

***The Making of an Integrated National Grain
Market in China***

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Summary: Market economy will not emerge from redistributive economy automatically once the state abolishes 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. This paper examined the evolution of market pattern in the new market transition economies based on the emergence of an internal grain market under market reform in China. I found that local markets, tightly “protected” by local officials, 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 deliberate actions of the reform-oriented state.

Key Words: Market Reform, Grain Market, Blockmodeling, Selective Intervention.

I Introduction

Market reform from state socialism provides an unusual opportunity to study the evolution of the market pattern in 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, many of these researches have focused on issues of economic development or property rights, but not directly on the evolution of the market pattern. If market economy can be seen as a set of institutional arrangements, then it's more important to understand the institutional changes than just explain economic development; and it's at least evenly important to understand the evolution of market pattern, as is property rights.

In his classical work, Karl Polanyi (1957:63-65) argued that the formation of a laissez-faire economy cannot be based on local markets because local markets, often controlled by territorial powers (towns, for example), inhibit burgresses from long-distance trade. It was thus the "nationalization" of the local markets, which creates an integrated national market (internal market) through deliberate action of the state, that enables laissez-faire.

Though Polanyi's view is based on modern Western European history, it may also be true in new market transition economies. 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 closed local economy (Wong 1986, 1987; Nee 1992). So, it's understandable that many top economists in China have called on the central government since the beginning of the reform to construct an integrated national market. Therefore, it seems promising to examining Polanyi's theory of the evolution of the market pattern in non-western-European environments: the new market transition economies.

The evolution of China's national grain market since 1978 is a good case to examine the evolution of market pattern in the new market transition economies. It is an appropriate case because it has following unique attributes. First, according to polenyi's theory, there should have lots of local markets for one kind of goods before an internal market emerges. In reforming China, each province is a local market for grain trade ever since the beginning of the grain market reform, especially under provincial governor's responsibility system (Findlay 1998:21-22); and in fact, there also exist dozens of local grain markets in county level in each province. Second, there should have an inter-territorial state which has interest in constructing an internal market. No wonder, the reform-oriented Chinese socialist state is such an inter-territorial political entity. Third, there should have a relatively long market development history to see the influence of the state on the formation of an internal market. While after more than 20 years' development, grain market is now one of the most developed goods markets in China.

This paper is organized as follows. Section II briefly reviews the history of the grain market reform in China. Research questions based on Polenyi's theory of the evolution of market pattern and the history of grain market reform are proposed in Section III. Section IV discusses the data used in this paper; Block-modeling method is discussed in Section V separately. Section VI reports the empirical results. Some concluding remarks are provided in Section VII.

II. Review of the History of Grain Market Reform

Territorial grain flow in China before 1978 is not transacted through grain market, but by Unified Purchase and Sales System (UPSS). Under UPSS, all peasants' grain surplus were ordered to sell only to the state in a planned price; at the same time, the state redistributed grain to citizens and peasants who were short of grain in a planned quantity. In 1960, people's communes were

constructed across the country to ensure the state's control over peasants to enforce UPSS efficiently. By doing so, the state extracted billions of agricultural surpluses for industrial capital, while national grain output declined forward because of peasants' low incentives to grow grain under such 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 to increase incentives to direct producers to grow grain. These steps include changing collective system under people's commune to Household-Responsibility System, and increasing in state grain purchase prices. Citizens were also permitted to buy grain directly from peasants in reemerged small local markets from then on. But since surplus grains of each peasant household are not too much, 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 have sold grain quota to the state. However, because of the legacy of Maoist closed local economy and socialist shortage economy, grain outflow to other territories, except for the centrally planned transfer, was still seen by local officials as "destructing socialist economic order". So local governments were hostile towards private grain merchants ever since the beginning of the grain reform.

The first stage reform benefiting direct producers brought out dramatic growth in grain production. As a result, the state was encouraged to take a bolder approach to agricultural reforms. This began the second stage from 1985 to 1993. In 1985, the UPSS was replaced by the contract system. Under the new system, state 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 to establish 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 grain consumption of the citizens. People were more and more concerning about better quality and varieties, and the quantity became less important. This in turn resulted in the abolishment of the state' grain redistributive system to citizens in 1993 because the redistributive system is based on longtime shortage of grain. Also in 1993, the state decided to release prices of all grains, no matter quota or non-quota grain. Before this, the state has already established State Grain Stocks in 1990 in order to increase its ability of macro-adjustment on national grain market.

