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The Making of an Integrated National Grain Market in China

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Abstract

A market economy will not emerge from a redistributive economy automatically once the state abolishes its redistributive system. Because of the cognitive incompleteness of market actors in post-redistributive societies, and also because of the conflicts between the state and local interests and among local interests, selective state interventions are inevitable and necessary for a successful market transition. By using unique networked trade data, this paper examines the evolution of market patterns in the new market transition economies based on the emergence of an internal grain market under market reform in China. The finding is that local markets, tightly "protected" by local officials, tried to curtail long-distance trade beyond local territories and thus are not starting points for an internal market in China's national grain market. The emerging internal grain market at the beginning of the 21st century in China is the result of the deliberate actions of the reform-oriented state.

I. Introduction

Market reform in former state socialist countries provides an unusual opportunity to study the evolution of the market patterns in the contemporary era. Thus far researchers have discussed much about the making of a market economy (Polanyi 1957; North 1981; Olson 1982; Block 1990; Walder 1992; Evans 1995; Oi 1999; Nee 2000). However, much of this research has focused on issues of economic development or property rights, but not directly on the evolution of the market pattern. If a market economy can be seen as a set of institutional arrangements, then it is more important to understand the institutional changes than simply to explain economic development; and it is at least as important to explain the evolution of market patterns as it is to understand the changes of property rights.

Polanyi is one of the pioneers who paid much attention to the evolution of market patterns during the emergence of a market economy. In his classical work, Polanyi (1957:63-65) argued that the formation of a laissez-faire economy does not result from the development of local markets because local markets, often controlled by territorial powers (towns, for example), inhibit burgesses from long-distance trade. It is the "nationalization" of the local markets, Polanyi argued, that creates an integrated national market (internal market) through the deliberate actions of the states which in turn enables laissez-faire.

Though Polanyi's argument is based on the great transformation from a feudal economy to a market economy in western Europe, his argument may also hold true during the ongoing market transition from a socialist redistributive economy. Take China as an example. Under China's decentralized partial reform, the overall inefficiency of rural industry is seen by some researchers as partly resulting from the anti-market, protectionist conservatism of local officials

and the Maoist legacy of a closed local economy (Wong 1986, 1987; Nee 1992). In this sense, it is quite understandable that many top economists in China have suggested that the central government construct an integrated national market. Thus it seems promising to examine Polanyi's theory of the evolution of market patterns in non-western-European environments, that is, in the new market transition economies.

The evolution of China's national grain market since 1978 is a good case to test Polanyi's theory in the new market transition economies. It is an appropriate case because the evolution of China's national grain market has the following unique attributes that fit very well in terms of testing Polanyi's theory. To test Polanyi's theory, first, there should exist many local markets for one type of goods before an internal market emerges. In reforming China each province has been a local market for grain trade ever since the beginning of the grain market reform, especially under the provincial governor's responsibility system (Findlay 1998:21-22); and there also exist dozens of local grain markets at the county level in each province. Second, there should be an inter-territorial state that has an interest in constructing an internal market. It is no wonder that the reform-oriented Chinese socialist state is such an inter-territorial political entity. Third, there should be a relatively long market development history so that one can see the influence of the state on the formation of an internal market. After more than 20 years of development, the grain market is now one of the most developed product markets in China.

This paper is organized as follows. Section II briefly reviews the history of the grain market reform in China. Research questions and hypotheses, based on both Polanyi's theory of the evolution of market patterns and the history of China's grain market reform, are proposed in Section III. Section IV discusses the data used in this paper. The block-modeling method is discussed in Section V separately. Section VI reports the empirical results. Concluding remarks are provided in Section VII.

II. Review of the History of China's Grain Market Reform

Territorial grain flows in China before 1978 were not enforced through grain markets but through a Unified Purchase and Sales System (UPSS). Under UPSS, all grain surpluses of peasants were collected by the state under a planned price; the state then redistributed grain, in planned quantities, to citizens (people living in cities) and peasants who were short of grain. In 1960 people's communes were constructed across the country to ensure the state's control over peasants in order to enforce UPSS efficiently. By so doing the state extracted billions of agricultural surpluses for industrial capital, while national grain output declined continuously due to the low incentives of peasants to grow grain under such a system. This triggered the agricultural reform and thus the liberalization of UPSS in 1978.

From 1978 to 1984, the state launched a series of fundamental reforms in the rural sector (see Lin, 1992). The reforms at this stage were mostly aimed at increasing incentives for the direct producers to grow grain. The reform

measures at this stage include changing the collective system under the people's communes to a Household-Responsibility System and increasing the grain purchase prices. Citizens were also permitted to buy grain directly from peasants from then on in the small local markets that has reemerged. But since surplus grains of each peasant household are not great, private grain merchants emerged to take on the role of aggregation of products to supply to larger markets, and a network of trade began to emerge (Findley 1998:13). In 1984, the state officially approved the emerged free market system and allowed peasants to sell surplus grain on local markets after they had sold their grain quota to the state. However, because of the legacy of the Maoist closed local economy and socialist shortage economy, grain outflows to other territories, except for the centrally planned transfer, were still seen by local officials as destructive of local economic order.

The first stage reform benefiting the direct producers brought about dramatic growth in grain production. As a result the state was encouraged to take a bolder approach to agricultural reforms. Thus began the second stage of grain market reform from 1985 to 1993. In 1985, the UPSS was replaced by the contract system. Under the new system state-decided grain prices were fixed on the 70:30 ratio of quota and over-quota prices. In 1988, in order to encourage inter-territorial grain flow, the state approved establishment of national wholesale grain markets to construct a national grain market (Ma 1999). The increase in grain production and the emergence of the grain markets in this stage had significant effects on the grain consumption of the citizens. People became increasingly concerned on the better quality and more variety, and quantity became less important. This in turn resulted in the abolishment of the grain redistributive system —UPSS—in 1993 because the redistributive system had been based on longtime shortage of grain. Also in 1993 the state decided to release prices of all grains, irrespective of quota or non-quota grain. Before this the state also established State Grain Stocks in 1990 in order to increase its ability of macro-adjustment on national grain market.

In China's interest, the 1993 reform also changed inter-provincial grain transfer system. In the 1980s and early 1990s there was a dual system for the inter-provincial grain trade—transfer at planned prices (lower than market prices) and transfer at negotiated/market prices (Findley 1998:21). Each province was given a quota for inter-provincial transfer at planned prices, and after fulfilling the quota for planned transfer, provinces could purchase grain at market prices from other provinces. Since 1993, however, the planned transfer was abolished and all inter-provincial grain trade has been undertaken mainly at market prices on nationwide wholesale grain markets.

