenue, on the other hand, was 2,639.647 billion. The former exceeds the latter by 412.553 billion yuan. We believe the figures for disposable income more accurately reflect China's current fiscal situation; the answer depends, however, on China's current fiscal system, as well as the methods used to generate government revenues.

Under China's current fiscal system, government revenues are generated in four ways: the first is budgetary revenue. This figure is usually accurate for its scope. The revenue, seemingly not

a big portion, is often cited by Chinese tax authorities in response to criticism from international community[6]. The second source of revenue is extra-budgetary revenue. This figure also in official statistics. According to estimates, the proportion of budgetary to extra-budgetary revenue was roughly 1:1 before the Chinese government launched an initiative to lower it to 1:0.6[7]. If we assume the lower proportion is correct, China's extra-budgetary revenue in 2004 was 1,683.7 billion yuan.

Extra-budgetary revenue has two principle sources: land transfer fees and social security revenue. Over the years, land transfer fees have constituted a major source of local extra-budgetary revenue, and the difference between land purchasing fees paid by real estate developers and the amount of compensation to lessees is only a small part. In 2004, China's land transfer fees amounted to 589.4 billion yuan. In 2005, they reached 550.5 billion yuan (land purchase fees were less than 300 billion yuan that year). In 2006, they exceeded 700 billion yuan and, according to economist Ping Xinqiao's estimate, exceeded one trillion yuan[8].

The third type of government revenue is extra-system revenue, which lacks reliable estimates. In the early 1990s, using information from surveys, Fan Gang estimated that the extra-system revenue of various levels of government in the year 1994 accounted for 30 per cent of local budgetary revenue. In Table 2, government disposable income is less than the sum of budgetary revenue and extra-budgetary revenue by 57.365 billion yuan (= 3,052.2 billion yuan – 2,639.647 billion yuan - 469.918 billion yuan).

Lastly, government revenue also takes the form of levying fees on the commercial sector for routine tasks. These statistics are even less available. Putting these four sources of revenue together, the share of government disposable revenue in the nation's GDP is rather high. To illustrate, if from 2000 to 2004 the household consumption rate and the investment rate fell to their average levels during the period from 1995 to 1999, and government disposable income maintained its average increase over those years,, wealth transfer from individuals to the government would amount to 1,573.911 billion yuan, or 314.782 billion yuan per year. In 2003, this figure would be as high as 575.229 billion yuan.

3. Wealth transfer to asset owners

China is in the process of asset revaluation, an important economic phenomenon that occurs as developing economies transition to developed economies. As the lesson of history demonstrates, however, the process of asset price revaluation is fraught with risks and is often accompanied by rapid increases in asset prices and asset bubble inflation. Artificial undervaluation of factor and resource prices will pull down the prices of general commodities and distort the price parity relationship between general commodities and asset prices, causing wealth to transfer to asset owners.

Excessively low resource factor rents not only increase profits in monopolistic sectors but also magnify their profits from general commodities. As a result of artificially increased profits,

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[6] May 15, 2007, Singapore's *Lianhe Zaobao* reported that according to the recent *Global Tax Misery Rank* by Forbes, China continued to be the most tax miserable country among Asian economies, ranking the third in the world with tax misery index of 152, which is lower than France (166.8) and Belgium (156.4). China's State Administration of Taxation rejected this report, claiming that *China's macro-tax burden is currently at a low level in the world and the so-called conclusion that China's tax burden is second or third heaviest in the world is scientifically unfounded and contradicts with the reality* (see *Beijing Morning Post*, August 4, 2007).

[7] See *Nanfang Daily*, May 27, 2007.

[8] See *China Youth Daily*, April 23, 2008.

the market value of assets will inevitably be overvalued. This is demonstrated by the fact that asset price inflation in China has been much higher compared to the general commodity price inflation. Between 1997 and the third quarter of 2007, China's CPI increased by only 10.96 per cent, while RPI decreased by 1.65 per cent, with growth rates of 0.1 per cent and -0.2 per cent per year, respectively. However, asset price inflation increased at a faster rate. During this period, real estate sales prices rose 80.74 per cent and stock price indices ballooned to 3.65 times their previous levels, i.e., a growth rate of 6.1 per cent and 16.6 per cent per year, respectively. In the past few years, asset price inflation has become even more rampant. Real increases of property prices are much higher than official statistics.