To our interest, the state's 1993 reforms also changed inter-provincial grain transfer system. In the 1980s and the 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. After 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 constructed if there were no later retreats. 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 Australian Center for International Agricultural Research (Findlay, 1998:14), Problems around 1994 included: (1) continuous rises of grain prices. This is easy to understand since the nominal

prices of grains before the abolishment of UPSS were far below market/real prices. So, the rises of prices are just 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. This is because the grain prices continued rising even after the state took macro-adjustment measures, such as the release of 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 and taking other measures. 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 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 Provincial Governor's Responsibility System only worsened the situation, since these measures intensified local protectionism.

In 1998, Premier Zhu Rongji initiated the forth stage of the grain market reform. This reform was initially aimed to bailout state-owned grain enterprises (SOGE). Continuing 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. However, at this time it

permitted SOGE to sell grains on local and internal markets with prices higher than both market prices and purchase prices. At the same time, the state liberated SOGE from grain administrative bureaus in local governments thus made SOGE become self-constrained and manage-autonomous firms. Though this reform is mainly concerned about SOGE, it also had effects on inter-territorial grain flow. First, by liberating SOGE, the purchase and sales of grains would be less interfered by local governments thus it's helpful to break through territorial barriers. Second, the liberalization of SOGE, combined with the establishments of more and more national wholesale markets by the state these years, would increase 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 to try to make an internal grain market in reforming China. First, it breaks down UPSS, the planned redistributive grain system. The grain market will not emerge only after at least partial exit of such system. Second, it gradually replaces planned inter-provincial transfer system with 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, it establishes more and more national wholesale grain markets to promote long-distance grain trade across the country. Fourth, it uses macro-control measures to break through internal barriers and protect inter-provincial grain trade. Fifth, it liberates SOGE from local governments to make them independent economic entities on national grain market. The result is that grain has been mainly traded on local markets and national markets since 1980s. However, the road to a national grain market is uneven, and the grain market reform is incomplete. First, local governments prevent the formation of the national grain market (inter-provincial grain trade), though they are interested in the development of local markets. Second, the central government still monopolizes the purchase of grains through state owned grain enterprises and prevents entry

of those private grain merchants to purchase markets. Third, the state still manipulates most of the prices of grains. So, it seems that though the state has taken deliberate actions to promote an internal grain market, it still uses plan measures, which are harmful to the formation of an internal market, to try to solve market problems. These are still the political economy of China's grain market in the year of 2000, which is the time span of what my data covers.

III. Research Questions

Local grain markets came into being soon after the state initiated rural reform in 1978 as we can see from the history of China's 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 obstacles contributing to it. First, as it has been shown by Polanyi in western history, to develop an internal market conflicts to 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 that the emergence of an internal market will have to be an incremental process, even if the state promises to take actions to develop a national grain market. So, our first research question is:

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

Nevertheless, 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 under the role of market, that is, 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 of the 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 achieve 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 – the state, though the 1998 reform strategy has partly revised policies and thus reopened the door to an internal grain market. Therefore, our 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 not only has been interested in the making of an integrated national grain market – an internal grain market, but has also 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 issued to construct a couple of large national wholesale grain markets in 1988, there are about 150 such markets in 2000 with the average constructing speed of about 12 markets per year¹. This performance is especially salient if we notice that there were always so many doubts, hesitations and even retreats in the state's decisions in abolishing UPSS, in releasing grain prices, in separating state-owned grain enterprises from local governments, in permitting the entry of private grain enterprises, etc. Thus, to examine Polanyi's theory of the evolution of 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 to China's grain market, does the establishment of national wholesale grain markets by the state significantly contribute to the making of an integrated national grain market?*

¹ See <http://xzhlyj12.363.net/>. Webpage for “Zhongguo Liangyou Pifa Shichang”(China's national wholesale grain and oil markets).