It seems that the internal grain market would have been constricted if there were no later retreat in grain market reform. But unfortunately, the optimistic future of China' grain market was interrupted soon after 1993, and thus began the third stage of the grain reform. According to a report released by the Australian Center for International Agricultural Research (Findlay, 1998:14), problems around 1994 included: (1) Continuous rises in grain prices. This is easy to understand since the nominal prices of grains before the abolition of UPSS were far below market/real prices. Thus the rises in prices are just a normal response to an emerging internal market. (2) Worsening barriers to internal trade because of the worsening local protectionism. (3) Rising concern of the state about the lack of control because the grain prices continued rising even after the state took macro-adjustment measures, such as the release of the state grain stock. (4) Complaints from consumers about the rising prices of grain, meat and all other farm foods.

These problems resulted in a short period of dual-track system from 1994 to 1997. The state recontrolled the prices of quota grains and also tried to influence market prices by issuing price ceilings. Also, it began to exclude private merchants in grain markets by giving state-owned grain enterprises rights to monopolize 80% of the purchase and sales of grain. Based on this state monopolized national grain market, the state then divided the responsibilities of the central and local government. First, in order to offset trade barriers among territories, the state established the Provincial Governor's Responsibility System (PGRS) in 1995, requiring each province to be responsible to balance the supply and demand for grain within territory. Second, the state itself began to take responsibility in using macro-adjustment measures, such as National Grain Stock and National Grain Risk Securities, to balance the supply and demand of grain among provinces (Wang, 1999). However, the price-recontrol, the exclusion of private merchants, and the establishment of the Provincial Governor's Responsibility System only exacerbated the situation, since these measures intensified local protectionism.

In 1998 Premier Zhu Rongji initiated the fourth stage of the grain market reform. This reform was initially aimed to bailout state-owned grain enterprises (SOGE). Deepening the 1994-97 dual-track system, the state controlled all of the purchase of grains by permitting only SOGE to purchase grains from producers with state-protected prices. At the same time it permitted SOGE to sell grains on local and national markets with prices higher than both market prices and purchase prices. Also, the state liberated SOGE from grain administrative bureaus in local governments thus caused SOGE to become self-constrained and autonomous firms. Though this reform is mainly concerned with SOGE, it also had effects on inter-territorial grain flow. First, by liberating SOGE the purchase and sales of grain are interfered much mess by local governments, and this helps break through territorial barriers. Second, the liberalization of SOGE, combined with the establishment of more and more national wholesale markets by the state during these years, increases the formation of an internal market.

From the discussion above we can see that the state (central government) has taken a series of important measures in order to create an internal grain market in the process of reforming China. First, it has broken down UPSS – the planned redistributive grain system. The grain market will not emerge until at least partial exit from such a system. Second, the state gradually replaced the planned inter-provincial transfer system with the market transfer system as

the major grain exchange mechanism among territories. This is a necessary condition for the emergence of an internal grain market. Third, the state established an increasing number of national wholesale grain markets to promote long-distance grain trade throughout the country. Fourth, the state used macro-control measures to break through internal barriers and protect inter-provincial grain trade. Fifth, the state liberated SOGE from local governments to make them independent economic entities on the national grain market. The result is that grain has been circulated increasingly through markets rather than through a planned transfer system since the 1980s.

However, the road to a national grain market is uneven, and the grain market reform is incomplete. First, local governments are still preventing the formation of the national grain market (inter-provincial grain trade), though they have been interested in the development of local markets. Second, the central government is still monopolizing the purchase of grains through state-owned grain enterprises and prevents entry of those private grain merchants to purchase markets. Third, the state is still manipulating most of the prices of grains. Thus it seems that although the state has taken a series of deliberate actions to promote an internal grain market, it is still using planned measures, which are harmful to the formation of an internal market, to try to solve market problems. These planned measures are still the political economy of China's grain market in the year 2000, the time span covered by my data.

III. Research Questions and Hypotheses

Local grain markets came into being soon after the state initiated rural reform in 1978 as we can see from the history of China' grain market reform. These markets were soon officially approved by the state in 1984. However, an internal market did not emerge from the natural spreading of the local markets. There are two contributing factors here. First, as it has been shown by Polanyi in western history, developing an internal market conflicts with the interests of local authorities. Second, specific institutions of the planned economy, such as UPSS and the planned inter-provincial transfer system, also prevent the formation of an internal market in socialist China. These constraints predetermine the emergence of an internal market as an incremental process, even though the state has committed to developing a national grain market. Thus, my first research question is:

(1) What does the national grain market look like now? That is, has an internal grain market in terms of spatial differentiation emerged?

Spatial integration in goods flow is not the whole meaning of an internal market; to achieve an internal market, all market transactions in the country should be "directed by market prices and nothing but market prices" (Polanyi 1957:43). This was the object of the 1993 reform strategy when the state released all state-controlled grain prices and replaced dual-track transfer among provinces with uniform market transfer. However, this trend is reversed by the grain market crisis around 1994. Since then the obstacles to

achieving such a self-regulating system of grain market are not only from the local governments but also from the anti-market policies issued by the central government, namely, the state, although the 1998 reform strategy has partly revised policies and thus reopened the door to an internal grain market. Therefore, the second research question is:

(2) Are the market transactions of grains in the national market directed by principle of market now? That is, are these transactions sensitive to demand and supply under the circumstances of both market reform and anti-market obstacles?

From the history of China's grain market reform we know that the state has been interested not only in the making of an integrated national market – an internal grain market – but also has taken a series of important measures to promote it. Among these measures establishment of national wholesale grain markets is the most visible, continuous, and irreversible action. Since the state commissioned construction of a couple of large national wholesale grain markets in 1988, about 150 such markets has emerged till 2000 with an average constructing speed of about 12 markets per year.[1] This performance is especially salient if we notice that there have always been so many doubts, hesitations, and even retreats in the state's decisions to abolish UPSS, to release grain prices, to separate state-owned grain enterprises from local governments, to permit the entry of private grain enterprises, etc. Thus, to examine Polanyi's theory of the evolution of a market pattern in China's transition economy, we would ask the third question:

(3) Do the state's actions significantly promote the formation of an internal market? Or with regard to China's grain market, does the establishment of national wholesale grain markets by the state significantly contribute to the formation of an integrated national grain market?