Figure 4 indicates the share of labor wage, net production tax, and depreciation plus operating surplus in GDP. While the share of wages declined annually, dropping from 52.78 per cent in 1995 to 47.14 per cent in 2004, a decrease of 5.64 percentage points, the share of depreciation plus operating surplus stayed above 30 per cent and increased steadily, up 4.69 percentage points in 2004 from its 1995 level. If we calculate wealth transfer using the average share of wages (31.94 per cent between 1995 and 1999), China's wealth transfer from workers to asset owners was an estimated 1,514.648 billion yuan, or 302.93 billion yuan per year. In 2004, this figure peaked at 957.671 billion yuan. Thus, we can see that wealth transfer from workers to asset owners has taken place on a similar scale to wealth transfer from individuals to government.

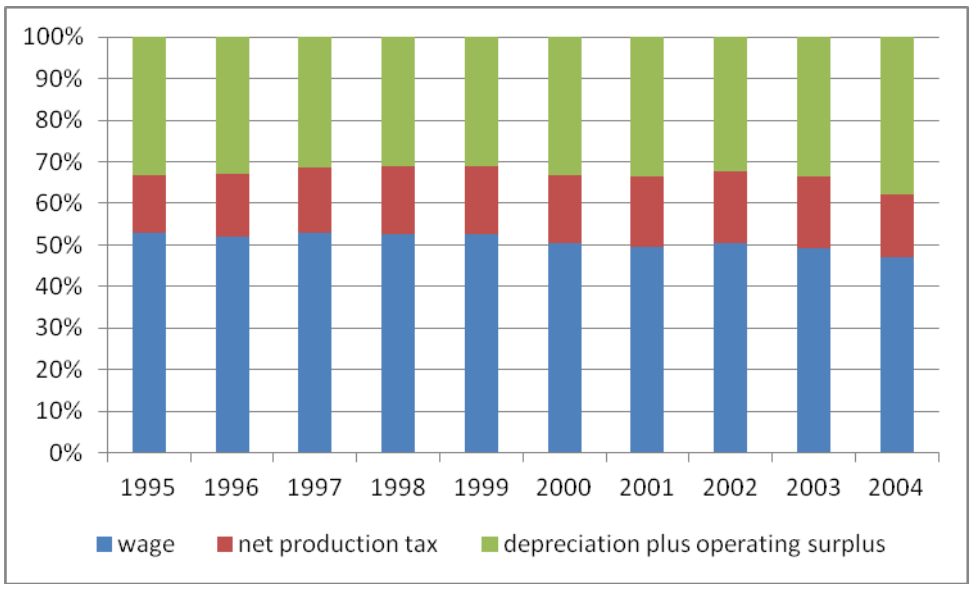

Figure 4: Shares of wages and depreciation plus operating surplus in GDP (%)

Source: Cash flow statements (in-kind transactions), 1995 to 2004. *Historical Information on China's Cash Flow Statements: 1992 to 2004,* China Statistics Press, 2008.

(II) International wealth transfer caused by factor price distortion

In China, as factor and resource prices have been kept artificially low, it has caused reverse wealth transfers both within China as well as internationally; specifically, wealth has flowed from China, a relatively poor country, to richer countries in Europe and America. Under a price system that distorts relative domestic and international prices, international wealth transfer has taken place primarily through trade and capital flow. On the one hand, subsidies to foreign countries developed as Chinese exports increased, a result of undervalued trade commodity prices, which

itself was a result of undervaluing domestic factor and resource prices. Similarly, on the other hand, another form of exporter subsidy has arisen from import losses caused by international commodity price inflation and appreciation of the renminbi. Exchange rate losses and discounts have also caused wealth to flow out of China.

Table 3 lists price indices of international bulk commodities and domestic industrial goods, as well as purchasing prices of energy, raw materials, and power. Over the past ten years, prices of international bulk commodities increased by a factor of 1.2. Metal prices, for example, rose by a factor of 1.7, while energy prices increased to 3.4 times that of previously levels. Prices of domestic retail commodities, by comparison, saw hardly any change. Purchasing prices of energy and raw materials increased only 33 per cent. Outside China, prices of industrial goods increased 1.8 times, while ex-factory prices in China grew by only 12 per cent. These figures indicate that international wealth transfer is taking place on a large scale.

Table 3: Price indices of international bulk commodities, domestic industrial goods, energy, and raw materials

	International bulk commodities				Domestic commodities		
	Total	Metal	Energy	Industrial goods	Retail commodities	Industrial goods	Fuel and raw materials
1997	59.4772	67.8754	38.1902	86.2700	105.9839	94.5378	83.3097
1998	47.7517	55.5493	26.9627	71.7340	103.2285	90.6663	79.7940
1999	49.9169	55.3799	34.4349	71.3290	100.1392	88.4754	77.1662
2000	63.2656	62.6991	53.6943	77.7412	98.6362	90.9664	81.1080
2001	58.2790	56.2662	48.0124	72.5897	97.8569	89.7959	80.9304
2002	58.3002	54.3214	47.1851	71.3800	96.5767	87.8151	79.0838
2003	65.0462	64.7044	55.2302	75.3300	96.4932	89.8259	82.8835
2004	80.4847	81.7048	72.4114	89.1579	99.1929	95.3181	92.3296
2005	100	100	100	100	100	100	100
2006	120.7135	156.1966	119.2351	136.3245	101.0020	103.0012	106.0014
2007	134.9830	183.3120	131.6651	154.2824	104.8401	106.2372	110.6831