IV. DATA

The data used in this paper is about inter-provincial grain flows on national market in China from November 1999 to October 2000. This data is mainly collected from National grain & Oil Information Web page of China Fuzhou Grain Wholesale Market², which is one of the 22 largest national wholesale grain markets in China (see footnote 1). Other sources include Internet WebPages of Jilin Grain Exchange Market³, China Net of Grain⁴, Igrain Net⁵, China Net of Grain & Oil Information⁶, and China Cereals Trade Net⁷. Since Internet trade can greatly reduce transaction costs, especially in information-search costs, now it becomes an important trade form for inter-provincial grain flows⁸, and all national wholesale grain markets have constructed or been constructing WebPages (see footnote 1). Therefore, the data, which is collected from WebPages, is both reliable and effective under the circumstance of diffusion of 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 consumption⁹, we will just include inter-provincial flows of these three main types of grain in our data.

The information about inter-provincial flows of these three types of grains is collected from market reports and market information boards on the above WebPages. Unfortunately, we can only get information about the direction but no amounts of grain flows among provinces. But because the amounts of grain in each trade on wholesale markets are usually quite large, and also

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

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

⁴ <http://www.cngrain.com>

⁵ <http://www.igrain.com.cn/igrain/>

⁶ <http://www.cof.net.cn>

⁷ <http://www.cctn.com.cn/cctn/>

⁸ <http://168.160.224.132/cctn/help/suc.asp/>.

because our object is just to know if there exist market trades among groups of provinces, information about direction of grain flows is still quite enough in this research. Thus, we code “1” for A --> B if there exists market grain flow from A province to B province, and “0” if no such flow exists during November 1999 to October 2000. Since there are 30 provincial districts except Chongqing Special City¹⁰, according to Wasserman & Faust (1997), the resulted data is a dichotomized, directed, and 30x30 matrix network data (see Appendix I for the whole data).

Two points should be commented here. First, since there exist lots of local grain markets 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 possible relations is 900, the density of this matrix equals to 0.1756 (158/900). So, it’s a rather sparse matrix, meaning that the national grain market is not very developed yet.

V. Method For Resolving Research Questions

A Priori Blockmodeling method

The a priori blockmodeling method used here is to test statistically the extent to which the spatial differentiation is barrier to inter-provincial grain trades, the market supply and demand factors are functioning to these trades, and the deliberate actions taken by the state to promote internal grain market are significant to these trades. The general null hypothesis is that such four dimensions are not significant for inter-provincial grain flows in nowadays China. That is, (1) spatial differentiation is not barrier to the grain trades, meaning that national grain market is spatially integrated. (2) Demand and supply factors have no functions to the grain trades,

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.

meaning that national grain market hasn't been economically integrated. (3) And the state actions are not significant to grain trades. The alternative hypothesis is that these four dimensions are salient factors for grain flows. This means that (1) national grain market hasn't been spatially integrated, but (2) has been economically integrated, and (3) state actions are significant to grain flows.

A priori blockmodeling method is 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 is permuted into distinct sets (or blocks), using the rule of structural equivalence with 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's called dense submatrix and the block is assigned "1" (oneblock); otherwise it's 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 basic blockmodeling method is based on the algebraic rule of structural equivalence while in a priori blockmodeling model, however, is on a priori aggregation standard.

The a priori aggregation standard used in this paper is the four explanatory variables affecting inter-provincial grain flows according to our research questions and hypotheses. So, we will discuss these variables in the next part.

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

Explanatory Variables

(1) Spatial differentiations (territorial factor)

Based on this variable, we 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 existing during 1950s¹¹. 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 groups¹².

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

According to this variable, we 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 supply factor because those provinces with more grain output per capita will outflow more grain and inflow less grain than those with less grain output per capita, if an internal market has emerged. For GOPC and group identity of each province, see Appendix II

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

Since most peasants can feed themselves on their own lands, only people living in cities need to buy grain from markets. So, to examine the demand factor in grain market, we will just

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 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 ones. In these provinces, I furthered to code those with GOPC greater than 470 kg as **Provinces with sufficient surpluses**, and those with GOPC ranging

compare Living Expenditure Per Capita in cities for each province (LEPC). Based on this variable, we divided the 30 provinces into four a priori groups: **Rich Provinces; Relative Rich Provinces; Relative Poor Provinces; Poor Provinces**¹⁴. If an internal market has emerged, those 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 concern 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 has 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 uses the number of national wholesale grain markets in each province as index. We partitioned all the provinces into four categories: **very developed provinces; developed provinces; developing provinces; undeveloped provinces**¹⁵. It's called state factor because it is designed to examine the role of the state in making an internal market. Under the circumstance 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.