To answer the above three research questions, this paper will employ unique network data to test the extent to which (1) spatial differentiation is a barrier to inter-provincial grain trades; (2) supply-side and demand-side factors have effects on these trade exchanges; and (3) the deliberate actions taken by the state to promote internal grain market are significant to these trade exchanges. The general null hypothesis is that four such dimensions are not significant for the inter-provincial grain flows in China today. There are three sub-null hypotheses, which correspond to the above three research questions, respectively. These sub-null hypotheses are:

Hypothesis 1. *Spatial differentiation is not a barrier to the grain trade exchanges, meaning that the national grain market is spatially integrated*;

Hypothesis 2. *Demand-side and supply-side factors have no effects on the grain trade exchanges, meaning that the national grain market has not been economically integrated*;

Hypothesis 3. *The deliberate state actions to promote an internal grain market are not significant to grain trades.*

IV. Data

The data used in this paper are about inter-provincial grain flows on the national market in China from November 1999 to October 2000. These data are collected mainly from the National Grain & Oil Information webpage of China Fuzhou Grain Wholesale Market[2], which is one of the 22 largest national wholesale grain markets in China (see footnote 1). Other sources include the webpages of Jilin Grain Exchange Market[3], China Net of Grain[4], Igrain Net[5], China Net of Grain & Oil Information[6], and China Cereals Trade Net[7]. Since Internet trade can greatly reduce transaction costs, especially in information-searching costs, it becomes an important mode of inter-provincial grain trade[8], and thus all national wholesale grain markets have constructed or been constructing webpages (see footnote 1). Therefore, the data which are collected from webpages are quite reliable under the circumstance of the diffusion of the new information technology.

In China grain includes five categories: rice, wheat, corn, soybeans, and tubers. However, since rice, wheat, and corn account for about 86% of China's total grain production in the 1990s and around 85% of its grain consumption[9], I will include only the inter-provincial flows of these three main types of grain in the data.

The information about inter-provincial flows of these three types of grains was collected from market reports and market information boards on the above webpages. Unfortunately, I could only obtain information about the direction but not the amount of grain flows among provinces. Because the amount of grain in each trade on wholesale markets is usually quite large, and also because my objective is to know whether market trade exchanges among groups of provinces exist, information about the direction of grain flows is sufficient for the purpose of this research.

I coded "1" for A →B if market grain flow from province A to province B exists, and "0" if no such flow exists from November 1999 to October 2000. Since there are 30 provincial districts outside of Chongqing Special City[10], the resulting data are dichotomized, directed, and 30x30 matrix network data according to Wasserman & Faust (1997) (see Appendix I for the whole data).

Two points are worth mention here. First, since numerous local grain markets exist in each province, reflexive relations from each province to itself also exist, and thus the main diagonal of the matrix is "1"s. Second, there are 158 directed arcs in the matrix. Since for a 30x30 matrix with main diagonal is "1"s, the total number of possible relations is 900, the density of this matrix equals to 0.1756 (158/900). The matrix is rather sparse, which indicates that the national grain market is not very developed yet.

V. Method

A Priori Blockmodeling Method

The a priori blockmodeling method was first developed by Wayne Baker. This method is based on a revision of the basic blockmodeling approach. According to the basic blockmodeling approach, the original social network data are permuted into distinct sets (or blocks), using the rule of structural equivalence by treating each set as internally homogeneous and homogeneous in its relations to every other set (Baker 1992). The next step is to calculate submatrix densities (Δ-density) in each block. If one submatrix density is greater than or equal to the overall density of the whole matrix which is often called as α-density (Wasserman & Faust 1997:400), it is called dense submatrix and the block is assigned "1" (oneblock); otherwise it is called sparse submatrix and the block is assigned "0" (zeroblock). The resulting image is a reduced-form representation of the original network, and the validity of this blockmodel can be judged on how adequately it fits the ties in the original data (Baker 1992). The a priori blockmodeling method is very similar to the basic one. All of the steps are the same except for the formation of the blocks, which in the basic blockmodeling method is based on the algebraic rule of structural equivalence while in an a priori blockmodeling model, however, it is based on a priori aggregation standard.

The a priori aggregation standard used in this paper is composed of the four explanatory variables affecting inter-provincial grain flows according to the research questions and hypotheses. These variables are discussed below.

Explanatory Variables

(1) Spatial differentiations (territorial factor)

This variable is used to test the first hypothesis; namely, whether spatial differentiation is a barrier to inter-provincial grain trades. Based on this variable I divided the 30 provinces into four a priori groups: **Northern-eastern**; **Eastern**; **Central-southern**; and **Western** (see Appendix II for the group identity for each province). There are two reasons for this aggregation. First, this aggregation is based on the six Bureaus of Large Administrative Districts once exiting during 1950s.[11] Second, many provinces in each of the four territories are geographically approximate to each other. And thus traditionally grain exchanges in each group have been much more than among groups.[12]

(2) Grain output per capita for each province (supply-side factor)

This variable is employed to test part of the second hypothesis; namely, whether the supply-side factor has an effect on the grain trade exchanges. According to this variable I partitioned the 30 provinces into four *a priori* groups: **provinces with sufficient surpluses**; **provinces with marginal surpluses**; **self-sufficient provinces**; and **provinces short of grain**.[13] This category is seen as a supply-side factor because provinces with more grain output per capita will outflow more grain and inflow less grain than those with less grain output per capita on the market. For the GOPC and group identity of each province, see Appendix II.

(3) Living expenditure per capita in cities for each province (demand-side factor)

This variable is employed to test another part of the second hypothesis; namely, whether the demand-side factor

has an effect on the grain trade exchanges. Since most peasants can feed themselves, only people living in cities need to buy grain from markets. Thus, to examine the demand-side factor in the grain market, I will compare Living Expenditure Per Capita in cities for each province (LEPC). Based on this variable, I divided the 30 provinces into four a priori groups: **rich provinces**; **relatively rich provinces**; **relatively poor provinces**; and **poor provinces**.[14] If an internal market has emerged, provinces with higher LEPC will tend to have more grain inflows than those with lower LEPC. This is true even when provinces with higher LEPC are themselves grain-surplus provinces because citizens in these provinces tend to be concerned more about quality and varieties of grain than those with lower LEPC. For example, citizens in Jiangsu, a both surplus-sufficient and rich province would rather eat white wheat from Henan and Shandong provinces than eat red wheat, which is mainly produced in Jiangsu, because white wheat is of better quality than red wheat. The average LEPC and the group identity of each province are put in Appendix II.