Source: International bulk commodities indices are calculated using information from DRAFTS\COM\Monthly 05\PNProj\Price 05.Bnk, TYPE=LAREMOS. The information was collected with the assistance of the Unirule Institute of Economics (Issue No. 2, 2008).

The size of international wealth transfer is difficult to estimate primarily due to lack of availability of domestic and international price information. We estimate the subsidies to foreign countries resulting from the difference between domestic and overseas energy and metals prices.

Table 4: Export subsidies to foreign countries in 2004 as a result of energy price undervaluation

	Difference between domestic	Energy consumption	Total price difference	Manufacturing energy consumption	Price difference for manufacturing	Price difference for

	and international prices (yuan/ton)		(million yuan)		energy consumption (million yuan)	energy intensity of industrial finished goods for export (million yuan)
Coal (thousand tons)	75①	1935960	145197	731020	54823	12933
Coke (thousand tons)	75②	172670.1	12950	167750	12582	2968
crude oil (thousand tons)	0③	287493.1	0			
Gasoline (thousand tons)	791④	46957.6	37143	4040	3195	754
kerosene(thousand tons)	814⑤	10608.6	8635	540	438	103
Diesel (thousand tons)	837④	98951.6	82822	12690	10516	2504
Fuel oil (thousand tons)	814⑤	47834.8	38938	20500	16686	3936
Natural gas (million cubic meters)	0.2368⑥	39672	9394	19878.67	4706	1110
Electricity (million kilowatt)	0.2235⑦	2797137	491060	1130207.37	252622	59594
Total			826139		355668	83902

Notes:

1. The offshore price of export steam coal in May 2005 was higher than the domestic price by 40 to 110 yuan; here we take a median value. In 2004, the average price of coal internationally was 54.69 US dollars (export price of South African coal) and 56.73 US dollars (offshore price of Australian thermal coal), which was higher than the 2005 price by five to six US dollars.

2. Calculated comparing coal prices.

3. China's crude oil price since 2002 integration with international prices.

4. Difference between domestic ex-factory price and international price.

5. Mean price difference of gas and diesel.

6. Mean ex-factory price of natural gas was 593 yuan/1,000 cubic meters in 2004, which is equivalent to 41.7 per cent, 40 per cent, and 45.2 per cent of LNG price upon shipment in Japan, South Korea and EU in the same year. Here, the mean difference of 40 per cent is adopted.

7. After-tax electricity tariff in the Unites States, Italy, Japan, and South Korea were 7.19, 8.35, 14.33, 6, 7.04, and 7.20 cents/kWh (in US dollars). This figure was 4.5 US cents in China. We set the international price here at 7.20 cents/kWh..

Source: Li Sheng (honorary editor-in-chief) and Zhang Ping (editor-in-chief): *Resource Price Reform: Overall Philosophy, Strategies and Support Measures*, page 66, 180, 197 and 218. *China Statistical Yearbook* (2006).

Table 5: Export subsidies to foreign countries arising from metal price undervaluation in 2004

	Steel	Copper	Aluminum	Total
Domestic price (thousand yuan)	41814	295695	165475	
Import price (thousand yuan)	58725	271757	263445	
Export price (thousand yuan)	48474	317662	215110	
Domestic price - import price (thousand yuan)	-16911	23938	-97970	
Domestic price - export price (thousand yuan)	-6660	-21967	-49635	
Production quantity (thousand tons)	319757.2	2202.1	6690.4 ⑥	
Consumption quantity (thousand tons) ①	334827.2	3002.2	6869.5	
Manufacturing consumption quantity (thousand tons) ②	184690.7	1656	3789.2	
Consumption quantity in export sector (thousand tons) ③	43568.5	369.4	893.9	
Price difference of metal consumption in export sector I (thousand yuan) ④	-73678690.4	884269.7	-8757538.3	81551959
Price difference of metal consumption in export sector II (thousand yuan) ⑤	-29016621	-811461	-4436872.7	34264954.7

Notes:

1. Consumption quantity equals production quantity plus import quantity minus export quantity;

2. Manufacturing consumption quantity is calculated as follows: total consumption quantity multiplied by the share of manufacturing intermediate inputs. As 2004 information is not available, this share is calculating using statistics from 2002 inputs and outputs.