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 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 **Relative 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 Web page for “Zhongguo Liangyou Pifa Shichang”(China’s national wholesale grain and oil markets). Totally there are 147 NWGM 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**.

Goodness-of-fit Indices for Evaluating Blockmodels

To evaluate how well the blockmodels fit the underlying network data, we will use two indices: (1) Carrington-Heil-Berkowitz (CHB) index to compare observed densities to a target blockmodel; and (2) Δ_{x2} index to compare observed relational linkages to a target blockmodel.

(1) CHB Index for Single Relation

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

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

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

= $g_k \alpha$ = “ $g_k \ g_l \ \alpha$ ”, if $k \neq l$; or “ $g \ g \ \alpha$ ”, if $k = l$

t_{kl} = “1”, if $\Delta_{kl} < \alpha$; or “ $(1 - \alpha)/\alpha$ ”, otherwise;

here Δ_{kl} means the submatrix density of each block.

Because this index is based on worst-possible α -fit, meaning 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.

(2) Δ_{x2} Index for Single Relation

For sociomatrices whose main diagonal elements are defined and which have only a single relation, Δ_{x2} index is as follows:

$$\Delta_{x2} = 1 - 1/(g_k g_l) \{ \sum_{k=1}^B \sum_{l=1}^B | X_{kl} - X_{kl}^{(t)} | \}$$

where

X_{kl} = number of ties in the (k, l)th block

$X_{kl}^{(t)}$ = all possible ties in the (k, l)th block,

= $g_k g_l$ = “ $g_k g_l$ ”, if $k \neq l$; or “ g_k ”, if $k = l$

Because this index evaluate the proportion of ties in the original matrix X that are identical to the target matrix $X^{(t)}$, the larger the index, the better the blockmodel fits the data (Wasserman & Faust 1997:686). This index ranges also from 0 to 1.

Ideal Image

In blockmodeling, if the submatrices in the blocked matrix would have equal densities, then we 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 reaches when our four variables have no effects on the grain flow among provinces, meaning that our general null hypothesis holds. In this case, CBH index or Δ_{b2} equals to 1 while Δ_{x2} equals to 0. Only when the blockmodel images we have got are significantly deviated from the amorphous one, can we reject the null hypothesis and accept the alternative hypothesis. Here “significantly” means small Δ_{b2} and big Δ_{x2} .

VI Results and Discussions

The results are mainly calculated 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 Δ_{b2} and Δ_{x2} are 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 (α -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, we will also code them as "1"s.

Research Question (1)

The hypothesis of territorial factor is designed to answer research question (1). Based on the territorial factor: spatial differentiation, we get the following blockmodel image:

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

And goodness-of-fit indices for this blockmodel are:

$\Delta_{b2} = 0.105$

$\Delta_{x2} = 0.569$

Notes:

- (1) the number in the parentheses beside territorial categories is how many provinces in each category.
- (2) the bolded numbers “1” or “0” in each block means whether it’s oneblock or zeroblock.
- (3) The two numbers in the second line of each block is Δ -density before “/” and number of ties after “/” for each block.

According to the two goodness-of-fit indices, this blockmodel fits the original data quite well. Also by comparing this blockmodel image to the ideal image, we can see that this image is very different from ideal image, meaning that the null hypothesis should be rejected. So, territorial factor is still an obstacle to the formation of an integrated national grain market. However, here we see that the three eastern groups have almost established united/integrated grain market, because the partial blockmodel image is very similar to the ideal image, except for one zeroblock. This means that an internal market does have to significant degree emerged in China except for the nine western provinces. By examining these western provinces, however, 3 provinces in the southwest are short of grain, 3 are just self-sufficient, and only three have surplus with two are in northwest. Therefore, this group should be better off if it joins the national market. One important reason of why it’s still out of national market is that western provinces always lag in market reforms. So, there are still few national wholesale grain markets there (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 relationship (grain trade among groups). This finding partly reflects the influence of the local/provincial governments because they can use political measures to prevent inter-provincial grain trade. Also this is partly because provinces are required to trade with neighbors firstly because of the macro-adjustment measures of the state. In addition, we can see by examining the Δ -densities that, contrary to pre-reform era when the main trend is grain flow from south to the north, trades from north to south are larger than those from south to north. This is partly because the development

of the TVEs in southern provinces changed the comparative advantage of growing grain on decreasing arable lands.