(4) Degree of market development for each province (state factor)

This variable is used to test the third hypothesis; namely, whether the deliberate state actions to promote internal grain market are significant to grain trade exchanges. This variable uses the number of national wholesale grain markets in each province as its index. I partitioned all the provinces into four categories: **very developed provinces**; **developed provinces**; **developing provinces**; and **undeveloped provinces**.[15] This is called a state factor because it is designed to examine the role of the state in producing an internal market. Under the circumstances of an internal market, the higher the degree of market development for a province, the more it outflows and inflows grain. The number of NWGM and the group identity for each province are put in Appendix II.

Goodness-of-fit Index for Evaluating Blockmodels

To evaluate how well the blockmodels fit the underlying network data, I will use the Carrington-Heil-Berkowitz (CHB) index to compare observed densities to a target blockmodel.

For sociomatrices whose main diagonal elements are defined and which have only a single relation, CHB index is as follows:

$$\_{b2} = 1/(g\ g\ \_) \_{k=1}^{B} \_{l=1}^{B} \{(O_{kl} -- O_{kl}{}^*)^2/[\ O_{kl}{}^*\ (t_{kl}\ )^2]\}$$

Where
g = number of nodes in matrix
α = matrix density of the whole data
B = number of defined blocks in the matrix
O_{kl} = number of "1"s in the (k, l)th block
$O_{kl}{}^*$ = expected number of "1"s in the (k, l)th block = g_{kl} α = "$g_k\ g_l$ α", if k ≠ l; or "g g α", if k = l
t_{kl} = "1", if $\_{kl}$ < α; or "(1 -- α)/α", otherwise; here $\_{kl}$ means the submatrix density of each block.

Because this index is based on worst-possible a-fit, which indicates that it calculates the sum of deviations from the target blockmodel, the smaller the CHB index is, the better the blockmodel fits the network data (Wasserman & Faust 1997:682). The CHB index ranges from 0 to 1. However, there is still no developed standard for evaluating $\_{b2}$ (Wasserman & Faust 1997:684), and Wasserman and Faust (1997: 690) even treated $\_{b2}$ = 0.499 as an evidence of a good fit of the blockmodel to the original network data in their example, I thus adopted 1/3, which is far less than 0.499, as the critical value. That is, only if $\_{b2}$ <0.333, will I claim that the blockmodel fits the original network data well.

Ideal Image

In blockmodeling, if the submatrices in the blocked matrix would have equal densities, then I would get the amorphous blockmodel image (Baker 1992):

1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1

This image emerges when the four variables have no effects on the grain flow among provinces, indicating that the general null hypothesis holds. Only when the blockmodel images we get significantly deviate from this amorphous one can we reject the null hypothesis and accept the alternative hypothesis. Here "significantly" means $\_{b2}$ <0.333.

VI. Results and Discussions

The results are calculated mainly by UCINET VI, a computer program used to analyze social network data. After densities in each block are calculated, the images of four target blockmodels are then constructed and $\_{b2}$ is calculated to evaluate if the blockmodels significantly represent the original network data. Lastly, the blockmodel images are compared to ideal images to examine whether the null hypothesis should be rejected.

The matrix density (a-density) of the whole grain trade data is the basis for forming the blockmodel images. According to whether we include the main diagonal, there are two values for α-density. One is 0.1756 if we include the main diagonal; the other is 0.1471, if we don't include the main diagonal. In each blockmodel, the values of Δ-density (submatrix density for each block) are compared to 0.1756. However, to some blocks that are off main diagonal and with Δ-density less than 0.1756 but greater than or almost equaling to 0.1471, I will also code them as "1"s.

Results for Hypothesis 1

Hypothesis 1, which states that *spatial differentiation is not a barrier to the grain trades, meaning that the national grain market is spatially integrated*, is designed to answer the first research question. Based on the territorial factor, spatial differentiation, I get the following blockmodel image:

Table 1. **Territorial Factor: Spatial Differentiation**

	Northern-Eastern	Eastern	Central-Southern	Western
Northern-Eastern -8	**1** 0.3594/ 23	**1** 0.3393/ 19	**1** 0.2500/ 12	**0** 0.1111/ 8
Eastern -7	**1** 0.1429/ 8	**1** 0.5102/ 25	**1** 0.1667/ 7	**0** 0.0317/ 2
Central-Southern -6	**1** 0.1667/ 8	**0** 0.0952/ 4	**1** 0.3611/ 13	**0** 0.0926/ 5
Western -9	**0** 0.0556/ 4	**0** 0.0317/ 2	**0** 0.0370/ 2	**1** 0.1975/ 16

Goodness-of-fit index for this blockmodel is: $\_{b2}$ = 0.105

Notes:
1. The number in the parentheses under territorial categories refers to the numbers of provinces in each category.
2. The bolded numbers "1" or "0" in each block signifies whether it is a oneblock or zeroblock.
3. The two unbolded numbers of each block is Δ-density before "/" and number of ties after "/" for each block.

According to the value of $\_{b2}$ which is far less than a third, this blockmodel fits the original data very well. Also by comparing this blockmodel image to the ideal image, we can see that this image is very different from the ideal image, indicating that the null hypothesis, which states that spatial differentiation is not a barrier to grain flows, should be rejected. Thus, the territorial factor is still an obstacle to the formation of an integrated national grain market. However, here we can see that the three eastern groups, namely the northern-eastern, eastern, and the central-southern groups, have almost established an integrated grain market because the partial blockmodel image is very similar to the ideal image, with the exception of one zeroblock. This means that an internal market has to significant degree emerged in China, with the exception of the nine western provinces.

An examination of these western provinces, however, reveals that three provinces in the southwest are short of grain, three are merely self-sufficient, and only three have a surplus with two located in northwest. Therefore, this group would be better off were it to join the national market. One important reason as to why it is still not part of the national market is that the western provinces always lag in market reforms. There are still few national wholesale grain markets in this region (eight out of nine are still market undeveloped provinces). Also we can find that internal relationships (grain trade within each group) are much intensive than external relationships (grain trade among groups). This finding partly reflects the influence of the local/provincial governments because the latter can use political measures to prevent inter-provincial grain trade. This is also partly owing to the fact that all provinces are required to trade with neighbors first because of the macro-adjustment measures of the state. In addition, by examining the Δ-densities we can see that, contrary to the pre-reform era when the main trend was grain

flow from south to the north, trade exchanges from north to south are larger than those from south to north. This trend results partly from the fact that the development of the TVEs in southern provinces changed the comparative advantage of growing grain on the decreasing arable lands.