3. Consumption in export sector is equal to manufacturing consumption quantity multiplied by the share of industrial finished goods in total manufacturing output.

4. Calculated according to the difference between domestic price and import price;

5. Calculated according to the difference between domestic price and import price;

6. Electrolytic aluminum.

Source: Domestic prices were provided by He Hui of the National Logistics Information Center; other prices are calculated from *China Statistical Yearbook*: *2005* and *2006*.

Using the difference between domestic and overseas prices as our base, we calculated the export subsidies for energy and major metals (steel, copper, and aluminum) in 2004; these subsidies, in turn, arose from price undervaluation in the range of 118.167 billion yuan to185.454 billion yuan. Considering the degree to which other resource factors are undervalued, we estimate

that subsidies to foreign consumers would be many times higher than this figure. Given that the output of energy and metals accounts for 16.33 per cent of total intermediate inputs (output), corresponding export subsidies could have reached as much as 723.619 to 1,135.664 billion yuan, or 87.427 to137.211 billion US dollars, which would have accounted for 14.74 to 23.13 per cent of China's total exports that year. This figure indicates the massive scale of reverse wealth transfer resulting from undervaluation of resource factor.

V. Conclusions

In a planned economy, factor price controls are a strategic way for government to control the economy and promote growth. Today, 30 years since reform and opening, however, China has failed to resolve this problem in the context of becoming an emerging market economy and participating in global trade. This suggests that China's transition towards a market economy is far from complete. We argue that causes go beyond institutional inertia and are an inevitable result of economic policies targeted at growth and stability. Current policies must be reviewed from the strategic perspective of China's unique development path if the Chinese government is to launch reform in the real sense.

Factor price distortion has obvious consequences. Aside from losses in the efficiency of resource allocation, it produces wealth transfer among different social groups. Based on this paper's estimates, wealth transfer is of a scale larger than previously imagined; as China continues to reform and develop, the increasingly disproportionate power of vested interests and the resulting social resentment are likely to be a major hazard. It is a question that must be addressed in the next step of China's reform.

References:

Cowling, Keith and Dennis Mueller (1978): "The Social Cost of Monopoly Power", *Economic Journal*, 88, 727-748.

Fan Gang (1996): *On the New Standard of Public Revenue and Spending*, *Case Studies of China's Institutional Transformation*, executive editor-in-chief Zhang Shuguang, Shanghai People's Press (in Chinese).

Garbaccio, Richard (1994): "Price Reform and Structural Change in the Chinese Economy: Policy Simulations Using a CGE Model", *China Economic Review*, 6, 1-34.

Gong Min (2009): *A Comprehensive Description of China's Factor Price Reform*, *Times Finance*, 1st Issue (in Chinese).

Monetary Policy Analysis Panel of PBoC (2005): *Report on the Steady Promotion of Market-based Interest Rates* (supplement of *China Monetary Policy Implementation Report*), China Finance Press (in Chinese).

NBS (2007): *China Statistical Yearbook*, China Statistics Press (in Chinese).

NBS Department of National Economic Accounts, Department of Survey Statistics, PBoC (2008): *History Information of China's Cash Flow Statements* (1992~2004), China Statistics Press (in Chinese).

Qin, Duo, Marie Cagas, Geoffrey Ducanes, Xinhua He, Rui Liu, and Shiguo Liu (2009): "Effects of Income Inequality on China's Economic Growth", *Journal of Policy Modeling*, 31,

69-86.

Tornell, Aaron and Philip Lane (1999): "The Voracity Effect", *American Economic Review*, 89, 22–46.

Tornell, Aaron and Andres Velasco (1992): "Why Does Capital Flow from Poor to Rich Countries? the Tragedy of the Commons and Economic Growth", *Journal of Political Economy*, 100, 1208–1231.

Torvik, Ragnar (2002): "Natural Resources, Rent Seeking and Welfare", *Journal of Development Economics*, 67, 455-70.

Xu, Dianqing (1993): "Price Distortion in the Transition Process: A CGE Analysis of China's Case", *Economics of Planning*, 26, 161–182.

Young, Alwyn (2000): "The Razor's Edge: Distortions and Incremental Reform in the People's Republic of China", *Quarterly Journal of Economics*, 115, 1091-1135.

Zhang Ping (ed.) (2006): *Resource Price Reform – Outlines, Strategies and Support Measures*, China Market Press (in Chinese).

Zhang Shuguang (2007): "Market-based Transition of China's Economy: Description and Analysis", *Social Sciences Frontline*, 4th Issue (in Chinese).