Research Question (2)

The hypothesis of supply and demand factors is designed to answer research question (2). Based on the supply and demand factors: grain output per capita and living expenditure per capita in each province, we get the following two blockmodel images:

Supply side factor: grain output per capita 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

And goodness-of-fit indices for this blockmodel are:

$$\Delta_{b2} = 0.313$$

$$\Delta_{x2} = 0.618$$

Notes:

- (1) “reflexive” in (3,3) and (4,4) blocks means that each province in these blocks only has grain flow within itself, but no without.

According to the two goodness-of-fit indices, this blockmodel fits the original data relatively well. Also by comparing this blockmodel image to the ideal image, we can see that this image is very different from ideal image, meaning that the null hypothesis should be rejected. So, supply factor does have effect on inter-provincial grain flows. More detailedly, we can find that surplus-sufficient provinces outflow grains to all other groups; surplus-marginal provinces outflows grains to all other groups except for surplus-sufficient provinces which have more grain

output per capita than themselves. However, the self-sufficient provinces and provinces short of grain just sell their own grains on 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. Therefore, this image demonstrates that the inter-provincial grain flows have been ideally fulfilled according to one of the market factor: supply factor.

The strong effect of supply factor is the direct result of the reform policies -- the release of grain prices, the abolishment of UPSS, and especially the replacement of planned inter-provincial transfer system for market transfer system. However, some people may argue that planned transfer under UPSS can also get the same image result as the above blockmodel shows, so the strong effect of supply factor is not necessary the result of reform policies. My first response to this critique is that even though planned transfer might also get the same result, the efficiency of resource allocation of these two ways is extremely different. Under planned transfer system, there were only a couple of times each year for inter-provincial grain flow 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 was part of the reason why provinces short of grains were always short of grains under planned transfer system. However, This problem can be to a large degree resolved by market transfer since market transaction is sensitive to market information and has far less 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 market system are much better than they were before reform. My second response is that central planned transfer can never simulate the sensitivity to people's demand for quality and variety under market transfer system, even though it can imperfectly simulate the sensitivity to the

market supply side as above. The following blockmodel image, which is based on demand factor, is designed to explain this argument.

Demand side factor: living expenditure per capita 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

And goodness-of-fit indices for this blockmodel are:

$$\Delta_{b2} = 0.139$$

$$\Delta_{x2} = 0.483$$

According to the two goodness-of-fit indices, this blockmodel fits the original data also quite well. By comparing this blockmodel image to the ideal image, we can see that this image is very different from ideal image, meaning that the null hypothesis should be rejected. So, demand side does have significant effects on inter-provincial grain trade. In the matrix, we can see that the group of rich provinces inflow 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 perfectly demonstrates that demand factor does have effects on inter-provincial grain flows.

There are two reasons for the above effects of demand factor. First, under the circumstance of market transfer system, citizens in two groups of rich provinces tend to concern more about quality and variety of grain than other two groups, thus they would rather and can afford to inflow varieties of high quality grains from every where; while even though citizens in two groups of poor provinces also concern about quality and variety, they can not afford to buy

varieties of high quality grains from every where as rich provinces do. Since citizens' new preferences 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 simulate the effect of demand side. 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, grain trades in reforming China are to a large degree sensitive to demand and supply now. This means that the market transactions of grains in the national market have been directed by principle of market to some degree. An internal grain market is forming according to this criterion. And combined with the finding for research question (1), we may conclude that though it's still not perfect, the internal grain market does have emerged. The following blockmodel is thus designed to testify whether the role of the state in making this internal grain market is significant or not.