Results for Hypothesis 2

Hypothesis 2, which states that *demand-side and supply-side factors have no effects on the grain trades, indicating that national grain market has not been economically integrated*, is designed to answer the second research question. Based on the supply and demand-side factors: grain output per capita and living expenditure per capita in each province, we can get two blockmodel images. Let us begin with the supply-side factor.

Supply-side factor

Table 2. **Supply-side Factor: Per Capita Grain Output for Each Province**

	Sufficient Surpluses	Marginal Surpluses	Self-Sufficient	Short of Grain
Sufficient Surpluses -7	**1** 0.3061/ 15	**1** 0.4107/ 23	**1** 0.2857/ 12	**1** 0.3810/ 24
Marginal Surpluses (8)	**0** 0.1071/ 6	**1** 0.3438/ 22	**1** 0.2708/ 13	**1** 0.3194/ 23
Self-Sufficient (6)	**0** 0/ 0	**0** 0.0208/ 1	**Reflexive** 0.1667/ 6	**0** 0.0556/ 3
Short of Grain -9	**0** 0/ 0	**0** 0/ 0	**0** 0.0185/ 1	**Reflexive** 0.1111/ 9

Goodness-of-fit index for this blockmodel is: $\_{b2}$ = 0.313

Notes:
1. The number in the parentheses under supply-side categories equals to the number of provinces in each category.
2. The bolded numbers "1" or "0" in each block indicates whether it is a oneblock or zeroblock.
3. The two unbolded numbers of each block is Δ-density before "/" and number of ties after "/" for each block.
4. "Reflexive" in (3,3) and (4,4) blocks means that each province in these blocks has grain flow only within itself, but not outside itself.

According to the value of $\_{b2}$, this blockmodel fits the original data relatively well because the index is less than 1/3. By comparing this blockmodel image to the ideal image, we can see that this image is very different from the ideal image, signifying that the null hypothesis, which states that supply-side factor should have no effect on grain flows, should be rejected. Thus the supply factor does have an effect on inter-provincial grain flows.

By examining the table we find that surplus-sufficient provinces outflow grains to all other groups; surplus-marginal provinces outflow grains to all other groups except for surplus-sufficient provinces, which have more grain output per capita. However, the self-sufficient provinces and provinces short of grain simply sell their own grains in local markets (as we can see there is only reflexive relation in these

two blocks); and at the same time, they inflow grains from two groups of grain-surplus provinces. This image demonstrates that the inter-provincial grain flows have been ideally enforced under the influence of the supply-side factor.

The strong effect of the supply factor is the direct result of reform policies – the release of grain prices, the abolishment of UPSS, and especially the replacement of a planned inter-provincial transfer system for a market transfer system. However, some people may argue that planned transfer under UPSS can also achieve the same image result as the above blockmodel shows, thus the strong effect of the supply factor is not necessarily the result of reform policies. This argument is incorrect. Even though planned transfer might also yield the same result, the efficiency of resource allocation of these two methods would be extremely different. Under the planned transfer system inter-provincial grain flows resulted only a couple of times each year under the guidance of central government because the transaction and transportation costs are too high for the state to enforce grain transfer as often as market does. This partially accounts for why provinces short of grains were always short of grains under a planned transfer system. However, under the market transfer system, grain flows are very sensitive to market information, and have far fewer transaction costs. From the above table we can see that Δ-densities in blocks (1,4) and (2,4), which indicate grain flows from two grain-surplus groups to the short-of-grain groups, are very high. This means that provinces short of grain under a market system are much better than they were before reform.

Demand-side Factor

Table 3. **Demand-side Factor: Per Capita Living Expenditure in Cities for Each Province**

	Rich Provinces	Relatively Rich	Relatively Poor	Poor Provinces
Rich provinces -8	**1** 0.2500/ 16	**0** 0/ 0	**0** 0/ 0	**0** 0.0125/ 1
Relatively Rich -5	**1** 0.1750/ 7	**1** 0.2800/ 7	**0** 0.0857/ 3	**0** 0.0800/ 4
Relatively poor (7)	**1** 0.3393/ 19	**1** 0.2000/ 7	**1** 0.2041/ 10	**1** 0.2429/ 17
Poor provinces -10	**1** 0.2625/ 21	**1** 0.1800/ 9	**1** 0.1429/ 10	**1** 0.2700/ 27

Goodness-of-fit index for this blockmodel is: $_{b2}$ = 0.139

Notes:
1. The number in the parentheses under demand-side categories indicates the number of provinces in each category.
2. The bolded numbers "1" or "0" in each block signifies whether it is a oneblock or zeroblock.
3. The two unbolded numbers of each block are Δ-density before "/" and number of ties after "/" for each block.

Let us turn now to the effect of the demand-side factor on the grain flow. As Table 3 shows, this blockmodel fits the original data also very well because $_{b2}$ is far less than 1/3. By comparing this blockmodel image to the ideal image we can see that this image is also very different from the ideal image; this means that the null hypothesis, which states that demand-side factor should have no effect on grain flows, should be rejected.

In the matrix, we can see that the group of rich provinces inflows grains from all other groups; the relatively rich provinces inflow grain from all other groups except for the rich provinces. However, the two poor groups are mainly self-fed and grain-outflow provinces, according to this blockmodel image. This image therefore demonstrates that the inter-provincial grain flows have been ideally enforced under the influence of the demand-side factor.

There are two reasons for the above mode of effects of the demand-side factor. First, under the circumstance of a market transfer system, citizens in two groups of rich provinces tend to concern more about quality and variety of grain than the other two groups, thus they were able to inflow varieties of high quality grains from every where. While citizens in two groups of poor provinces also had concern about quality and variety, they can not afford to buy varieties of high quality grains from everywhere as the rich provinces do. Since the new preferences of the citizens to quality and variety of grain are the direct result of market reform, it is hard to imagine that the planned transfer system before reform can mimic the effect of the demand-side factor of the market system. Second, many poor provinces are actuary grain-surplus provinces (Chinese Academy of Science, 1997:308-333; also see Appendix II), thus they seldom inflow grains from other provinces.

From the discussion above, though there are still anti-market obstacles from local protectionism and anti-market central policies, we note that grain trade has been to a large degree sensitive to both demand-side and supply-side factors in China today. The market transactions of grains in the national market have been directed by the principle of market to some degree. An internal grain market has been forming according to this criterion. And combined with the finding for research question (1), we may conclude that although imperfect, the internal grain market has emerged, especially in the eastern part of China. The following blockmodel is thus designed to test whether the state actions in making this internal grain market are significant or not to the ongoing pattern of grain flows in China.

Results for Hypothesis 3

Hypothesis 3, which states that *the deliberate state actions to promote internal grain market are not significant to grain trades*, is designed to answer the third research question. Based on the state factor, the number of national wholesale grain markets deliberately constructed by the state, we arrive at the following blockmodel image:

Table 4. **State Factor: The Number of National Wholesale Grain Markets in Each Province**

	Very Developed	Developed	Developing	Un-developed
Very developed (5)	**1** 0.5200/ 13	**1** 0.2571/ 9	**1** 0.3778/ 17	**0** 0.2222/ 1
Developed (7)	**1** 0.3429/ 12	**1** 0.4490/ 22	**1** 0.4444/ 28	**0** 0.0952/ 6
Develop-ing -9	**0** 0.0667/ 3	**1** 0.1429/ 9	**1** 0.2222/ 18	**0** 0.1235/ 10
Un-developed -9	**0** 0/ 0	**0** 0.0159/ 1	**0** 0/ 0	**Reflexive** 0.1111/ 9

Goodness-of-fit index for this blockmodel is: $\_{b2}$ = 0.220

Notes:
1. The number in the parentheses under state factor categories refers to the number of provinces in each category.
2. The bolded numbers "1" or "0" in each block indicates whether it is a oneblock or zeroblock.
3. The two unbolded numbers of each block is Δ-density before "/" and number of ties after "/" for each block.
4. "Reflexive" in (4,4) blocks means that each province in these blocks only has grain flow within itself, but not outside itself.

According to the goodness-of-fit index, this blockmodel fits the original data well because the index is less than 1/3. And by comparing this blockmodel image to the ideal image, we can see that this image is very different from the ideal image. Thus, the null hypothesis, which states that the deliberate actions of the state in making an integrated market have no effect on the grain flows, should be rejected. The deliberate action of the state in constructing national grain markets does have effects on inter-provincial grain flows.

To see the effect of the state factor more clearly, we notice that the vast majority of the grain trades are enforced among the first three groups: two groups of market-developed provinces and the group of market-developing provinces. And according to the values of Δ-density, the groups of two market-developed provinces do much better than the group of market-developing provinces. However, the market-developing provinces also do much better than the undeveloped provinces, in which all grain trade exchanges only exist within local markets, as can be seen from the reflexive relations of these provinces. Nevertheless, almost half of the undeveloped provinces are short-of-grain provinces and the other half of the provinces are merely self-sufficient. The latter group would therefore definitely benefit from trading with others in the national grain market.

As argued above the establishment of national wholesale grain markets is the most visible, continuous, and irreversible action deliberately taken by the state to construct a market environment for an internal grain market in the past 12 years. Therefore, the significant effects of the numbers of national grain markets in each province on inter-provincial grain flows demonstrate that the state (the central government) does have an important role in forming an integrated national market – an internal market.

The meaning of the deliberate establishment of national wholesale markets by the Chinese government deserves emphasis here. When discussing reasons behind the nondevelopment of Chinese capitalism during the imperial era, Fernand Braudel (1977: 32-33) convincingly argued that the lack of intricate exchange mechanisms – fairs and bourses (large wholesale markets) – and the hostility of Chinese governments in the history to these higher forms of exchange are the most important contributors. What Chinese state has done during the reform era is just the opposite of what its ancestors did. The emerging Chinese capitalism benefits much from the deliberate actions of the state in upgrading exchange mechanisms, and since these mechanisms are beginning to be rooted in the Chinese society, the road to capitalism is irreversible.

VII. Concluding Remarks

This paper has examined the evolution of a market pattern in the new market transition economies based on the emergence of an internal grain market under market reform in China. Just as Polanyi (1957:63) has argued, local markets "nowhere showed any sign of reducing the prevailing economic system to their pattern," we found that local markets, tightly "protected" by local officials, always tried to curtail long-distance trade beyond local territories and thus were not starting points of an internal market in China's national grain market. The approximate internal grain market at the beginning of the 21st century in China is the result of the deliberate actions of the reform-oriented state. In other words, Polanyi's theory of the evolution of market patterns holds in the new market transition economies.

State interventions, however, are not always helpful to the formation of an internal market, especially when the state itself is still under an arbitrary central government but not under rule of law (Hayek, 1976). As we have learned from the history of grain market reform in China, the state (the central government) also has made some anti-reform policies in the name of "grain market reform" to intervene viciously in the formation of an internal market. Excluding private grain merchants from grain trade and permitting state-owned grain enterprises (SOGE) to monopolize grain purchase since 1994, for example, are two of the sources of the trade inefficiency in the national grain market (Wang 1999; Long 1998).

However, these vicious "state interventions in emerging markets aimed to protect state monopolies also contributed to the increased regulatory burden of the state" (Nee 2000). In 1998 the state had to loose controls over SOGE and permit private merchants to enter grain sales markets (but entry to purchase markets is still not permitted) in order to increase the efficiency of grain flows. Also, in 1999 the state divided the Central Reserve Bureau of Grain, which was both a government bureau and a super grain administrative corporation, into two parts: (1) the Central Bureau of Grain which takes responsibility in macro-controlling national grain flows; and (2) General Administrative Corporation of National Reserve Grain which is in charge of national grain stock. These measures all indicate that the state is transformed gradually into a regulatory one under rule of law by the

burdens of too many state interventions. We may predict here that only when the state begins to employ complete

regulatory interventions, but no longer any authoritarian interventions in market, can a complete internal market emerge in the market transition economies.