Research Question (3)

The hypothesis of state factor is designed to answer research question (3). Based on the state factor: the number of national wholesale grain markets deliberately constructed by the state, we get the following blockmodel image:

State factor: the number of national wholesale grain markets in each province

	Very developed	Developed	Developing	Undeveloped
Very developed(5)	1 0.5200/13	1 0.2571/9	1 0.3778/17	0 0.0222/1
Developed(7)	1 0.3429/12	1 0.4490/22	1 0.4444/28	0 0.0952/6
Developing(9)	0 0.0667/3	1 0.1429/9	1 0.2222/18	0 0.1235/10
Undeveloped(9)	0 0/0	0 0.0159/1	0 0/0	Reflexive 0.1111/9

And goodness-of-fit indices for this blockmodel are:

$$\Delta_{b2} = 0.220$$

$$\Delta_{x2} = 0.622$$

According to the two goodness-of-fit indices, this blockmodel fits the original data also well. And by comparing this blockmodel image to the ideal image, we can see that this image is very different from ideal image, meaning that the null hypothesis should be rejected. Thus, the deliberate action of the state in constructing national grain markets does have effects on inter-provincial grain flows. More detailedly, we can see 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 latter also does much better than the group of undeveloped provinces, in which all grain trades cannot be enforced beyond local markets, as can see from the reflexive relations of these provinces. But as a matter of fact, almost half of the undeveloped provinces are short-of-grain provinces and others are just self-sufficient provinces. This means that this group would definitely benefit from trading with others in the national grain market.

As we have argued above, the establishment of national wholesale grain markets is the most visible, continuous, and irreversible action deliberately taken by the state among other measures to construct 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 making an integrated national market – an internal market.

The meaning of deliberate establishment of national wholesale markets by Chinese government deserves emphasis here. When discussing about reasons behind the nondevelopment

of Chinese capitalism during 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 government to these higher forms of exchange were the most important factors involved. So, what Chinese state has done during the reform era is just the opposite of 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 any more.

VII Concluding Remarks

This paper has examined the evolution of 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 deliberate actions of the reform-oriented state. In other words, Polanyi’s theory of the evolution of market pattern 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 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 the sources of the inefficiency in 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 are signs 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 not authoritarian interventions any more in market, can a complete internal market emerge in the market transition economies.

Appendix

I. Network data for the inter-provincial grain flows in 2000 China

		1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3					
		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
		f	s	s	b	z	g	h	t	g	j	g	q	x	h	j	s	l	n	g	y	n	s	h	a	h	h	s	h	x	j
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	
2	shanghai	0	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	
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	
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	
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	
6	guizhou	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	
8	tianjin	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	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	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	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	1	0	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	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	
14	henan	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	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	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	1	0	0	0	1	1	0	0	0	
18	ningxia	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	
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	
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	
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	
23	hebei	0	0	1	1	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	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	
25	hunan	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	1	0	0	1	0	1	0	0	0	0	0	1	0	0	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	
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	
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	
30	jiangsu	1	1	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	

II. Attributes and blockmodel identities of 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	N	5118	218.7	6
Hebei	N	3754	433.2	4
Shanxi	N	3177	326.4	8
Neimenggu	N	2968	652.2	3
Liaoning	N	3701	387.9	8
Jilin	N	3298	845.2	7
Heilongjiang	N	3208	816.7	13
Shanghai	Eastern	6816	155.1	3
Jiangsu	E	4493	489	16
Zhejiang	E	6050	337.8	11
Anhui	E	3692	441	6
Fujian	E	4788	292.8	2

Jiangxi	E	3136	411.3	7
Shandong	E	3984	473.5	10
Henan	Central-southern	3267	425.1	7
Hubei	C	3881	433.1	4
Hunan	C	4262	421.5	4
Guangdong	C	6881	270.4	4
Guangxi	C	4391	333.4	0
Hainan	C	3851	280.9	0
Sichuan	Western	4087	407.8	4
Guizhou	W	3642	292	1
Yunnan	W	4525	314.4	0
Xizang	W	4536* (just for 1996)	325	0
Shuanxi	W	2440	334	0
Gansu	W	2961	330.5	2
Qinghai	W	3352	257.2	2
Ningxia	W	3229	513.1	2
Xinjiang	W	3686	483.6	3

Blockmodel identities:

(1) territorial factor: see 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, heilongjiang, 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

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