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Appendix I. **Network Data for Inter-Provincial Grain Flows in China, Year 2000**

#	Province	1 Fujian	2 Shanghai	3 Sichuan	4 Beijing	5 Zhejiang	6 Guizhou	7 Heilongjiang	8 Tianjin	9 Gansu	10 Jiangxi	11 Guangdong	12 Qinghai	13 Xingjiang	14 Henan	15 Jilin	16 Shuanxi	17 Liaoning	18 Ningxia	19 Guangxi	20 Yunnan	21 Neimeng	22 Shanxi	23 Hebei	24 Anhui	25 Hunan	26 Hubei	27 Shandong	28 Hainan	29 Xizang	30 Jiangsu
1	Fujian	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Shanghai	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Sichuan	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Beijing	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Zhejiang	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Guizhou	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Heilongjiang	1	1	1	1	1	0	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0
8	Tianjin	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Gansu	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Jiangxi	1	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Guangdong	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Qinghai	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Xingjiang	1	0	1	1	0	1	0	1	1	1	1	1	1	0	0	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0
14	Henan	1	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	0	1	0	1	0	1	1	0	0	1	1	0	0	1
15	Jilin	1	1	1	1	1	0	0	0	0	0	1	1	0	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	0
16	Shuanxi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Liaoning	1	1	1	1	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0
18	Ningxia	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
19	Guangxi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
20	Yunnan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
21	Neimeng	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
22	Shanxi	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
23	Hebei	0	0	1	1	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	1	1	1	0	1	1	0	0	0	0
24	Anhui	1	1	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
25	Hunan	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
26	Hubei	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0
27	Shandong	1	0	1	1	1	0	0	1	0	1	1	1	0	0	0	0	1	0	0	0	1	1	1	0	1	1	1	0	0	1
28	Hainan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
29	Xizang	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
30	Jiangsu	1	1	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Appendix II. **Attributes and Blockmodel Identities for Each Province**

Attributes of Each Province

	Spatial Differentiation	Living Expenditure (Per Capita, RMB)	Grain Output (Per Capita, kg)	Degree of Market Development (Number of National Wholesale Markets)
Beijing	Northern-Eastern	6410	190.6	9
Tianjin	Northern-Eastern	5118	218.7	6
Hebei	Northern-Eastern	3754	433.2	4
Shanxi	Northern-Eastern	3177	326.4	8
Neimenggu	Northern-Eastern	2968	652.2	3
Liaoning	Northern-Eastern	3701	387.9	8
Jilin	Northern-Eastern	3298	845.2	7
Heilongjiang	Northern-Eastern	3208	816.7	13
Shanghai	Eastern	6816	155.1	3
Jiangsu	Eastern	4493	489	16
Zhejiang	Eastern	6050	337.8	11
Anhui	Eastern	3692	441	6
Fujian	Eastern	4788	292.8	2
Jiangxi	Eastern	3136	411.3	7
Shandong	Eastern	3984	473.5	10
Henan	Central-Southern	3267	425.1	7
Hubei	Central-Southern	3881	433.1	4
Hunan	Central-Southern	4262	421.5	4
Guangdong	Central-Southern	6881	270.4	4
Guangxi	Central-Southern	4391	333.4	0
Hainan	Central-Southern	3851	280.9	0
Sichuan	Western	4087	407.8	4
Guizhou	Western	3642	292	1
Yunnan	Western	4525	314.4	0
Xizang	Western	*4536	325	0
Shuanxi	Western	2440	334	0
Gansu	Western	2961	330.5	2
Qinghai	Western	3352	257.2	2
Ningxia	Western	3229	513.1	2
Xinjiang	Western	3686	483.6	3

* (just for 1996)

Appendix II. **Attributes and Blockmodel Identities for Each Province (continued)**

Blockmodel Identities:

(1) Territorial Factor: see the above table

(2) Grain Output Per Capita for Each Province

Sufficient-Surplus Provinces	Neimenggu, Jilin, Heilongjiang, Jiangsu, Ningxia, Xinjiang, Shandong
Marginal-Surplus Provinces	Hebei, Liaoning, Anhui, Jiangxi, Henan, Hunan, Hubei, Sichuan
Self-Sufficient Provinces	Shanxi, Zhejiang, Guangxi, Xizang, Shuanxi, Gansu
Short Of Grain Provinces	Beijing, Tianjin, Shanghai, Guangdong, Fujian, Hainan, Guizhou, Yunnan, Qinghai

(3) Living Expenditure Per Capita For Citizens In Each Province

Rich Provinces	Fujian, Shanghai, Beijing, Tianjin, Zhejiang, Guangdong, Jiangsu, Yunnan
Relatively Rich Provinces	Shandong, Hunan, Guangxi, Sichuan, Xizang
Relatively Poor Provinces	Hebei, Liaoning, Anhui, Guizhou, Xinjiang, Hubei, Hainan
Poor Provinces	Shanxi, Jilin, Helongjiang, Jiangxi, Henan, Qinghai, Ningxia, Shuanxi, Gansu, Neimeng

(4) Degree Of Market Development/ Number Of National Wholesale Markets In Each Province

Very Developed Provinces	Beijing, Heilongjiang, Jiangsu, Zhejiang, Shandong
Developed Provinces	Tianjin, Shanxi, Liaoning, Jilin, Anhui, Jiangxi, Henan
Developing Provinces	Hebei, Neimeng, Fujian, Shanghai, Hubei, Hunan, Guangdong, Sichuan, Xinjiang
Undeveloped Provinces	Guangxi, Hainan, Guizhou, Yunnan, Xizang, Shuanxi, Gansu, Qinghai, Ningxia

ENDNOTES

1. See http://xzhljy12.363.net/. Webpage for "*Zhongguo liangyou pifa shichang*"(China's National Wholesale Grain and Oil Markets).

2. See http://go5.163.com/~fzlspf/new_page_5.htm

3. See http://6688.ccec.com.cn/new_info/20000808_zjlt1.html

4. See http://www.cngrain.com

5. See http://www.igrain.com.cn/igrain/

6. See http://www.cof.net.cn

7. See http://www.cctn.com.cn/cctn/

8. See http://168.160.224.132/cctn/help/suc.asp/.

9. For grain production, see "output of major farm crops" each year from 1978 to 1998, *China Official Annual Report 1998*, p1134; for grain consumption, see Findlay, 1998, p15.

10. Chongqing City was part of Sichuan Province before 1997. So, maybe grain market reports are still taking it as a city under Sichuan province.

11. These bureaus are (1) northern bureau, (2) north-eastern bureau, (3) southeastern bureau, (4) central-southern bureau, (5) southwestern bureau, and (6) northwestern bureau. Here I combine (1) and (2) as northern-eastern group and (5) and (6) as western group. Provinces in southeastern bureau are coded as eastern group; and provinces in central-southern bureau as central-southern group.

12. In fact, even though the planned grain redistributive system has been dismissed since 1993, the Grain Adjustment Conferences Among Spatial Proximate Provinces each year have still been organized mainly according to this geographical division in order to balance the supply and demand on the national grain market. If an integrated national grain market has emerged, we may find that there are random relations among groups.

13. Here grain output per capita for each province (GOPC) is calculated from the *Rural Statistical Yearbook of China* by averaging grain output per capita for each province from 1996 to 1998 (See Appendix II for GOPC for each province). According to Yang Xie (see Footnote 2), here provinces with GOPC greater than 385 kg are coded as grain-surplus provinces. In these provinces, I furthered code those with GOPC greater than 470 kg as provinces with sufficient surpluses, and those with GOPC ranging from 385 kg to 470 kg as provinces with marginal surpluses. In China, provinces with GOPC ranging from 320 kg to 385 kg can be seen as self-sufficient provinces; while those with GOPC less than 320 kg are seen as provinces short of grain

14. LEPC for each province is calculated from the *Statistical Yearbook of China* by averaging LEPC of citizens in each province from 1996 to 1998. Since the mean LEPC for all provinces is around 4000 RMB (about 500 US$), we coded provinces with LEPC greater than 4500 RMB as rich provinces; provinces with LEPC ranging from about 4000 RMB to 4500 RMB as relatively rich provinces; provinces with LEPC ranging from 3500 RMB to 4000 RMB as relatively poor provinces; and those with LEPC less than 3500 RMB as poor provinces.

15. The number of national wholesale grain markets (NWGM) in each province is calculated from the webpage for "*Zhongguo liangyou pifa shichang*"(China's National Wholesale Grain and Oil Markets). Totally there are 147 NWGN in 2000. So, the average number of NWGM for each province is about 4.8. Therefore, I coded those provinces with more than 9 NWGM as very developed provinces; those with the number of NWGM ranging from 5 to 9 as developed provinces; those with the number of NWGM ranging from 3 to 4 as developing provinces; and those with the number of NWGM less than 3 as undeveloped provinces.

SOURCES

Baker, Wayne. 1992. "The Network Organization in Theory and Practice." Pp.397-429 in *Networks and Organizations: Structure, Form, and Action,* edited by Nitin Nohria and Robert Eccles. Boston: Harvard Business School Press.

Block, Fred. 1990. *Postindustrial Possibilities: A Critique of Economic Discourse*. Berkeley: University of California Press.

Braudel, Fernand. 1977. *Afterthoughts on Material Civilization and Capitalism*. The John Hopkins University Press.

Brown, L.R. 1994. "Who Will Feed China?" *World Watch* (September - October): 10-18.

———. 1995. *Who Will Feed China?: Wake-up Call for a Small Planet*. NY: WW Norton.

China Official Annual Report, 1999, 1998, 1997.

China Statistical Yearbook, 1999, 1998,1997. http://www.stats.gov.cn/yearbook/

Chinese Academy of Science. 1997. *Agriculture and Development: Study on Development Strategy of Grains and Agriculture in 21st Century China*. Shenyang: Liaoning People Press.

Evans, Peter. 1995. *Embedded Autonomy: States and Industrial Transformation*. Princeton, N.J.: Princeton University Press.

Findlay, Chrstopher. 1998. *Grain Market Reform in China: Global Implications*. ACIAR Technical Reports No.43.

Hayek, Friedrich A. 1944 (1976) *The Road to Serfdom*. The University of Chicago Press.

Lin, Justin Yifu. 1992. "Rural Reforms and Agricultural Growth in China." *The American Economic Review* 82: 34-51.

———. 1988. "The Household Responsibility System in China's Agricultural Reform: A Threoretical and Empirical Study." *Economic Development and Cultural Change* 36.

———. 1996. *The China Miracle: Development Strategy and Economic Reform*. Hongkong: The Chinese University Press.

Long, Ma. 1998. "*Liangshi liutong haishi buyao dujia jingying.*" ("Don't Monopolize Grain Flow"). http://www.cdi.com.cn/yjbg/cyjj/22.html.

Ma, Xiaohe. 1999. "*Woguode liangshi ziji zhengce he shiping anquan.*" ("China's Grain Self-sufficiency Policy and Food Security")

http://unionforum.cei.gov.cn/AMR/Report/19990113ce3.htm

Nee, Victor. 2000. "The Role of the State in Making a Market Economy." *Journal of Institutional and Theoretical Economics* 156: 64-98.

———. 1992. "Organizational Dynamics of Market Transition: Hybrid Forms, Property Rights, and Mixed Economy in China." *Administrative Science Quarterly* 37: 1-27.

North, D.C. 1981. *Structure and Change in Economic History*. Norton: New York.

———. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.

Oi, J. C. & Andrew G. Walder. 1999. *Property Rights and Economic Reform in China*. Stanford, Calif.: Stanford University Press.

Oi, J.C. 1999. *Rural China Takes Off : Institutional Foundations of Economic Reform*. Berkeley : University of California Press.

Olson, M. 1982. *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*. New Haven: Yale University Press.

Rural Statistical Yearbook of China 1999, 1998, and 1997.

Polanyi, Karl. 1957. *The Great Transformation*. Boston: Beacon Press.

Walder, Andrew G. 1992. "Property Rights and Stratification in Socialist Redistributive Economies." *American Sociological Review* 57: 524-539.

Wang, Ruichao. 1999. "*Woguo liangshi liutongtizhi gaige yanjiu.*" (Research on the Grain Flow System in China). http://www.cnjj.com/content/study/fiscallt…liangshiliutong/2woguoliangshiliutong.htm.

Wasserman, Stanley & Katherine Foust. 1997. *Social Network Analysis: Methods and Applications*. Landon: Cambridge University Press.

Wong, Christine P.W. 1986. " The Economics of Shortage and Problems of Reforms in Chinese Industry." *Journal of Comparative Economics* 10: 363-387.

———. 1987. "Between Plan and Market: the Role of the Local Sector in Post-Mao China." *Journal of Comparative Economics* 11: 385-398.

Yang, Yongzheng and Weiming Tian. 2000. *China's Agriculture at the Crossroads*. NY: ST. Martin's Press, Inc.